



Food and Agriculture Organization
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Accelerated vocational training in agriculture
curriculum of module on
agricultural practices of plant nurseries



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Contents

Acknowledgements.....	iv
Introduction.....	1
Educational guidelines.....	1
Didactical tools.....	2
Evaluation of professional competencies	4
Chapter 1: Nurseries and their facilities (6 hours)	5
Chapter 2: Potting media and mixes (8 hours).....	5
Chapter 3: Reproductive methods used in nurseries (16 hours)	6
Chapter 4: Grafting (10 hours).....	6

Tables and boxes

Table 1 The competency of the unit and its stages	2
Table 2 Didactical tools	3
Box 1 First phase of competency.....	5
Box 2 Second stage of efficiency.....	6
Box 3 Third phase of competency	6

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This curriculum was formed within the framework of the accelerated agricultural technical and vocational training for youth from 14 to 25 years (Lebanese and non-Lebanese) within the framework of the Food and Agriculture Organization of the United Nations (FAO) project "Upgrading the technical agriculture education system in Lebanon", funded by the Kingdom of the Netherlands. The training was implemented by the schoolteachers, trainers and AVSI.

This project, led by FAO is implemented in cooperation with the Ministry of Agriculture, UNICEF, ILO, AVSI and WARD. It aims to upgrade the management and services of the agricultural technical schools of the Ministry of Agriculture in a sustainable manner to provide high-quality agricultural technical training to Lebanese and Syrian youth for increasing their employability skills. It also aims to review and update the Agriculture BT program and curricula following Competency Based Training (CBT) and labour market needs along reviewing and updating its related institutional arrangement.

It further aims at building linkages for agricultural technical schools with private sector and setting contractual arrangement for work based learning. Also, it seeks to provide a healthy and protective learning environment for youth growth and development through the rehabilitation of school buildings and equipping school laboratories field demonstrations.

A student text book is developed for this curriculum (in Arabic)

Introduction

Unit: agricultural practices of plant nurseries

duration: 40 hours

Plant nursery is an area devoted to produce many plant seedlings and to cultivate and grow trees, shrubs and herbaceous plants where the seeds are planted or part of plants of some varieties for the purpose of producing seedlings.

The main purpose of an arboretum is to preserve the genetic traits of the plant species to be propagated, as well as the production of virus free seedlings with a good plant breeding.

Educational guidelines

Accelerated vocational training is based on the principle of free participatory and constructive education. The basis of education is that trainees share their information with each other (no matter what level they are) and build upon them after correction. Trainees' experience is one of the most important pillars that helps them to appreciate themselves and to link what they learn to what is needed in the labour market. On this basis, the training strategy aims to guide trainees and help them enter into a production cycle. It also aims to change their behaviour (especially those who have dropped out of general education or who have different difficulties to prevent their active participation in society) and to ensure a sound and effective integration into the labour market. Therefore, the trainer must be careful to implement the following things/steps:

1. Focus on collaborative work in small groups.
2. Encourage trainees to discuss, dialogue and open exchange of information and experiences.
3. Respect for colleagues at work, employer, public safety laws, rules of health and environmental protection.
4. Give equal opportunities to participate.
5. Adopt the deductive method in education because it is most suitable for this type of teaching.
6. Link practical steps to theoretical steps that is, starting from applied work to the conclusion of theories.
7. Stay away from purely technical information, simplify things, and increase experience.
8. Pay attention to each trainee individually and monitor his/her work and correct what is necessary to maintain his/her safety and the safety of his/her colleagues and his/her work.
9. To consider "class workshop" as one of the most important teaching strategies used in this field, where the reality of work is applied directly to the reality of work or similar to the reality of work, theoretical learning is not separate from the application and the processes of discovery continue.
10. Emphasize that the trainee performs the cleaning and sterilization operations with emphasis on replication with high quality.
11. Consider field training (in practice) as one of the most important learning strategies that can be adopted.
12. Individual follow-up of the trainee during and after the educational process to ensure the achievement of the procedural objectives and acquire the necessary skills as the basis for his/her work in the labour market.
13. To consider the general objectives as the basis for the work of the trainee in the labour market, so it is necessary to verify their acquisition and acquire the necessary skills through the individual follow-up of the trainee during the learning process and during field training.
14. Work to motivate trainees to learn and push them to explore, extract and apply information frequently in order to acquire the required skill and focus using different active and interactive methods. Examples: scientific observation, field visits and projects, as well as experience and practice which are considered the most important elements of training.
15. The use of multiple educational aids to facilitate the absorption process, especially films and computer programs specialized in this area or websites.

