Food and Agriculture Organization
of the United Nations

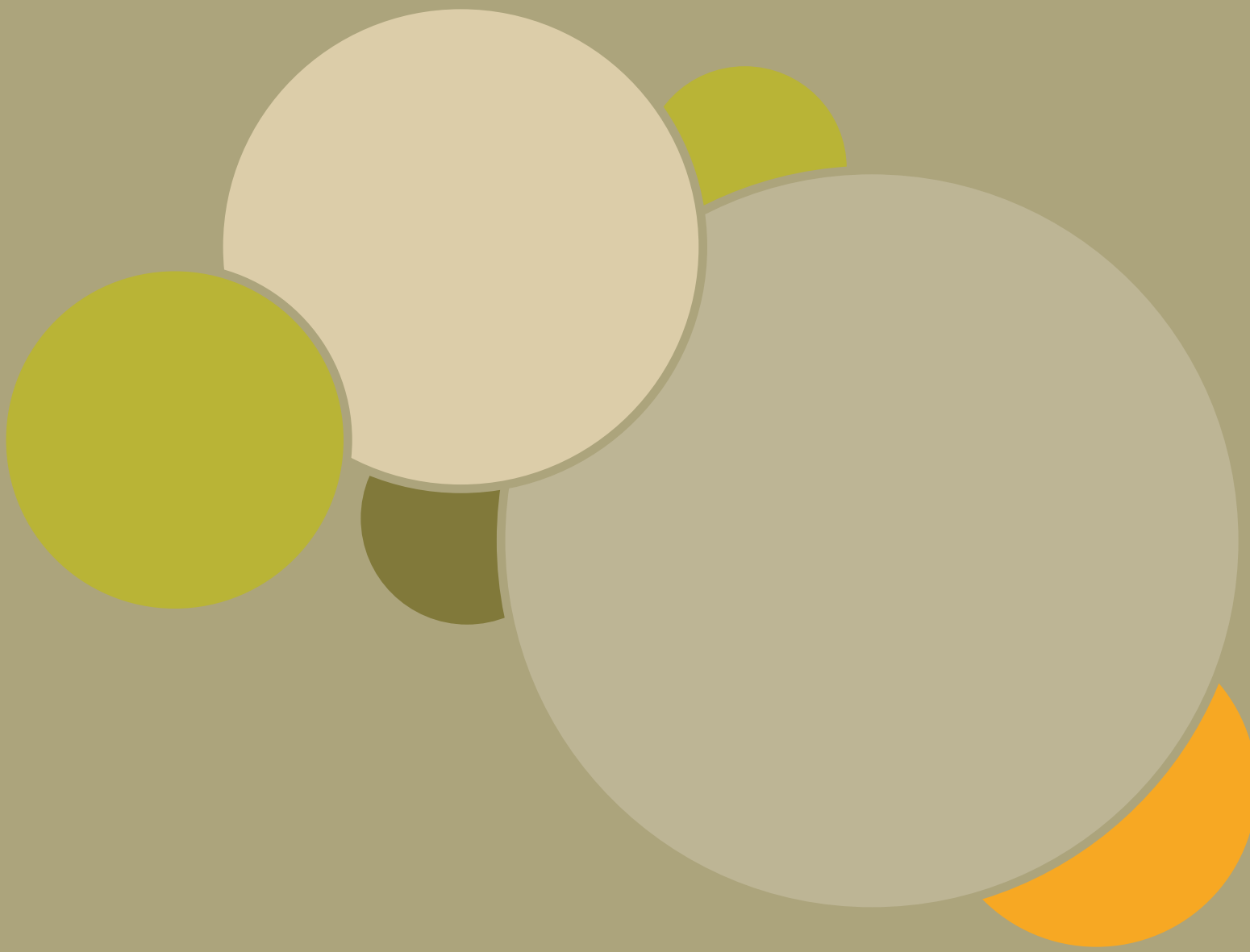
Global Strategy to improve Agricultural and Rural Statistics

Global Strategy to improve Agricultural and Rural Statistics

TRAINING IN AGRICULTURAL STATISTICS

(Trainer's guide)

Title of training	Agricultural statistics
Duration	10 days
Training type	Face-to-face
Training level	Degree or Master's in statistics – agronomists and economists with previous training in statistics
Requirements	Statistics, sampling, general economics



Contents

Course content

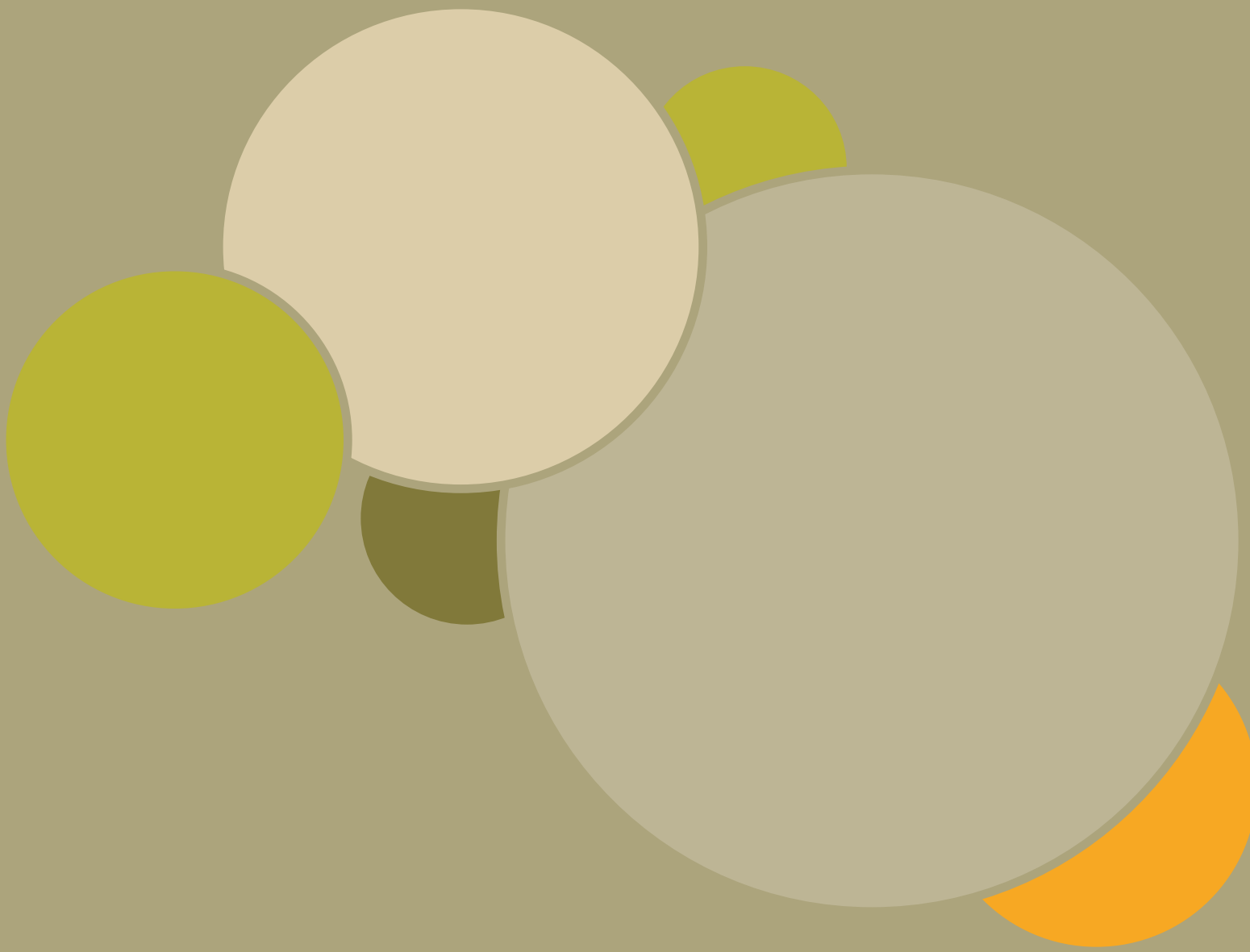
PROPOSED DAILY TRAINING SCHEDULE

- 8.00-12.30 h (30 min break at 10.00 h);
- 12.30-14.00 h (lunch break);
- 14.00 h-17.30 h (30 min break at 16.00 h).

