

FAO
STATISTICAL
DEVELOPMENT
SERIES

2

PROGRAMME FOR
THE 1990
WORLD CENSUS
OF AGRICULTURE



FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1986**

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FOREWORD

The Statistical Development Series provides comprehensive technical manuals for assisting countries in planning, developing and operating the integrated statistical programme component of a National Information System for Food and Agriculture. Although a rather full potential "state of the arts" statistical programme that even the most advanced country could benefit from is planned for the series, some of the more advanced programmes such as a country-wide early crop estimates sampling capability and remote sensing crop monitoring capability must await future technological developments, cost efficiencies and coverage. And most of the subjects covered in early issues will be improved upon with field experience and subsequent revision. But every country, even the poorest and least developed, both economically and in statistical capability, can, after evaluating its statistical needs and current capability, initiate the planning and development of an effective national statistics programme to serve its policy and planning needs. The first cycle of such a programme will reflect marginal improvements in the country's current capability and each successive one to two year programme development cycle can result in a larger and more integrated programme.

Because statistics must have a sound conceptual base with theoretical concepts relevant to real world problems on the national policy agenda successfully operationalized, and the resulting data interpreted and analysed to become useful information to policy analysts, planners and decision makers, the first issue of the series places statistical programmes in the context of a national information system for food and agriculture. As the census of agriculture provides both data on agricultural structure and a frame for specialized surveys, this second manual in the series is devoted to the Programme for the 1990 World Census of Agriculture. Data needed for monitoring and evaluating agrarian reform and rural development places one of the largest burdens on a national information system. Accordingly a separate volume in this series will cover guidelines on socio-economic indicators for monitoring and evaluating agrarian reform and rural development. Basic data development components such as household surveys and community level statistics are treated in successive issues, as is the use of administrative records as a source of secondary data. Subject matter statistics on use of land and water, credit, fertilizers, machinery and other manufactured inputs, farm management, labour force, marketing, food balance sheets, commodity supply and utilization accounts, agricultural input and output prices, food prices, consumption and nutrition, economic accounts for agriculture and other relevant socio-economic areas will take up most of the remaining volumes. Because computers provide the arterial system through which the life blood of statistics - data flow, another volume will cover data processing.

In all areas, from the agricultural census as the cornerstone of the basic data development programme to the use of socio-economic indicators in a multidisciplinary approach to monitoring and evaluating agrarian reform and rural development, the emphasis is on a balanced programme of data collection, processing and analysis as integral and inseparable statistical programme parts of a national information system for food and agriculture.

Leroy Quance
Director
Statistics Division

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CHAPTER 1

INTRODUCTION

Background

1.1 By the end of 1985, 92 countries are expected to have completed, or to be in the process of conducting, an agricultural census for the period covered by the Programme for the 1980 World Census of Agriculture - 1976 to 1985. As early as 1981, the FAO Council and Committee on Agriculture called for preparation of the 1990 World Census of Agriculture Programme. The 13th Session of the FAO/Economic Commission for Europe/Conference of European Statisticians (FAO/ECE/CES) Study Group on Food and Agricultural Statistics for Europe held in 1982 and the FAO Statistics Advisory Committee of Experts, Ninth Session held in 1982, also recommended preparation of the 1990 Programme.

1.2 The 1990 World Census of Agriculture is the seventh such decennial Programme. The first and second Programmes were sponsored by the International Institute of Agriculture (IIA) in 1930 and 1940 respectively. The subsequent four Programmes centred on 1950, 1960, 1970 and 1980 were promoted by FAO which assumed the responsibilities of IIA following its dissolution in 1946.

1.3 The present 1990 Programme as well as the four previous Programmes were based on Article 1 of FAO's Constitution, the first paragraph of which reads: "The Organization shall collect, analyze, interpret and disseminate information relating to nutrition, food and agriculture".

1.4 "World Census of Agriculture" should not be interpreted as a census carried out simultaneously in all countries during a given year. Such an attempt was made in the 1930 Programme by asking countries to carry out their national censuses of agriculture during 1929 if located in the northern hemisphere and during 1930 if located in the southern hemisphere. The objective was to obtain global data referring to the same time period. A similar request was made in the 1940 Programme. However, because of differences in country statistical commitments, this request was later relaxed. For example, the 1980 Programme covered national censuses taken during 1976-1985.

1.5 The 1930 Programme was promoted at a time when there was a large gap in agricultural information and data sources for agricultural statistics were not well organized, even in developed countries. Thus, the agricultural census was expected to help fill this gap by providing much needed information. However, due to its wide scope and emphasis on agricultural output, many countries experienced difficulties in taking their first national agricultural census. Recruiting

and training a large field staff was not easy and completing long questionnaires fatigued both enumerators and respondents; data quality was a serious problem; data processing was time-consuming and the whole operation proved expensive.

1.6 Taking these experiences into account, the 1950 Programme proposed a more restricted scope, concentrating on structural aspects of agriculture. The 1960, 1970 and 1980 Programmes gradually re-expanded the census scope while keeping agricultural structure, with methodological improvements, as the principal theme. Some countries again experienced difficulties with such a wide scope while other countries conducted agricultural censuses with an even wider scope.

1.7 The draft 1990 Programme was presented to the Fifteenth Session of the FAO/ECE/CES Study Group on Food and Agricultural Statistics in Europe in June 1984, to the Tenth Session of the African Commission on Agricultural Statistics in March 1984, to the Tenth Session of the Asia and Pacific Commission on Agricultural Statistics in July 1984, to the FAO/Inter-American Statistical Institute (IASI) Working Group on Agricultural Statistics of the Conference of Governmental Statisticians of the Americas (CEGA) in November 1984 and to the Economic Commission for Western Asia (ECWA)/FAO Seminar on Agricultural Statistics in December 1984. Recommendations from the various FAO Statutory and other similar bodies in statistics, comments received from statistical offices of UN agencies and international organizations, and from individual experts were taken into account in revising the 1990 Programme.

1.8 The 1990 Programme, while recognizing the wide range of economic and statistical development among countries, encourages countries to develop and implement an agricultural census tailored to their unique situation. But within each country situation, the Programme encourages a limited scope for the agricultural census and a complementary relationship between the agricultural census and more frequent food and agricultural sample surveys as well as with related non-agricultural censuses and surveys.

Census of agriculture in an integrated statistical programme

1.9 The importance of food and agricultural statistics cannot be over-emphasized. Formulating public policies, preparing, monitoring and evaluating development plans and projects relating to food, agriculture, agrarian reform and rural development should be based on comprehensive and detailed analysis of the structure and performance of the food, agricultural and rural sectors. But all food and agricultural statistics cannot be collected through a decennial census of agriculture. Thus, as early as 1966, attention was drawn to establishing an integrated set of data sources with the census of

agriculture as an important component (FAO 1968). The 1979 World Conference on Agrarian Reform and Rural Development (WCARRD), urged countries to develop statistics for preparing, monitoring and evaluating programmes on agrarian reform and rural development, thus placing even greater demands on national statistical capabilities. For this reason the 1980 World Census of Agriculture Programme emphasized the need for an integrated system of food and agricultural statistics, with reference to various data sources in addition to the census of agriculture.

1.10 FAO has prepared a document: Food and agricultural statistics in the context of a national information system (FAO 1985) (System document). This document emphasizes the need for statisticians, economists, rural development experts and other social scientists who have a role in developing, processing and analyzing information for policy making in food and agriculture, to work together in conceptualizing, developing and using the same simulation of the food, agriculture and rural development complex. Primary data sources include the agricultural census, population census, industrial census and sample surveys such as those on agricultural production, live-stock, farm management, post harvest losses, food consumption, household income/expenditure, and labour force. Administrative records, local community records, technological research and international statistical publications are cited as secondary data sources. These and other sources, some beyond the domain of agricultural statistics, contribute to the data pool needed for a national information system on food and agriculture. The approach focuses attention on linkages between these data sources, with the following aims:

- (a) conceptual and classification uniformity;
- (b) optimizing the use of available statistical resources;
- (c) preventing overloading of a census or survey with too many items;
- (d) preventing publication of conflicting statistics;
- (e) providing all data needed for comprehensive analysis; and
- (f) ensuring full processing, analysis and user availability of collected statistics.

Consequently, countries are recommended to prepare a multi-year plan for a sequence of activities relating to data collection, processing and analysis, and to allocate adequate statistical resources in a balanced manner across essential programme dimensions. The totality of these activities and the agencies conducting them is referred to as the integrated statistical programme component of a national information system for decision-making in food, agriculture and rural development. Thus, the Programme for the 1990 World Census of Agriculture should be used within the above framework.

1.11 A reorientation of statistical activities is not necessary in countries where data requisites on food and agriculture are efficiently met. Planning and implementing a sequence of coherent statistical activities require an efficient organization, trained personnel at various levels, and secured budgetary allocations over a period of years. Efficient organization implies strong cooperation between both users and producers of statistics. As different statistical activities are not necessarily all under the jurisdiction of a single government institution, establishing coordination among various agencies is sometimes difficult because they may have different mandates regarding the purpose, scope and timing of their work. Countries having a shortage of trained statistical personnel and/or insufficient funds for statistical development may need a longer time to realize different statistical activities. Nevertheless, it is recommended that all statistical development efforts should be oriented toward the long-term goal of establishing an integrated statistics programme that will provide a continuous stream of timely, accurate data covering all relevant aspects of food, agricultural and rural development.

1.12 An agricultural census is best suited to collecting data on various characteristics relating to agricultural holdings that change only slowly over time because it is usually conducted at ten year intervals and the agricultural holding is the statistical unit. This limits the desirable scope of the agricultural census to the number and size distribution of agricultural holdings by type of enterprise. These attributes are referred to as the structure of the agricultural production sector. Type of enterprise is generally closely related to the resource base, e.g. agro-ecological zones, technology such as power source, machinery and equipment, land improvements, crop-livestock rotations and general source of soil nutrient improvements such as green or organic manure, livestock or other waste, or chemical fertilizers. Structure could also relate to the educational level of the farmer and skill levels required of labourers. Other structural data include legal status of the farmer, tenure arrangements, ancillary fishery and forestry activities, demographic characteristics of holders and size of farmer's household.

1.13 Structure is in contrast to performance which relates to the prices and quantities of inputs and outputs, enterprise costs and returns and net farm income. Data on the performance of the agricultural production sector as well as on other important policy indicators such as food prices, consumption and nutrition that change rapidly over time can best be collected through frequent sample surveys.

1.14 Basic data needed for constructing socio-economic indicators of agrarian reform and rural development cut across structural and performance data and even require censuses and surveys outside the domain of food and agricultural statistics. With respect to the agricultural census programme, it is important to include those socio-economic data relating to the structure of the agricultural production sector.

1.15 In food and agriculture, the agricultural census is distinguished from sample surveys by its wide (if not total) coverage of agricultural holdings. Thus, the agricultural census provides a frame for sample surveys through which other data, usually relating to performance, can be collected. The agricultural census also provides essential structural data for small areas (communities, administrative units and agro-ecological zones) to prepare plans and formulate policies for rural development. And it is the basic data source for the structure of specialized holdings (such as those equipped with greenhouses), again providing a frame which can be used for conducting special surveys. The agricultural census is also useful in identifying disadvantaged groups (such as subsistence farmers and women holders) for whom governments are urged to take special measures to improve levels of living.

1.16 In a national food and agricultural statistics programme, two points need to be kept in mind when considering the scope of agricultural census. First, the census involves collecting, processing and analyzing data from a large number of holdings. Census execution is difficult and thus the census scope should be limited to essential basic data in order to assure its success. Second, since the census statistical unit is the agricultural holding, structural data related to other units of interest, such as agricultural service establishments, occasional workers, etc., should be left to other data sources.

Basic characteristics of 1990 Programme

1.17 The 1990 Programme has three basic characteristics. First, care is taken that concepts, definitions and classification criteria used in the census are harmonized with those used in other data sources, both agricultural and non-agricultural. For example, the definitions adopted in the present document for such concepts as household, occupation etc., are those recommended by the UN Statistical Office. Uniformity in concepts, definitions and classifications is essential for simultaneous use of data collected through various sources.

1.18 Second, the agricultural census scope (detailed in Chapter 2) is more limited than in previous Programmes; this restricted scope is essential for the success of the census in many developing countries.

1.19 Third, following the approach adopted in the 1980 Programme, extensive cross-tabulations (detailed in Chapter 4) are recommended, to provide maximum use of census data. In addition to classifications based on total area of holding; other classifications based on characteristics such as cropland, livestock number, land tenure, age and sex of holder, etc., are also proposed. Such extensive cross-tabulations lay the groundwork for census data to play a more analytically-oriented role in a comprehensive food and agricultural data base.

CHAPTER 2

METHODOLOGICAL CONSIDERATIONS

Objectives

2.1 The agricultural census has two basic objectives:

- (a) to collect data on agricultural structures which do not change rapidly from year to year;
- (b) to provide a frame for other agricultural surveys on holdings.

2.2 Since the agricultural census is not a frequent data collection activity it is natural to associate it with those aspects of agricultural structure which change relatively slowly. Most slow changing aspects relate to organizational structure. Analysis of these aspects also helps to explain, in a general way, causal structure relating to technological changes, economies of scale and supply response.

2.3 The second census objective is to provide a frame for other types of surveys on agricultural holdings. Such a frame may be a list, or any other means, which helps to identify the agricultural holdings.

2.4 Census data is also useful in preparing sample designs (such as probability proportionate to size sampling, stratified sampling, etc.) and in obtaining estimates through ratio and regression estimation techniques. Useful stratification criteria are included in the structural aspects of agriculture: sex and age of holder, total area, area by crops, number of livestock, number of trees, integration of holding with enterprises, etc.

2.5 These two basic objectives are more restrictive than those of the 1980 Programme. This restriction results from the negative experiences of many developing countries attempting agricultural censuses with much wider objectives. Countries with developed statistical systems and sufficient resources may, however, wish to add one or more objectives:

- (a) to obtain bench mark data for improving current crop production estimates;
- (b) to obtain detailed data on livestock characteristics, such as type, age, sex, breed, use etc.;
- (c) to obtain detailed data on various inputs used for agricultural production, such as type and quantity of fertilizers, pesticides, seeds, number of man-days, source of irrigation water, credit, etc.

To obtain bench mark data, countries should keep in mind that the census year may not be a typical year for them and in that case census results should be compared to current production series with reservation.

2.6 When adding more census objectives, countries should ensure that the two basic objectives mentioned in paragraph 2.1 are not adversely affected. To establish their census objectives, countries should carefully evaluate available resources against requirements.

Census scope

2.7 The agricultural census scope concerns the data to be collected. Consistent with the two basic census objectives, the scope is broadly defined as:

- (a) holding location;
- (b) legal status of holder;
- (c) integration of holding with enterprises engaged in other economic activity(ies);
- (d) basic demographic characteristics of holder and household;
- (e) inventory of production factors:
 - (i) source of manpower used on the holding (family workers, hired agricultural workers);
 - (ii) number and area of land parcels;
 - (iii) area by land use;
 - (iv) area harvested, by crops;
 - (v) number of trees by crops;
 - (vi) number of livestock by type;
 - (vii) type of machinery and equipment used;
 - (viii) number of forest trees on the holding;
 - (ix) agricultural buildings;
- (f) tenure arrangements on production factors:
 - (i) land tenure;
 - (ii) source of machinery and equipment used;
- (g) other features:
 - (i) whether or not shifting cultivation is practised;
 - (ii) whether or not:
 - a. irrigation is practised;
 - b. drainage is practised;
 - c. fertilizers are used;
 - d. pesticides are used;
 - e. high yielding variety seeds are used;
 - (iii) whether or not fisheries or forestry activities are carried out as an ancillary activity;
 - (iv) livestock system.

These subjects are described in Chapter 3.

2.8 As observed in the above list, many aspects relevant to agriculture (including production and quantities of inputs used such as fertilizers, seeds, etc.) are not recommended for inclusion in the census scope. These aspects should, in principle, be covered by sample surveys or other data sources more appropriate to current statistics.

2.9 If a subject included in the census scope, such as shifting cultivation, is not relevant to a particular country, it should be disregarded.

2.10 For general guidance in determining the census scope, countries are recommended to critically review their level of statistical development based on the following criteria:

- (a) status of data sources other than the census;
- (b) professional statistical staff available for planning the census and/or surveys;
- (c) field organization, personnel, equipment and budgetary allocations available;
- (d) data processing, storage, printing, and/or retrieval facilities accessible.

Countries ranking low in all or most of these criteria are recommended to restrict their census scope to the items presented in Chapter 3 prepared on the basis of subjects outlined in paragraph 2.7. Countries with medium statistical development may want to include also those structural items for which tabulations of separate administrative units and agro-ecological zones are considered essential. Countries with fully developed statistical systems may wish to further enlarge their census objectives (as mentioned in paragraph 2.5). However, all countries are cautioned against overloading the agricultural census with such broad coverage that collecting, processing, storing, retrieving and disseminating data becomes too burdensome. Small, cost-efficient sample surveys, based on an adequate frame provided by the census, are sources for obtaining such additional data. In all cases, if accurate structural data are readily available from other sources, then such data should be excluded from the census scope.

Statistical unit

2.11 The statistical unit is the entity for which the required data items are gathered. For the agricultural census, the recommended statistical unit is the agricultural holding. This concept is explained in detail in Chapter 3.

Coverage

2.12 The agricultural census should, in principle, cover all national territory, including both rural and urban areas. Overall

coverage is particularly important for providing a frame for other subsequent agricultural surveys. In many countries, a minimum size limit is adopted for holdings included in the census. The rationale behind this minimum size limit is that generally there is a large number of small holdings with a small contribution to total agricultural production and their inclusion in the census greatly increases the workload. Although this argument is acceptable in some countries, it cannot be easily defended in other countries where small holdings may contribute substantially to total agricultural production. In any case, small holdings are a significant part of the agricultural structure and without information on such holdings, a complete picture cannot be provided. Ideally, the census should include all holdings in the country. No uniform lower limits for area, number of trees, livestock, volume or value of output, for example, are suggested. Countries that exclude small holdings from their agricultural censuses are strongly urged to set the minimum size limit as low as possible and to take steps to collect data through special surveys from small holdings not covered by the census.

2.13 Some countries exclude urban areas and/or semi-desert regions from their agricultural censuses. Omission of urban areas with gardens used mainly for vegetable production or intensive animal husbandry activities, such as dairying or poultry farming, may result in loss of valuable information. Similarly, to exclude semi-desert regions may omit important livestock resources, because nomadic tribes usually keep large numbers of livestock in such regions. As mentioned under "Census frame", (see paragraph 2.26) a population census, if taken prior to the agricultural census, can identify holders in urban areas and semi-desert regions.

Frequency

2.14 The 1990 Programme refers to the national agricultural census taken during the ten-year period, 1986-95. Countries are recommended to take at least one agricultural census during this period. However, where rapid changes are occurring in their agricultural structure, countries may prefer to conduct two censuses at five-year intervals. If the census scope is limited, a five-year interval agricultural census is more feasible and can provide a fairly up-to-date frame for intervening annual sample surveys.

Time reference

2.15 The census reference year is a period of 12 consecutive months, generally encompassing the various time reference dates or periods of data collected on individual census items; it may be a calendar year or an agricultural year. For the census reference year, countries are urged 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. In general, the time reference for specific items is the agricultural year or the day of enumeration. The reference period for specific items is indicated in Chapter 3.

Enumeration period

2.16 The actual period in which the census enumeration is taken may be during or soon after the census reference year; however, the enumeration period should be short. This is essential to avoid omissions or duplications because of variations in information collected, such as changes in livestock numbers. This also applies when census enumeration is carried out through more than one round, in which case even greater care should be exercised to ensure meaningful tabulation of data obtained from individual holdings. These are additional reasons for limiting the census scope.

Complete or sample enumeration

2.17 An agricultural census may be conducted through complete enumeration, or sampling or a combination of both. A complete enumeration involves obtaining information from all holdings in the country (see paragraphs 2.12-2.13) whereas sampling involves collecting information from only a predetermined number of holdings. In the past, an agricultural census conducted through sampling was referred to as a "sample census of agriculture". In this Programme, the term "sample enumeration" is preferred, as the word "census" implies a complete enumeration. "Sample enumeration" is also consistent with the terminology used by the UN Statistical Office. Complete and sample enumerations are sometimes combined in various ways to conduct an agricultural census: complete enumeration for a few items and sampling for the remainder; or complete enumeration of certain areas or certain holdings (such as government holdings or holdings above a predetermined size) and sampling of other areas or the remaining holdings.

2.18 In a national statistical programme for food and agriculture, it is desirable to have the agricultural census carried out by complete enumeration, which fulfills all objectives of an agricultural census. It is possible to obtain statistics for every geographical, agro-ecological or administrative region, irrespective of size. This information is important for a comprehensive understanding of agricultural structure. A sample enumeration cannot provide estimates sufficiently precise for all regions. Complete enumeration however also provides a frame with useful information for stratification. With such a frame, it is possible to design efficient surveys, such as an annual production survey or a farm management survey; it is also useful to identify certain holdings with special features, such as holdings operated by women, holdings with fisheries as an ancillary activity, holdings with only rented land, etc. This information is

extremely important for rural development programmes oriented toward specific target groups. A sample enumeration will not provide such a complete list of holdings with these special features. For successful implementation, prior information on holdings is not required for a complete enumeration, whereas prior information is essential for designing an efficient sample enumeration.

2.19 On the other hand, complete enumeration demands more from the national transport and communications system; an efficient organization both at headquarters and in the field, staffed with sufficient number of qualified personnel; certain basic facilities, such as detailed maps and processing equipment; and funds for salaries, per diem, travel and other costs.

2.20 Sample enumeration is undertaken when inadequate funds, personnel, transport and data processing equipment preclude complete enumeration. In rare cases it is undertaken when the population census or other statistical activity, such as aerial frame construction, has provided the information necessary for designing an efficient sample enumeration. Sample enumeration provides an opportunity to choose an adequate number of qualified personnel and to train them better. In most cases, sampling method is used to broaden the census scope but it should also be noted that taking a sample enumeration requires expertise in sampling theory. Frame preparation, stratification, sample selection, developing formulae for estimates and their sampling errors, are best accomplished by experts having theoretical training and considerable experience in sampling techniques.

2.21 Census objectives and practicality must be considered when choosing between complete or sample enumeration. Countries are urged to undertake research and preparatory studies before deciding on the most appropriate method to be used.

Census frame

2.22 A frame is a means like a list or a map identifying the holdings (see paragraph 2.3) and is needed, not only for sample but also for complete enumeration. The frame for an agricultural census should cover all holdings in the country.

2.23 An ideal census frame would be a complete list of all holdings. In such a frame, each holding would be shown without omissions or duplications and it would not include any units other than holdings.

2.24 The register of holdings (farm registers) established in some countries may be an example of an ideal frame. These registers contain regularly updated information which takes account of continuity of holdings over time, as well as their appearance and disappearance. A

farm register has a fixed reference number for each holding and basic information on its characteristics is entered periodically. The register is particularly useful when combined with an adequate computer storage information system, thus facilitating data retrieval, tabulation and analysis. If a complete farm register is developed independently of an agricultural census, then the second census objective (providing a frame for specialized surveys, as described in paragraph 2.3) can be omitted. Under such conditions, the census scope can be expanded, and can more rationally become a sample enumeration. However, the work volume and difficulties in establishing a farm register with basic information for each holding and its subsequent updating, is so great that even in statistically developed countries only a few basic items can be maintained in the register. Accordingly, while the possibilities of building up computerized farm registers and keeping them updated should be considered by all countries with the necessary facilities and regulations, the need for a census will continue.

2.25 One form of farm register exists as the records of state and cooperative holdings, or list of parties contracting to the state, in countries with centrally planned economies. In these countries, the need for an agricultural census may still exist if, besides state and cooperative holdings, there are other holdings for which no records are readily available.

2.26 Most countries do not have a farm register and, therefore, need other types of frames. One such frame can be obtained from a population census, if it is carried out prior to the agricultural census, and if relevant questions for identifying holders are included in the questionnaire. Such a holders' list is useful, even in countries where a farm register is kept, to update or complement the register particularly in cases where the register does not include holdings of holders having other occupation(s). It is important to note, however, that a holders' list obtained from a population census may become outdated if the time lag between the population and agricultural census is too long. To benefit from the population census in providing a frame for the agricultural census, countries are strongly recommended to coordinate these censuses. Such coordination is, in fact, necessary within the general framework of a national statistical programme for food and agriculture, where all data collection activities are interrelated not only with respect to scope but also with respect to operations, including timing, personnel, equipment, etc.