Table 1 The competency of the unit and its stages

	Texts			Evaluation Mechanism
Competency	At the end of this unit, when facing a problem- a situation, the trainee will be able to propose a solution to this situation by employing resources (knowledge, skills, techniques...) related to the methods of establishing nurseries and implementing special agricultural operations out.			Evaluation Criteria of a Complex situation
Competency Stages	14 hours At the end of the first stage of efficiency, and when facing a problem – a situation, it has a meaning for him/her, the trainee will be able to propose a solution to this situation and through the use of integrated resources linked to the selection of the nursery site and determine its types and basic facilities and all agricultural mixtures and equipment used therein.	16 hours At the end of this stage, and when facing a problem – a situation, it is meaningful for him/her, the trainee will be able to propose a solution to this situation and through the use of integrated resources related to the implementation of various methods of reproduction of plants and trees.	10 hours At the end of this unit, and when facing a problem – a situation, the trainee will be able to propose a solution to this situation by using it in a combination of resources related to the implementation of different grafting techniques.	Evaluation Criteria of a Complex situation

Didactical tools

Learning by experience and class workshop contributes by enabling the trainee to acquire the skills he/she needs. Field training (in fields and farms) is one of the most reliable tools.

In addition to the above, it is important that the trainer uses various didactical tools that contribute to reducing learning difficulties and facilitate the learning process of the trainee on the other hand. In this context, it is preferable to use active instructional materials than using the passive ones, because of the nature and type of training, and in accordance with the levels of understanding and knowledge of trainees.

Some of the most important media:

1. computer, monitor and internet;
2. television, CD player and specialized films;
3. specialized books and magazines;
4. wall paintings; and
5. various visual and digital tools and materials to facilitate the process of explaining the theoretical content in the classroom and the practical applications in the field (safety masks, gloves, pruning shears, trees, etc.).

Add to that, Websites are full of films, videos and information on the subject, which we recommend to use on the one hand and encourage trainees to look at them and search them.

Table 2 Didactical tools

Unit	Quantity for each school	Description/ specification	Chapter №
pieces	each student	rubber gloves	4-3-2-1
pieces	each student	agriculture gloves	4-3-2-1
pieces	each student	protective goggles /glasses	4-3-2-1
pieces	each student	rubber boots	4-3-2-1
pieces	each student	mask	4-3-2-1
pieces	each student	coverall	4-3-2-1
pieces	5	shovel with a long wooden handle	2-1
pieces	6	pickaxe with a long wooden handle	2-1
pieces	5	hoe with a long wooden handle	2-1
pieces	2	wheel Barrow	2-1
pieces	2	fork Hoe with a long wooden handle	2-1
pieces	2	rake	2-1
pieces	5	garden hand hoe with 3 teeth + pickaxes	2-1
pieces	2	slow release fertilizer (15.15.15) 50kg	2
pieces	2	organic Fertilizer 25 kg	2
pieces	8	perlite 100 lt	2
pieces	1	weather thermometer	1
pieces	1	weather hygrometer	1
pieces	30	seed tray	3-2-1
pieces	1	tensiometer (soil moisture sensor) + Auger	3-2-1
bag	1	vegetable seeds – Okra	3
Kg	2	vegetable seeds – Phaseolus	3
bag	2	vegetable seeds - Summer Cabbage	3
bag	2	vegetable seeds - Coriander	3
bag	2	vegetable seeds - Zucchini	3
bag	1	vegetable seeds - cherry tomato	3
bag	1	vegetable seeds - Eggplant	3
bag	2	vegetable seeds - Tomato	3
bag	1	vegetable seeds - Cucumber	3
bag	2	vegetable seeds - Pepper	3
Kg	1	vegetable seeds -Broad Beans	3
bag	1	vegetable seeds - Cauliflower	3
Kg	1	vegetable seeds - Parsley	3
envelope	3	flower seeds - Zinnia	3
envelope	3	flower seeds - Cyclamen	3
envelope	3	flower seeds - Paris Daisy (Chrysanthemum)	3
envelope	3	flower seeds - Petunia	3
plants	10	plants – Rose	3
plants	5	plants - Sword fern	3
plants	5	plants - blue star fern	3
plants	5	plants - bird’s- nest fern	3
plants	5	plants – lipstick	3
plants	5	plants – Bromeliads	3
plants	5	plants – Begonia	3
plants	5	plants – Hostas	3
plants	5	plants - String of pearls	3
plants	5	plants - Echevira	3
plants	5	plants - Crassula	3
plants	5	plants – Sedum	3
plants	5	plants - Tillandsias	3
plants	5	plants - Aechmea	3
plants	5	plants - Vriesea	3