TIMETABLE

Modules	Exercises	Days	Time
Module 0. Statistical review			
0.1. Definitions	N° 1,2	D0	30 min
0.2. The steps of a statistical survey	D0	30 min	0 h 30
0.3. Sampling method	D0	1 h 30 min	1 h 30
0.4. Data collection	D0	1 h	1 h 00
0.5. Data processing	D0	1 h	1 h 00
0.6. Data analysis	D0	30 min	0 h 30
0.7. Data dissemination	D0	15 min	0 h 15
0.8. Data quality management	D0	15 min	0 h 15
TOTAL FOR MODULE 0	**Day 0**	**5 h 30 min**	**5 h 30**
Module 1. An overview of the general framework of agricultural statistics			
Chapters			
1.1. Scope of the course	N° 3	D1	1 h
1.2. Conceptual framework of the global strategy	N° 4, 5, 6, 7, 8	D1	1 h 30min
1.3. SPARS and NSDS		D1	2 h 30 min
1.4. Users and uses of agricultural statistics	N° 9	D1	30 min
TOTAL FOR MODULE 1		**1 day**	**5 h 30 min**
Module 2. Data sources, statistical units and collection methods			
Chapters			
2.1. Statistics to be produced		D2	5 h
2.2. Data producers: centralized and decentralized statistical systems	N° 10	D3	30 min
2.3. Sources of agricultural statistics	N° 11, 12, 13, 14, 15, 16	D3 - D4	9 h
2.4. Statistical units		D4	5 h
2.5. Data collection	N° 17, 18	D4 - D5	7 h
TOTAL FOR MODULE 2		**4 days**	**26 h 30 min**
Module 3. Data processing, analysis and dissemination			
Chapters			
3.1. General overview of current processing practices and limits observed		D5	1 h
3.2. Areas and yields of mixed crops	N° 19, 20, 21, 22, 23, 24	D5 - D6	5 h
3.3. Production		D6	1 h
3.4. Crop forecasting		D7	4 h
3.5. Analysis and dissemination		D7	3 h
TOTAL FOR MODULE 3		**2 days**	**14 h**

Modules	Exercises	Days	Time
Module 4. Analytical frameworks and derived statistics			
Chapters			
4.1. Economic accounts for agriculture and environmental-economic accounts		D8	5 h
4.2. Cost of Production	N° 25	D8	2 h
4.3. Post-harvest losses	N° 26	D9	2 h
4.4. Agricultural prices and price indexes	N° 27, 28, 29	D9	3 h
4.5. Food security and food balance sheet	N° 30	D9	4 h
TOTAL FOR MODULE 4		**2 days**	**16 h**
Summary and Evaluation			
Summing up		D10	4 h
Evaluation		D10	3 h
TOTAL FOR SUMMING UP-EVALUATION		**1 day**	**7 h**
TOTAL THEORETICAL PART			**45 h**
TOTAL EXERCISES (on average 1 h per exercise)			**25 h**
TOTAL TRAINING		**10 days**	**70 h**



Introduction

Duration: 30 min
The objective of this section is to introduce the course content.

The objective of this guide is to support trainers in the preparation of their agricultural statistics training sessions by emphasizing the key points, limits and needs in terms of training time and requirements of trainers and trainees for achieving the realistic objectives of each module.

The course is divided into five modules subdivided into topics and submodules:

Module 0. Statistical review
- Definitions
- The steps of a statistical survey
- Sampling method
- Data collection
- Data processing
- Data analysis
- Data dissemination
- Data quality management

Module 1. Overview of the general framework of agricultural statistics
- Scope of the course
- Conceptual framework of the Global strategy to improve agricultural and rural statistics and its economic, social and environmental dimensions
- Strategic plans for agricultural and rural statistics (SPARS) and National strategies for the development of statistics (NSDS)
- Users and uses of agricultural statistics

Module 2. Data sources, statistical units and collection methods

- Statistics to be produced
- Data producers: centralized and decentralized statistical systems
- Sources of agricultural statistics
- Statistical units
- Data collection

Module 3. Data processing, analysis and dissemination

- General overview of current processing practices and limits observed
- Areas and yields of pure and mixed crops
- Production
- Crop forecasting
- Analysis and dissemination

Module 4. Analytical frameworks and derived statistics

- Economic accounts for agriculture and environmental-economic accounts
- Costs of production
- Post-harvest losses
- Agricultural product prices and price indexes
- Food security and food balance sheet

The topics will be covered in theoretical sessions by the trainer. These sessions will be illustrated and supported by examples and exercises to enhance understanding.

The trainer will do the following for each topic:

- *Give a theoretical presentation of the topic, emphasizing strong points;*
- *Ask trainees for feedback and questions;*
- *Respond to the feedback and questions, encouraging exchanges between trainees;*
- *Give trainees exercises where appropriate;*
- *Correct exercises with the involvement of trainees.*

At the end of the course:

- *Summarize the training, emphasizing the key points of each module while encouraging trainees to take part in the summary;*
- *Ask trainees to evaluate the course.*

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Module 0.
Statistical review

This module is not included in the initial training schedule. It is a reminder of the necessary requirements that allow the trainees to follow the training correctly. It is, however, up to the institution or trainers in charge of delivering the training to decide whether it is relevant or not. This could be justified by the need to standardize trainees' knowledge of basic principles. The presentation should not, however, last longer than the first day of training.

0.1. DETAILED CONTENTS OF MODULE 0

Module 0: Statistical review	
Chapters	**Time**
0.1 Definitions This section covers basic vocabulary, useful for assimilating the training content.	30 min
0.2 The steps of a statistical survey This section describes the various steps necessary for preparing and conducting a data collection operation.	30 min
0.3 Sampling method This section highlights the main issues raised in constructing a sample for carrying out a data collection operation.	1 h 30 min
0.4 Data collection This section covers the main activities involved in data collection field work.	1 h
0.5 Data processing This section gives a brief description of data processing activities. It also covers the main steps in this phase.	1 h
0.6 Data analysis This section covers the main tools used to convert data into information.	30 min
0.7 Data dissemination This section covers the main methods used to make available to the public the data and information contained in data.	15 min
0.8 Data quality management This section focuses on the main criteria for assessing data quality	**15 min**
TOTAL FOR MODULE 0	**5 h 30 min**

0.2. MODULE LEARNING OBJECTIVES

At the end of this module the participants:

- Will have a brief overview of the key concepts which will be addressed in subsequent modules
- Will be familiar with basic statistics vocabulary, necessary for assimilating the training as a whole
- Will have an overview of the various steps necessary for conducting a data collection operation (from preparation to dissemination of results)
- Will be aware of the norms and standards relating to data quality.