2.27 Other possible frames for an agricultural census include a list of enumeration areas prepared for the population census, a localities' list (villages), aerial photographs and maps. A population census enumeration area has clearly identified limits so that, while all national territory is covered, there is no overlapping. In rural

areas, one enumeration area may be a village but larger villages are sometimes divided into several enumeration areas. ^{1/}

2.28 A localities' list may also serve as a frame. Care must be exercised in updating the localities' list if it is not recent. Both the population census enumeration areas' list and the localities' list pose some problems when used as an agricultural census frame. If a complete enumeration is carried out, all holdings in each enumeration area or locality have first to be identified, either by a visit to each household or by an interview with the local authorities. Identifying all holdings is tedious. If sample enumeration is done, usually a sample of enumeration areas or localities is selected as first-stage sampling units within which the process of identifying the holdings is carried out. For an efficient sampling scheme, prior information relevant to holdings is needed on each enumeration area or locality. In cases where information such as number of holdings, main types of crops grown and number of livestock is not available, one may have to be satisfied with the total population of the enumeration area or locality. With more information, better sample designs can be prepared.

2.29 Aerial photographs and maps can also be used as a frame, particularly for sample enumeration. In this case, a sample of well-defined areas is chosen for collecting data. In area sampling, rules are developed to associate data collected on sample areas with holders operating land in those sample areas. If aerial photographs and maps are not readily available, their cost should be compared to the cost of other frames when deciding upon the frame to be used. Use of satellite imagery in agricultural censuses has not yet reached a stage practical enough to formulate international recommendations.

Nonsampling errors

2.30 Apart from errors arising only when sampling is used, it is common for data collected in an agricultural census to suffer from other errors common to both complete and sample enumeration. A frame which does not include all agricultural holdings, ambiguously worded questions, failure by the enumerators to find the respondents or to record correct answers, non-cooperating holders, inaccurate editing or coding, etc. are some causes of so-called nonsampling errors.

2.31 It is important to take steps to control nonsampling errors at various census operation phases. Detailed manuals on responsibilities of field and office personnel, adequate training programmes and

^{1/} To facilitate obtaining village level information from the population census, the practice of defining an enumeration area composed of two or more small villages is not recommended by the United Nations.

efficient activity control help to reduce errors caused by enumerators, editors, coders and other data processing personnel. The census design should include a quality check survey as well as other appropriate measures to cope with non-cooperating holders and holders that cannot be contacted. The publication Quality of Statistical Data (FAO 1966), contains detailed information on nonsampling errors.

Data processing

2.32 Data processing is an important phase of the agricultural census requiring adequate planning and preparation. Such planning and preparation should include hardware acquisition, personnel training, participation of data processing experts in questionnaire design, and writing computer programmes prior to enumeration. Since the quantity of data to be processed is large, insufficient preparation may easily cause long delays in obtaining census results. This subject is covered in Chapter 4 with respect to the tabulation programme and also in Chapter 5.

Analysis

2.33 Use of the data to be collected should be considered when planning an agricultural census which will provide statistics describing the structure of agriculture. In countries where the agricultural census has been a periodic activity, results over some decades indicate the trend of changes taking place in the structure of agriculture. Such changes and the complex relationships among other variables in the domain of food and agriculture are best analysed within the framework of appropriate models. These may be constructed at different levels of completeness and complexity depending upon the availability of information and the planning and policy needs for such analysis. (FAO 1985, Chapter 7)

CHAPTER 3

PROPOSED CENSUS ITEMS

3.1 The term "census item" refers to specific information on a certain characteristic. The census items' list is based on allocating items to all possible data sources discussed in the system document mentioned in paragraph 1.10. In this document, the item load of each data source is identified by taking into account its objectives, field personnel's work load and respondents' ability to respond. For ease of reference, the System document provides a six-digit code number for each item. The first two digits show the category, the following three digits indicate the division, the section and the subsection respectively, each referring to a particular area of interest in decreasing order of generality. The sixth digit identifies the item within a subsection.

3.2 Census items are listed in categories following the grouping system adopted in the System document. Item codes indicating categories, divisions, sections and subsections are the same as those utilized in the System document. It is anticipated that this consistency will assist users in referring from one document to the other. It should be noted, however, that census item codes given here will not necessarily be continuous and there may be jumps in the sequence of code numbers. This is because census items are selected from a more comprehensive list containing items more suitable for other data sources in addition to census items.

3.3 Item categories are given below:

<u>Category code</u>	<u>Category title</u>
01	Identification
02	General Characteristics
03	Demographic and Anthropometric Characteristics
04	Employment
05	Land and Water
06	Crops
07, 08	Livestock ^{1/}
09	Machinery and Equipment
10	Buildings and Other Structures
11	Ancillary Activities

Following the practice of previous census Programmes, a census items' subset is identified as main items requiring priority over others. These items are marked with asterisks. Countries wishing to broaden their census scope are recommended to consult the System document for other items that could be included in the census programme.

1/ Due to the large number of items regarding livestock, 07 and 08 are both assigned to livestock in the System document.

3.4 Definitions and explanations of concepts are generally the same as those used in earlier Programmes. Most definitions relate exclusively to agricultural statistics. Other general definitions are those recommended by other United Nations agencies to ensure harmony between census results and data collected through other sources.

3.5 A time reference is provided for each item, usually occurring within the census reference year. Countries may wish to alter these time references to suit their individual conditions. With certain exceptions, the time references are either "the day of enumeration" or "the agricultural year". The term "day of enumeration" should be interpreted as the date of the actual interview with the respondent, or a date near it.

Category 01: Identification

3.6 Category 01 identifies various units of interest in the agricultural census: holding, holder, head of the household of the holder and respondent, in case information is collection from somebody other than the holder.

3.7 Proposed items:

*011101	Holding address
*011201	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

3.8 Time reference for the items in Category 01 is the enumeration day.

Definition of Category 01 terms

3.9 Holding - An agricultural holding is an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form, or size. Single management may be exercised by an individual or household, jointly by two or more individuals or households, by a clan or tribe, or by a juridical person such as a corporation, cooperative or government agency. The holding's land may consist of one or more parcels, located in one or more separate areas or in one or more territorial or administrative divisions, providing the parcels share the same production means utilized by the holding, such as labour, farm buildings, machinery or draught animals. The requirement of sharing the same production means should be fulfilled to a degree to justify the consideration of various parcels as components of one economic unit.

3.10 Economic units engaged solely in the following economic activities are not considered agricultural holdings because these economic activities are outside agriculture:

- hunting, trapping and game propagation;
- forestry and logging;
- fishing.

Economic units engaged in agricultural services are not considered agricultural holdings; they are "establishments". (See paragraph 3.31 for definition of Establishment.)

3.11 The following additional points relate to identifying a holding:

- (a) holdings may have no significant land area, e.g. poultry hatcheries or holdings keeping livestock for which land is not an indispensable input for production;
- (b) holdings operated by persons who do not have any rights to agricultural use of the land on which the trees are grown (tree holdings);
- (c) various economic agricultural production units under the same ownership, or under the same general direction, are considered separate holdings if they are operated by different persons;
- (d) there may be more than one holding in a household;
- (e) there may be holdings operated jointly by two or more individuals;
- (f) if a member of a cooperative, religious organization, government agency, clan or tribe, is assigned a separate unit for agricultural production that is operated under the member's management, and for which he/she has general, technical and economic responsibility, then this unit represents a holding;
- (g) there may be holdings operated by holders having other occupation(s) in addition to being a holder; and
- (h) open rangeland (such as land open to communal grazing) is not considered a holding. However, if a specified area is delimited by fencing, or any other form of boundary demarcation, and if its use is supervised, such land qualifies as a "communal grazing land holding" and could be included as a special category. Common grazing land not conforming to these criteria should not be considered a holding. If a decision has been made to distinguish communal grazing land from open rangeland, however, the criteria used should be indicated. Data collected for communal grazing land holdings should include only the following items: Location and holding area; holder's legal status (government, tribe and/or clan, etc.); and, if possible, the number of live-

stock holders having access to this holding. This information should be tabulated separately from the tabulations regarding other holdings.

3.12 The holding definition is basically the same as used in previous Programmes, with the exception that the holding is here referred to as an "economic" unit instead of a "techno-economic" unit.

Note: This change is adopted on the grounds that the holding is in many ways similar to the establishment, which is considered an economic unit, and that "technical unit" is used by the United Nations to refer to a section or department of an establishment engaged directly in producing a class of the goods made, or services rendered, by that establishment, or a stage in producing these goods and services. The department of a textile mill that spins yarn, weaves and dyes cloth is an example of a technical unit that is vertically integrated into an establishment. Departments of a meat packing plant which produce lard, cure bacon or can meat are examples of technical units that are horizontally integrated (UN 1971, p.16). The same concept has been utilized in various previous Programmes to refer to a unit which, under the same management, has the same production means, such as labour force, machinery and animals (FAO 1967, p. 12; FAO 1976, p.16).

The need for the term "technical unit" in defining a holding relates to difficulties encountered in its geographic delineation. A holding was understood to comprise all parcels of land which constituted part of the same "technical unit" regardless of location. In the new definition, the properties of the parcels to be included in the holding are expressed directly, without recourse to an intermediary concept, by identifying the parcels that "have the same means of production such as labour, farm buildings, machinery or draught animals utilized by the holding".

3.13 Holding address - The holding location should be given in detail in the census schedule. If the holding is located in a village or hamlet, the village or hamlet name and administrative area should be recorded. This is essential for tabulating results by administrative units or agro-ecological zones. It will also facilitate enumeration control, summarization by territorial divisions, subsequent verification, sampling enquiries, etc. If the holding comprises two or more parcels, special care is required in describing the holding location. Generally, the location of the parcel containing the farm buildings or other farm structures and the main machinery or equipment may be designated as the holding location. In many cases, the holder's residence may be suitable as the description or part of the holding location description.

3.14 Holder - The holder is a civil or juridical person who exercises management control over the agricultural holding operation and takes major decisions regarding resource use. The holder has technical and economic responsibility for the holding and may undertake all responsibilities directly, or delegate responsibilities related to day-to-day work management to a hired manager. (See "legal status of holder" (paragraph 3.23), "hired manager" (paragraph 3.29) and "farmer" (paragraph 3.52) for further explanation.)

3.15 Household - The household concept is one of the basic elements of a national statistics system. According to the United Nations:

"The concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living. A household may be either (a) a one-person household, that is, a person who makes provision for his or her own food or other essentials for living without combining with any other person to form part of a multiperson household, or (b) a multiperson household, that is, a group of two or more persons living together who make common provision for food or other essentials for living. The persons in the group may pool their incomes and have a common budget to a greater or lesser extent; they may be related or unrelated persons or a combination of both. Households usually occupy the whole, part of, or more than one housing unit but they may also be found living in camps, boarding houses or hotels or as administrative personnel in institutions, or they may be homeless. Households consisting of extended families that make common provision for food or of potentially separate households with a common head, resulting from polygamous unions, or households with vacation or other second homes may occupy more than one housing unit. Homeless households are defined as those households without a shelter that would fall within the scope of living quarters." (UN 1980, p.50)

3.16 Various household types must be explained, particularly the extended household, due to the possibility of more than one holding per household. The United Nations recommends a household classification based on the "family nucleus". The family refers to "those members of the household who are related, to a specified degree, through blood, adoption or marriage". (UN 1980, p.72) A household may contain more than one family. A family nucleus consists of one of the following types (each of which must consist of persons living in the same household): (a) a married couple without children; (b) a married couple with one or more never-married children; (c) a father with one or more never-married children; or (d) a mother with one or more never-married children.

The following household types are identified:

- "(a) one-person household;
- (b) nuclear household, defined as a household consisting entirely of a single family nucleus;
- (c) extended household, defined as a household consisting of either:
 - (i) a single family nucleus and other persons related to the nucleus;
 - (ii) two or more family nuclei and other persons related to the nucleus;
 - (iii) two or more family nuclei related to each other, plus other persons related to at least one of the nuclei; or
 - (iv) two or more persons related to each other but none of whom comprises a family nucleus.
- (d) composite household, defined as a household consisting of either:
 - (i) a single family nucleus plus other persons, some of whom are related to the nucleus and some of whom are not;
 - (ii) a single family nucleus plus other persons, none of whom is related to the nucleus;
 - (iii) two or more family nuclei related to each other plus other persons, some of whom are related to at least one of the nuclei;
 - (iv) two or more family nuclei related to each other plus other persons, none of whom is related to any of the nuclei;
 - (v) two or more family nuclei not related to each other, with or without any other persons;
 - (vi) two or more persons related to each other but none of whom comprises a family nucleus, plus other unrelated persons; or,
 - (vii) non-related persons only." (UN 1980, pp. 73-74)

3.17 In rural areas, particularly in developing countries, a one-to-one correspondence between a household and a holding is quite common. Thus households serve to identify holdings. This is the case particularly in developing countries. The number of households whose members operate separate holdings, or the number of holdings operated by two or more persons belonging to different households, is few but nevertheless exists. When considering the relationship between a household and a holding it is important to remember that the former is a complex socio-economic unit, while the latter is a simple economic unit. As such, when studying the holding related to a rural household, whose head is the holder with some household members participating in the work of this holding, it is recommended to consider:

- (a) the holding as the economic unit engaged in agricultural production;
- (b) household members participating in the work of the holding as members of the labour force used by the holding; and
- (c) members of the household not participating in the work of the holding as not directly related to the holding.

However, when the same household rather than the holding is the object of the enquiry, interest may extend beyond the economic activities covered in studying the holding within that household. (See paragraphs 3.23-3.25)

3.18 Head of household - The head of household is the person in the household acknowledged as head by the other members. The head has primary authority and responsibility for household affairs. However, in cases where such authority and responsibility are not vested in one person, special rules may be needed to identify the head of household. (UN 1980, p.70)

3.19 Respondent - The respondent is the person from whom data are collected about the statistical unit.

Category 02: General Characteristics

3.20 Category 02 covers legal status of the holder, hired manager, and integration of the holding with other economic units.

3.21 Proposed items:

0211 Holder

*021101

Legal status of holder

(a) Private

- An individual

- A household

- Two or more individuals of different households or two or more households

- Corporation

- Cooperative

- Other (specify)

(b) Government

0212 Hired manager

021201 Whether there is a hired manager

021202 Name

021203 Address, if different from holding

021204 Whether the hired manager has a fixed wage or shares economic and financial responsibility of holding

0213 Economic activities of an enterprise

021301 Whether holding is part of 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) Other (specify)

3.22 Time reference for items on integration of the holding is the agricultural year. For other items, time reference is the enumeration day.

Definition of Category 02 terms

3.23 Legal status of holder - The term "legal status" is not necessarily confined to the holder's legal characteristics, as it concerns broader aspects of identifying specific types of holdings. Two types are first differentiated: private and government; then a further disaggregation of private holders is given. In most cases, the private holder is an individual but there may be more than one holder in a given household, each operating a separate holding. If the agricultural operations carried out and commodities produced by different household members are pooled, it is more practical to treat them as one holding. This condition prevails in some regions as a kind of traditional agriculture. In extended households and composite households (defined in paragraphs 3.15-3.17) it is more convenient to identify several holders. The pooling of various holdings, operated by members of the same household, or splitting a household into separate households (each corresponding to one holding), avoids double counting of household members for data collected on the holder's household (see paragraph 3.33).

3.24 Where two or more members of the same household jointly operate the same holding, the holder is considered to be the household. It is possible that a household member who jointly operates such a holding may also be the holder of another holding operated by himself alone (see paragraph 3.23).

3.25 When two or more individuals of different households jointly operate a holding, they should each be recorded as a joint holder but separate data should be collected for the household of each joint holder (see paragraph 3.33).

3.26 Juridical persons, such as a corporation or cooperative, are entities separate from the real persons who form them and they should be defined within the context of national laws and customs. In most countries, joint stock companies constitute typical examples of corporations. Cooperatives include several kinds of organizations in which the principles of individual, joint ownership, or leasehold, are combined to various degrees. Collectives such as kolkhozes (in the USSR) and ejidos (in Mexico), are not recognized as a separate class by the United Nations but are included in the cooperatives' class.

3.27 Private holders not specified in any classes mentioned should be identified separately. Examples are tribes, clans, private schools and religious institutions other than collective monastic orders or their equivalent.

3.28 Government holdings are operated by a central or local government directly or through a special body.

3.29 Hired manager - A hired manager is a civil or juridical person who takes technical and administrative responsibility to manage a holding on a holder's behalf. Responsibilities are limited to making day-to-day decisions to operate the holding, including managing and supervising hired labour. Payment is generally made in cash and/or kind. Where the hired manager shares economic and financial responsibilities in addition to managing the holding, the hired manager is usually considered a holder or a joint holder.

3.30 Enterprise - Enterprise is the legal entity or family of legal entities owning or controlling a number of establishments.

"The legal entity in the case of a market economy may be a corporation joint stock company, cooperative association, incorporated non-profit association, partnership, individual proprietorship, or some other form of association. The equivalent of the legal entity in the case of a centrally planned economy is the management and book-keeping unit known as the enterprise. The family of legal entities in the case of a market economy consists of a group of entities which are owned or controlled by the same interests. Common ownership or control may be considered to exist where the majority, i.e., 50% or more, of the equity of each legal entity is owned by the same interests. In some instances, a group of legal entities may be controlled by the same interests though less than 50% of the equity of some of these entities may be owned by the

parties involved. The equivalent of the family of legal entities in the case of centrally planned economies is the combine, trust or similar groupings of enterprises. A combine or trust may be made up of enterprises engaged in the various stages in a chain of production, or in the output of different classes of goods in which similar materials are used, or in the production of the same goods." (UN 1971, pp.17-18)

3.31 Establishment - The establishment is ideally the economic unit which engages, under a single ownership or control by a single entity, in one, or predominantly one, economic activity at a single physical location. (UN 1968, p.12) Because of difficulties encountered in meeting the criteria given in this definition, the following more flexible definition is proposed for operational purposes: an establishment is a combination of activities and resources owned or controlled by a single entity and directed toward producing an homogeneous group of goods and services, usually at one location, but sometimes over a wider area, for which separate records are available that provide data concerning the production of these goods and services and the materials, labour and physical resources, both direct and indirect, used in the production.

3.32 Economic activities of an enterprise - An enterprise may be engaged in two or more economic activities (defined in paragraph 3.30). In many countries some enterprises engage in agriculture together with some other economic activity.

Category 03: Demographic and Anthropometric Characteristics

3.33 Category 03 describes the holder and holder's household members. Items are proposed for holdings operated by: an individual; a household composed of two or more persons; two or more individuals of different households; or two or more households. Where holdings are operated by two or more individuals of different households or by two or more households, data on the total number of household members and age and sex of household members should be recorded separately for each of the joint holders. For tabulations by sex and age of the holder, one of the joint holders need to be identified as the senior holder. Duplication should be avoided when collecting data from joint holders, as some may also operate another holding separately or jointly with others. (See paragraphs 3.23-3.25)

3.34 Proposed items for:

<u>0311</u>	<u>Household</u>	
	*031101	Number of household members
<u>0312</u>	<u>Household members</u>	
	031201	Name
	*031202	Age
	*031203	Sex

[Note: * for age sex refers to the holder]

3.35 Time reference for the items in Category 03 is the enumeration day.

Definition of Category 03 terms

3.36 Age - Age is the time interval between birth date and census date, expressed in completed calendar years.

Category 04: Employment

3.37 Category 04 provides employment data on a limited scale for holder's household members, holder and agricultural workers other than holder's household members. Items are proposed for holdings operated by an individual, a household composed of two or more persons, two or more individuals of different households or two or more households. Other holdings are excluded. Items concerning holder's household members identify members who are economically active and qualitatively indicate their contribution to the holding work. Items on holder's occupation(s) identify holders having other occupation(s) in addition to being a holder. Data on employment of agricultural workers, other than the holder's household members, provide a criterion for classifying holdings by hired agricultural workers. A limited number of items on employment are also proposed.

3.38 Proposed items:

<u>For each household member</u>	
041101	Whether economically active
*041201	Whether has more than one occupation
*041202	Main occupation
042101	Whether any work done on holding during the year
042102	Whether permanent or occasional agricultural worker on holding

Agricultural workers other than members of holder's household

042211	Whether permanent agricultural workers employed during year
042212	Whether occasional agricultural workers employed during year
042221	Number of permanent agricultural workers - male
042222	Number of permanent agricultural workers - female

[Note: * refers to the holder]

3.39 Time reference for Category 04 items, except those relating to number of permanent workers, is the agricultural year. A longer term reference period rather than a one-week period is necessary as work on a holding is seasonal and frequently changes. There are periods when the work is intensive and others when it is almost non-existent. It often depends on weather conditions; farmers may wait for rain or other favourable conditions. Census emphasis is on the source of labour inputs rather than volume of employment. Time reference is the enumeration day for items referring to number of permanent agricultural workers.

Definition of Category 04 terms

3.40 Economically active - Not economically active - Economically active population comprises all persons providing labour to produce economic goods and services during a reference period. (UN 1980, pp.92-97) An economically active person is a person of either sex above a specified age working at a job or seeking work for pay or profit. These specifications for an economically active person are further elaborated in the following paragraphs.

3.41 The minimum age limit for economically active persons should be set in accordance with conditions in each country, but actually never higher than 15 years. A lower minimum age limit will normally be desirable in developing countries where younger children usually participate in agricultural work. To facilitate international statistical comparisons, tabulations should distinguish between persons under 15 years and those above. A separate tabulation for persons under ten years of age is recommended where that country's minimum age limit is below ten years.

3.42 "Economically active" population includes persons in the civilian labour force and the armed forces. A separate category "members of the armed forces" may be inserted. The civilian labour force comprises persons employed and unemployed during the reference

period. "Employed" comprises all persons, including unpaid family workers, who worked during the reference period, or who had a job in which they previously worked, but from which they were temporarily absent because of illness or injury, industrial disputes, vacation or other leave, or temporary interruption of work for such reasons as bad weather, mechanical breakdown or production requirements.

3.43 "Unemployed" comprises all persons not working during the reference period, but seeking work for pay or profit, including those who have never worked before. Persons not seeking work during the reference period because of temporary illness, previous arrangements to start a new job subsequent to the reference period, or on temporary or indefinite lay-off without pay, are also included. Where employment opportunities are very limited, "unemployed" should also include persons not working but available for work and those not actively seeking work because they believed no jobs were available.

3.44 Unpaid family workers constituting a subset of employed persons require special mention. The United Nations defines an unpaid family worker as "a person who works a specified minimum amount of time (at least one third of the normal working hours), without pay, in an economic enterprise operated by a related person living in the same household. Where it is customary for young persons, in particular, to work without pay in an economic enterprise operated by a related person who does not live in the same household, the requirement of living in the same household may be eliminated." (UN 1980, p.96) Strict application of the minimum working requirement ("at least one third of the normal working hours") for unpaid family workers in agriculture is not recommended; otherwise a large number of people, including many female workers, dividing their working time between study or housework and work on the holding, may be excluded from the economically active population. Each country should determine the minimum requirement for the amount of time worked on the holding by a member of the holder's household during the reference period, to determine whether the member should be considered to have "worked on the holding" or not. Members who worked on the holding are part of the economically active population.

3.45 To classify holder's household members into economically active and not economically active, the general principle is that participation in an economic activity should always take precedence over participation in a non-economic activity. Hence, employed and unemployed persons should be excluded from the "not economically active population". For example, students or homemakers are classified as economically active if they participate in an economic activity during the reference period. Similarly, persons receiving pensions consequent to retirement from one job but who are, at the same time, working at another job, should be considered "economically active".

3.46 "Not economically active" persons are those at or above a specified age limit not participating in any economic activity during the reference period. Such persons fall under the following four classes:

- (1) Homemakers: persons of either sex, not economically active, engaged in household duties in their own home; for example, spouses and other relatives responsible for home and child care. (Domestic employees working for pay are classified as economically active);
- (2) Students: persons of either sex, not economically active, attending any regular educational institution, public or private, for systematic instruction at any educational level;
- (3) Income recipients: persons of either sex, not economically active, receiving income from property or other investment royalties or pensions from former activities;
- (4) Others: persons of either sex, not economically active, receiving public aid or private support, and all other persons not falling into any of the above classes, such as children not attending school and disabled household members.

3.47 Occupation - Occupation refers to the kind of work done during the reference period by the person employed (or the kind of work done previously, if unemployed), irrespective of the industry or employment status. For persons reporting more than one occupation, main occupation is determined as either the occupation on which most time was spent during the period or the occupation which was most remunerative during the period.