plants	5	plants - Ivies/Hedera	3
plants	5	plants - Wandering Jew	3
piece	1	mastic for grafting	4
piece	1	pruning shears	4-3
piece	1	grafting knife	4
piece	1	raffia ribbon	4
piece	1	pruning saw	1-3-4

Evaluation of professional competencies

This curriculum is based on two pillars: specific objectives and competencies and their stages.

A. Evaluation of specific objectives:

- true / false questions;
- matching questions (here the number of items in the second list must be greater than the number of items in the first list);
- fill in the blank questions;
- multiple choice questions;
- exercises; and
- follow specific implementation stages.

B. Competency and its stages evaluation:

The formative and corrective function of the evaluation is the most important central function, as it allows to valuing achievement and discover the learning difficulties to address them and correct the course of learning through feedback. It also seeks to develop of the higher thinking skills, especially the skill of self-assessment and critical sense and mutual evaluation among trainees, which develop their sense of responsibility. Because the measurement of the development of higher thinking skills can only be achieved by solving the problem of a complex problem or carrying out a complex task¹ in which a number of factors overlap, the trainee is linked, coordinated and separated. Therefore, it is essential that the complex situation be characterized by the following components and characteristics:

Complex situation components¹

- Context describing the environment in which the situation takes place.
- Document which is a set of physical, hypothesis or real elements provided to the student: text, pictures, drawings, and so on. To be used in resolving the situation, the document contains information that may be complete or incomplete, both basic and non-essential.
- The function that determines the purpose of production required, a social function.
- Instruction: a set of work instructions that are explicitly given to the student, which is a translation of the task to be accomplished.

Complex situation Properties

The complex situation should be:

- appropriate for any target efficiency;
- specialized resource that employs resources; and
- motivating the trainee, meaning that it raises his/her interests.

The standardized evaluation is ideal for verifying the extent to which a trainee acquires competencies and their stages through a complex situation or a complex task. The criteria adopted in this approach are:

- Relevance of the learner's product: meaning match of the production of the trainee with instructions for the task required of the trainee to do, regardless of whether the production is true or not. Did the trainee answer what he/she asked for? Was the answer within or beyond the subject? And so on. In other words, the trainee's understanding of the situation in general and of instruction in particular. If the instruction,

¹ Complex and not complicated: "Complex" means that the trainee has all the resources necessary for the solution, and only has to coordinate and connect with each other* to accomplish the solution or task while "complicated" means that resources have not yet been acquired by the trainee

as it is supposed to be, is composed of a complex procedural act and a cognitive content, the answer is appropriate if procedural action and cognitive content are taken into account.

- Proper use of the tools of the material: the use of concepts, theories and knowledge relating to the question properly.
- Coherence in answers, arguments, and intellectual context. The logical sequence in a trainee's product, the coherence of ideas, and the unit of meaning in a product. Is the answer logical, reasonable, acceptable, or likely to be, even if it is wrong? Is there a contradiction in the trainee's answer? And so on.