0.3. DEFINITIONS

Duration: 30 min

Summary: This section provides an overview of basic concepts, useful for assimilating the training content. It therefore covers the key concepts that trainees are supposed to understand for a good comprehension of subsequent modules.

Exercise 1: Definition of population

Definition of the concept of population in calculating the average	**Exercise N° 1**	**Page in exercise book: 1**

Exercise 2: Sampled population vs target population

Distinction between target population and sampled population	**Exercise N° 2**	**Page in exercise book: 3**

Learning points: Stress the distinction between target population and sampled population. Give examples that illustrate these concepts and explain when they could coincide.

0.4. THE STEPS OF A STATISTICAL SURVEY

Duration: 30 min

Summary: This section describes the various steps necessary for preparing and conducting a data collection operation. The **Generic Statistical Business Process Model V** was used to illustrate this section.

Learning points: Description of the various steps in a survey

0.5. SAMPLING METHOD

Duration: 1 h 30 min

Summary: This section highlights the main issues raised in constructing a sample for carrying out a data collection operation. It also reviews the different types of sample design, in conjunction with types of sampling frame. The main methods for constructing a sample are also covered.

Learning points: Sample selection methods, sample design, sampling frame.

0.6. DATA COLLECTION

Duration: 1 h

Summary: This section covers the main activities involved in data collection field work. It focuses on awareness raising which is important for the success of field work. Other aspects are also addressed, such as the schedule of operation activities, the identification of various statistical units, etc.

Learning points: Raising awareness of data collection activities, field work, schedule of the operation.

0.7. DATA PROCESSING

Duration: 1 h

Summary: This section gives a brief description of data processing activities. These activities are carried out after the return of questionnaires from the field or after data have been transferred from the field to the processing team. It is essential to make trainees aware of the main sources of errors in data and appropriate processing techniques.

Learning points: Data entry, data cleaning, schedule of data processing activities.

0.8. DATA ANALYSIS

Duration: 30 min

Summary: This section covers the main tools used to convert data into information. The main software packages used are described. It also emphasizes the challenges that can face the analyst in this process.

Learning points: Statistical software packages, tabulation, indicators.

0.9. DATA DISSEMINATION

Duration: 15 min

Summary: This section covers the main channels whereby collected data are made public.

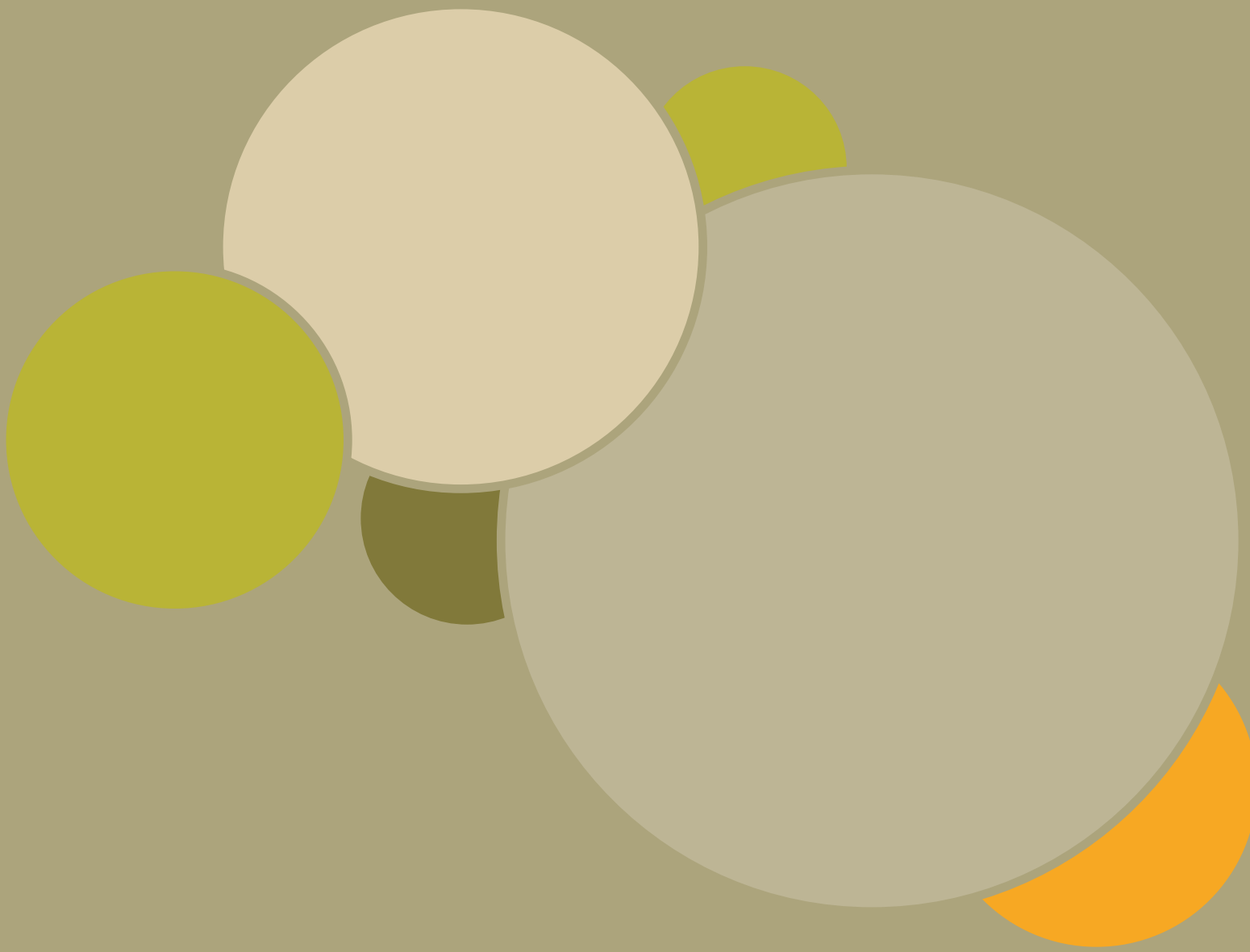
Learning points: Dissemination, users.

0.10. DATA QUALITY MANAGEMENT

Duration: 15 min

Summary: This section focuses on the main criteria for evaluating data quality. It also covers the various standards available for assessing data quality.

Learning points: Data quality frameworks, quality standard.



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Module 1. Overview of the general framework of agricultural statistics

1.1. DETAILED CONTENTS OF MODULE 1

Module 1. Overview of the general framework of agricultural statistics	
Sections	**Time**
1.1 Scope of the course This section introduces the content of the agricultural statistics training	1 h
1.2 Conceptual framework of the Global Strategy This section covers the conceptual framework of the Global Strategy to improve agricultural and rural statistics and the link between agriculture and its four interdependent dimensions: i) economic; ii) social; iii) environmental; and iv) geospatial.	1 h 30 min
1.3 SPARS and NSDS This section covers a key point: the integration of agricultural statistics into NSDS by developing a Strategic plan for agricultural and rural statistics (SPARS).	2 h 30 min
1.4 Users and uses of agricultural statistics This section shows the importance of agricultural statistics by covering the types of users of these statistics and their various uses, as well as the various producers of statistics.	30 min
TOTAL FOR MODULE 1	**5 h 30 min**

1.2. MODULE LEARNING OBJECTIVES

At the end of the training, participants:

- Will have an overview of the conceptual framework of the Global Strategy to improve agricultural and rural statistics;
- Will be able to describe the main headings of an agricultural census;
- Will understand the links between the economic, social and environmental dimensions of this conceptual framework;
- Will understand the importance of Strategic plans for agricultural and rural statistics (SPARS) and their integration into National strategies for the development of statistics (NSDS);
- Will be able to list the main producers and main users and main uses of agricultural statistics.