3.48 Occupations are classified in the International Standard Classification of Occupations (ISCO) issued by the International Labour Office (ILO 1969) into the following "Major Groups":

- 0, 1 Professional, technical and related workers
- 2 Administrative and managerial workers
- 3 Clerical and related workers
- 4 Sales workers
- 5 Service workers
- 6 Agricultural, animal husbandry and forestry workers, fishermen and hunters
- 7, 8, 9 Production and related workers, transport equipment operators and labourers
- X Workers not classifiable by occupation.

3.49 These "Major Groups" are divided into "Minor Groups", "Unit Groups" and "Occupational Categories" in this order of detail. Most persons in rural areas report occupations belonging to Major Group 6. This Major Group has five Minor Groups:

Farm Managers and Supervisors
Farmers
Agricultural and Animal Husbandry Workers
Forestry Workers
Fishermen, Hunters and Related Workers.

3.50 The holder's main occupation should be identified as either "Farmer", "Agricultural worker", or "Other". In the following paragraphs, the concepts for farm managers and supervisors, farmers, and agricultural workers are explained.

3.51 Farm Managers and Supervisors - A "hired manager" who is not the holder or joint holder of the holding which he/she manages as a main occupation, is considered part of the Minor Group "Farm Managers and Supervisors".

3.52 Farmer - The Minor Group "Farmers" is defined in ISCO as "workers conducting mixed farms to produce a variety of agricultural and animal husbandry products, or specialized farms to produce a particular type of agricultural or animal husbandry product, on their own behalf or in partnership" (ILO 1969, p.138). "Workers" here signifies "real persons" in general. In this document, "Workers" is limited to the context of agricultural workers (as defined in paragraph 3.53). From the ISCO definition quoted above, "Farmer" covers holders who are civil persons (as opposed to juridical persons). To avoid confusion, the term "Farmer" is not used to refer to all holders.

3.53 Agricultural and Animal Husbandry Workers - This Minor Group includes all workers on farms performing any of a variety of tasks connected with growing crops, breeding and raising livestock, maintaining farm structures and equipment and carrying out simple farming tasks (ILO 1969, p.144). The term "agricultural worker" is preferred rather than "agricultural and animal husbandry workers" and covers workers engaged in either crop production, animal husbandry or both, consistent with the explanations given in Chapter 2. Agricultural workers are classified into two groups: Permanent and Occasional.

3.54 Permanent and Occasional Agricultural Workers - A permanent agricultural worker is a person whose services are utilized regularly and continuously during the agricultural year for agricultural work on the holding. The total number of days worked during the agricultural year (normally six months or more) distinguishes a permanent from an

occasional worker in some countries. However, a permanent worker may actually work less than six months during the agricultural year, especially in crop production in countries with one crop season. Countries should determine the minimum number of working days or months in accordance with their particular agricultural and other relevant conditions. Permanent agricultural workers on the holding may engage in other work, especially during periods when no significant agricultural work is undertaken. An occasional worker is a person hired once or more times during the agricultural year and is not expected to work regularly or continuously on the holding.

Category 05: Land and Water

3.55 Category 05 provides basic data on the holding's land and water resources. Items are presented in two subdivisions: 051 includes holding level items; and 052 items are related to individual parcels.

3.56 Proposed items:

<u>051</u>	<u>For entire holding</u>		
	<u>0511</u>	<u>Number of parcels and total area</u>	
		*051101	Number of parcels
		*051102	Total area
	<u>0512</u>	<u>Rental of land</u>	
		051211	Whether land was rented to others during year
	<u>0514</u>	<u>Shifting cultivation</u>	
		051401	Whether shifting cultivation practised
	<u>0518</u>	<u>Irrigation</u>	
		*051812	Whether any land in holding actually irrigated during year
	<u>0519</u>	<u>Drainage</u>	
		051911	Whether any land of holding has drainage facilities
<u>052</u>	<u>For each parcel</u>		
	<u>0521</u>	<u>Location, area and distance</u>	
		052101	Location
		052102	Total area
	*0522	<u>Area by tenure</u>	
		05221	<u>Owned or held in owner-like possession</u>
		052211	Area owned or held in owner-like possession

<u>05222</u>	<u>Rented from others</u>
05221	Area rented for an agreed amount of money and/or produce
052222	Area rented for a share of produce
052223	Area rented in exchange for services
052224	Area rented under other rental arrangements
<u>05223</u>	<u>Squatter basis</u>
052231	Area operated on a squatter basis
<u>05224</u>	<u>Tribal or traditional communal forms of tenure</u>
052241	Area operated under tribal or traditional communal forms of tenure
<u>05225</u>	<u>Other form of tenure</u>
052251	Area operated under other forms of tenure

*0524 Land use

<u>05241</u>	<u>Arable land</u>
052411	Land under temporary crops - in open air
052412	Land under temporary meadows
052413	Land temporarily fallow
052414	All other arable land
<u>05242</u>	<u>Land under protective cover</u>
052421	Land under protective cover - temporary crops
052422	Land under protective cover - permanent crops
<u>05243</u>	<u>Land under permanent crops - in open air</u>
052431	Land under permanent crops - in open air
<u>05244</u>	<u>Land under permanent meadows and pastures</u>
052441	Cultivated
052442	Naturally grown
<u>05245</u>	<u>Woodland or forest</u>
052451	Woodland or forest

05246	<u>All other land</u>
052461	Unused and undeveloped potentially productive land
052462	Land in holding n.e.s. <u>1/</u>

0526	<u>Shifting cultivation</u>
052601	Year cleared for cultivation.

3.57 Different time references are proposed for various items of this category:

<u>Section no.</u>	<u>Time reference</u>
0511*	Enumeration day
0512	Agricultural year
0514	Past 10 years
0518	Agricultural year
0519	Enumeration day
0521*	Enumeration day
0522*	Enumeration day
0524*	Enumeration day
0526	Past 10 years

Enumeration day as the time reference should be a specific date within the major cropping season in countries with more than one cropping season per year; however, countries may also wish to collect information for other cropping seasons using the appropriate time reference.

Definition of Category 05 terms

3.58 Parcel - The term parcel, as used here, should not be confused with the same term in cadastral work. A holding parcel is any piece of land entirely surrounded by other land, water, road, forest, etc. not forming part of this holding. A parcel may consist of one or more fields adjacent to each other. A field is a piece of land in a parcel separated from the rest of the parcel by easily recognizable demarcation lines, such as paths, cadastral boundaries and/or hedges. A field may consist of one or more plots. A plot is a part or whole of a field on which a specific crop or crop mixture is cultivated.

3.59 Parcel location - For ease of identification, the parcel location should be described in accordance with the most common practice in each country.

1/ n.e.s. is used throughout the text for "not elsewhere specified".

3.60 Total holding area - Total holding area is the combined area of all the holding's parcels. Land owned by the holder but rented to others should not be included in the total holding area. The holding area includes farmyard and land occupied by farm buildings. Land area of the holder's house is also included in total holding area if the house is not located off the holding (for example, in a residential area of a nearby village or town), and is not used solely for residential purposes. The total area of a holding practising shifting cultivation (see paragraph 3.61 for definition of shifting cultivation) should include area under crops during the reference period and area prepared for cultivation but not sown or planted at the time of enumeration; it should exclude land abandoned prior to the reference period. Holders having access to communal grazing land should not include their estimated share of such land in their total holding area. Total holding area should be equal to total land area under various use classes.

3.61 Shifting cultivation - Shifting cultivation is a land utilization method; a particular piece of land is cultivated for some years and then abandoned for a period sufficient for it to restore its fertility by natural vegetative growth; it is then recultivated. The distinguishing characteristic of shifting cultivation is that neither organic fertilizers nor manure are used to retain soil fertility. As a result cultivated land productivity steadily decreases and it becomes economically preferable to open up a new piece of land and abandon the existing one. Abandoned land usually takes a long time to regain fertility by natural processes.

3.62 In some areas, holders move their dwellings when they shift to new land in order to be close to their holdings.

3.63 Irrigation - Irrigation refers to purposively providing land with water, other than rain, for improving pastures or crop production. Uncontrolled land flooding by overflowing of rivers or streams is not considered irrigation. When rainwater or uncontrolled overflow from rivers and streams is collected and later used on the land for crop or pasture production, this is considered irrigation.

3.64 Drainage - Drainage is the removal of excess water from land surface and/or the upper soil layer to make nonproductive wet land productive and wet land more productive.

3.65 Land tenure - Land tenure refers to arrangements or rights under which the holder holds or uses holding land. A holding may be operated under one or more tenure forms. All data regarding land tenure should be collected for the same time reference.

3.66 Area owned or held in owner-like possession - Area owned is the holding area for which the holder possesses title of ownership and has the right to determine the nature and extent of its use. It does not include area owned but rented to others.

3.67 Area held in owner-like possession comprises the land area held under conditions which enable it to be operated as if owned by the holder, without possessing an ownership title. It does not include area held in owner-like possession but rented to others. Some common types of owner-like possession include:

- (a) land operated under perpetual lease or hereditary tenure and under a long-term lease, usually ranging from 30-99 years, with a nominal rent;
- (b) land operated peacefully and without interruption for a time period such as 30 years by the holder without legal ownership title or long-term lease or payment of rent;
- (c) the system under which a rent-free plot or tribal, ejidal or other communal land is received and retained as long as it is kept under cultivation by recipient's personal labour and that of household members but which cannot be sold or mortgaged.

3.68 Area rented from others - This includes total area of all holding parcels rented or leased by the holder from other persons, usually for a limited time period. Rental arrangements may take different forms:

- (a) land rented for an agreed amount of money and/or produce with land administration, management and operation generally being the holder's responsibility, namely the lessee;
- (b) land rented for a produce share (in exceptional cases the equivalent in money). The share amount varies according to local conditions and type of agriculture involved (crops, livestock and livestock products, poultry, etc.). Technical responsibility for holding management may be exclusively the holder's or shared, to a limited degree, with the landlord if the latter contributes tools, fertilizers, or other aids. Economic risks of operation to income are shared by holder and landlord;
- (c) land rented in exchange for services; the usufruct is granted to holder instead of wages. Two examples are: (i) agricultural labourer operates a piece of land received from the landlord, in return for which he must work, unpaid, for a certain number of days; and (ii) holder is granted land use in partial payment for services to government, religious organization or other;

- (d) land operated under other rental arrangements includes areas operated under other rental forms not covered by above items, such as areas of usufructuary mortgages and land operated gratuitously (namely, granted rent free).

3.69 Area operated on a squatter basis - Total land area operated by holder without ownership title and without paying rent while retaining total usufruct. Land occupied by squatters may be private or public property occupied without owner's consent, sometimes tolerated, particularly in public domain.

3.70 Area operated under tribal or traditional tenure forms - Land in this category is held, often without careful planning, with joint or communal use because of traditional or tribal conditions. This tenure form may be important in countries where land is held on tribal, village, kindred, or family basis with certain individual rights held by virtue of membership in the social unit. Land title, often vested in the tribal chief, is communal in character but not absolute; it is only usufructuary.

3.71 Area operated under other forms of tenure - Tenure forms other than those previously described may be common or limited in some countries. Examples are: land operated under transitory tenure forms, such as trusteeship (operated by trustee); land received by members of collective holdings for individual use; or land under inheritance proceedings.

3.72 Land use - Total holding area is classified according to the following land uses:

- (a) Agricultural land
 - (i) Cropland
 - a. Arable land
 - b. Land under protective cover
 - c. Land under permanent crops - in open air
 - (ii) Land under permanent meadows and pastures
 - a. Cultivated
 - b. Naturally grown
- (b) Woodland or forest
- (c) All other land
 - (i) Unused and undeveloped potentially productive land;
 - (ii) Land in holding not elsewhere specified.

Agricultural land and cropland disaggregation have not been listed under item 0524 in order to remain within a six-digit identification format.

3.73 Gross and net area - Gross area refers to all land area under the respective land-use classes, including uncultivated patches, bunds, footpaths, ditches, headlands, shoulders, and shelterbelts. Net area can be obtained by deducting these areas from the gross area. (In reporting land use, the gross area concept should be used.)

3.74 Arable land - Arable land is classified as:

- (a) Land under temporary crops - in open air;
- (b) Land under temporary meadows;
- (c) Land temporarily fallow;
- (d) All other arable land.

These classes are further explained below. In some countries, the term "arable land" also covers land under permanent crops; in others this term may have a different sense. Whenever used, the term should be clearly defined to facilitate arable land area calculations.

3.75 Land under temporary crops - in open air - This includes all land in the open air used for crops with an under-one-year growing cycle, which must be newly sown or planted for further production after the harvest. Crops remaining in the field more than one year should also be considered temporary crops if harvesting destroys the plant (for example, cassava and yams). Crops grown in rotation and destroyed when the land is ploughed (for example, alfalfa, clover, grasses), should be considered as temporary crops. Asparagus, strawberries, pineapples, bananas, and sugar cane, for example, are sometimes grown as permanent, biennial or annual crops; the respective areas should be classified under temporary or permanent crops accordingly. Vegetables, flowers, bulbs, and kitchen and market gardens, should also be included in this category. Countries may wish to establish the class "land under specialized cultivation" for this land use type. Land under trees and shrubs producing flowers, such as roses and jasmine, should not be included in land under temporary crops.

3.76 Land under temporary meadows and pastures - This includes land temporarily cultivated with herbaceous forage crops for mowing or pasture. A period of less than five years should be considered as temporary to avoid practical difficulties when differentiating between temporary and permanent meadows.

3.77 Countries use different criteria to distinguish between temporary and permanent meadows or pastures. National practices should be clearly indicated in census reports.

3.78 Land temporarily fallow - This is land at prolonged rest before recultivation. Land remaining fallow for too long may acquire characteristics requiring it to be reclassified, such as "permanent

meadows and pastures" (if used for grazing), or "woodland or forest" (if overgrown with trees that could be used for timber, firewood, etc.), or "all other land" (if it becomes wasteland). A maximum idle period should be specified; probably less than five years. Land is not considered temporarily fallow unless it has been, or is intended to be, kept at rest for at least one agricultural year. Land temporarily fallow should be distinguished from land abandoned by shifting cultivation; the former is part of the holding whereas the latter is not.

3.79 If census data are collected before sowing or planting has been completed, the area lying fallow at that time, which will be put under crops soon afterwards should be classified by the crops being sown or planted, and not as fallow land.

3.80 Fallow land temporarily used for grazing, should be classified as "fallow" if the land is normally used for cultivating temporary crops.

3.81 All other arable land - This includes all rotation land not put to the uses mentioned above during the reference year, such as arable land temporarily damaged by floods, land prepared for cultivation but not sown due to unforeseen circumstances, etc.

3.82 Land under protective cover - This is land under structures with protective roof of glass, plastic or other material. Such land may be used for both temporary and permanent crops.

3.83 Land under permanent crops - in open air - This includes land cultivated with long-term crops which do not have to be replanted for several years after each harvest; land under trees and shrubs producing flowers, such as roses and jasmine; and nurseries (except those for forest trees, which should be classified under "woodland or forest"). A nursery is a piece of land where young plants are cultivated for transplanting and/or sale. Permanent meadows and pastures are excluded from land under permanent crops. Care should be exercised when reporting land under permanent crops in cases of associated crops.

3.84 Land under permanent meadows and pastures - This includes land used permanently (for five years or more) to grow herbaceous forage crops, through cultivation or naturally (wild prairie or grazing land). Permanent meadows and pastures on which trees and shrubs are grown should be recorded under this heading only if the growing of forage crops is the most important use of the area.

3.85 Cultivated permanent meadow and pasture areas should be recorded separately from naturally grown permanent meadows and pasture areas (see also land under temporary meadows and pastures, paragraph 3.76).

3.86 Woodland or forest - This includes woodlots or timber tracts, natural or planted, constituting part of the holding which have or will have value as wood, timber, other forest products or for protection. Forest tree nurseries should be included in this category. Rows, belts and small clumps of trees, bamboo and other woody vegetation should be included in woodland and forest. Woodland or forest used only for recreation purposes should be excluded and reported under "land in the holding not elsewhere specified".

3.87 All other land - This includes all other land on the holding, not elsewhere specified, whether or not potentially productive. It covers two land classes: (a) unused and undeveloped land potentially productive for agriculture or forestry, but not yet developed; and (b) land on the holding not elsewhere specified.

3.88 Unused and undeveloped potentially productive land - This includes uncultivated land, comprising part of the holding but not included under the preceding headings, producing some kind of utilizable vegetable product, such as reeds or rushes for matting and bedding for livestock, wild berries, plants and fruit, or land which could be brought into crop production with little more effort in addition to that required in common cultivation practices.

3.89 Land in the holding not elsewhere specified - This includes land occupied by buildings, parks and ornamental gardens, roads or lanes, open spaces needed for storing equipment and products, wasteland, land under water, and any other land not reported under previous classes.

3.90 Cultivated land - Internationally recommended land-use classes are covered in the previous paragraphs. Cultivated land is not included, among these classes. However, some countries use this concept for total cropland and the cultivated part of land under permanent meadows and pastures. Countries using this concept should indicate the components to provide internationally comparable statistics.

Category 06 - Crops

3.91 Category 06 covers basic features of crop cultivation on the holding. Items are in subdivisions: 061 includes holding level items; and 062 provides data on individual parcels. Some items in the first subdivision are aggregates of items in the second, resulting in a repetition of temporary and permanent crops in the items' list.

3.92 Proposed items:

061 For entire holding0611 Temporary crops

061111 Name of crops grown
 *061141 Area harvested

0612 Permanent crops

061211 Name of crops grown

06124 Plantation features and ages of permanent crops for each crop

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

0613 Fertilizers

*061311 Whether inorganic fertilizers applied

061331 Whether organic manure or other fertilizers applied

0614 Pesticides

061401 Whether pesticides applied during year

0615 Seeds and young plants

061501 Whether high yield variety seeds used during year for each crop

062 For each parcel0621 Crop stand

062101 Indication of crop stand

(a) Pure stand - temporary crop

(b) Pure stand - permanent crop

(c) Mixed - temporary crops

(d) Mixed - permanent crops

(e) Associated crops

0623 Temporary crops - inputs used

062312 Area harvested for each crop

0625 Permanent crops - plantation characteristics for each crop

062511 Number of scattered trees

062512 Number of trees of productive age in compact plantations

- 062513 Area under trees of productive age in compact plantations
 062515 Area under trees of nonproductive age in compact plantations

Crop List

3.93 An alphabetical list of crops with botanical names is given in Appendix 1. A list of crops grouped into two broad classes, temporary and permanent, is given in Appendix 2. Each crop class is subdivided by the end-use of crops, such as human consumption, industrial use or fodder. This crop list is not exhaustive nor do all crops listed apply to any one country. Countries may wish to expand or abridge the crop list, taking into account national agricultural practices.

3.94 Crops used for different purposes are listed under relevant headings. The alphabetical crop list provides further clarification by giving corresponding items numbers. A few cases, where the placement is not obvious, are given below:

- (a) Barley for grain, alcohol and all other purposes is included under 114 (Barley);
- (b) Oats for grain and mature oats fed unthreshed to animals are included under 116, but oats used as fodder crops (for green feed or for silage) are covered under 1732;
- (c) Sugar cane used for sugar, juice or chewing is included under 1411 (sugar cane), but sugar cane for thatching is under 1454 and sugar cane for fodder under 17507;
- (d) Hemp for fibre under 1443 includes hemp for paper mills;
- (e) Vegetables grown principally for human consumption are under 15; vegetables grown principally for fodder are under 175; and vegetables grown only for seed are under 18.

3.95 Different time references are proposed for various items of this category:

<u>Section No.</u>	<u>Time reference</u>
0611	Agricultural year
0612	Enumeration day
0613	Agricultural year
0614	Agricultural year
0618	Agricultural year
0621	Agricultural year
0623	Agricultural year
0625	Enumeration day

Definition of Category 06 terms

3.96 Area harvested - area harvested for a particular crop refers to total area from which the crop is gathered. In certain regions, some temporary crops are grown more than once on the same land in the same agricultural year (see successive crops, paragraphs 3.99-3.100). In this case, the land is counted as many times as the crop is harvested to obtain area harvested for that crop.

3.97 In reporting area harvested, net area concept is used for temporary crops and gross area concept for permanent crops. If net area harvested cannot be reported for temporary crops, then gross area harvested may be recorded. Net area harvested refers to area actually harvested; gross area harvested includes uncultivated patches, bunds, footpaths, ditches, headlands, shoulders, shelterbelts, etc., as explained in paragraph 3.73.

3.98 To determine crop area harvested in mixed and associated crop cases, no general rules are recommended. Duplication should be avoided when counting areas under the same crop producing more than one product during the same agricultural year. For example, cotton produces both fibre and seed. In such cases the area harvested should be reported under the principal product. If the same area is also reported for the secondary product, then it is shown in brackets and omitted from the total area harvested.

3.99 Successive crops - The same crop, or different crops, may be grown and harvested successively on the same land several times during the agricultural year. Successive cropping is important in countries with more than one cropping season. The field, or parts of it, may be left fallow during one or more cropping seasons, or sown or planted and harvested during each cropping season in the same agricultural year. The successive crop area should be reported for each crop separately each time the area is sown or planted during the agricultural year. Thus, if two different crops are grown successively on the same field, the field area will appear twice in the results, (under each of the two crops concerned), or sometimes more in countries having more than two cropping seasons. Similar area counting also occurs if the same crop is grown successively during the agricultural year. In these cases total harvested or sown area for the agricultural year may be, and usually is, larger than the total physical cropland holding area.

3.100 Successive harvests from the same standing crops should not be confused with successive cropping. Areas for the former should be reported once, unless the same crop is sown or planted and harvested more than once during the agricultural year.

3.101 Pure stand - This is a single crop cultivated alone in a field. A pure stand crop may be either temporary or permanent.

3.102 Crops cultivated simultaneously - Different crops cultivated simultaneously on the same land can cause difficulties in ascertaining which part of the total area to ascribe to each crop. There are two crop combination types: mixed and associated crops. Mixed crops are two or more different temporary or permanent crops (but not temporary and permanent crops) grown simultaneously in the same field or plot. The number, kind and proportions of crops in the mixture will generally vary according to prevailing practices or to other factors such as meteorological conditions.

3.103 Temporary crops, particularly grains, are grown and harvested as mixtures in some countries. It is best to treat a mixture of this kind as a single crop, without attempting to estimate the area under each crop. Individual crops in the mixture should be specified and the most important constituent crop or crops named. Mixed cereal grain crops, other mixed grain crops and mixed grasses grown for hay are examples.

3.104 For other crop mixtures it may be practicable and desirable to estimate the area which each crop would have covered had it been grown alone. Various methods are used, or can be devised, to estimate these areas, based on quantities of seed used for crops in the mixture, plant density in temporary or permanent crop mixtures compared with pure stand density, eye estimates of the proportions of area occupied by component crops (if distinguishable), number of plants or trees per area unit, etc. Countries should also use objective sampling methods for important estimates.

3.105 A crop planted between rows of another crop (e.g., sorghum and groundnuts between cotton rows, or groundnuts between maize or sorghum rows) is referred to as interplanted crops and may be differentiated from mixed temporary crops or associated crops. It is desirable to assign the interplanted crop area to individual crops in proportion to the area occupied by each crop. Yields of some mixed crops may be as large as when grown alone (for example, sweet potatoes and maize, maize and peas or beans) but the total of area equivalents assigned to individual crops should be equal to the total area under the mixture, even when favourable interactions, in the case of special mixtures, may result in increased yields.

3.106 When both temporary and permanent crops are grown simultaneously in the same field, each crop is referred to as an associated crop. Distinction should be made between crop mixtures defined above. The method used to assign areas under each associated crop may differ among countries due to prevailing conditions in agricultural practices. Difficulty in defining estimated area equivalents for mixture components might be encountered. Generally, for associated crops, net harvested areas are reported for temporary crop components, and estimated gross area for permanent crop components. If the permanent crop is a compact plantation, total gross area may be assigned to it.

3.107 No general method is recommended for assigning area under associated crops to individual crops. Compact plantation areas on which associated temporary crops are also grown, are not considered arable land. When reporting land use in Category 05, gross area of compact plantations is assigned to the permanent crop. It is important to estimate net area equivalents under associated temporary crops in compact plantations to calculate aggregate area, when temporary crops are harvested during the agricultural year.

3.108 Permanent crops of productive age - This includes permanent crops already bearing fruit or otherwise productive. Most tree crops and some other permanent crops become productive after a certain age. Crops at that stage should be enumerated "of productive age" even if, due to meteorological conditions or other reasons, they have not yielded a harvest during the reference year. Senile or other trees of productive age but no longer productive, should not be enumerated if it is possible to identify them. Some countries may wish to classify trees into productive and non-productive age groups.