Box 1 First phase of competency

First phase of competency (14 hours)

At the end of the first stage of efficiency, and when facing a problem – a situation, it has a meaning for him/her, the trainee will be able to propose a solution to this situation and through the use of integrated resources linked to the selection of the nursery site and determine its types and basic facilities and all agricultural mixtures and equipment used therein.

Chapter 1: Nurseries and their facilities (6 hours)

Specific objectives: at the end of this chapter, the trainee will be able to:

1. define the nursery;
2. specify the nursery types;
3. locate the nursery according to cultivated plants/seedlings;
4. find out how to establish a plant nursery;
5. determine nursery facilities and divisions; and
6. choose the right equipment and tools used in nursery.

Theoretical content:

1. definition of nurseries;
2. choose the nursery site;
3. types of nurseries;
4. nurseries establishment;
5. basic facilities for nurseries; and
6. equipment/tools used in nurseries.

Practical content:

Exercise 1: specifying nursery types.

Exercise 2: identification of the basic facilities of the nursery and the equipment/tools used.

Chapter 2: Potting media and mixes (8 hours)

Specific objectives: at the end of this chapter, the trainee will be able to:

1. link between type of agriculture (or plant species) and the appropriate potting media(s);
2. identify suitable fertilizer for agriculture and for potting media; and
3. apply different types of mixtures according to plantations.

Theoretical content:

1. potting media and mixtures used in nurseries;
2. method of application of Organic fertilizers; and
3. mixing of potting media used in nurseries.

Practical content:

Exercise 1: preparation of various mixture types.

Exercise 2: filling bags with the potting mixture.

Box 2 Second stage of efficiency

Second stage of efficiency (16 hours)

At the end of the second stage of efficiency, and facing a problem -situation, it is meaningful for him/her, the trainee will be able to propose a solution to this situation and through the use of integrated resources related to the implementation of various methods of reproduction of plants and trees.

Chapter 3: Reproductive methods used in nurseries (16 hours)

Specific objectives: at the end of this chapter the trainee will be able to:

1. detect the propagation types of plants and trees;
2. perform various propagation processes for plants and trees; and
3. perform all post-cultivation practices such as irrigation, fertilization, weeding.

Theoretical content:

1. types of plants;
2. types of Reproduction;
3. seed reproduction (sexual);
4. vegetative reproduction (asexual):
 - cutting;
 - layering;
 - offshoot propagation;
 - rhizome (Reproduction by part of plant grown under the soil surface);
 - Propagation by division.
5. necessary conditions for the formation and growing of roots; and
6. post-cultivation practices in nurseries.

Practical content:

Exercise 1: implementing the seeds and vegetative propagation.

Exercise 2: implementing the reproductive process with cutting.

Exercise 3: implementation of the process of layering.

Exercise 4: implementation of the offshoot propagation.

Exercise 5: reproduction by Rhizome (some plant parts growing under the surface of the soil).

Exercise 6: implementation of the propagation process by division.

Exercise 7: post cultivation operations (irrigation, fertilization, weeding).

Note: These operations can be carried out through a visit to a plant nursery.

Box 3 Third phase of competency

Third phase of competency (10 hours)

At the end of this unit, and when facing a problem - a situation, the trainee will be able to propose a solution to this situation by using it in a combination of resources related to the implementation of different grafting techniques.

Chapter 4: Grafting (10 hours)

Specific objectives: at the end of this chapter the trainee will be able to:

1. determine the concept and types of grafting;
2. discover the advantages of grafting;
3. determine the materials and the tools used in the grafting process; and
4. perform various grafting operations.

Theoretical content:

1. grafting definition;
2. advantages of grafting;
3. components of successful grafting;
4. materials and grafting tools;
5. select and store the Scion for grafting; and
6. types of grafting.

Practical content:

Exercise 1: selection of the Scion.

Exercise 2: implementation of different types of grafting.



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