1.3. SCOPE OF THE COURSE

Duration: 1 h

Summary: This part reviews the fields covered by agricultural and rural statistics.

In addition to conventional activities of agriculture (rainfed crops, market gardening, horticulture) and of livestock, agricultural statistics cover the following fields:

- **Forestry** and **agroforestry**: production of forest products and to the interface between forestry and agriculture.
- **Aquaculture** and **fishery**: sources of food, food security and household income.
- The **geospatial scope** of agricultural statistics: wider scope of national land use statistics.
- Agricultural statistics should also cover **water use** for agricultural purposes for irrigation and other uses.

The starting point for defining agricultural statistics is the following:

- The **System of national accounts (SNA)** which defines international standards as regards concepts, definitions and classifications of economic activities. **The System of environmental-economic accounting (SEEA)**, which is a satellite account of the SNA, is the starting point for environmental statistics;
- Socioeconomic variables relating to agricultural holdings coming from national accounts.

For the full scope of agricultural statistics, two additional approaches should be considered:

a. The **ISIC[1] (Rev. 4) approach** which comprises:
   - **Crop production** which covers temporary crops (crops that do not last for more than two growing seasons) and perennial crops with a growing cycle of more than one year, namely growing plants which last for more than two seasons of crop growth, either they die after each season or they grow continually;
   - **Animal production** which includes raising livestock and the selection of all livestock except aquatic animals.
b. The approach of the Global Strategy to improve agricultural and rural statistics: this approach is more complete and covers, in addition to plant production and livestock production, forestry, fishery and aquaculture sectors and other fields such as geospatial aspects of land, the environment and non-agricultural rural activities.

Learning points: Remember that environmental and rural statistics must be included in the global scope of agricultural statistics, and the full scope of agricultural statistics should take into account two additional considerations: i) The **ISIC (Rev. 4) approach**; and ii) the approach of the **Global Strategy** to improve agricultural and rural statistics.

Exercise 3: Domains covered by agricultural statistics

Scope of agricultural statistics	Exercise N° 3	Page in exercise booklet: 5

1.4. CONCEPTUAL FRAMEWORK OF THE GLOBAL STRATEGY TO IMPROVE AGRICULTURAL AND RURAL STATISTICS AND ITS ECONOMIC, SOCIAL, AND ENVIRONMENTAL DIMENSIONS

Duration: 1 h 30 min

Summary: This part describes the conceptual framework of the Global Strategy to improve agricultural and rural statistics and its four dimensions (economic, social, environmental and geospatial).

The conceptual framework focuses on the cause and effect relationships that connect the economic, environmental and social dimensions of agriculture.

Links between agriculture and its interdependent economic, social, environmental and geospatial dimensions are becoming increasingly important. These links should be considered in a global context for agriculture covering four interdependent dimensions: i) **The economic dimension** of agriculture is based on land, the work force and capital introduced into the production process and resulting products; ii) Information relating to **the social dimension** of agriculture and to rural development primarily concerns households and members of households, both agricultural and non-agricultural; iii) **The environmental dimension** of agriculture concerns the role of the sector as a user of natural resources – mainly land and water – and also relates to waste and to the emission of by-products generated by production; iv) **The geospatial dimension** of land should be considered in agricultural statistics, paying particular attention to land use for agriculture and forestry.

1 International Standard Industrial Classification of all Economic Activities

Learning points: Stress the economic, social, environmental and geospatial dimensions of agricultural and rural statistics and their interdependence.

Exercise 4: Conceptual framework of agricultural statistics and its four dimensions

Conceptual framework of the Global Strategy	Exercise N° 4	Page in exercise book: 6

Exercise 5: Agricultural activities and rural activities

Agricultural activities and rural activities	Exercise N° 5	Page in exercise book: 7

Exercise 6: Economic, social and environmental aspects

Economic, social and environmental aspects	Exercise N° 6	Page in exercise book: 8

Exercise 7: Agricultural holder / agricultural holding

Agricultural holder / agricultural holding	Exercise N° 7	Page in exercise book: 9

Exercise 8: Agricultural holder / agricultural holding

Agricultural holder / agricultural holding	Exercise N° 8	Page in exercise book: 10

1.5. STRATEGIC PLANS FOR AGRICULTURAL AND RURAL STATISTICS (SPARS) AND NATIONAL STRATEGIES FOR THE DEVELOPMENT OF STATISTICS (NSDS)

Duration: 2 h 30 min

Summary: This section covers the key aspect of the integration of agricultural statistics in the NSDS through the development of a Strategic plan for agricultural and rural statistics (SPARS).

The second pillar of the Global Strategy (integration of agriculture into their National Statistical System to ensure comparability of data between countries and over time) requires countries to develop and implement **Strategic plans for agricultural and rural statistics** (SPARS) in the framework of **National strategies for the development of statistics** (NSDS) to facilitate the integration of agriculture into NSS.

This integration is an essential component of the Global Strategy which recognizes that the first step in improving agricultural statistics is incorporating SPARS in the NSS, through its integration in the NSDS.

Learning points: Importance of SPARS as recommended guides in the sector implementation, paving the way for the production and consistent use of agricultural and rural statistics in developing countries.