3.109 Compact plantation - This includes plants, trees and shrubs planted in a regular and systematic manner. Plants, trees or shrubs forming an irregular pattern but dense enough to permit data collection of area planted, are also considered "compact plantation".

3.110 Scattered plants, trees and vines - This includes plants, trees, vines and shrubs scattered or isolated to prevent adequate determination of the aggregate area occupied. Countries reporting the area under scattered trees should convert the total number of trees into area by allocating a standard area to each tree.

3.111 Fertilizers - Fertilizers generally refer to anything added to the soil to increase the amount of plant nutrients available for crop growth. They are divided into inorganic fertilizers, organic manures and other fertilizers.

3.112 Inorganic fertilizers are classed in four types: nitrogenous, phosphate, potash, mixed and complex fertilizers.

3.113 Organic manures include farmyard manure, compost, green manure and seaweed. Farmyard manure refers to farm animal faeces and urine mixed with litter, mainly straw, to absorb the urine. Compost is manure derived from decomposed plant remains, usually fermented waste plant material, such as straw, grass mowings, etc., heaped in alternate layers with lime, nitrogen and water added. Green manure is a crop, such as Italian rye grass, mustard, etc., grown specifically to be ploughed back into the soil to provide humus. Green manure crops are often planted in autumn/fall, after a fallow period when no main rotation crop is planted to prevent accumulated nitrates from being leached out during winter. Kelp refers to seaweed of the Laminaria-ceae and Funcaceae families used as a source of potash for soil.

3.114 Other fertilizers includes all fertilizers not mentioned among the inorganic fertilizers or organic manures. Guano is a fertilizer rich in nitrogen and phosphorus, derived from accumulated droppings of certain sea birds, found particularly on islands off the Peruvian coast. Fish manure is unprocessed offal from gutted fish and waste or unsold rotting fish, spread on fields as manure. Fish guano is produced from unmarketable fish and fish waste products after oil extraction. Bone meal is coarsely ground bones with fat removed. Wood ash refers to burned wood ash.

3.115 Pesticides - These include insecticides, fungicides, fumigants, herbicides, rodenticides and various other materials, mostly synthetic chemicals produced in concentrated form but diluted for application with various substances such as water, talc, clays, kerosene, etc. They are used for mitigating, controlling or eliminating pests troublesome to crops or livestock.

Category 07-08: Livestock

3.116 Category 07-08 provides data on holding livestock system type and the present livestock population kept.

3.117 Proposed items:

<u>0711</u>	<u>Livestock production system</u>
071101	Type of livestock production system
	(a) Nomadic or totally pastoral
	(b) Semi-nomadic or semi-pastoral
	(c) Sedentary pastoral
	(d) Ranching
<u>*0712 - 0713</u>	<u>Animal numbers, by animal type</u>
071201	Cattle
071202	Buffaloes
071203	Sheep
071204	Goats
071205	Pigs
071206	Horses
071207	Asses
071208	Mules and hinnies
071209	Camels
071301	Chickens
071302	Beehives
071303	Deer
071304	Others (e.g. other poultry, rabbits, llamas, elephants, ostriches, silkworms, fur-bearing animals reared in captivity, etc.)

3.118 Time reference for items in Category 07-08 is enumeration day.

Definitions of Category 07-08 terms

3.119 Livestock - Livestock refers to all animals kept or reared mainly for agricultural purposes including cattle, buffaloes, sheep, goats, pigs, horses, mules and hinnies, asses, camels, poultry, bees, deer, rabbits, llamas, as well as foxes, mink, etc. reared in captivity on the holding for agricultural purposes. Countries may wish to collect data separately on various livestock types grouped under item 071304 to suit their own needs.

3.120 Livestock system - This refers to general characteristics of livestock keeping practices. Four different systems are identified:

- (a) Nomadic or totally pastoral: livestock kept by households with no permanent place of residence and do not practise regular cultivation;
- (b) Semi-nomadic or semi-pastoral: livestock kept by households that establish permanent residence for several years. These households cultivate crops as a supplementary food source, but move herds on transhumance to assure forage and water;
- (c) Sedentary pastoral: livestock keeping and crop cultivation are carried out by households with permanent residence;
- (d) Ranching: livestock kept on ranches.

3.121 Livestock population - The livestock population refers to animal numbers present on the holding on the reference date, regardless of ownership. Livestock population includes livestock temporarily absent or in transit at enumeration time.

Category 09: Machinery and Equipment

3.122 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 during the reference period are excluded. Only machinery and equipment in usable condition should be reported. A list of machinery and equipment, with coding identifications, is given in Appendix 3.

3.123 Proposed items:

<u>0911</u>	<u>Indication of use, by type of machinery and equipment</u>
091101	Whether used on holding during past year

<u>0912</u>	<u>Number and source</u>
	091201 Numbers used on holding, by source and type of machine or equipment

Source classes:

- (1) Owned solely by holder
- (2) Owned jointly by holder and others
- (3) Provided by landlord
- (4) Provided by other private holders (excluding cooperatives)
- (5) Provided by cooperative
- (6) Provided by a private agricultural service establishment
- (7) Provided by a government agency.

3.124 The time reference for items in Category 09 is the agricultural year. For item 091201 relating to prime movers, electric generators and electric motors which requests numbers by source, the time reference is the enumeration day.

Definitions of Category 09 terms

3.125 Stationary machinery - Machinery in a fixed place, as opposed to a portable unit moved at frequent intervals, is called stationary machinery.

3.126 Prime movers - These are machines that convert any energy form, other than electrical, into mechanical energy. They may be activated by human beings or animals, wind, falling water, steam, heat or chemical reactions and may consist of a simple wheel shaft arrangement, windmill, water wheels, steam engine or turbines, or internal combustion engines. A prime mover may be connected to drive generators or other machinery.

3.127 Internal combustion engine - This is an engine deriving power from energy liberated by the combustion of hydrocarbon mixture, in gaseous or vaporized form, with atmospheric air.

3.128 Steam engine - This is an engine utilizing energy contained in steam under high pressure. Energy released when steam expands.

3.129 Windmill - This is a device utilizing wind to pump water or generate electricity. It has blades connected to a central shaft and the wind action causes the blades to turn the shaft.

- 3.130 Electric generator - This is a machine to convert mechanical energy into electrical energy.
- 3.131 Electric motor - This is a machine to convert electrical energy into mechanical energy.
- 3.132 Track-laying tractor - This tractor travels on tracks or treads laid down from an endless belt running around sprocket wheels. These tractors are also known as caterpillar or crawler tractors.
- 3.133 Four-wheel tractor - This is a tractor supported by two axles and four wheels.
- 3.134 Single axle tractor - This is a two-wheeled tractor steered by a walking operator and used for light cultivation.
- 3.135 Power tiller - This implement which cuts trash and soil using a rotor operated from a power-driven, transverse shaft on which knives or tines are mounted. It is generally without wheels.
- 3.136 Tillage equipment - This includes various field equipment designed to lift and invert soil, stir or pack soil, reduce clods and control weeds; examples are ploughs, harrows, disks and cultivators.
- 3.137 Rotary tiller - This implement has cutting knives or tines mounted on a horizontal or vertical power-driven shaft. The revolving tines loosen the soil or destroy weeds. (Also called a rotary plough.)
- 3.138 Rotary harrow - This ground-driven cultivating implement usually consists of two curved, spike-like toothed gangs rotating on axles, the points of which dig into the ground, destroying young weeds and breaking the soil crust.
- 3.139 Disk harrow - This equipment consists of two opposed gangs of disk blades, set optionally at various horizontal angles with the direction of travel, throwing soil outward from the centre of tilled strip.
- 3.140 Grain drill - This is a mechanical seeding device to uniformly place small grain, grass and legume seeds. It consists of furrow openers equally spaced, into which grain is fed, and has seed metering devices to control and regulate seeding rate.
- 3.141 Broadcast seeder - This is a machine for sowing seeds (mainly grass and clover), usually consisting of a hopper supplying seed to one or more revolving brushes by which it is scattered.

- 3.142 Cultivator - This is a machine used to prepare the upper portion of soil before sowing a crop by ripping out weeds and raising unrotted trash to the surface. Cultivators have heavy cutting knives or tines which deeply penetrate the soil.
- 3.143 Manure spreaders - These include various machines used to distribute solid or liquid manure over the soil.
- 3.144 Fertilizer broadcaster - This is a machine which broadcasts fertilizer with various distributive mechanisms, such as spinning disks, revolving fingers, rollers and chains.
- 3.145 Sprayer - This is used to apply pesticides in liquid form by forcing the liquid from a tank through a nozzle(s) under pressure.
- 3.146 Duster - This mechanical device consists of a blower, a dust reservoir and a nozzle used to apply pesticides in powder form.
- 3.147 Mower - This is an implement used to cut grass crops.
- 3.148 Hayrake - This implement is used in gathering hay. A side delivery hayrake rakes hay to one side into loose continuous windrows for gathering by mechanical hay loaders or balers.
- 3.149 Hay baler - This is a machine that picks up hay or straw from a swath or windrow, compressing and tying it into bales.
- 3.150 Forage harvester - This is a machine for cutting, chopping and loading green crops (for example grass or lucerne) into an adjacent or towed trailer.
- 3.151 Forage blower - This is a machine used to fill a silo (particularly the tower type) with finely chopped material to make silage, by blowing it up, sometimes to a height of 15 metres, into the silo.
- 3.152 Combine - This is a shortened name for a combine harvester, used to harvest cereals. It cuts or gathers crop from a windrow, threshes it, separates seed and chaff from straw, and cleans seed. It may be tractor-operated or self-propelled. specialized machines for the integrated harvesting of peas for canning, for example, are not included in this category.
- 3.153 corn picker - this machine is equipped with snapping rolls to remove corn ears from standing stalk. machine does not sever stalks from the ground. there are various types: snapper does not remove the husk; picker/husker husks and shells after picking the corn; a picker/shredder shreds stalks after the ears are picked.

- 3.154 digger, elevator digger, potato harvester - these are implements used to remove root crops from the soil. the name elevator digger indicates diggers used for harvesting potatoes. it lifts potatoes from field rows, cleans off soil and deposits potatoes in a row on the field for collection. potato harvester is an improved elevator digger.
- 3.155 sugar beet harvester - this machine severs beet tops (crowns and leaves), lifts roots from ground, cleans off soil and deposits them onto an elevator mechanism which carries them to an adjacent trailer or storage tank.
- 3.156 reaper-binder - this machine, made in several types, is used for harvesting grain, but is being increasingly replaced by combine/harvester.
- 3.157 thresher - these machines of various types separate grain or seed from straw or chaff.
- 3.158 grain cleaner - this is a device used to remove weeds and trash from grain during or after harvest.
- 3.159 sorters and graders - these machines separate or grade products according to size or other specifications.
- 3.160 milking machine - this is a mechanical device used to milk cows. milk is drawn from the udder by alternately applying a vacuum and atmospheric pressure.
- 3.161 milk cooler - this is a tank used to temporarily hold and cool milk (to prevent bacterial multiplication) by using a jacket of chilled water.
- 3.162 cream separator - this equipment consists of a series of revolving disks in a bowl, used to separate cream by centrifugal force.
- 3.163 incubator - this is an apparatus used to hatch eggs by providing artificial heat, usually maintained at 37.2°C but reduced to about 36.1°C for the last two days of incubation. humidity is maintained at around 60%. types vary from small flats holding 50-100 eggs, to large cabinets holding up to 40 000 eggs in trays, or specially designed walk-in rooms holding up to 80 000 eggs.
- 3.164 bulldozer - this is a crawler tractor with blade mounted in front to move earth and underbrush.
- 3.165 carryall - this heavy excavating device is used to level fields and construct canals and waterways.

3.166 land plane - this is a large tractor-drawn machine for planing or smoothing the land.

3.167 transport equipment - equipment used primarily for agricultural purposes to transport agricultural goods of the holding, members of the holder's household, or labourers and employees. motor vehicles, such as jeeps, primarily used as tractors should be reported under tractors.

3.168 Office machinery and equipment - this includes computers, calculators, typewriters and office equipment, including furniture. machinery and equipment classified as fixed capital have a life-use of one year or more. equipment of small value, such as office desk equipment and furnishings may be excluded from fixed capital.

3.169 machinery and equipment source - this indicates the way the holder has obtained the right to use the machinery and equipment

3.170 Owned solely by holder - this refers to agricultural machinery and equipment which the holder has exclusive and full right to use, primarily for agricultural work on his holding.

3.171 Owned jointly by holder and others - this refers to agricultural machinery and equipment, the right of use of which the holder shares with others, primarily for agricultural work on his holding. machinery and equipment owned by cooperatives of which the holder is a member are not included in this class.

3.172 provided by the landlord, other holders, private contractors, cooperative or government agency - this is any agricultural machinery not owned by holder, either individually or jointly with others, but which is provided by the landlord, private contractor, cooperative or government agency, with or without a fee for use in agricultural work on the holding. Machinery supplied by private contractors refers to machinery and equipment provided on a contractual basis by private enterprises, including agricultural service establishments.

Category 10: Buildings and Other Structures

3.173 Category 10 refers to data on use of non-residential buildings by the holding.

3.174 Proposed items:

<u>102</u>	<u>Nonresidential buildings</u>			
		102111	Whether any	nonresidential
			buildings used	

10212	<u>Tenure (for each nonresidential building used)</u>
102121	Indication of type of tenure
	(a) Owned
	(b) Rented
	(c) Other (specify)
10221	<u>Area or volume</u>
102211	For keeping livestock other than poultry (area)
102212	For keeping poultry (area)
102213	For storing agricultural products (volume)
102214	For keeping agricultural machinery and equipment (area)
102215	As office (area)
102216	For mixed or other purposes (area)

3.175 Time reference for item 102111, nonresidential building use, is the agricultural year. For other items in this category, the time reference is enumeration day.

Definition of Category 10 terms

3.176 Buildings - "A building is any independent free-standing structure comprising one or more rooms or other spaces, covered by a roof and usually enclosed within external walls or dividing walls which extend from the foundations to the roof. However, in tropical areas, a building may consist of a roof with supports only, that is, without constructed walls; in some cases, a roofless structure consisting of a space enclosed by walls may be considered a building" (UN 1980, p.232). A building may be used as living quarters or for industrial purposes exclusively, or it may be partially used for both purposes.

3.177 Nonresidential buildings - These are buildings entirely or primarily intended for agricultural use, such as warehouses, stores, stables, barns, office buildings, etc. Proposed Category 10 items cover only these buildings.

3.178 Tenure - Tenure concerns arrangements or rights under which a building is held or used. Different tenure forms may apply to different buildings.

3.179 Buildings owned - Any building for which the user possess ownership title .

3.180 Buildings rented - Any building for which the user pays rent to the owner.

3.181 Other tenure forms - Tenure type should be indicated for buildings used which are neither owned nor rented. Examples are buildings under inheritance proceedings, or buildings occupied rent-free with the owner's consent.

3.182 Use of nonresidential buildings - The various use classes indicated refer to nonresidential buildings. A building used for more than one purpose should be recorded as used "for mixed or other purposes".

Category 11: Ancillary Activities

3.183 Category 11 identifies holdings carrying out forestry and fishery activities ancillary to agriculture.

3.184 Proposed items:

<u>111</u>	<u>Forestry</u>	
<u>1111</u>	<u>Existence of forest trees on holding</u>	
111101	Whether forest trees exist on holding	
<u>1112</u>	<u>Number of forest trees</u>	
11121	Total number	
<u>112</u>	<u>Fisheries</u>	
<u>1121</u>	<u>Existence of fisheries activities on holding</u>	
*112101	Whether fish or other aquatic animals and plants are taken from the waters within the holding	
<u>1122</u>	<u>Cultural installation</u>	
*112201	Indication of type of cultural installation used for fisheries	
	(a) Pond	
	(b) Rice fields	
	(c) Other (specify)	

3.185 Time reference for items 112101 and 112201 is the agricultural year; for all other items it is the enumeration day.

Definition of Category 11 terms

3.186 Forest trees - Forest trees are those grown for producing wood for industry, fuel, forage, protection or other purposes, but not included among trees grown as permanent crops, covered in Category 06. Forest trees include bamboo and other woody vegetation used for the above-listed purposes.

3.187 Other aquatic animals and plants - These include aquatic animals, other than fish, such as frogs, crabs, etc. and aquatic plants.

3.188 Cultural installations - These include any water environment used for fishery activities.

CHAPTER 4

TABULATION PROGRAMME

General considerations

4.1 To meet user needs, the data collected in the agricultural census must be meaningfully summarized as well as fully processed. Summaries are sometimes in the form of totals, averages or quantiles providing a quick general understanding of characteristics. Fully processed data should be made available in an easily accessible computer data bank conducive to analytical uses. Data are generally summarized in the form of simple tabulations, giving information by classes of a single characteristic, or cross tabulations providing information by classes of two or more characteristics. Cross tabulations based on two characteristics are preferable. Summaries should fully describe distribution of characteristics.

4.2 The census tabulation programme refers to the table list and other summary measures published. Sampling errors of some important estimates should also be included if sample enumeration is applied. It is important to produce summary measures which can be evaluated together with those of the previous censuses, to study changes over time. The tabulation programme for tables to be published should clearly indicate:

- (a) title of each table
- (b) unit of measurement
- (c) classes adopted for characteristics studied in each table;
- (d) aggregate levels, such as administrative units and agro-ecological regions which involve separate tabulations.

4.3 Because the tabulation programme represents a published census end product, decisions concerning it are directly related to other design aspects of the agricultural census. Cross tabulation requirements must be evaluated concurrently with the census scope. The number of administrative units and agro-ecological regions for which separate tabulations are required is a decisive factor in choosing between complete enumeration, sampling or a combination of both methods.

4.4 The large volume of work involved in tabulations is an important consideration in preparing the tabulation programme. Available man-power including computer programmers, number of data input stations and computer capacity may impose limitations on the tabulation programme. It is recommended to establish priorities for tables to be included in the tabulation programme and to concentrate efforts on obtaining those tables first (see paragraph 4.19).

4.5 This Chapter contains a detailed tabulation programme recommended for national and international use. Countries may wish to restrict or augment tabulations to meet their national needs; they are cautioned against excessive cross tabulations if the census is conducted on a sample basis, as sampling errors of the estimates in some cells of tables may be very large due to small sample size. In both complete and sample enumeration, excessive cross tabulations may also impair confidentiality for classes containing very few units.

4.6 Numerous combinations of characteristics can be used for cross tabulation purposes. Certain characteristics are identified as the main classification criteria to be considered for cross tabulation with all other characteristics, as well as with each other. The main classification criteria are:

- (a) Total holding area (or possibly agricultural land area)
- (b) Cropland (or possibly arable land area) of holding
- (c) Number of cattle on holding
- (d) Number of permanent agricultural workers
- (e) Land tenure
- (f) Holder's legal status
- (g) Size of holder's household
- (h) Holder's age
- (i) Holder's sex
- (j) Intensity of arable land cultivation.

The differences in main classification criteria between the 1990 and the 1980 Programme are:

- (i) "normally irrigated area" - excluded from the 1990 Programme because the current item list does not cover this characteristic; and
- (ii) "Holder's sex" - was not included in the 1980 Programme.

4.7 The classification criteria (a) and (b) in paragraph 4.6 are different measures of size based on area: total area and cropland, total area being the most widely used. "Total holding area" was proposed in the 1930 Programme and has been recommended in all previous census programmes. While total holding area provides a fairly clear measure of size, particularly for regions with homogeneous land, it has certain serious limitations:

- (i) it may include forest, woodland or other land not used for agricultural purposes, making the "total area" somewhat misleading as a size measure;
- (ii) it disregards land quality: land productivity depends on climate, soil, water availability, etc.; non-irrigated land in an arid or semi-arid region may be much less productive than an equal irrigated area; land at high altitudes may

- have an entirely different productive capacity from the same land area at a lower level;
- (iii) it neglects land use intensity; in some countries, an area may produce two or more crops per year; in others, a crop may be produced only once every two or three years;
 - (iv) it does not take into account the possible division of holdings into small scattered parcels; a multiplicity of holding parcels is often equivalent to a reduction in area.

"Agricultural land area" is proposed as another size criterion which partly offsets the shortcomings of total area. Cropland and arable land area are useful size criteria for studying holdings engaged mainly in crop production.

4.8 "Number of cattle" is an appropriate size criterion for holdings engaged mainly in cattle raising. Similar criteria can be adopted for other types of livestock in countries or regions where sheep, goats or other livestock raising is the predominant activity.

4.9 "Number of permanent workers" is useful in studying the labour source used on the holding.

4.10 "Land tenure" provides information on access to land by holders. This subject is one of the main areas of concern in the World Conference on Agrarian Reform and Rural Development (WCARRD) Programme of Action.

4.11 "Legal status of holder" provides a base for comparative analysis of holdings operated by individuals, households, cooperatives, etc.

4.12 "Size of holder's household" is relevant for understanding the dependence of rural people on land. This is also important in evaluating labour sources, as the household provides unpaid family workers. Because of the difficulty in associating household size with holdings operated by two or more individuals belonging to different households or by two households, it is recommended that "holder's household size" be considered only for those holdings operated by an individual or single household.

4.13 "Holder's age" is an important concern in many countries experiencing emmigration from rural areas.

4.14 "Holder's sex" will provide separate data for holdings operated by women. Rural women are one of the disadvantaged groups requiring special attention in all developing countries.

4.15 "Intensity of arable land cultivation" is the ratio of harvested arable land to total arable land. This characteristic is important for better assessment of land resources' use.

4.16 For tabulation purposes, it is necessary to identify the classes for each characteristic by which the holding, or other units of interest, will be classified. Chapter 3 provides such classes for characteristics corresponding to single items. Classes for all characteristics, including those given in Chapter 3, are now presented. To provide internationally comparable results, countries are urged to adopt these classes to the extent possible, while at the same time paying attention to the dangers of excessive cross classifications, as mentioned in paragraph 4.5. Countries wishing to utilize more detailed classes are recommended to adopt classes which can be regrouped into those proposed here. Classes for the main classification criteria are first given below and the classes proposed for other characteristics are given in the same order as they appear in Chapter 3. The numbers of relevant sections or specific items for each characteristic are indicated in parenthesis following the characteristic description.

4.17 Classes for main classification criteria

Total area of holding (051102)

This classification covers all holdings. The same classification is recommended for agricultural land area.

- (a) Holdings without land
- (b) Holdings with land
 - Under 0.1 ha
 - 0.1 ha and under 0.2 ha
 - 0.2 ha and under 0.5 ha
 - 0.5 ha and under 1 ha

 - 1 ha and under 2 ha
 - 2 ha and under 3 ha
 - 3 ha and under 4 ha
 - 4 ha and under 5 ha
 - 5 ha and under 10 ha

 - 10 ha and under 20 ha
 - 20 ha and under 50 ha
 - 50 ha and under 100 ha

 - 100 ha and under 200 ha
 - 200 ha and under 500 ha
 - 500 ha and under 1000 ha
 - 1000 ha and under 2500 ha
 - 2500 ha and over

Cropland of holding (05241, 05242)

This classification covers all holdings. The same classification is recommended for arable land area.

- (a) Holdings without cropland
- (b) Holdings with cropland
 - Under 0.1 ha
 - 0.1 ha and under 0.2 ha
 - 0.2 ha and under 0.5 ha
 - 0.5 ha and under 1 ha
 - 1 ha and under 2 ha
 - 2 ha and under 3 ha
 - 3 ha and under 4 ha
 - 4 ha and under 5 ha
 - 5 ha and under 10 ha
 - 10 ha and under 20 ha
 - 20 ha and under 50 ha
 - 50 ha and under 100 ha
 - 100 ha and under 200 ha
 - 200 ha and under 500 ha
 - 500 ha and under 1000 ha
 - 1000 ha and over

Number of cattle of holding (071201)

This classification covers all holdings

- (a) Holdings with no cattle
- (b) Holdings with cattle
 - 1 to 2 head
 - 3 to 4 head
 - 5 to 9 head
 - 10 to 19 head
 - 20 to 49 head
 - 50 to 99 head
 - 100 to 199 head
 - 200 to 499 head
 - 500 head and over

Number of permanent agricultural workers (042221, 042222)

This classification covers all holdings

- (a) Holdings without permanent agricultural workers
- (b) Holdings with permanent agricultural workers
 - 1 worker
 - 2 workers
 - 3 workers
 - 4 workers
 - 5 workers
 - 6 workers and over

Land tenure (0522)

This classification covers all holdings. The breakdown (c) may not be applicable in some cross tabulations.