1.6. USERS AND USES OF AGRICULTURAL STATISTICS

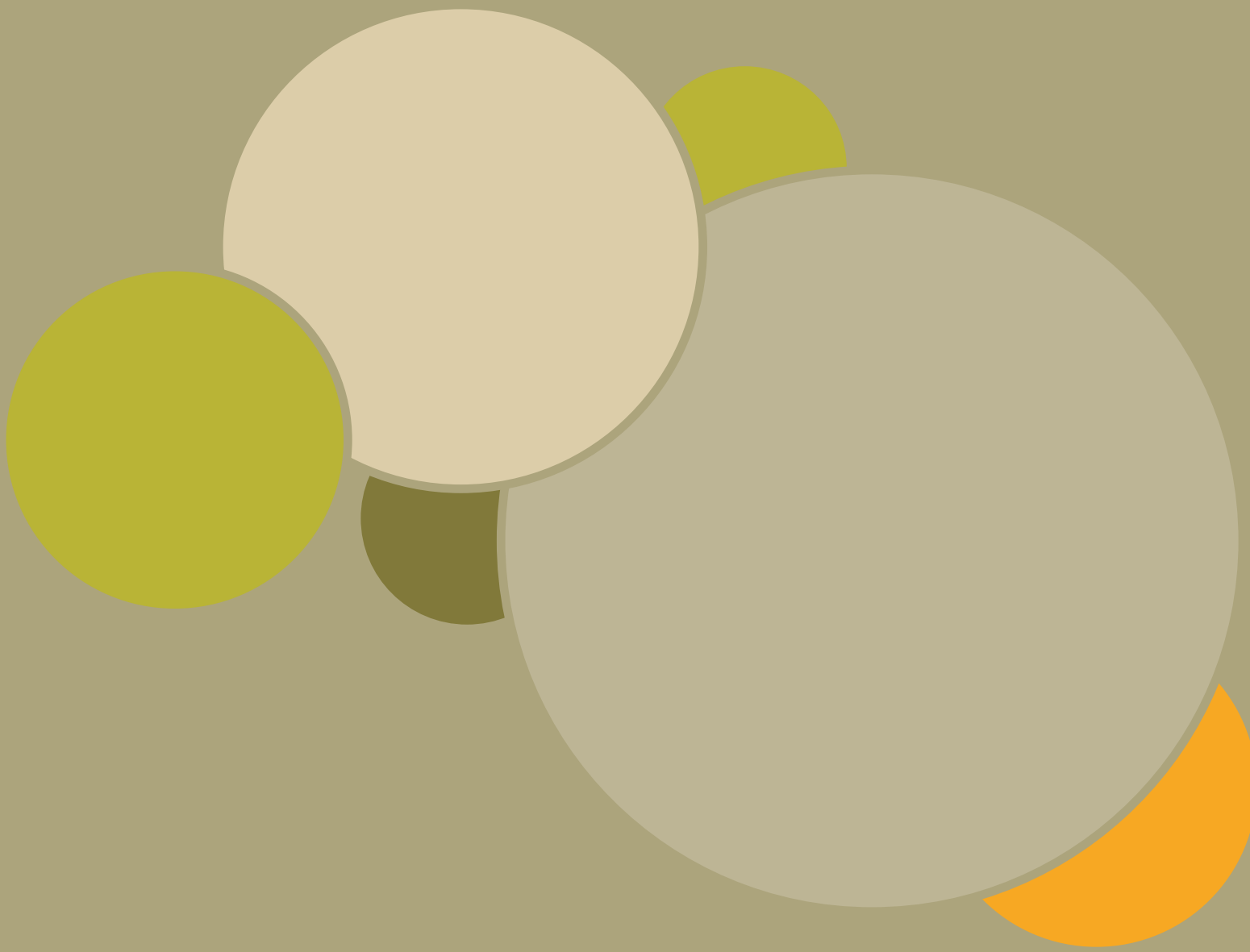
Duration: 30 min

Summary: This section covers the main users of agricultural statistics. It focuses on the importance of this information in decision-making, identifying major users and the use made of the information (investment decisions, identification of outlets, policy making, developing national accounts, etc.). It also addresses the private sector, which uses statistical information to better evaluate the opportunities offered by the economic and social environment.

Learning points: the importance of statistical information in decision-making, users of agricultural statistics and various types of uses.

Exercise 9: Users and uses of agricultural statistics

Users and uses of agricultural statistics	Exercise N° 9	Page in exercise book: 11



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Module 2.
Data sources, statistical units and collection methods

2.1. DETAILED CONTENTS OF MODULE 2

Module 2. Data sources and collection methods	
Sections	**Time**
2.1 Statistics to be produced This section will cover the statistics to be produced according to the various data sources. 2.1.1 Crop production statistics 2.1.2 Livestock statistics 2.1.3 Aquaculture statistics 2.1.4 Fishery statistics 2.1.5 Silviculture and agroforestry statistics 2.1.6 Environment statistics 2.1.7 Rural statistics 2.1.8 Price statistics	30 min
2.2 Data producers: centralized and decentralized statistical systems This section covers the advantages and weaknesses of the centralized statistical system and the decentralized statistical system, as a system responsible for statistical production.	5 h
2.3 Sources of agricultural statistics This section will cover the various sources of data, particularly agricultural censuses and agricultural sample and specific thematic surveys. 2.3.1 Agricultural censuses 2.3.2 Agricultural sample surveys 2.3.3 Specific thematic surveys 2.3.4 Administrative sources 2.3.5 Remote sensing and GIS in agriculture	9 h

Module 2. Data sources and collection methods	
Sections	**Time**
2.4 Statistical units This section will cover statistical units where agricultural data are found. 2.4.1 Agricultural holding 2.4.2 Household 2.4.3 Aquacultural holding 2.4.4 Establishment 2.4.5 Community or locality 2.4.6 Natural unit and management unit	5 h
2.5 Data collection This section will cover the vehicle used to obtain agricultural statistics, namely collection methods. 2.5.1 Survey period and crop calendar 2.5.2 Questionnaires 2.5.3 Interviewing methods 2.5.4 Use of new collection technologies 2.5.5 Typical holding	7 h
TOTAL FOR MODULE 2	**28 h**

2.2. MODULE LEARNING OBJECTIVES

At the end of this module, participants will be able to:

- identify the demand for agricultural statistics (what people want to know);
- describe the organization of the statistical system to better understand how to organize agricultural data production;
- explore the main sources of agricultural statistics;
- describe statistical units (where the information is);
- describe statistical methods for obtaining information (how to obtain information and what the collection methods are).

2.3. STATISTICS TO BE PRODUCED

Duration: 5 h

Summary: This section will cover the statistics to be produced from the various data sources. In addition to statistics from an agricultural census, there are statistics relating to the following fields:

- crop production;
- livestock production;
- aquaculture;
- fishery;
- silviculture and agroforestry;
- environment;
- rural areas;
- prices.

Learning points:

- The key statistics in conjunction with their sources;
- The distinction between structural data and cyclical data.

2.4. DATA PRODUCERS: CENTRALIZED AND DECENTRALIZED STATISTICAL SYSTEMS

Duration: 30 min

Summary: This section covers the weaknesses and advantages of centralized and decentralized statistical systems.

In the centralized system, the central statistical body is responsible for all (or a very large majority of) the areas of statistical production. In the decentralized system, each of the areas of statistical production comes under the control of the department or a specialized structure in charge of the area.

A decentralized system will not operate properly without strong coordination (system governance).

Learning points: Emphasize the advantages and weaknesses of each system.

Exercise 10: Data producers and main sources of agricultural data

Data producers and main sources of agricultural data	Exercise N° 10	Page in exercise book: 15

2.5. SOURCES OF AGRICULTURAL STATISTICS

Duration: 9 h

Summary: This section will describe the main sources of agricultural statistics. Agricultural statistics are produced from several sources depending on the data required and according to appropriate collection methods and tools. These are primarily:

- **the agricultural census:** FAO uses the nomenclature of the various groups in the international standard industrial classification of all economic activities (ISIC) (Rev. 4) to determine the scope of the agricultural census described in the *World Programmes for the Census of Agriculture 2010 and 2020*:
    - Group 011: Growing of non-perennial crops
    - Group 012: Growing of perennial crops
    - Group 013: Plant propagation
    - Group 014: Animal production
    - Group 015: Mixed farming.