- (a) Holdings without land
- (b) Holdings operated under one tenure form
 - Owned or held in ownerlike possession
 - Rented from others
 - For an agreed amount of money and/or produce
 - For a share of produce
 - In exchange for services
 - Under other rental arrangements
 - Operated on a squatter basis
 - Operated under tribal or traditional communal tenure forms
 - Operated under other tenure forms
- (c) Holdings operated under two or more tenure forms
 - Area owned or held in ownerlike possession
 - Area rented from others
 - For an agreed amount of money and/or produce
 - For a share of produce
 - In exchange for services
 - Under other rental arrangements
 - Area operated on a squatter basis
 - Area operated under tribal or traditional communal tenure forms
 - Area operated under other tenure forms

Legal status of holder (021101)

This classification covers all holdings.

- (a) Holdings operated privately
 - An individual
 - A household
 - Two or more individuals of different households or two or more households
 - A corporation
 - A cooperative
 - Other n.e.s
- (b) Holdings operated by the Government

Holder's household size (031101)

This classification covers only those holdings operated by an individual or a household. Other holdings are excluded.

- 1 person
- 2 to 3 persons
- 4 to 5 persons
- 6 to 9 persons
- 10 persons and over

Holder's age (031202)

This classification applies only to holdings operated by an individual, a household, two or more individuals of different households or two or more households. It excludes other holdings. In the case of holdings operated by a household, two or more individuals of different households or two or more households, one senior holder should be selected.

Under 25 years
 25 to 34 years
 35 to 44 years
 45 to 54 years
 55 to 64 years
 65 years and over

Holder's sex (031203)

Explanations given above for holder's age, equally apply here.

Male
 Female

Arable land cultivation intensity (05241, 061141)

This classification applies only to those holdings having arable land.

Under 0.50
 0.50 and under 0.75
 0.75 and under 1.00
 1.00 and under 1.25
 1.25 and under 1.50
 1.50 and under 2.00
 2.00 and over

4.18 Classes for other characteristicsCategory 01Administrative units and agro-ecological regions (011101)

Classes by administrative units and agro-ecological zones are to be determined by countries.

Category 02Integration with another economic unit (021301)

This classification covers all holdings.

Holdings that are part of an enterprise also engaged in another economic activity.

Holdings that are not part of an enterprise also engaged in another economic activity.

Other economic activities of enterprises operating a holding (021302)

This classification applies to holdings that are part of an enterprise also engaged in another economic activity.

- (a) Single economic activity other than operating a holding
 - Agricultural services
 - Hunting, trapping and game propagation
 - Forestry and logging
 - Fishing
 - Manufacturing
 - Other (specify)
- (b) Two or more economic activities other than operating a holding

Hired manager (021201, 021204)

Holdings with a hired manager
Holdings without a hired manager

Category 03

Age of holder's household members (031202)

The first three age groups are combined for the holder when cross-classifying holder's age (see Holder's age).

Under 10 years
10 to 14 years
15 to 24 years
25 to 34 years
35 to 44 years
45 to 54 years
55 to 64 years
65 years and over

Sex of holder's household members (0310203)

Male
Female

Category 04

Activity status (041101)

This classification covers holder's household members above a specified age - see paragraph 3.41.

Economically active
 Not economically active

Number of holder's household members economically active
 (041101)

- 1 person
- 2 persons
- 3 persons
- 4 persons
- 5 persons or more

Work of household members on holding (042101, 042102)

This classification applies to economically active members of holder's household.

- Occasional agricultural worker on holding
- Permanent agricultural worker on holding
- Not worked on holding

Holder's occupations (041201, 041202)

- Not having any other occupation besides being a holder
- Having other occupation(s) besides being a holder, with main occupation of
 - Farmer
 - Agricultural worker
 - Other (specify)

Employment of agricultural workers (042211, 042212)

- Holdings that employ agricultural workers only on a permanent basis
- Holdings that employ agricultural workers only on an occasional basis
- Holdings that employ agricultural workers both on permanent and occasional basis
- Holdings that do not employ agricultural workers

Sex of permanent agricultural workers (042221, 042222)

- Male
- Female

Category 05

Number of parcels (051101)

This classification applies to holdings with land.

1 parcel
 2 to 3 parcels
 4 to 5 parcels
 6 to 9 parcels
 10 parcels and more

Land rented out (051211)

Holdings that rent out land
 Holdings that do not rent out land

Shifting cultivation (051401)

Holdings practising shifting cultivation
 Holdings not practising shifting cultivation

Irrigation (051812)

Holdings that irrigate some land
 Holdings that do not irrigate any land

Drainage (051911)

Holdings having drainage facilities
 Holdings not having drainage facilities

Size of parcels (052101)

Under 0.1 ha
 0.1 ha and under 0.2 ha
 0.2 ha and under 0.5 ha
 0.5 ha and under 1 ha
 1 ha and under 2 ha
 2 ha and under 5 ha
 5 ha and under 10 ha
 10 ha and over

Land use (0521, 0524)

(a) Agricultural land
 Cropland

Arable land

Area under temporary crops - in the open air
 Area under temporary meadows
 Area temporarily fallow
 All other arable land

Land under protective cover

Land under permanent crops - in the open air

Land under permanent meadows and pastures

Cultivated

Naturally grown

(b) Woodland or forest

- (c) All other land
 Unused and undeveloped potentially productive
 land,
 Land in the holding n.e.s.

- (d) Total land

Time elapsed since clearance for cultivation (in shifting
 cultivation) (0521, 0526)

- Area cleared less than 1 year ago
 Area cleared 1 year and less than 2 years ago
 Area cleared 2 years and less than 5 years ago
 Area cleared 5 years ago or earlier

Category 06

Area harvested (061141)

- For each temporary crop grown
 Under 1 ha
 1 ha and under 2 ha
 2 ha and under 5 ha
 5 ha and under 10 ha
 10 ha and under 20 ha
 20 ha and over

Plantation features and ages of permanent crops (061241-061245)

- For each permanent crop
 Trees of productive age in compact plantations
 Trees of non-productive age in compact plantations
 Scattered trees

Fertilizers (0613)

- (a) Holdings that do not use fertilizers
 (b) Holdings that use fertilizers
 Only inorganic fertilizers
 Only organic fertilizers
 Both types of fertilizers

Pesticides (0614)

- Holdings that do not use pesticides
 Holdings that use pesticides

Seeds (0615)

- Holdings that use high yield variety seeds
 Holdings that do not use high yield variety seeds

Crop stand (0521, 0621)

- Area under pure stand - temporary crops
 Area under pure stand - permanent crops

Area under mixed - temporary crops
Area under mixed - permanent crops
Area under associated crops

Category 07-08

Livestock system (071101)

Nomadic or totally pastoral
Semi-nomadic or semi-pastoral
Sedentary pastoral
Ranching

Number of buffaloes (071202)

1 to 2 head
3 to 4 head
5 to 9 head
10 to 19 head
20 to 49 head
50 to 99 head
100 to 199 head
200 to 499 head
500 head and over

Number of sheep (071203)

1 to 4 head
5 to 9 head
10 to 19 head
20 to 49 head
50 to 99 head
100 to 199 head
200 to 499 head
500 head and over

Number of goats (071204)

1 to 4 head
5 to 9 head
10 to 19 head
20 to 49 head
50 to 99 head
100 to 199 head
200 to 499 head
500 head and over

Number of pigs (071205)

1 to 4 head
5 to 9 head
10 to 19 head
20 to 49 head
50 to 99 head

100 to 199 head
 200 to 499 head
 500 head and over

Number of chickens (071301)

1 to 9 chickens
 10 to 49 chickens
 50 to 199 chickens
 200 to 999 chickens
 1000 to 4999 chickens
 5000 to 9999 chickens
 10 000 chicken and over

Number of deer (071303)

1 to 4 head
 5 to 9 head
 10 to 19 head
 20 to 49 head
 50 to 99 head
 100 to 199 head
 200 to 499 head
 500 head and over

Category 09

Indication of machinery and equipment used and source for each type (091101, 091201)

- (a) Holdings that do not use machinery and equipment
 (b) Holdings that do use machinery and equipment
 Owned solely by holder
 Owned jointly by holder and others
 Provided by landlord
 Provided by other private holders (excluding cooperatives)
 Provided by private cooperative
 Provided by a private agricultural service establishment
 Provided by a government agency

Category 10

Nonresidential buildings use (102111)

Holdings that use nonresidential buildings
 Holdings that do not use nonresidential buildings

Use of nonresidential buildings owned (102121, 10221)

For keeping livestock, other than poultry
 For keeping poultry
 For storing agricultural products
 For keeping agricultural machinery and equipment
 As office
 For mixed or other purposes

Category 11Existence and number of forest trees (111101, 111211)

Holdings with no forest trees

Holdings with forest trees

1 to 9 trees

10 to 49 trees

50 to 199 trees

200 trees and over

Fisheries activity and cultural installation (112101, 112201)

Holdings that do not carry out fisheries activity

Holdings that carry out fisheries activity

- in pond

- in rice fields

- in other cultural installations

Recommended cross tabulations

4.19 Figure 1 indicates recommended cross tabulations. Tabulations requiring priority are indicated with an asterisk. Columns 1-10 give the main classification criteria; in the stub various characteristics are listed by category. Category 01, providing data needed to classify holdings by administrative units and agro-ecological regions, is not included in the Figure, as all recommended cross tabulations apply to all administrative units and agro-ecological regions.

4.20 Some of the main classifications criteria also appear in the stub because certain cross tabulations are needed, but they are indicated only once to avoid repetition.

4.21 The letters a to u are used in the Figure to indicate recommended cross tabulations. The meaning of these letters is given below:

- a : Number of holdings
- b : Number of holdings reporting
- c : Total area
- d : Agricultural land
- e : Cropland
- f : Arable land
- g : Area of specific land use classes (including d, e and f)
- h : Area of parcels
- i : Area under trees in compact plantations for each crop
- j : Area harvested for each temporary crop
- k : Number of parcels
- l : Number of cattle
- m : Number of specific type of livestock (other than cattle)
- n : Number of trees for each permanent crop
- o : Number of specific types of machinery and equipment

- p : Area (or volume) of nonresidential buildings owned
- q : Number of forest trees
- r : Number of holder's household members - total
- s : Number of holder's household members - of economically active age
- t : Number of holder's household members - economically active
- u : Number of permanent agricultural workers

4.22 Statistics presented in the proposed cross tabulations refer to either numbers of holdings, livestock, parcels, trees, etc., or areas, as indicated by the letters. Clarification is needed for: "Number of holdings" and "Number of holdings reporting". In classifications where a holding has to be included in only one cell, number of holdings in each cell refers to a mutually exclusive subset of all holdings being studied. However, not all classifications have this property. Other classifications may include a holding in more than one cell. In such cases, number of holdings reporting should be utilized instead of number of holdings. For example, to classify holdings by total area, the concept number of holdings is appropriate as each holding will fall into only one size class. On the other hand, to classify the holdings by land use, the concept number of holdings reporting should be used because a holding having two types of land, such as area under permanent crops, woodland or forest, will appear twice in the classification.

4.23 Some cells of the Figure include only one letter while others include two or three. The letters given in parentheses replace those preceding them. Two examples are given below to illustrate the use of the Figure of recommended cross tabulations.

Example 1

The cell corresponding to column 1 (total area) and stub "integration with another economic unit" includes a, c(d). The table proposed here is shown in Figure 2. If the country wishes to use agricultural land (which is indicated by letter d in parentheses) as the size criterion, the term "Total area of holding" will be replaced by the term "Agricultural land of holding" in the title and stub.

Example 2

The cell corresponding to column 9 (sex of holder) and stub "Plantation features and ages of permanent crops" includes b, n, i. This classification is proposed for each permanent crop.

Figure 3 provides a sample table for "Number of apple trees, area under compact plantation of apple trees and number of holdings reporting by sex of holder and by plantation features and ages of trees.

Figure 1 (continued)
Recommended cross tabulations

Characteristics	Main classification criteria									
	1	2	3	4	5	6	7	8	9	10
	Total area (or agricultural land)	Cropland (or arable land)	Cattle No. (or other livestock)	No. permanent agricultural workers	Land tenure	Holder's legal status	Holder's household size	Holder's age	Holder's sex	Holder's cultivation intensity
Household members working on holding	a,t	-	-	-	-	-	t	t	t	-
Holder's occupation	a,c(d)*	a,e(f)	-	-	-	-	a	a	a	-
Employment of agricultural workers	a,c(d)	a,e(f)	a,l(m)	a,u	-	-	-	a	a	a,c(d)
No. of permanent agricultural workers	a,u	a,u	a,u	-	-	-	-	-	-	71
Permanent agricultural workers' sex	-	-	-	a,u	-	-	-	-	-	-
Category 05										
Total area (or agricultural land)	-	a,e(f)	a,l(m)*	a,c(d)	b,c*	-	-	-	-	a,c(d)
Cropland (or arable land)	a,c(d)	-	a,l(m)	a,e(f)	-	-	-	-	-	a,e(f)
Land tenure	-	-	a,l(m)	-	-	-	-	-	-	-
No. of parcels	a,c(d)*	a,e(f)	-	-	a	a	-	-	a	-
Land rented out	a,c(d)	-	-	-	a	a	-	a	a	-
Shifting cultivation	a,c(d)	-	-	-	-	-	-	a	a	-
Irrigation	a,c(d)*	a,e(f)	-	a	a	-	-	a	a	-

Figure 1 (continued)
Recommended cross tabulations

Characteristics	Main classification criteria									
	1	2	3	4	5	6	7	8	9	10
	Total area (or agricultural land)	Cropland (or arable land)	Cattle No. (or other livestock)	No. permanent agricultural workers	Land tenure	Holder's legal status	Holder's household size	Holder's age	Holder's sex	Cultivation intensity
Drainage	a,c(f)	a,e(f)	-	a	a	-	-	a	a	-
Size of parcels	k	k	-	-	-	-	-	k	k	-
Land use	b,g*	b,g	b,g	-	b	b	-	b	b	-
Time elapsed since clearance for cultivation (in shifting cultivation)	k,h	-	-	-	-	-	-	-	-	-
Category 06										
Area harvested (for each temporary crop)	a,i*	a,j	-	-	a	a	a,i	a	a	-
Plantation features and ages of permanent crops (for each crop)	b,n,i	b,n,i	-	-	-	-	b,n,i	b,n,i	b,n,i	-
Fertilizers	a,c(d)*	a,e(f)	-	-	a	-	-	a	a*	a,e(f)
Pesticides	a,c(d)	a,e(f)	-	-	a	-	-	a	a	a,e,(f)
Seeds	a,c(d)	a,e(f)	-	-	a	-	-	a	a	a,e,(f)
Crop stand	b,h	b,h	-	-	-	-	-	b,h	b,h	-

Figure 1 (conclusion)
Recommended cross tabulations

Characteristics	Main classification criteria									
	1	2	3	4	5	6	7	8	9	10
	Total area (or agricultural land)	Cropland (or arable land)	Cattle No. (or other livestock)	No. permanent agricultural workers	Land tenure	Holder's legal status	Holder's household size	Holder's age	Holder's sex	Holder's cultivation intensity
Category 07-08										
Livestock system for each type of livestock	a,1(m)	a,1(m)	a,1(m)	-	-	a,1(m)	-	a,1(m)	a,1(m)	-
Category 09										
Machinery and equipment use indication and source for each machinery and equipment type	b,o	b,o	b,o	b,o	b,o	b,o	-	b,o	b,o	b,o 73
Category 10										
Nonresidential buildings use	a	a	a	-	-	-	-	-	-	-
Type of nonresidential buildings owned	b,p	b,p	b,p	-	-	-	-	-	b,p	-
Category 11										
No. of Forest trees	a,q	a,q	-	-	-	-	-	a,q	a,q	-
Indication of fisheries activities and the cultural installation	b*	b	-	-	-	-	-	b	b	-

Figure 2
Number and area of holdings by integration with another economic unit and by total area of holding

Total area of holding	Integration with another economic unit				Total	
	Holdings that are part of an enter- prise also engaged in another economic activity		Holdings that are not part of an enterprise also engaged in another economic activity			
	Number	Area(ha)	Number	Area(ha)	Number	Area(ha)
Holdings without land						
Holdings with land						
Under 0.1 ha						
0.1 ha and under 0.2 ha						
0.2 ha and under 0.5 ha						
0.5 ha and under 1 ha						
1 ha and under 2 ha						
2 ha and under 3 ha						
3 ha and under 4 ha						
4 ha and under 5 ha						
5 ha and under 10 ha						
10 ha and under 20 ha						
20 ha and under 50 ha						
50 ha and under 100 ha						
100 ha and under 200 ha						
200 ha and under 500 ha						
500 ha and under 1000 ha						
1000 ha and under 2500 ha						
2500 ha and over						
Total						

Figure 3

Number of apple trees, area under compact plantation of apple trees and number of holdings reporting by sex of holder and by plantation features and ages of trees

Plantation features and ages of trees	Holder's sex						Total	
	Male			Female			Area under compact plantation (ha)	Number of holdings reporting
Number of trees	Area under compact plantation (ha)	Number of holdings reporting	Number of trees	Area under compact plantation (ha)	Number of holdings reporting	Number of trees			Area under compact plantation (ha)
Trees of productive age in compact plantations								
Trees of non-productive age in compact plantations								
Scattered trees								
Total								

CHAPTER 5

GUIDELINES FOR TAKING A CENSUS OF AGRICULTURE

5.1 This Chapter presents basic principles for planning and carrying out an agricultural census. The aim is to provide a check list of major aspects rather than an exhaustive description.

Developing the census programme

5.2 Agricultural census is one of the data sources of a national statistical programme for food and agriculture. Countries are strongly recommended to prepare an overall national food and agricultural statistics programme before embarking on the census programme, and to view the agricultural census as one important activity in a continuing cycle of statistical development, processing and analysis. Such an approach will help to overcome many issues discussed in this Chapter.

5.3 The first issue concerns the establishment of a legal base to conduct the census. It may be in the form of a law, decree or other instrument, depending on the legislative procedures of the country. Census legislation is essentially meant to identify responsibilities of government agencies and respondents and to serve as a base for budgetary allocations. Government agencies' responsibilities should include securing confidentiality of the data collected from individual respondents. This guarantee helps to obtain respondents' confident cooperation. Census legislation, in general, also indicates a broad description of the census scope and timing. Countries are thus recommended to review their legislation on data collection activities and begin to establish a coherent legal base for a national food and agricultural statistics programme, including the agricultural census.

5.4 The second issue concerns the census scope. Countries are recommended to examine carefully the items' list given in this Programme. Reviewing the items' list will not only assist in clarifying the census scope but will indicate how the census may complement other existing data sources. Countries that have not yet established a satisfactory national statistical programme for food and agriculture should resist the temptation to have wide census scope.

Budget

5.5 An agricultural census budget should be prepared covering all census phases from the preparatory work to publication of results and installation of all data in the user-oriented data system. The budget should show, for each fiscal year, permanent and temporary personnel required, salaries and wages, travel costs and expenditures for

acquisition and operation of machinery and equipment, office space, communications, transport and supplies, and provision should be made for unforeseen expenses. The agency legally responsible for executing the census should be empowered to reallocate resources in case of unforeseen difficulties, especially during enumeration and data processing.

5.6 The budget for enumeration and data processing should show the volume of work to be performed, performance rates and measurable costs of all activities in the work programme. The amount of work in relation to each important operation, such as enumeration, examining questionnaires, and preparing punch cards or tapes, should be included. The budget should be reviewed periodically and work accomplishments compared to budget expenditures. Corrective action should be taken when necessary.

5.7 Network analysis is an essential aid for cost control, planning and executing a census. PERT (Programme Evaluation and Review Technique) provides a systematic approach to determining realistic time references and deadlines; it also pinpoints tasks crucial to punctual census completion, and analyzes effects of contemplated shifts of resources upon interrelated tasks and activities.

Organization

5.8 The agricultural census requires a hierarchical organization for successful execution. An inter-ministerial committee should be established to perform overall census supervision. This committee could be the central coordinating body of the national food and agricultural statistics programme, or one of its sub-committees including representatives from producer and/or user agencies. Membership in such a committee involves responsibility and time-consuming work and it is preferable to restrict membership to people who are actively concerned with the census. This committee should carry out the following activities:

- (a) determine the census scope
- (b) approve activities to be undertaken at various census stages
- (c) periodically review census operations' progress and advise government authorities on needed steps and measures
- (d) approve publication of census results; and
- (e) conduct an ex post census programme evaluation.

The census committee may carry out its functions through specific technical working groups.

5.9 An agency responsible for conducting the census should be designated. This agency will execute the census with assistance from other agencies and under the general supervision of the census committee.

5.10 The organization may include province and/or district level census committees to oversee field work of supervisors and enumerators.

Staff recruitment

5.11 Principal administrative and professional staff must be highly skilled and qualified, recruited from personnel familiar with agriculture, census methods and procedures, and government work. Supervisory personnel for enumerators can be recruited or borrowed from government agencies or local sources, such as statistical and agricultural extension services and educational organizations. Such personnel need to know local conditions, customs, transportation systems, dialects and other relevant facts.

5.12 Enumerators are best recruited from localities in which they will work. They should be qualified. They should undergo simple tests designed to measure their ability to read and apply instructions, understand maps, communicate easily with people, enter information on questionnaires accurately, and perform simple arithmetical operations.

5.13 Successful enumerators are tactful and resourceful in handling problems that arise when meeting and talking with holders and others; their actions and attitudes should gain the respect and confidence of holders. They must be willing and able to work full-time, without engaging in other activities, until the job has been completed. They must work carefully and diligently even when their supervisor is absent and always maintain required records.

5.14 Staff who edit, code and tabulate the data (manually or with the help of electronic calculators and/or computers) must be carefully selected. Appropriate tests should be given to staff candidates, particularly those who will transfer the data from questionnaires to machine-readable media.

Informing the public

5.15 Informing the public about the census cannot be overemphasized. Experience shows that inadequately informed and uncooperative citizens may jeopardize the entire census. The purpose of publicity is to bring the census to the attention of all agricultural holders, or to at least one family member thereof. The scope and coverage of the census should be clearly explained in the national and local press to

familiarize people with the questions to be asked. The publicity programme should explain the use of data to be collected, particularly for development planning and formulation of agricultural policies, making the census meaningful to people, thus establishing confidence between people and census authorities. The confidential nature of data collected and need for accurate replies should also be emphasized.

5.16 The most effective publicity means will vary by country. In many countries, the daily and weekly press, cinema, radio, television and posters are used. In others, the cooperation of local religious leaders, community chiefs, business association heads, labour groups and public service organizations, has been effective. School publicity programmes may be efficient because schoolchildren are apt to pass information to and influence their families. The national or local census committee could also play an important role in the publicity campaign. In some countries, committees have been organized in villages to read and explain census publicity material to illiterate farmers. Using audio-visual aids under such conditions may be helpful.

Tabulations

5.17 Because the tables to be published will be obtained from data recorded in the questionnaires, there is a strong link between design of the questionnaire and the tabulation programme. Experience shows that often data recorded on the questionnaire cannot be readily extracted for tabulation, thus time and resources are wasted. Countries are recommended, therefore, to prepare the tabulation programme concurrently with the questionnaire.

5.18 It will be necessary, during initial consideration of the tabulation programme, to decide upon the amount of tabulation to be carried out for various levels of administrative units and agro-ecological regions during initial consideration of the tabulation programme. Few countries can expect the tabulation programme to provide statistics for every village or commune. Further limitations are imposed when the census is taken through sample; reductions in the amount of tabulation will be unavoidable for the administrative units. As this might be a delicate issue under some circumstances, it is desirable to find a solution before the census is begun.

5.19 Another important tabulation programme aspect is the choice of size criteria to be adopted for classification purposes. Explanations in Chapter 4 may provide guidance on this subject.

5.20 Countries are encouraged to adopt the classes proposed for each characteristic in this Programme to produce internationally comparable results.

5.21 Countries that expand the agricultural census scope beyond the items given in Chapter 3 may find it useful to adopt a size classification based on area irrigated, total value of products sold or consumed by the holding, or on value added, depending on relevant data collected in the census.

5.22 There is increased interest in tabulating certain characteristics of holdings by various types of farming. Countries where farm typology is established may find it useful to obtain the same set of cross tabulations for each type of farming, to make comparative studies.