  While focusing on planning an agricultural census, the following four methodological approaches will be described, stressing their differences, how they complement one another, the conditions and frameworks for their use:
    - the classical approach;
    - the modular approach;
    - the use of registers and administrative records;
    - the integrated census and survey system

- **thematic sample surveys:** Special emphasis should be placed on the importance of the sampling frame, the various types of sampling frame (list, area, multiple) and the master sample, which are essential for conducting all thematic sample surveys (crop, livestock, aquaculture, fishery, forestry, rural areas, environment, agricultural inputs, prices, etc.)
- **administrative sources:** These are from activities conducted by administrative departments, projects and NGOs. Using these sources provides important information on fields such as infrastructure, commercialization, rainfall, etc.
- **remote sensing** which allows data collection on areas difficult to access. Remote sensing data can be analysed in a Geographic Information System (GIS) to produce maps, for example land cover and land use maps. Organized with other collected data types, they become a powerful tool for aiding decision-making for anything concerning crops and cropping practices.
- **warning systems / observatories:** these are structures or organizations in charge of collecting and centralizing data of interest in the form of indicators. The information collected is intended to **describe** specific phenomena, **give a warning** in an emergency and **assess** changes in key indicators (epidemiological or health surveillance, monitoring seismic or meteorological phenomena, etc.).

Learning points:

- The importance of agricultural censuses and sample surveys and other sources of agricultural statistics (administrative sources and remote sensing);
- The various types of sampling frames;
- The master sample.

Exercise 11: General Population and Housing Census (GPHC) and National Agriculture Census (NAC)

General Population and Housing Census (GPHC) and National Agriculture Census (NAC)	Exercise N° 11	Page in exercise book: 17

Exercise 12: Structural and cyclical variables

Structural and cyclical variables	Exercise N° 12	Page in exercise book: 17

Exercise 13: Population, statistical unit and sampling frame

Population, statistical unit and sampling frame	Exercise N° 13	Page in exercise book: 18

Exercise 14: Sampling frame

Sampling frame	Exercise N° 14	Page in exercise book: 23

Exercise 15: Primary sampling unit: EAs vs villages

Primary unit sampling: EAs vs villages	Exercise N° 15	Page in exercise book: 24

2.6. STATISTICAL UNITS

Duration: 5 h

Summary: This section will describe statistical units which contain information in conjunction with data sources and statistics to be produced. For each topic studied, it is important to specify and define the statistical unit to be surveyed. The definition of this unit determines the methodology – the sample design, collection and processing – to be adopted to obtain the required information.

Learning points:

- The specification and definition of statistical units by topic;
- The definition of an agricultural holding (in the household or non-household sector), the definition of a household and the correspondence between agricultural holding and household.

Exercise 16: Population, statistical unit and sampling frame

Population, statistical unit and sampling frame	Exercise N° 16	Page in exercise book: 25

2.7. DATA COLLECTION

Duration: 7 h

Summary: *This section will cover the approaches used to obtain agricultural statistics, namely collection methods, emphasizing the following*

- survey periods;
- new interviewing methods and their advantages over the traditional paper and pen method;
- the use of new data collection technologies (description of GPS and PDA/tablets, advantages of using GPS and PDA/tablets, collection using PDA/tablets);
- the typical holding method.

When conducting censuses and surveys, the effects of modernizing data collection practices are increasingly being felt.

To anticipate current changes in data collection practices, it is important to allow enough time to introduce new collection technologies after covering traditional methods that are still in use.

The advantage of presenting traditional methods and then the new methods is that this will emphasize the benefits that these new technologies bring in terms of accuracy, time and cost.

It should, however, be noted that the old methods are still used to varying degrees in many countries. It can nevertheless be observed that the transition to the use of new technologies is constantly evolving. For example, GPS is taking over from the compass and the PDA from the paper questionnaire.

Learning points:

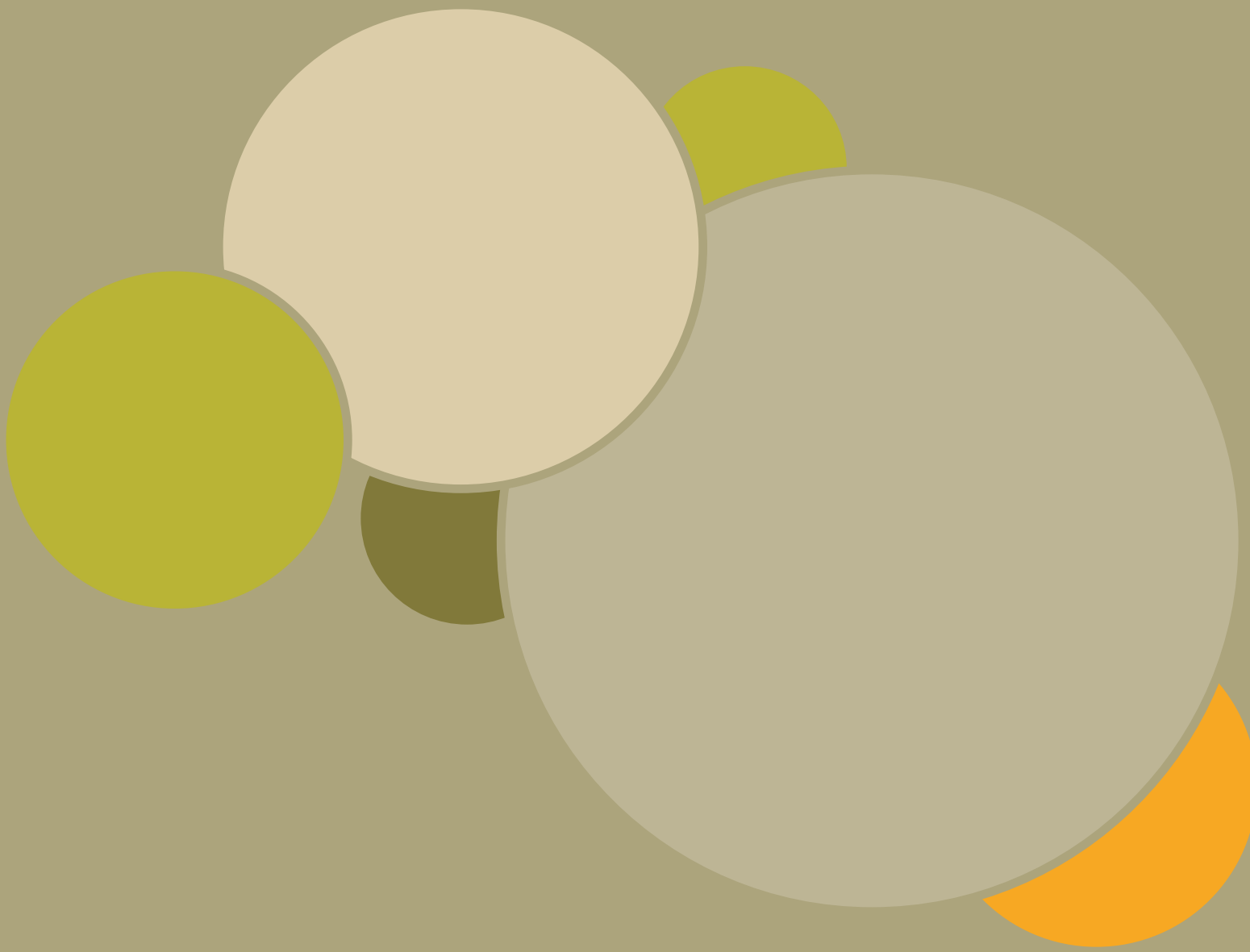
- new interviewing methods;
- using new data collection technologies and comparing them with traditional methods;
- the typical holding method.