Questionnaire

5.23 A questionnaire is the medium for recording in a standardized manner the data obtained in censuses and surveys. Development of census questionnaires is an important and exacting task in census preparation. The collected data quality depends largely on the questionnaire and the enumerators who complete it. 1/

5.24 The possible difficulties of enumerators and the required tabulations of the data should be kept in mind when designing the questionnaire. It must use uniform concepts and definitions easily understood and clearly explainable by enumerators to the holders. The questions must be simple and plainly phrased. One questionnaire aim is to provide a standardized interpretation of the meaning of census items and data to be collected.

5.25 The questionnaire must be prepared sufficiently in advance of the enumeration date to permit adequate pretesting, finalizing the tabulation programme and starting data processing early. Pretests should be planned so that various aspects related to the questionnaire can be investigated. A major objective of pretests is to ascertain deficiencies in the questionnaire and the holder's reaction to it.

1/ Although the practice is presently only in the experimental stage in just a handful of countries, before the 1990 Programme is completed in 1995, many countries will undoubtedly use hand-held computer devices for field enumeration. This will involve further demands for complete and efficient questionnaire design but will serve to make the data collected machine-readable from its initial collection point and will permit more automatic consistency checks at the holder levels.

Complete and/or sample enumeration

5.26 The decision to conduct the census by complete or sample enumeration or a combination of both requires careful evaluation of each methods' advantages and disadvantages and a clear understanding of what is expected from the agricultural census relative to other components of the integrated statistical programme (see Chapter 2). Results of pilot studies of each method can provide useful guidance for this evaluation.

Cartographic preparation

5.27 Enumerating all agricultural holdings in a country, without omission or duplication, in a short period of time, requires utmost attention. The exact delineation of areas covered by each enumerator is necessary and each enumerator should be provided with an enumeration area map showing exact boundaries.

5.28 Census authorities should investigate cartographic resources well before enumeration date and, where maps or aerial photographs are not available, arrange to provide sketches clearly showing area boundaries.

5.29 Where maps or aerial photographs are not available and the agricultural census is undertaken on a sample basis, a complete list of villages or other distinguishable geographic units should be prepared in advance, including complementary data on size of villages or units such as agricultural population or people engaged in agriculture, population of ethnic groups, total area and agricultural land area, main crops, and agricultural practices, and facilities including water availability for irrigation and agricultural machinery. These data will be useful to stratify villages for obtaining efficient sample design.

Holding list

5.30 The listing of all holdings within each enumeration area (mentioned in paragraphs 5.27-5.28) is another important agricultural census operation. Holdings' or holders' lists available at administrative offices are frequently incomplete and out of date and unsuitable for census enumeration. Available ancillary sources such as households' and holders' lists obtained from a population census taken shortly before the agricultural census are useful in listing operations. Some countries may have to begin listing households and holders within households in order to identify the holdings.

Data collection

5.31 In an agricultural census, data are collected through interview and/or by mail. In the interview technique, the enumerator visits the holding and the responses of the holder to questions are entered in the questionnaire. Interview may be supplemented by observations or measurements carried out by the enumerator. Interview is the technique adopted in most developing countries where postal services are not fully developed and literacy rate is low.

5.32 In the mail technique, less costly than interview, the questionnaire with explanatory notes is mailed to the holder, usually with a stamped preaddressed return envelope. This technique is utilized mainly in developed countries. Reminders may be necessary to increase response rate.

5.33 Interview and mail techniques are sometimes used to complement each other. Interviewers are sent to a sample of holders who have not responded even after sending reminder letters. Sometimes data are collected from juridical holders or government-operated holdings by mail and enumerators are sent to other holders. Each country must decide its own technique, based on local conditions and available resources.

Instructions and training for enumerators

5.34 Country experience indicates that it is essential to provide instruction manuals and training for census enumerators to standardize procedures, secure a common understanding of tasks to be performed and provide a reference guide during enumeration. Instructions manuals and enumerator training programmes are very important because census data quality depends primarily upon the enumerators. Instruction manuals should contain detailed explanations of procedures for conducting the enumeration, interview techniques, guidance on how to handle major and frequently encountered problems (such as uncooperative holders), and examples of properly completed questionnaires. Preparation of these instruction manuals is a high priority job and should be done by persons with a thorough knowledge of and wide experience in preparing instruction manuals, census design, holders' characteristics and psychology of both enumerators and holders. Training should be carefully organized and conducted within an appropriate time schedule and some account should be taken of the training and knowledge acquired by some personnel in previous work.

5.35 Enumerator training should cover:

- (a) why the census is taken and its importance
- (b) general information:
 1. job

2. responsibility
 3. dealing with holders and others
 4. confidentiality of data
- (c) objectives and nature of census:
1. data to be collected
 2. how the census is organized
 3. how the census is to be taken
- (d) definitions and procedures:
1. definitions and concepts
 2. making appointments
 3. from whom to obtain data
 4. techniques for conducting a good interview
 5. how to ask questions
 6. completing questionnaires
 7. ending an interview
 8. checking questionnaires
 9. calling back to obtain missing data
 10. overcoming holder's objections to providing data
 11. use of interpreters
- (e) administrative instructions:
1. hours of work
 2. absenteeism
 3. instructions on other administrative matters
 4. records required on time and attendance.

Instructions and training for supervisors

5.36 The supervisors' work in controlling enumerators' work and assisting them to solve problems encountered is essential to the census success. The supervisor's presence and inspection of enumerators' work helps prevent carelessness, and facilitates error detection and correction while enumeration is in progress. Supervisors should encourage enumerators to perform acceptable work, complete work assignments on time and help promote holders' cooperation. Supervisors should follow and record enumeration progress, taking appropriate action when work is not performed in accordance with a predetermined time schedule. Good supervision is a proven and worthwhile investment; one supervisor for a reasonable number of enumerators is fully justified by improvement in work quality and completion of work on schedule. The best supervision is usually achieved by working on the job with enumerators. The supervisor should be present at several initial interviews of each enumerator. By listening to and observing the interviews, the supervisor may detect deficiencies and take immediate remedial action. Subsequent regular visits should be organized to observe at least one interview and inspect a small sample of completed questionnaires for

completeness and internal consistency. When the enumerator has completed one work phase in a locality, the supervisor must review the enumerator's work, ensuring that all households have been accounted for, all holders interviewed and all questionnaires properly completed. In cases of unsatisfactory results, the enumerator must repeat the work until satisfactory.

5.37 In view of their important role, supervisors should undergo an intensive training programme including:

- (a) why the census is being taken
- (b) how the work of census taking is organized
- (c) supervisor's responsibilities
- (d) how to check local sample area maps or enumeration districts
- (e) how household or holder lists are prepared and used
- (f) maps required and their use
- (g) how to use training guides
- (h) how to check holding lists
- (i) conducting training sessions for enumerators
- (j) recruiting and selecting enumerators
- (k) observing the enumerator at work
- (l) giving enumerators additional training
- (m) reviewing questionnaires and other records prepared by enumerators
- (n) determining whether or not each enumerator is performing his work according to the prescribed time schedule
- (o) recording and appraising periodic reviews of enumerator's work
- (p) handling special problems encountered by enumerators
- (q) action required to replace enumerators
- (r) making a final review of enumerator's work
- (s) action to be taken when work is not completed satisfactorily
- (t) handling cases of refusal or unwillingness to provide required data
- (u) organization of field editing and aggregating completed questionnaires; and
- (v) periodic progress reports required.

5.38 Omissions in the holdings' list require special supervisory attention. In many countries, significant listing errors result from difficulties in identifying households along the enumeration border area. If the map or locality sketch map does not clearly distinguish boundaries by natural features, the supervisor should check carefully the accuracy of listings on the enumeration area perimeter.

Pretesting

5.39 Pretesting is enumerating a limited number of holdings, a prelude for collecting evidence, through interviews and/or objective measurement techniques, of the adequacy of various census procedures. Pretesting alternative census methodologies, the questionnaire, and enumerators' instructions and training programmes are vital. The census should not be undertaken without adequate pretesting. Pretests of the selection and training of enumerators must be performed exactly as prescribed for the main census enumeration. Some purposes of pretesting are to:

- (a) provide evidence on the adequacy of time allocated for each part of the training programme;
- (b) indicate, by tests and experimental enumeration, the questions, definitions and procedures not fully understood by enumerators;
- (c) show how well enumerators can perform their duties after training;
- (d) measure enumerators' ability to explain to holders what is intended, what kind of data are required, etc.;
- (e) measure the holder's ability to provide qualitative and quantitative answers;
- (f) indicate which questions the holder does not fully understand;
- (g) identify questions for which it is difficult to obtain data;
- (h) ascertain type and magnitude of errors made by enumerators and respondents;
- (i) estimate time required for various activities to be carried out by enumerators; and
- (j) help choose between complete enumeration and sampling, or a combination of both.

5.40 Quality control records of enumerators' activities during the pretest should be kept, preferably by supervisors or staff members without training responsibilities. Such records should include number and kind of errors made by each enumerator and the time required for each operation or part of the training programme. Summaries of time used and problems recorded during pretesting should also be prepared. These records and written suggestions from supervisors and staff members participating in the pretest will be the basis for revising the questionnaire or instructions to enumerators.

5.41 Pretesting may also involve pilot surveys, designed to enable the technicians conducting the census to choose between complete enumeration and sampling or a combination of both. This requires highly specialized surveys and should be an essential part of the census research phase.

Field work quality checks

5.42 Nonsampling errors arising from numerous sources are discussed in Chapter 2. The census frame or holdings' list may be incomplete or inaccurate; the wording of questions ambiguous or misleading; enumerators may have their own opinions on proper answers, thus influencing respondents; respondents occasionally do not really know the answers, or cannot recall the data requested, and others may consciously answer incorrectly; field work may be inadequately organized or supervised; enumerators may lack specific training or unsatisfactory standards may have been used for their selection; mapping materials may be inaccurate and incomplete, possibly resulting in double enumeration and omissions; holders may not provide data; or completed questionnaires may be lost.

5.43 The following error types can occur during field work:

- households or holdings are omitted during listing;
- household members absent at time of listing are omitted;
- failure to identify holder in household;
- failure to record data for all parcels in holdings, when some parcels are located in another locality;
- omissions by holder, due to lapse in memory or for other reasons;
- failure to obtain correct area because actual area may not even be known to holder;
- land incorrectly identified due to misunderstanding of definition of land use;
- inaccurate crop areas where mixed, associated and successive cropping methods are used;
- failure to report livestock which is temporarily away on public or common pastures, or in transit outside holding;
- failure to report use of jointly owned agricultural machinery, tc.

Furthermore, errors and biases are sometimes traceable to unconscientious enumerators entering false data or omitting holders or holdings not easily accessible. Response errors also result from enumerators having their own biases which cause them to commit data recording errors or mislead respondents.

5.44 Efforts to reduce errors arising from all field work sources and stages should be made through proper planning and activity control. The presence and possible magnitude of errors and biases should be determined by conducting sample surveys as quality checks during or just after the main census enumeration. Statisticians have

an obligation to their profession and to data users to undertake these checks. Without assessing data quality, there is no way to determine the reliability of the data collected. Checking and reporting data quality are necessary for proper use of statistical information.

5.45 Another important reason to check work quality is that such checking may represent the only serious attempt to obtain evidence of census methodology deficiencies, types of errors occurring, and magnitude of such errors. Such evidence provides a concrete basis for overall improvement in survey methods and the elimination or reduction of errors and biases.

Advance estimates

5.46 The regular tabulation of all census items takes a long time to complete in some countries, even when electronic data processing facilities are available. Long delays mean that urgent needs for statistical information are unfulfilled and the practical usefulness of the census results is seriously diminished.

5.47 A possible solution is advance tabulation of data from a selected sample of enumerated units, so that estimates of basic characteristics can be obtained to meet the most urgent census result needs. Using sampling methods to provide advance estimates can help reduce negative effects of the delay between enumeration and release of complete census tabulations. Adequate sample size and sample selection procedures must be carefully determined to ensure that advance estimates are sufficiently precise. Advance sample tabulation users should be made aware of sampling errors, in the resulting data and the possibilities of significant deviations from the final tabulations. The number of subclassifications and cross-tabulations should be kept to a minimum in advance sample tabulations. Sampling procedures to obtain advance estimates require great care, meticulous research and planning. However, with advances in low-cost computer hardware and software, the need for advance sample tabulations probably indicates inadequate attention to data processing needs and/or too wide a census scope.

Data processing

5.48 Early preparation - Data processing preparations must start early in census planning. In particular, sufficient time must be assigned to selecting and training data processing staff.

5.49 The present basic guidelines are oriented to electronic data processing as most countries will use computers for processing the results of their 1990 agricultural census round. Countries without computer facilities may need to restrict the census scope and/or limit the number of units covered. A combination of manual and computer

5.53 Computer operations design - Computerized data processing requires various planning operations: precoding of questionnaire items; types of corrections to be made during questionnaire review for completeness; coding the questionnaire; correcting errors detected during keypunching or key-to-tape operations; and developing tabulations. This planning requires experienced agricultural statisticians to work with computer system analysts and programmers and should be included as a part of overall census planning.

5.54 The success of data processing depends on:

- (a) Reviewing the existing statistical data system and the role of census data in that system or conceptualizing such a system if it does not exist;
- (b) preparing outlines of all statistical tables concurrently and in coordination with the preparation of the questionnaire;
- (c) preparing computer programmes or installing software packages for modifying (or initiating) the data system to accommodate any new census needs, including user access to census data after the basic census operation is complete, and thoroughly testing them before data collection begins;
- (d) requiring the computer system analysts and programmers to fully document all programmes, allowing other programmers to understand them easily (the computer programmes should be self-documented by comments within them and user manuals should be updated or prepared); and
- (e) limiting changes in computer programmes to those absolutely necessary after the programmes have been prepared.

5.55 Preparing computer programmes - Considerable time is required to write computer programmes for tabulation, error identification and some automatic error correction. Available software packages should be carefully studied for their possible installation and use to perform these activities. After the selected software packages are installed or the computer programmes prepared, they should be tested with data from pretest surveys. Questionnaires used in the main data collection operation are likely to differ from questionnaires used for pretesting; therefore, data on questionnaires referring to holdings enumerated in the pretest must be transferred to census questionnaires. It may also be necessary to enter estimates on the census questionnaires for items not included in the pretest, as well as some erroneous data designed to test the full range of error detection specified for the computer programmes. Computer printouts should be run of identified errors and corrections. Corrections

should also be reviewed to determine whether all errors have been detected; if not additional specifications are required to correct remaining errors or inconsistencies.

5.56 Computer programmes are commonly tested by verifying results of both error detection and tabulations for a group of 100-500 questionnaires. Data used for such tests should be printed for each questionnaire and a manual tabulation made from the printouts to check each item or its classification in the tabulations. Manual tabulation of 100-500 questionnaires is a time-consuming operation and requires qualified staff. When such staff are not available, the number of questionnaires used for testing may have to be reduced. In such case, it may be best to complete the test questionnaires with artificial data in an attempt to cover all items in as few questionnaires as possible. If the data are well prepared, only 20-50 questionnaires may be sufficient.

5.57 Error detection by computer applies to missing and impossible entries and various internal data inconsistencies. This operation is designed to discover large data errors, assess the incidence of missing entries, and detect all inconsistencies within and between tables.

5.58 Procedures for correcting data will depend on the number of errors discovered. In the extreme case of a large number of errors, it may be necessary to repeat certain enumerations. Attempts should be made to discover excessive errors in the field and take corrective action before the data are sent for computer processing. It is normally impossible to correct errors without returning to the field, but when the error impact is significant, it may be better to substitute more acceptable entries for unacceptable ones. This error correction procedure should preferably be carried out manually. If automatic computerized correction is used, caution should be exercised to ensure that this procedure does not replace rational human judgement. Speed and uniformity of automatic correction is worth considering, however, for special types of errors. If missing entries incidence is significant, it might be preferable to tabulate them under "holdings not reporting" or to make corrections when practicable. It may also be feasible to impute certain values, such as average value or value taken from a similar holding.

5.59 Automatic error correction is delicate and, if implemented, should be used only for obvious and easily corrected errors, taking all possible precautions. Related computer programmes must be tested very carefully and the original suspect data retained for further scrutiny and reference. Some common types of automatic error detection computer operations needing little effort are:

- (a) checking for missing entries;
- (b) checking for inadmissible entries (for example, age of holder below minimum specified, nonexistent crop codes; and
- (c) checking totals (for example, total area reported under different land use classes should be equal to total area of holding), as consistency within and between tables depends on whether arithmetical relations between data are correct at holding level.

5.60 Whenever possible, computers should be used for coding operations to ensure uniformity and prevent errors. An example of computer coding is the assignment of size class codes to total holding area. Computer coding is performed normally after all data have been checked and corrected.

5.61 Census data processing is lengthy and requires time, perhaps more than a year, to complete all tables. Steps should be taken to obtain more urgently needed data, before all results are available by planning the tabulation programme in two or more phases. Phase one should include the most urgent and important tabulations, phase two and subsequent phases could include other more detailed tabulations according to established country priorities. Advance tabulations may be prepared from enumerated unit samples in the earlier phases but computer programmes should always be prepared for use with both advance and final tabulations. Advance tabulations can be supplemented by manually compiled aggregates of main census items. Enumerators may prepare enumerated holding aggregates on summary sheets; these can be further aggregated by administrative areas in districts and provinces, while corresponding national and other totals may be prepared and issued by the central office. Procedures should be developed and tested for processing all data. If some data are unprocessed due to the lack of such preparations, then the effort that went into conceptualizing their need, planning, and actual field enumeration were wasted and the policy analysts or planners needing such data will be very disappointed and unlikely to support future census efforts.

5.62 Micro-computers - Micro-computers are a recent development in electronic data processing and analysis. Some countries use micro-computers to process agricultural census data. Micro-computers have some advantages over large main-frame computers. First, they are less costly and are physically easy to transport and install. Second, users can easily master them, especially with the various "user friendly" and versatile software that is available. Third, it is possible to dedicate a micro-computer totally to census work, whereas this is generally impossible with a main-frame computer serving many users for different purposes. Certain aspects of micro-computers should be carefully evaluated, however, before deciding to acquire one

for processing agricultural census data. Micro-computers are usually equipped with one data entry station and a narrow carriage printer; they have restricted memories and data storage capacity; they generally use disk formats not directly compatible with most main-frame disks; software explicitly developed for census type data processing may not be available. The type of micro-computer needed for agricultural census data processing should have several data entry stations, wide carriage printer, sufficient memory and data storage capacity in hard disk form in addition to floppy disk units, and should use disk formats directly compatible with main-frame computers in use in the country. Other important matters to take into account are: uninterrupted power supply to prevent hardware failure and restart delay; servicing and spare parts supply; available personnel trained on micro-computers and adequate local training facilities. Micro-computers compatible with larger centralized computers can best be used to decentralize and speed data entry and checking for later off-loading and processing on the central computer.

5.63 Table evaluation - Despite precautionary measures taken in the course of data processing, some errors will remain and be incorporated into census tables. The effect of these errors might be considerable and all tables should be systematically reviewed before publication, to eliminate major and minimize the effects of minor errors. Various methods can be used to carry out this review. An essential procedure is a consistency study of census data compared with statistics on the same subject available from previous censuses and surveys. Agreement between old and new data obviously does not establish the accuracy of either. The same applies for internal consistency checks. However, if there are no major discrepancies, the data can be released. Should large discrepancies be discovered, further investigation is necessary and verification of original data may be useful to ascertain the error source. Another useful step involves breaking down basic aggregates by various administrative units and comparing the subaggregates with analogous data and statistics from other sources, including professional judgement.

5.64 Table review should not delay publication; because the tabulation programme is known, existing statistics can be studied beforehand. Thus, a quick review of the tables is possible immediately they are available. Results of quality checks made during and after field enumeration can be fully utilized in the final evaluation of census tables. Quality checks may reveal major gaps in the enumeration of holdings and the particular areas of the country or categories of holdings affected. Accuracy of response should also be checked. All important results from quality checks are utilized in evaluation and included in the final census report to familiarize data users with data quality and evaluation methods used.

5.65 Publication of census results - Census taking uses public resources and the published results represent public receipt of a major product from this expenditure. To optimize census value, main results should be published as early as possible. Direct reproduction of computer printouts is one method to accomplish this.

5.66 Direct reproduction of printouts, however, requires thorough tabulation programme computer testing to produce neat and understandable tables. Moreover, extensive manual corrections and changes may be difficult. This technique can be recommended only for countries with sufficient computer resources to start timely data processing preparations. On the other hand, it is questionable whether any country should start field enumeration for an agricultural census until such data processing capability has been developed and thoroughly tested.

5.67 A general census report, prepared by professional staff, may be issued in several volumes. The report should include, in addition to statistical tables, all information that might be useful to better understand and evaluate data. Details of organizational and administrative aspects of the census should also be included as they may be useful in preparing and implementing future censuses. The report might also include material on purpose or objectives, legal authority and administration, scope and coverage, essential definitions, concepts and classification, assessment of reliability of results, copies of questionnaires, summary of main instructions for enumerators and supervisors, data collection methods, data processing and tabulation methods, description of administrative and other divisions for which statistics are published, summary of important results and comparisons with statistics from prior censuses or other sources. The report should also provide all relevant sample design details for sample enumeration, particularly those discussed in the United Nation's publication on preparation of sample survey reports (UN 1964). Finally, disseminating census results through brief summaries and graphic presentation merits consideration as part of the publication programme.

5.68 The publication programme is as important as other components of census operations. Availability of computers and feasibility of storing primary data permit utilization of results in a variety of ways in addition to those included in main census publications. In particular, statistics requested by users on special topics excluded from general tabulation and publication programmes may be tabulated from census data stored on tapes or other media.

5.69 User access to data - Publication of census results is one way to provide user access to census data. However, in the long run it may be more useful to deposit census data in an interdisciplinary data system accessible to all social scientists within the government,

universities and colleges, and even the private sector. Data obtained through an agricultural census is very expensive and is often collected only once every ten years. The basis for such data collection should be part of an interdisciplinary effort to conceptualize the country's food, agriculture and rural development complex and the need to understand and provide government intervention in the technical, economic and social causal relationships involved. As explained earlier, the agricultural census is the source of data concerning structural aspects of such relationships. Thus, the real utility of agricultural census data is in its broad uses.

SUMMARY

5.70 Efficient census programme planning is essential. Efficiency primarily concerns costs in relation to the quantity and quality of data collected. Censuses employ many people and require long and costly preparations, such as cost of field operations, tabulation equipment, printing, and data maintenance and storage. A rational approach in planning census operations means a choice of methods and techniques to achieve established census goals while minimizing total census cost.

5.71 Small-scale research surveys and other activities, conducted at relatively low cost, can supply needed information, replacing guesswork in preliminary census programme planning by rational and objective decisions.

5.72 Collecting and analyzing data necessary for planning censuses and sample surveys comprise census programme research. Staffing questions arise early in the planning stage, such as: number of qualified people available for particular tasks in the country as a whole and in each administrative unit, criteria to be used for recruiting and selecting needed personnel, structure and scope of enumerator training programmes and staff performance in carrying out assigned tasks. Appropriately conducted research can provide means for handling these problems, give insight into all census operation components and help improve the quality of results. It is important to anticipate problems and difficulties expected to arise when implementing the main census operations.

5.73 Selecting data collection techniques for field enumeration is difficult even in countries with long experience in census taking. Certain holding types may furnish information through mail questionnaires. Accuracy requirements may suggest objective measurement techniques. Staff problems, census objectives, local customs and traditions, public cooperation and other factors, may suggest other techniques. When sampling techniques are used, alternative sampling schemes must be evaluated.

Research needs

5.74 Well conducted research studies furnish, for each alternative data collection technique, an assessment of corresponding cost and resource requirements, needed qualifications of enumerators, difficulties in following procedures, and additional useful information. This area of the census programme may be the most important subject for research, as the quality of census results depends heavily upon techniques used in data collection. The design of sample surveys requires basic information about the population being sampled. The appropriate number of units to be included in a sample survey cannot be determined without first estimating variances in important population characteristics. Pilot research studies are necessary to obtain this information when it is not readily available.

5.75 Another important reason for establishing a research programme is the need to monitor development of the national food and agricultural statistics programme of which the census is a component. On the one hand, the contribution of the census to this programme depends on relative development of other data sources, such as various agricultural surveys and administrative records. On the other hand, the census should provide a frame for specialized surveys on agricultural holdings essential for planning these surveys. A relevant research programme helps identify problems that will be encountered and remedies needed in the development of a national food and agriculture statistics programme.

5.76 Care must be given to the proper design and conduct of research activities and to proper interpretation of results and decisive follow-up action. All relevant facts must be disclosed, various alternatives must be scrutinized and any inherent biases exposed if a research programme is to achieve its aims. Pilot research studies must be conducted under field operating conditions, otherwise the research results have inadequate bearing on the real situation. Research results must be adequately and properly analyzed and, finally, the best course of action must be implemented to ensure a successful agricultural census. Qualified statisticians with research training and experience are a prerequisite for guaranteeing that these criteria are satisfied.

APPENDIX 1

ALPHABETICAL LIST OF CROPS, BOTANICAL NAME AND CODE NUMBER

The following list includes all crops specifically mentioned under the proposed census items in Chapter 3, together with their botanical name and assigned code number.

CROP	BOTANICAL NAME	CROP CODE NUMBER
Abaca (Manila hemp)	<i>Musa textilis</i>	2.2.4.1
Alfalfa for fodder	)	1.7.1.1
Alfalfa for seed	) <i>Medicago sativa</i>	1.8.2
Almond	<i>Prunus dulcis</i>	2.1.7.1
Anise seeds	<i>Pimpinella anisum</i>	1.4.3.4
Apple	<i>Malus sylvestris</i>	2.1.2.1
Apricot	<i>Prunus armeniaca</i>	2.1.3.1
Areca (betel nut)	<i>Areca catechu</i>	2.2.7.6
Arracha	<i>Arracacia xanthorrhiza</i>	1.2.9
Arrowroot	<i>Maranta arundinacea</i>	1.2.5
Artichoke	<i>Cynara scolymus</i>	1.5.1.0.1
Artichoke, Jerusalem	<i>Helianthus tuberosus</i>	1.7.5.0.2
Asparagus	<i>Asparagus officinalis</i>	1.5.1.0.2
Avocado	<i>Persea americana</i>	2.1.6.0.1
Bajra (millet)	<i>Pennisetum americanum</i>	1.1.5.1.2
Bambara groundnuts	<i>Vigna subterranea</i>	1.3.9
Banana	<i>Musa paradisiaca</i>	2.1.6.0.2
Barley	<i>Hordeum vulgare</i>	1.1.4
Bean, dry, edible	<i>Phaseolus vulgaris</i>	1.3.1
Bean, harvested green	<i>Phaseolus vigna</i> spp.	1.5.4.1
Beet, fodder (mangel)	)	1.7.5.0.5
Beet, red	)	1.5.3.5
Beet, sugar	) <i>Beta vulgaris</i>	1.4.1.2
Beet, sugar for fodder	)	1.7.5.0.6
Bergamot	<i>Citrus bergamia</i>	2.1.1.6
Betel nut	<i>Areca catechu</i>	2.2.7.6
Blackberry	<i>Rubus</i> spp.	2.1.5.7
Black pepper	<i>Piper nigrum</i>	2.2.3.1
Black wattle	<i>Acacia mearnsii</i>	2.2.5.2
Blueberry	<i>Vaccinium</i> spp.	2.1.5.1
Brazil nut	<i>Bertholletia excelsa</i>	2.1.7.6
Breadfruit	<i>Artocarpus altilis</i>	2.1.6.0.3
Broad bean, dry	)	1.3.2
Broad bean, harvested green)	<i>Vicia faba</i>	1.5.4.3

CROP	BOTANICAL NAME	CROP CODE NUMBER
Broccoli and cauliflower	<i>Brassica oleracea botrytis</i>	1.5.5.1
Broom millet	)	1.4.5.4
Broom sorghum	) <i>Sorghum bicolor</i>	1.4.5.4
Brussels sprouts	<i>Brassica oleracea gemmifera</i>	1.5.1.0.3
Buckwheat	<i>Fagopyrum esculentum</i>	1.1.9
Cabbage (red, white, Savoy)	<i>Brassica oleracea capitata</i>	1.5.1.0.4
Cabbage, Chinese	<i>Brassica rapa</i>	1.5.1.0.7
Cabbage, for fodder	<i>Brassica</i> spp.	1.7.5.0.1
Cacao (cocoa)	<i>Theobroma cacao</i>	2.2.1.2
Cantaloupe and other melons	<i>Cucumis melo</i>	1.5.2.0.1
Caraway seeds	<i>Carum carvi</i>	1.4.3.4
Cardamom	<i>Elettaria cardamomum</i>	2.2.3.7
Cardoon	<i>Cynara cardunculus</i>	1.5.1.1.5
Carob	<i>Ceratonia siliqua</i>	2.1.6.1.5
Carrot, edible	)	1.5.3.1
Carrot, for fodder	) <i>Daucus carota</i>	1.7.5.1.0
Cashew nuts	<i>Anacardium occidentale</i>	2.1.7.2
Cassava (manioc)	<i>Manihot esculenta</i>	1.2.3
Castor bean	<i>Ricinus communis</i>	1.4.2.1.0
Cauliflower and broccoli	<i>Brassica oleracea botrytis</i>	1.5.5.1
Celeriac	)	1.5.3.8
Celery	) <i>Apium graveolens</i>	1.5.3.8
Chayote	<i>Sechium edule</i>	1.5.2.1.2
Cherry (including sour)	<i>Prunus</i> spp.	2.1.3.2
Chestnut	<i>Castanea sativa</i>	2.1.7.4
Chickpea (gram pea)	<i>Cicer arietinum</i>	1.3.4
Chicory	)	1.4.5.2
Chicory for greens	) <i>Cichorium intybus</i>	1.5.1.0.6
Chilli, dry	)	1.4.3.1
Chilli, fresh	) <i>Capsicum</i> spp.	1.5.2.0.2
Chinese cabbage	<i>Brassica rapa</i>	1.5.1.0.7
Cinnamon	<i>Cinnamomum verum</i>	2.2.3.2
Citronella	<i>Cymbopogon nardus</i>	2.2.7.1
Citron	<i>Citrus medica</i>	2.1.1.6
Clementine	<i>Citrus veticulata</i>	2.1.1.2
Clover for fodder	)	1.7.1.2
Clover for seed	) <i>Trifolium</i> spp.	1.8.3
Clove	<i>Syzygium aromaticum</i>	2.2.3.3
Cocoa (cacao)	<i>Theobroma cacao</i>	2.2.1.2
Coconut	<i>Cocos nucifera</i>	2.2.2.1
Cocoyam	<i>Colocasia</i> spp.; <i>Xanthosoma</i> spp.	1.2.8
Coffee	<i>Coffea</i> spp.	2.2.1.1

CROP	BOTANICAL NAME	CROP CODE NUMBER
Cola	Cola spp.	2.2.1.6
Colza (rapeseed)	Brassica napus	1.4.2.0.5
Corn (maize)	)	1.1.3
Corn (maize), for silage	) Zea mays	1.7.3.1
Corn (sweet)	)	1.5.5.2
Corn salad	Valerianella locusta	1.5.1.1.5
Cotton	)	1.4.4.1
Cottonseed	) Gossypium spp.	1.4.2.0.8
Cowpea	)	1.3.6
Cowpea, harvested green	) Vigna unguiculata	1.5.4.3
Cranberry	Vaccinium spp.	2.1.5.2
Cress	Lepidium sativum	1.5.1.0.8
Cucumber	Cucumis sativus	1.5.2.0.3
Currants	Ribes spp.	2.1.5.3
Custard apple	Annona reticulata	2.1.6.0.4
Dasheen	Colocasia esculenta	1.2.8
Dates	Phoenix dactylifera	2.1.6.0.5
Drumstick tree	Moringa oleifera	2.2.3.8
Dry, bean, edible	Phaseolus spp.	1.3.1
Dry broad bean	Vicia faba	1.3.2
Dry chilli	Capsicum spp.	1.4.3.1
Dry garlic	Allium sativum	1.2.7
Dry onion	Allium cepa	1.2.6
Dry pea, edible	Pisum sativum	1.3.3
Dry pepper	Capsicum spp.	1.4.3.1
Durum wheat	Triticum durum	1.1.1.1.1
		1.1.1.2.1
Durra (sorghum)	Sorghum bicolor	1.1.5.2
Earth pea (bambara groundnut)	Vigna subterranea	1.3.9
Edo (eddoe)	Xanthosoma spp.; Colocasia spp.	1.2.8
Eggplant	Solanum melongena	1.5.2.0.4
Endive	Cichorium endivia	1.5.1.0.9
Esparto grass	Lygeum spartum	1.4.5.4
Fennel	Foeniculum vulgare	1.5.1.1.5
Funugreek	Trigonella foenum-graecum	1.3.9
Fig	Ficus carica	2.1.6.0.6
Filbert (hazelnut)	Corylus avellana	2.1.7.5
Fique	Furcraea macrophylla	2.2.4.6
Flax for fibre	)	1.4.4.2
Flax for oil seed (linseed)	) Linum usitatissimum	1.4.2.0.3

CROP	BOTANICAL NAME	CROP CODE NUMBER
Fodder beet (mangel)	Beta vulgaris	1.7.5.0.5
Formio (New Zealand flax)	Phormium tenax	2.2.4.4
Garlic, dry	)	1.2.7
Garlic, green	) Allium sativum	1.5.3.2
Geranium	Pelargonium spp.; Geranium spp.	1.4.3.2
Ginger	Zingiber officinalis	2.2.3.4
Gooseberry	Ribes spp.	2.1.5.4
Gourd	Langenaria spp; Cucurbita spp.	1.5.2.0.5
Gram pea (chickpea)	Cicer arietinum	1.3.4
Grapefruit	Citrus paradisi	2.1.1.4
Grape	)	2.1.4
Grapes for raisins	) Vitis vinifera	2.1.4.3
Grapes for table use	)	2.1.4.2
Grapes for wine	)	2.1.4.1
Grass esparto	Lygeum spartum	1.4.5.4
Grass, orchard	Dactylis glomerata	1.7.2.1
Grass, Sudan	Sorghum bicolor	1.7.2.1
Green garlic	Allium sativum	1.5.3.2
Green onion	Allium cepa	1.5.3.3
Groundnut (peanut)	Arachis hypogaea	1.4.2.0.1
Guava	Psidium guajava	2.1.6.0.7
Guinea corn (sorghum)	Sorghum bicolor	1.1.5.2
Hazelnut (filbert)	Corylus avellana	2.1.7.5
Hemp fibre	Cannabis sativa	1.4.4.3
Hemp, Manila (abaca)	Musa textilis	2.2.4.1
Hempseed	Cannabis sativa	1.4.2.1.1
Hemp, sunn	Crotalaria juncea	1.4.4.5
Henequen	Agave fourcroydes	2.2.4.2
Henna	Lawsonia inermis	1.4.5.4
Hop	Humulus lupulus	2.2.1.4
Horse bean	Vicia faba	1.3.2
Horseradish	Armoracia rusticana	1.5.3.8
Hybrid maize	Zea mays	1.1.3.1
Indigo	Indigofera tinctoria	1.4.5.4
Jasmine	Jasminum spp.	2.2.6.2
Jerusalem artichoke	Helianthus tuberosus	1.7.5.0.2
Jute	Corchorus spp.	1.4.4.4
Jowar (sorghum)	Sorghum bicolor	1.1.5.2

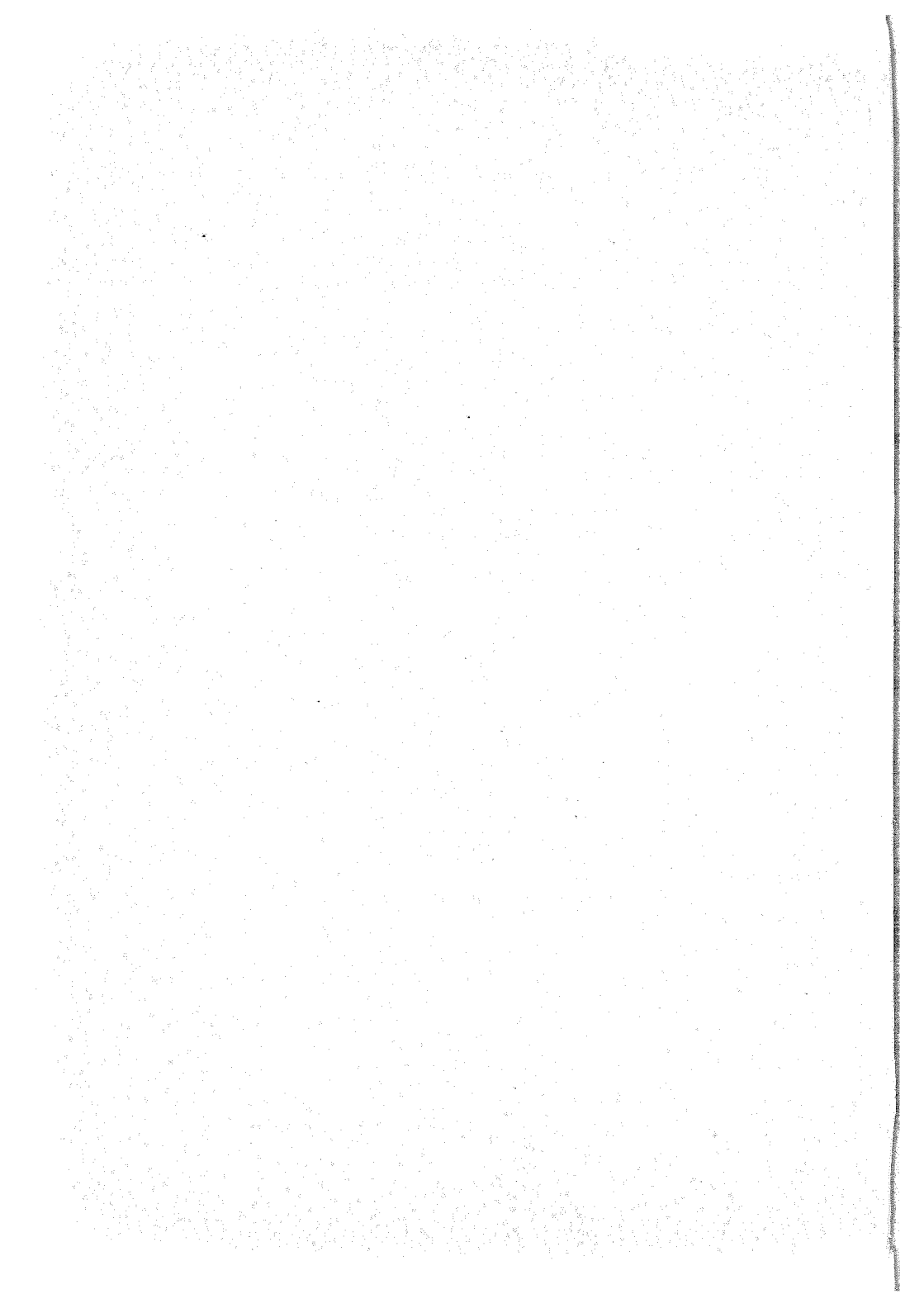
CROP	BOTANICAL NAME	CROP CODE NUMBER
Kale	<i>Brassica oleracea acephala</i>	1.5.1.1.0
Kapok	<i>Ceiba pentandra</i>	2.2.4.3
Kenaf	<i>Hibiscus cannabinus</i>	1.4.4.5
Kohlrabi	<i>Brassica oleracea gongylodes</i>	1.5.3.6
Lavender	<i>Lavandula</i> spp.	1.4.3.2
Leek	<i>Allium ampeloprasum</i>	1.5.1.1.1
Lemon	<i>Citrus limon</i>	2.1.1.3
Lemon grass	<i>Cymbopogon citratus</i>	2.2.7.7
Lentil	<i>Lens culinaris</i>	1.3.5
Lespedeza	<i>Lespedeza</i> spp.	1.7.1.3
Lettuce	<i>Lactuca sativa</i>	1.5.1.1.2
Liquorice	<i>Glycyrrhiza glabra</i>	1.4.3.3
Lime, sour	<i>Citrus aurantifolia</i>	2.1.1.5
Lime, sweet	<i>Citrus limetta</i>	2.1.1.6
Linseed (flax for oil seed)	<i>Linum usitatissimum</i>	1.4.2.0.3
Litchi	<i>Litchi chinensis</i>	2.1.6.1.5
Loquat	<i>Eriobotrya japonica</i>	2.1.2.5
Lupine	<i>Lupinus</i> spp.	1.3.9
Macadamia (Queensland nut)	<i>Macadamia</i> spp.	2.1.7.6
Mace and nutmeg	<i>Myristica fragrans</i>	2.2.3.5
Maguey	<i>Agave atrovirens</i>	2.2.4.6
Maize (corn)	)	1.1.3
Maize (hybrid)	)	1.1.3.1
Maize, ordinary	) <i>Zea mays</i>	1.1.3.2
Maize (corn) for silage	)	1.7.3.1
Mandarin and tangerine	<i>Citrus reticulata</i>	2.1.1.2
Mangel (fodder beet)	<i>Beta vulgaris</i>	1.7.5.0.5
Mango	<i>Mangifera indica</i>	2.1.6.0.8
Manila hemp (abaca)	<i>Musa textilis</i>	2.2.4.1
Manioc (cassava)	<i>Manihot esculenta</i>	1.2.3
Maslin (mixed cereals)	Mixture of <i>Triticum</i> spp.;	
	<i>Secale cereale</i>	1.1.8
Medlar	<i>Mespilus germanica</i>	2.1.2.4
Melon and cantaloupe	<i>Cucumis melo</i>	1.5.2.0.1
Millet, proso	<i>Penicum miliaceum</i>	1.1.5.1.1
Millet, bajra	<i>Pennisetum americanum</i>	1.1.5.1.2
Millet broom	<i>Sorghum bicolor</i>	1.4.5.4
Millet, bulrush	<i>Pennisetum americanum</i>	1.1.5.1.1
Millet, finger	<i>Eleusine coracana</i>	1.1.5.1.1
Millet, Italian	<i>Setaria italica</i>	1.1.5.1.2
Millet, Japanese	<i>Echinochloa crusgalli</i>	1.1.5.1.2

CROP	BOTANICAL NAME	CROP CODE NUMBER
Millet, pearl	<i>Pennisetum americanum</i>	1.1.5.1.1
Millet and sorghum	<i>Pennisetum americanum</i> ; <i>Eleusine coracana</i> ; <i>Sorghum bicolor</i>	1.1.5
Mint	<i>Mentha</i> spp.	1.4.3.2
Mulberry for fruit	<i>Morus</i> spp.	2.1.6.1.5
Mulberry for silkworms	<i>Morus alba</i>	2.2.7.2
Mushrooms	<i>Agaricus</i> spp.; <i>Pleurotus</i> spp.	
	<i>Volvariella</i>	1.6.2.2
Mustard	<i>Brassica nigra</i> ; <i>Sinapis alba</i>	1.4.2.0.6
Nectarine	<i>Prunus persica</i>	2.1.3.5
New Zealand flax (formio)	<i>Phormium tenax</i>	2.2.4.4
Niger seed	<i>Guizotia abyssinica</i>	1.4.2.1.1
Nutmeg and mace	<i>Myristica fragrans</i>	2.2.3.5
Oats, for fodder	)	1.7.3.2
Oats, for grain	) <i>Avena</i> spp.	1.1.6
Oil palm	<i>Elaeis guineensis</i>	2.2.2.2
Okra	<i>Abelmoschus esculentus</i>	1.5.2.0.6
Olive	<i>Olea europea</i>	2.2.2.3
Onion, dry	)	1.2.6
Onion, green	) <i>Allium cepa</i>	1.5.3.3
Onion seed	)	1.8.5
Opium	<i>Papaver somniferum</i>	1.4.3.3
Orange	<i>Citrus sinensis</i>	2.1.1.1
Orange, bitter	<i>Citrus aurantium</i>	2.1.1.6
Orchard grass	<i>Dactylis glomerata</i>	1.7.2.1
Ornamental plants		1.6.1.2
Palm, oil	<i>Elaeis guineensis</i>	2.2.2.2
Palm, sago	<i>Metroxylon</i> spp.	2.2.7.3
Palmyra palm	<i>Borassus flabellifer</i>	2.2.7.4
Papaya (pawpaw)	<i>Carica papaya</i>	2.1.6.0.9
Parsnip	<i>Pastinaca sativa</i>	1.5.3.8
Peach	<i>Prunus persica</i>	2.1.3.3
Peanut (groundnut)	<i>Arachis hypogaea</i>	1.4.2.0.1
Pear	<i>Pyrus communis</i>	2.1.2.2
Pea, edible dry	)	1.3.3
Pea, harvested green	) <i>Pisum sativum</i>	1.5.4.2
Pecan nut	<i>Carya illinoensis</i>	2.1.7.6
Pepper, black	<i>Piper nigrum</i>	2.2.3.1
Pepper, dry	<i>Capsicum</i> spp.	1.4.3.1
Pepper, sweet	<i>Capsicum annuum</i>	1.5.2.0.9

CROP	BOTANICAL NAME	CROP CODE NUMBER
Persimmon	Diospyros kaki;	
	Diospyros virginiana	2.1.6.1.0
Pigeon pea	Cajanus cajan	1.3.7
Pimento	Capsicum annuum	1.4.3.1
Pineapple	Ananas comosus	2.1.6.1.1
Pistachio nut	Pistacia spp.	2.1.7.6
Plantain	Musa paradisiaca	2.1.6.1.2
Plum and prune	Prunus domestica	2.1.3.4
Pomegranate	Punica granatum	2.1.6.1.3
Pomelo	Citrus grandis	2.1.1.4
Poppy seed	Papaver somniferum	1.4.2.1.1
Potato	Solanum tuberosum	1.2.1
Potato, sweet	Ipomoea batatas	1.2.2
Prune and plum	Prunus domestica	2.1.3.4
Pumpkin, edible	)	1.5.2.0.7
Pumpkin, for fodder	) Cucurbita spp.	1.7.5.0.3
Pyrethrum	Chrysanthemum cinerariaefolium	1.4.5.3
Quebracho	Aspidosperma spp.	2.2.5.3
Queensland nut (Macadamia)	Macadamia spp.	2.1.7.6
Quince	Cydonia oblonga	2.1.2.3
Quinine	Cinchona spp.	2.2.7.5
Quinoa	Chenopodium quinoa	1.1.9
Radish	Raphanus sativus (including Cochlearia armoracia)	1.5.3.4
Ramie and rhea	Boehmeria nivea	2.2.4.5
Rapeseed (colza)	Brassica napus	1.4.2.0.5
Raspberry	Rubus spp.	2.1.5.5
Red beet	Beta vulgaris	1.5.3.5
Red cabbage	Brassica oleracea capitata	1.5.1.0.4
Redtop	Agrostis spp.	1.7.2.1
Rhea and ramie	Boehmeria nivea	2.2.4.5
Rhubard	Rheum spp.	1.5.1.1.3
Rice	Oryza sativa; Oryza glaberrima	1.1.2
Rose	Rose spp.	2.2.6.1
Rubber	Hevea brasiliensis	2.2.5.1
Rutabaga or swede	Brassica napus	1.5.3.6
Rye	Secale cereale	1.1.7
Ryegrass seed	Lolium spp.	1.8.4
Safflower seed	Carthamus tinctorius	1.4.2.0.9
Sago palm	Metroxylon spp.	2.2.7.3
Sainfoin	Onobrychis viciifolia	1.7.1.3
Salad, corn	Valerianella locusta	1.5.1.1.2

CROP	BOTANICAL NAME	CROP CODE NUMBER
Salsify	Tragopogon porrifolius	1.5.3.8
Sapodilla	Achras sapota	2.1.6.1.4
Satsuma	Citrus reticulata	2.1.1.2
Savoy cabbage	Brassica oleracea capitata	1.5.1.0.4
Scorzonera	Scorzonera hispanica	1.5.3.8
Sesame	Sesamum indicum	1.4.2.0.7
Shea butter	Butyrospermum paradoxum	2.2.2.4
Sisal	Agave sisilana	2.2.4.2
Sorghum	)	1.1.5.2
Sorghum, broom	)	1.4.5.4
Sorghum, durra	) Sorghum bicolor	1.1.5.2
Sorghum, Guinea corn	)	1.1.5.2
Sorghum, jowar	)	1.1.5.2
Sorghum, sweet	)	1.4.1.3
Sour lime	Citrus aurantifolia	2.1.1.5
Soybean	)	1.4.2.0.2
Soybean hay	) Glycine max	1.7.1.3
Spelt	Triticum spelta	1.1.9
Spinach	Spinacia oleracea	1.5.1.1.4
Spring barley	Hordeum vulgare	1.1.4.2
Spring rye	Secale cereale	1.1.7.2
Spring wheat	)	1.1.1.2
Spring wheat, hard	) Triticum aestivum	1.1.1.2.1
Spring wheat, soft	)	1.1.1.2.2
Sprouts, Brussels	Brassica oleracea gemmifera	1.5.1.0.3
Squash	Cucurbita spp.	1.5.2.0.8
Strawberry	Fragaria spp.	2.1.5.6
Sudan grass	Sorghum bicolor Sudanense	1.7.2.1
Sugar beet	)	1.4.1.2
Sugar beet for fodder	) Beta vulgaris	1.7.5.0.6
Sugar beet for seed	)	1.8.1
Sugarcane for fodder	)	1.7.5.0.7
Sugarcane for sugar	) Saccharum officinarum	1.4.1.1
Sugarcane for thatching	)	1.4.5.4
Sunflower for fodder	)	1.7.5.0.4
Sunflower for oil seed	) Helianthus annuus	1.4.2.0.4
Sunhemp	Crotalaria juncea	1.4.4.5
Swede (rutabaga)	)	1.5.3.6
Swede for fodder	) Brassica napus	1.7.5.0.8
Sweet corn	Zea mays	1.5.5.2
Sweet lime	Citrus limetta	2.1.1.6

CROP	BOTANICAL NAME	CROP CODE NUMBER
Sweet pepper	<i>Capsicum annuum</i>	1.5.2.0.9
Sweet potato	<i>Iopmoea batatas</i>	1.2.2
Sweet sorghum	<i>Sorghum bicolor</i>	1.4.1.3
Tangerine and mandarin	<i>Citrus reticulata</i>	2.1.1.2
Tannia	<i>Xanthosoma sagittifolium</i>	1.2.8
Tapioca (cassava)	<i>Manihot esculenta</i>	1.2.3
Taro	<i>Colocasia esculenta</i>	1.2.8
Tea	<i>Camellia sinensis</i>	2.2.1.3
Teff	<i>Eragrostis abyssinica</i>	1.1.9
Timothy	<i>Phleum pratense</i>	1.7.2.1
Tobacco	<i>Nicotiana tabacum</i>	1.4.5.1
Tomato	<i>Lycopersicum esculentum</i>	1.5.2.1.0
Trefoil	<i>Lotus spp.</i>	1.8.6
Tung tree	<i>Aleurites spp.</i>	2.2.2.4
Turnip, edible	)	1.5.3.7
Turnip, for fodder	) <i>Brassica rapa</i>	1.7.5.0.9
Urena (Congo jute)	<i>Urena lobata</i>	1.4.4.5
Vanilla	<i>Vanilla planifolia</i>	2.2.3.6
Vetch for grain	<i>Vicia sativa</i>	1.3.8
Walnut	<i>Juglans spp.</i>	2.1.7.3
Watermelon	<i>Citrullus lanatus</i>	1.5.2.1.1
Wattle, black	<i>Acacia mearnsii</i>	2.2.5.2
Wheat	<i>Triticum spp.</i>	1.1.1
White cabbage	<i>Brassica oleracea capitata</i>	1.5.1.0.4
Winter barley	<i>Hordeum spp.</i>	1.1.4.1
Winter rye	<i>Secale cereale</i>	1.1.7.1
Winter wheat	)	1.1.1.1
Winter wheat, hard	) <i>Triticum aestivum</i>	1.1.1.1.1
Winter wheat, soft	)	1.1.1.1.2
Yams	<i>Dioscorea spp.</i>	1.2.4
Yerba maté	<i>Ilex paraguariensis</i>	2.2.1.5



APPENDIX 2

CROP LIST

This crop list is not exhaustive, nor do all crops listed apply to any one country. Crops grown but deleted from the proposed list should be reported under 19: "Other temporary crops n.e.s." or 23: "Other permanent crops n.e.s." To simplify the list, the product name rather than the crop has been used.