Exercise 17: Electronic data collection versus paper and pencil

Electronic data collection versus paper and pencil	Exercise N° 17	Page in exercise book: 26

Exercise 18: Data collection and agricultural calendar

Data collection and agricultural calendar	Exercise N° 18	Page in exercise book: 27



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Module 3. Data processing, analysis and dissemination

3.1 DETAILED CONTENTS OF MODULE 3

Module 3. Data processing, analysis and dissemination	
Chapters	**Time**
3.1 Current processing practices and limits observed This section describes current processing practices and limits observed, namely: • shortage of qualified personnel, • inadequacy of statistical methods, • inconsistencies in statistics from different sources • lack of modern equipment • and poor data quality.	1 h
3.2 Areas and yields of mixed crops This section covers the data necessary for estimating yield or area. It also covers methods for estimating areas and yields for pure or mixed crops.	5 h
3.3 Production This section covers methods of estimating production (multiplying yield and area, extrapolation of production from sampled holdings).	1 h
3.4 Crop forecasting This section aims to describe two types of crop forecasting techniques: the technique using cropping areas and yield forecasting (forecasting by density grids) and the technique using declaration by the farmer (forecasting by interview).	4 h
3.5 Analysis and dissemination This section covers the importance of analysis and dissemination of agricultural data, focusing on metadata, archiving and databases, safeguarding data and dissemination system.	3 h
TOTAL FOR MODULE 4	**14 h**

3.2. MODULE LEARNING OBJECTIVES

At the end of this module, participants will be able to:

- understand the problems which arise during processing, analysis and dissemination of agricultural data;
- become familiar with the concepts of areas and yields, placing special emphasis on the necessary data and calculation methods;
- become familiar with production estimation methods;
- understand the methods used for crop forecasting;
- become familiar with agricultural data processing steps and with analysis and dissemination methods.

3.3. GENERAL OVERVIEW OF CURRENT PROCESSING PRACTICES AND LIMITS OBSERVED

Duration: 1 h

Summary: This section describes the shortcomings observed in agricultural data processing:

- Shortage of qualified personnel;
- Inadequacy of statistical methods;
- Inconsistencies in the production of core indicators;
- Lack of modern equipment;
- Poor data quality.

Learning points:

- The importance of appropriate statistical methods;
- The importance of consistency in the production of core indicators.

3.4. AREAS AND YIELDS OF PURE AND MIXED CROPS

Duration: 5 h

Summary: This section develops methods for calculating areas and yields of mixed crops.

Learning points:

- Estimating the area of mixed crops;
- Estimating the area of pure stand crops;
- Estimating the yields of mixed crops;
- Estimating the yields of pure stand crops.

Exercise 19: Crop cutting experiment

Crop cutting experiment	Exercise N° 19	Page in exercise book: 29

Exercise 20: Estimation of yield

Estimation of yield	Exercise N° 20	Page in exercise book: 30

Exercise 21: Land area / yield / density

Land area / yield / density	Exercise N° 21	Page in exercise book: 31

3.5. PRODUCTION

Duration: 1 h

Summary: Production can be estimated either by multiplying yield and area, or by extrapolating production from sampled holdings. This method of estimation is still used only in developing countries where it is impossible to obtain the production of each holding.

Learning points:

- The method to be used depends on the information available (yields and areas, or production of holdings).

3.6. CROP FORECASTING

Duration: 4 h

Summary: This section aims to describe two types of crop forecasting techniques:
- the technique using cropping areas and yield forecasting (forecasting by density grids);
- the technique using declaration by the farmer (forecasting by interview).

Learning points:
- Forecasting from cropping areas and average cob weight or yield forecasting;
- Forecasting by interview.

Exercise 22: Density and area under crop

Density and area under crop	Exercise N° 22	Page in exercise book: 32

Exercise 23: Land area

Land area	Exercise N° 23	Page in exercise book: 33

Exercise 24: Production and yield: case study of plantain

Area / yield / density	Exercise N° 24	Page in exercise book: 34

3.7. ANALYSIS AND DISSEMINATION

Duration: 3 h

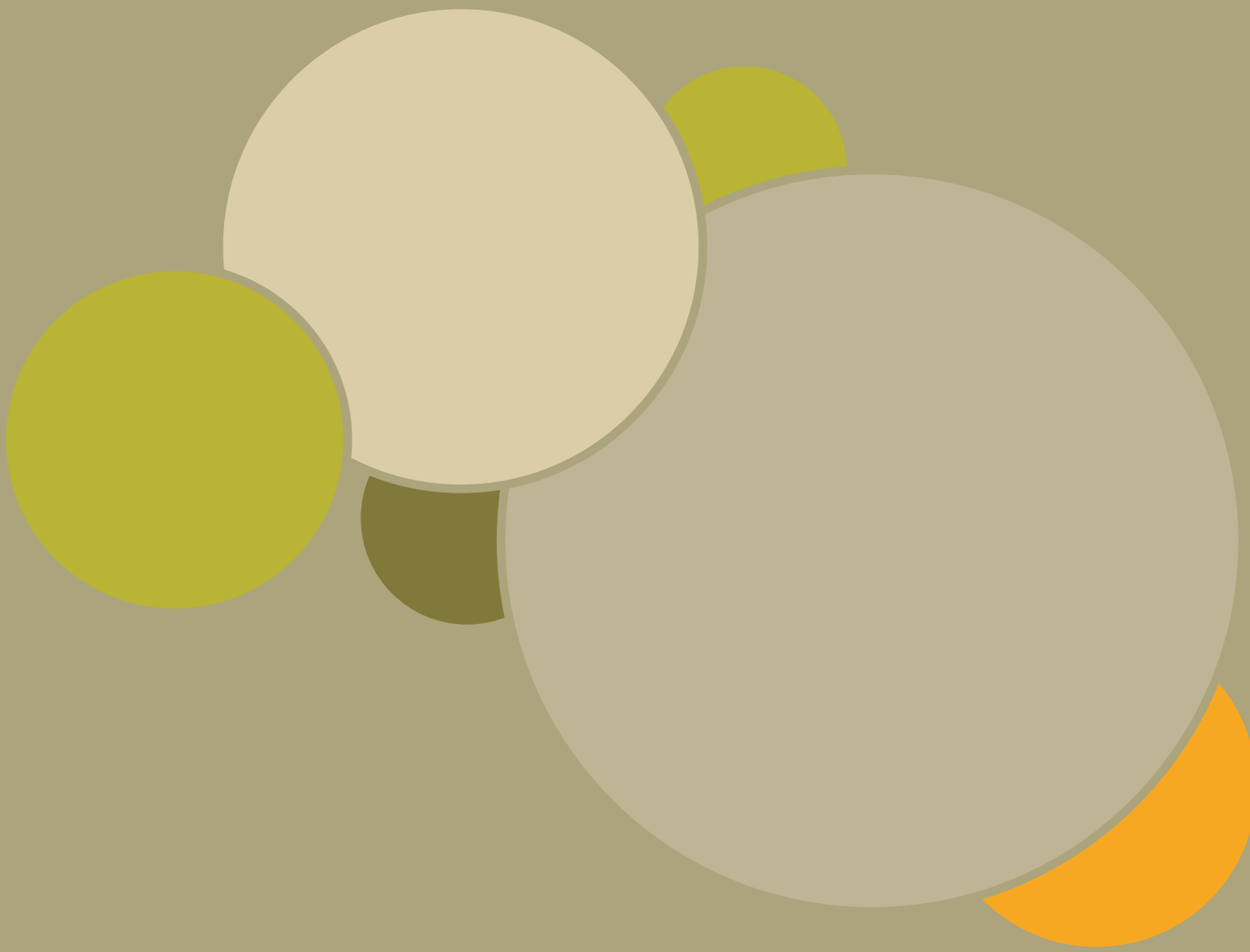
Summary: This section covers the importance of analysis and dissemination of agricultural data, focusing on metadata, archiving, databases and safeguarding data.

Data analysis and dissemination cover the following points:

- Geographic information system (GIS);
- Metadata;
- Archiving;
- Database and CountryStat;
- Safeguarding data and dissemination system.

Learning points:

- The importance of metadata in processing and analysis;
- Spatial analysis;
- Archiving;
- Databases and safeguarding data.



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Module 4. Analytical frameworks and derived statistics

4.1. DETAILED CONTENT OF MODULE 4

Module 4. Analytical frameworks and derived statistics	
Chapters	**Time**
4.1 Economic accounts for agriculture and Environmental-Economic accounts This section aims to introduce economic accounts for agriculture and Environmental-economic accounts and to demonstrate their importance. 4.1.1 Economic accounts for agriculture 4.1.2 Environmental-economic accounts	5 h
4.2 Costs of production This section covers the various costs of production and outlines methods of estimating them.	2 h
4.3 Post-harvest losses This section will describe types of losses, the factors that influence them and their impacts.	2 h
4.4 Agricultural prices and price indexes This section covers the various types of agricultural prices and the relevant price indexes. 4.4.1 The various types of agricultural prices 4.4.2 Price indexes	3 h
4.5 Food security and food balance sheet This section defines food security. The development and importance of food balance sheets is also covered in this section. 4.5.1 Food security 4.5.2 Food balance sheet	4 h
TOTAL FOR MODULE 4	**14 h**

4.2. MODULE LEARNING OBJECTIVES

At the end of this module, participants will be familiar with the following analytical frameworks and derived statistics:

- Economic accounts for agriculture and environmental-economic accounts;
- Costs of production;
- Post-harvest losses;
- Agricultural producer prices and price indexes;
- Food security and food balance sheets.

4.3. ECONOMIC ACCOUNTS FOR AGRICULTURE AND ENVIRONMENTAL-ECONOMIC ACCOUNTS (SUBNATIONAL AND NATIONAL LEVELS)

Duration: 5 h

Summary: This section aims to introduce economic accounts for agriculture and environmental-economic accounts and to demonstrate their importance.

Economic accounts for agriculture (EAA) do the following:

- really offer an integrated framework to describe the economic operation of the sector;
- also enable agricultural sector statistical data to be organized and structured according to rules and standards drawn up by the United Nations to produce indicators for the analysis and evaluation of the sector's economic performance and its relations with the remainder of the economy through accounts recommended by the current system of national accounts (SNA);
- The EAA framework enables statisticians to benefit from the overall consistency of statistical data and additional information sources. Statistical activities and methods then benefit from being integrated.

EAAs aim to describe the economic operations deriving from the performance of an agricultural activity, i.e. the agricultural production process and the primary income resulting from it. Their aim is not therefore to analyse all the income of units engaged in agricultural production (particularly agricultural households) as these units can have forms of income or expenditure other than those described in the accounts for agriculture. They measure total agricultural production.

Environmental-economic accounts (EEA) comprise detailed statistics describing the following:

- the size of natural resource stocks and their contribution to national wealth;
- the extraction of these resources and their distribution between enterprises, households, governments and the rest of the world;
- the production of waste (liquid, solid and gases) by industries, households and government services, as well as the management of this waste;
- expenditure by enterprises, households and government services on environmental protection.

Learning points:

- Economic accounts for agriculture and Environmental-economic accounts are composite statistics;
- They are compatible, as far as possible, with the System of National Accounts;
- They meet the need to follow closely the link between economic activities on the one hand, and agriculture and the environment activities on the other.

4.4. COSTS OF PRODUCTION

Duration: 2 h

Summary: This section covers the various costs of production and outlines methods of estimating them.

Estimating the cost of each of the main agricultural activities needs detailed data on the use of inputs and costs for each activity. These technical coefficients can be used in their turn to construct input-output frameworks, which are a powerful analytical tool for a better understanding of the links between the various agricultural activities and between agricultural activities and the rest of the economy.

Statistical costs of production cover two aspects: i) The cost of all statistical production stages; ii) The cost of agricultural activities themselves.

Learning points:

i. The cost of all statistical production stages;
ii. The cost of agricultural activities themselves.

Exercise 25: Costs of production statistics

Cost of production statistics	Exercise N° 25	Page in exercise book: 37

4.5. POST-HARVEST LOSSES

Duration: 2 h

Summary: This section will describe the following:

- types of losses during harvest;
- types of post-harvest losses;
- the factors influencing post-harvest losses;
- the impacts of post-harvest losses;
- methods of estimating losses during harvest;
- methods of estimating post-harvest losses.

Learning points:

- the factors influencing post-harvest losses;
- the impacts of post-harvest losses.

Exercise 26: Post-harvest losses

Post-harvest losses	Exercise N° 26	Page in exercise book: 40

4.6. AGRICULTURAL PRICES AND PRICE INDEXES

Duration: 3 h

Summary: This section covers the various types of agricultural prices and the relevant price indexes. These are:

- the producer price between the producer and the trader (or farmgate price if direct sale is possible);
- the wholesale price between the trader and the processor or wholesaler;
- the wholesale price between the processor or wholesaler and the retailer;
- the retail price between the retailer and the consumer.

The main types of agricultural price indexes are the following:

- Producer price index;
- Consumer price index;
- Agricultural production index.

Learning points:

- The various types of agricultural prices;
- The approaches to produce the various indexes;
- The importance of the various indexes.

Exercise 27: Collection of agricultural prices with non-conventional units

Collection of agricultural prices with non-conventional units	Exercise N° 27	Page in exercise book: 43

Exercise 28: Collection method for farm-gate prices

Collection method for farm-gate prices	Exercise N° 28	Page in exercise book: 44

Exercise 29: Agricultural price indexes (API)

Agricultural price indexes (API)	Exercise N° 29	Page in exercise book: 45

4.7. FOOD SECURITY AND FOOD BALANCE SHEET

Duration: 4 h

Summary: This section defines food security. The development and importance of food balance sheets is also covered in this section.

The concept of **food security** is complex as it has four (4) interacting dimensions. These are:

i. *availability*, defined as all the food resources produced, stored or imported for a given period;
ii. *accessibility*, understood as the ways and means whereby households can obtain the food products they need;
iii. *stability*, which implies temporospatial regularity of food availability;
iv. *food use*, which assumes that all individuals have a food intake which meets their needs in quantity and quality. Here this concept reflects nutritional quality which, if it is too low, can result in malnutrition, "*an abnormal physical condition caused by an imbalance between food intake and the body's requirements*".

The **food balance** sheet reflects variations between the availability of products and the needs of populations during a reference period. Drawing up a food balance sheet requires first of all a list of the products to be considered and sources, stating the origins (resources) and utilizations (uses) of these products.

Learning points:

- The four interacting dimensions of food security;
- The food balance sheet as a tool for analysing food security.

Exercise 30: Food balance sheet

Food balance sheet	Exercise N° 30	Page in exercise book: 47