1 Temporary crops1.1 Cereals harvested for grain1.1.1 Wheat1.1.1.1 Winter wheat

1.1.1.1.1 Hard wheat (including durum and semi-hard wheat)

1.1.1.1.2 Soft wheat

1.1.1.2 Spring wheat

1.1.1.2.1 Hard wheat (including durum and semi-hard wheat)

1.1.1.2.2 Soft wheat

1.1.2 Rice

1.1.2.1 Wetland (lowland)

1.1.2.2 Dryland (upland)

1.1.3 Maize (corn)

1.1.3.1 Hybrid maize

1.1.3.2 Ordinary maize

1.1.4 Barley

1.1.4.1 Winter barley

1.1.4.2 Spring barley

1.1.5 Millet and Sorghum1.1.5.1 Millet

1.1.5.1.1 Finger millet (for example, pearl millet, bullrush millet)

1.1.5.1.2 Other millet (for example, bajra, Japanese millet)

1.1.5.2 Sorghum (for example, jowar, Guinea corn, durra)

1.1.6 Oats

1.1.7 Rye

1.1.7.1 Winter rye

1.1.7.2 Spring rye

1.1.8 Mixed cereals for grain (for example, maslin)
spelt, teff)1.2 Tuber, root and bulk crops

1.2.1 Potato

1.2.2 Sweet potato

1.2.3 Cassava (manioc, tapioca)

1.2.4 Yam

1.2.5 Arrowroot

1.2.6 Dry onion

1.2.7 Dry garlic

1.2.8 Taro (cocoyam, dasheen, edoe, tannia)

1.2.9 Others n.e.s.

1.3 Leguminous plants mainly for grain (excluding soybean and groundnut)

1.3.1 Edible dry beans

1.3.2 Dry broad bean (horse bean)

1.3.3 Edible dry peas

1.3.4 Chick pea (gram)

1.3.5 Lentil

1.3.6 Cowpea

1.3.7 Pigeon pea

1.3.8 Vetches

1.3.9 Others n.e.s. (for example, lupines, fenugreek,
bambara nut)1.4 Crops mainly for industrial purposes1.4.1 Sugar crops

1.4.1.1 Sugar cane

1.4.1.2 Sugar beet

1.4.1.3 Others n.e.s. (for example, sweet
sorghum)1.4.2 Oilseed crops

1.4.2.0.1 Groundnut (peanut)

1.4.2.0.2 Soybean

1.4.2.0.3 Flax (linseed)

1.4.2.0.4 Sunflower

1.4.2.0.5 Rapeseed (colza)

1.4.2.0.6 Mustard

1.4.2.0.7 Sesame

1.4.2.0.8 Cottonseed

1.4.2.0.9 Safflower seed

1.4.2.1.0 Castor bean

1.4.2.1.1 Others n.e.s. (for example, hempseed,
poppy seed, niger seed)

1.4.3 Spices, condiments, aromatic and medicinal plants

- 1.4.3.1 Dry peppers, pimento or chilli
- 1.4.3.2 Oil plants for essence (for example, geranium, lavender, mint)
- 1.4.3.3 Medicinal plants (for example, opium, liquorice)
- 1.4.3.4 Others n.e.s. (for example, aniseed, caraway seed)

1.4.4 Fibre crops

- 1.4.4.1 Cotton
- 1.4.4.2 Flax for fibre
- 1.4.4.3 Hemp for fibre
- 1.4.4.4 Jute
- 1.4.4.5 Others n.e.s. (for example, sunn hemp, kenaf, urena)

1.4.5 Other industrial crops

- 1.4.5.1 Tobacco
 - 1.4.5.1.1 Flue-cured
 - 1.4.5.1.1 Other types
- 1.4.5.2 Chicory
- 1.4.5.3 Pyrethrum
- 1.4.5.4 Others n.e.s. (e.g. indigo, heena, broom millet, broom sorghum, esparto grass, sugar cane for thatching)

1.5 Vegetables mainly for human consumption1.5.1. Leafy or stem vegetables

- 1.5.1.0.1 Artichokes
- 1.5.1.0.2 Asparagus
- 1.5.1.0.3 Brussels sprouts
- 1.5.1.0.4 Cabbage (red, white, savoy)
- 1.5.1.0.5 Celery
- 1.5.1.0.6 Chicory for greens
- 1.5.1.0.7 Chinese cabbage
- 1.5.1.0.8 Cress
- 1.5.1.0.9 Endive
- 1.5.1.1.0 Kale
- 1.5.1.1.1 Leek
- 1.5.1.1.2 Salad crops
- 1.5.1.1.3 Rhubarb
- 1.5.1.1.4 Spinach
- 1.5.1.1.5 Others n.e.s. (for example, cardoon, fennel, corn salad)

1.5.2. Fruit-bearing vegetables

- 1.5.2.0.1 Cantaloupe and other melons

- 1.5.2.0.2 Chilli (fresh)
- 1.5.2.0.3 Cucumber
- 1.5.2.0.4 Eggplant
- 1.5.2.0.5 Gourd
- 1.5.2.0.6 Okra
- 1.5.2.0.7 Pumpkin
- 1.5.2.0.8 Squash
- 1.5.2.0.9 Sweet pepper
- 1.5.2.1.0 Tomato
- 1.5.2.1.1 Watermelon
- 1.5.2.1.2 Others n.e.s. (for example chayot)

1.5.3 Root, bulb and tuberous vegetables

- 1.5.3.1 Carrot
- 1.5.3.2 Green garlic
- 1.5.3.3 Green onion
- 1.5.3.4 Radish
- 1.5.3.5 Red beet
- 1.5.3.6 Rutabagas or swedes and kohlrabi
- 1.5.3.7 Turnips
- 1.5.3.8 Others n.e.s. (for example, celeriac, horseradish, parsnip, sconzonera, salsify)

1.5.4 Leguminous vegetables harvested green

- 1.5.4.1 Beans
- 1.5.4.2 Peas
- 1.5.4.3 Others n.e.s. (for example, broad bean, cowpea)

1.5.5 Other vegetables

- 1.5.5.1 Cauliflower and broccoli
- 1.5.5.2 Corn (sweet)
- 1.5.5.3 Others n.e.s.

1.6 Special horticultural cultivation

1.6.1 Grown in the open

- 1.6.1.1 Flowers, bulbs and corms
- 1.6.1.2 Ornamental plants
- 1.6.1.3 Others n.e.s.

1.6.2 Cultivation under protective cover (for example, glass, plastic)

- 1.6.2.1 Vegetables
- 1.6.2.2 Mushrooms
- 1.6.2.3 Flowers and ornamental plants
- 1.6.2.4 Others n.e.s.

1.7 Fodder crops (for grazing or cut for hay, green feed or silage)

1.7.1 Leguminous forage crops

- 1.7.1.1 Alfalfa
- 1.7.1.2 Clover
- 1.7.1.3 Others n.e.s (for example, lespedeza, sainfoin, soybean hay)

1.7.2 Grasses

- 1.7.2.1 Grown alone (for example, timothy, red top, orchard grass, Sudan grass)
- 1.7.2.2 Mixed grasses

1.7.3. Cereals

- 1.7.3.1 Maize (corn) for silage
- 1.7.3.2 Oats
- 1.7.3.3 Others n.e.s.

1.7.4 Mixed legumes, grasses and cereals

1.7.5 Other fodder crops, n.e.s.

- 1.7.5.0.1 Cabbage
- 1.7.5.0.2 Jerusalem artichokes
- 1.7.5.0.3 Pumpkin
- 1.7.5.0.4 Sunflower
- 1.7.5.0.5 Mangel (fodder beet)
- 1.7.5.0.6 Sugar beet
- 1.7.5.0.7 Sugar cane
- 1.7.5.0.8 Swede
- 1.7.5.0.9 Turnip
- 1.7.5.1.0 Others n.e.s. (for example, carrot)

1.8 Crops grown mainly for the production of seed

- 1.8.1 Seed of sugar beet
- 1.8.2 Alfalfa seed
- 1.8.3 Clover seed
- 1.8.4 Rye-grass seed
- 1.8.5 Onion seed
- 1.8.6 Others n.e.s. (for example trefoil)

1.9 Other temporary crops n.e.s.

2 Permanent crops

2.1 Fruit and nut trees

2.1.1 Citrus fruit

- 2.1.1.1 Oranges
- 2.1.1.2 Mandarin and Tangerine (including clementine and satsuma)
- 2.1.1.3 Lemon

- 2.1.1.4 Grapefruit and pomelo
- 2.1.1.5 Sour lime
- 2.1.1.6 Others n.e.s. (for example, bitter orange, sweet lime, citron, bergamot)

2.1.2 Pome fruit

- 2.1.2.1 Apple
- 2.1.2.2 Pear
- 2.1.2.3 Quince
- 2.1.2.4 Medlar
- 2.1.2.5 Others n.e.s. (for example, loquat)

2.1.3 Stone fruit

- 2.1.3.1 Apricot
- 2.1.3.2 Cherry (including sour)
- 2.1.3.3 Peach
- 2.1.3.4 Plum and prune
- 2.1.3.5 Others n.e.s. (for example, nectarine)

2.1.4 Grapes

- 2.1.4.1 Grapes for wine
- 2.1.4.2 Grapes for table use
- 2.1.4.3 Grapes for raisins

2.1.5 Small cultivated fruit

- 2.1.5.1 Blueberry
- 2.1.5.2 Cranberry
- 2.1.5.3 Currants
- 2.1.5.4 Gooseberry
- 2.1.5.5 Raspberry
- 2.1.5.6 Strawberry
- 2.1.5.7 Others n.e.s. (for example, blackberry)

2.1.6. Other cultivated fruit

- 2.1.6.0.1 Avocado
- 2.1.6.0.2 Banana
- 2.1.6.0.3 Breadfruit
- 2.1.6.0.4 Custard apple
- 2.1.6.0.5 Date
- 2.1.6.0.6 Fig
- 2.1.6.0.7 Guava
- 2.1.6.0.8 Mango
- 2.1.6.0.9 Papaya
- 2.1.6.1.0 Persimmon
- 2.1.6.1.1 Pineapple
- 2.1.6.1.2 Plantain
- 2.1.6.1.3 Pomegranate
- 2.1.6.1.4 Sapodilla
- 2.1.6.1.5 Other n.e.s. (for example, lychee, carob)

2.1.7 Edible nuts

- 2.1.7.1 Almond
- 2.1.7.2 Cashew
- 2.1.7.3 Walnut
- 2.1.7.4 Chestnut
- 2.1.7.5 Hazelnut (filbert)
- 2.1.7.6 Other n.e.s. (for example, pecan, pistachio, Brazil, Macadamia (Queensland) but excluding coconut)

2.2 Permanent crops mainly for industrial purposes2.2.1 Beverage crops

- 2.2.1.1 Coffee
- 2.2.1.2 Cocoa (cacao)
- 2.2.1.3 Tea
- 2.2.1.4 Hops
- 2.2.1.5 Yerba maté
- 2.2.1.6 Others n.e.s. (for example, cola)

2.2.2 Oil crops

- 2.2.2.1 Coconut
- 2.2.2.2 Oil palm
- 2.2.2.3 Olive
- 2.2.2.4 Others n.e.s. (for example, tung tree, shea butter tree)

2.2.3 Spices and aromatic crops

- 2.2.3.1 Black pepper
- 2.2.3.2 Cinnamon
- 2.2.3.3 Clove
- 2.2.3.4 Ginger
- 2.2.3.5 Nutmeg and spice
- 2.2.3.6 Vanilla
- 2.2.3.7 Cardamon
- 2.2.3.8 Others n.e.s. (for example, drumstick)

2.2.4 Fibre crops

- 2.2.4.1 Abaca (Manila hemp)
- 2.2.4.2 Agave plants (for example, drumstick)
- 2.2.4.3 Kapok
- 2.2.4.4 New Zealand flax (formio)
- 2.2.4.5 Ramie and rhea
- 2.2.4.6 Others n.e.s. (for example, fique, maguey)

2.2.5 Rubber and tanning crops

- 2.2.5.1 Rubber (hevea)
- 2.2.5.2 Black wattle
- 2.2.5.3 Quebracho
- 2.2.5.4 Others n.e.s.

2.2.6 Flower crops

- 2.2.6.1 Roses
- 2.2.6.2 Jasmine
- 2.2.6.3 Others n.e.s.

2.2.7 Other industrial crops

- 2.2.7.1 Citronella
- 2.2.7.2 Mulberry for silkworms
- 2.2.7.3 Sago palm
- 2.2.7.4 Palmyra plam
- 2.2.7.5 Quinine
- 2.2.7.6 Areca (betel) nut
- 2.2.7.7 Others n.e.s. (for example, lemon grass)

2.3 Other permanent crops n.e.s

APPENDIX 3

MACHINERY AND EQUIPMENT LIST

The following list contains machinery and equipment normally used on holdings and items not appearing on the list should be reported under 113, 228, 233, 243, 35 or 46 as appropriate.

Machinery and equipment1 Stationary power-producing machinery1.1 Prime movers

- 1.1.1 Internal combustion engines
- 1.1.2 Steam engine
- 1.1.3 Windmill
- 1.1.4 Other prime movers (specify)

1.2 Electric generators and motors

- 1.2.1 Electric generator
- 1.2.2 Electric motors

2 Agricultural machinery2.1 Tractors

- 2.1.1 Tracklaying tractors (also known as caterpillar or crawler tractor)
- 2.1.2 Four-wheel tractors
- 2.1.3 Six-wheel tractors
- 2.1.4 Power tillers

2.2 Tillage, planting and cultivating equipment2.2.1 Ploughs

- 2.2.1.1 Wooden plough
- 2.2.1.2 Iron or steel plough drawn by animals
- 2.2.1.3 Tractor-operated plough

2.2.2. Rotary tillers

- 2.2.2.1 Rotary tiller for tractors (also known as rotary cultivator)

2.2.3 Harrows

- 2.2.3.1 Animal-operated harrows (rotary or disk)
- 2.2.3.2 Tractor-operated harrows (rotary or disk)

2.2.4. Seeding equipment (including combined grain drills and fertilizer distributors)

- 2.2.4.1 Grain drills - animal operated

- 2.2.4.2 Grain drills - tractor operated
- 2.2.4.3 Row-crop planters for tractors
- 2.2.4.4. Broadcast seeder for tractors

2.2.5 Cultivators and other weeding machines

- 2.2.5.1 Animal operated
- 2.2.5.2 Tractor operated

2.2.6 Fertilizer distributors

- 2.2.6.1. Manure spreaders
- 2.2.6.2 Fertilizer broadcaster for tractors
- 2.2.6.3. Liquid fertilizer applicators for tractors

2.2.7. Sprayers and dusters

- 2.2.7.1 Hand operated
- 2.2.7.2 Animal operated
- 2.2.7.3 Tractor operated

2.2.8. Other tillage, planting and cultivating equipment

2.3 Harvesting and threshing equipment

2.3.1 For forage

- 2.3.1.1 Mowers
 - 2.3.1.1.1 Animal drawn
 - 2.3.1.1.2 Tractor drawn
 - 2.3.1.1.3 Self-propelled (windrowers)

- 2.3.1.2 Hayrakes
 - 2.3.1.2.1 For tractors

- 2.3.1.3 Hay balers
 - 2.3.1.3.1 For tractors

- 2.3.1.4 Forage harvesters
 - 2.3.1.4.1 For tractors

- 2.3.1.5 Forage blowers
 - 2.3.1.5.1 Chopper blowers
 - 2.3.1.5.2 Stationary hay blowers

2.3.2 For grain and other crops

- 2.3.2.1 Combines
 - 2.3.2.1.1 Tractor drawn (power take-off driven)
 - 2.3.2.1.2 Self-propelled (including self-propelled corn picker huskers)

- 2.3.2.2 Corn pickers
 - 2.3.2.2.1 Corn pickers, picker/shredders and picker/huskers (excluding self-propelled combines)

- 2.3.2.3 Potato harvesting machinery
- 2.3.2.3.1 Animal operated diggers
- 2.3.2.3.2 Tractor operated or self-propelled diggers and harvesters

- 2.3.2.4 Sugar beet harvesting machinery
- 2.3.2.4.1 Animal operated sugar beet lifters
- 2.3.2.4.2 Tractor operated or self-propelled sugar beet harvesters

- 2.3.2.5. Reaper/binders
- 2.3.2.5.1 Animal operated
- 2.3.2.5.2 Tractor operated

- 2.3.2.6 Threshing equipment
- 2.3.2.6.1 Threshers - hand operated
- 2.3.2.6.2 Threshing steds - animal drawn
- 2.3.2.6.3 Threshers - engine operated

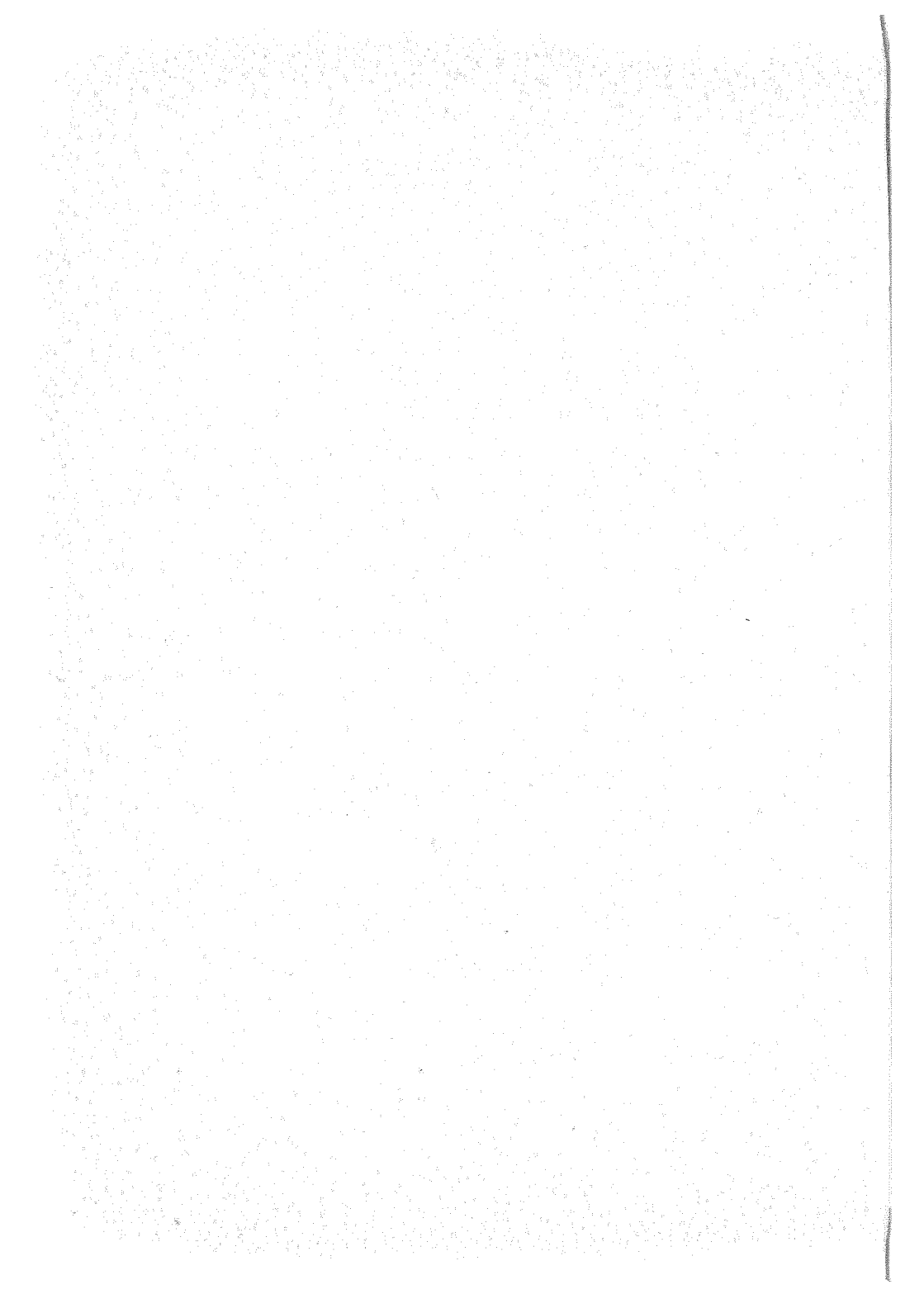
2.3.3. Other harvesting and threshing equipment (specify)

2.4 Farmstead equipment

- 2.4.1. Food and feed processing and handling equipment
- 2.4.1.1 Grain cleaners
- 2.4.1.2 Potato, onion and fruit sorters and graders
- 2.4.1.3 Grain grinders
- 2.4.1.4 Sugar cane crushers

- 2.4.2. Livestock equipment
- 2.4.2.1 Milking machines
- 2.4.2.2 Milk coolers
- 2.4.2.3 Cream separators
- 2.4.2.4. Incubators
- 2.4.2.5. Shearing equipment - hand operated
- 2.4.2.6 Shearing equipment - power operated
- 2.4.2.7 Power operated barn cleaners

2.4.3 Other farmstead equipment (specify)



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