The Educational Content of the Fun and Learn Program

- The educational content of the program consists of basic educational units that represent the successive steps of scientifically and practically sound plant production in the conditions of the Qatari climate.
- The stages of the program discuss the basic steps for preparing and properly cultivating the farm, while shedding light on recent developments paving the way for sustainable agriculture and rationalizing the consumption of irrigation water.
- Each unit is divided into simple theoretical lessons, followed by exciting educational activities specially designed for students to facilitate the learning of agricultural information.
- The program offers unique educational “doses” that depend on the student's continuous interaction with agricultural information, as this is applied inside the greenhouse, or the Hope Farm, or in the facilities of the QBG in the Qatar Foundation nursery.
- The QBG, in cooperation with its partners, has developed basic topics on which the idea of the program is based and from which it draws educational lessons and workshops for students every academic year.

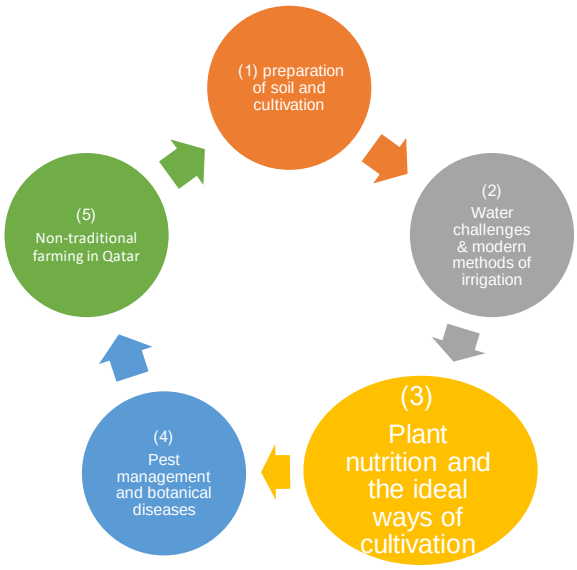
Topics of the Educational Program

- Land preparation for cultivation
- Soil, its characteristics and suitability for cultivation of each species
- Water challenges in Qatar and modern irrigation methods
- Vegetable crop production under Qatari climatic conditions
- Improved seeds and their vital role in agricultural production
- Integrated management of agricultural pests
- Plant nutrition and the ideal methods for high productivity
- Organic Agriculture – Opportunities and Challenges in Qatar
- Hydroponics and its applications in Qatar
- Marketing the Qatari agricultural product
- The role of agricultural tutorship in supporting food security in Qatar
- Initiatives to support agriculture in the State of Qatar

Academic year program 2019-2020

Unit (1): Soil preparation and plant cultivation

- Soil definition and good soil properties
- Improved industrial soils: Types, properties, and methods for using each type
- Land reclamation and soil problems
- Proper preparation of field soil for planting
- Vegetables suitable for cultivation in Qatar
- Qualities of seeds suitable for cultivation and specifications of good seedlings
- Appropriate planting dates for vegetable crops in Qatar
- Cultivation methods, cultivation distances, and management of vegetable crops on the farm
- **Practical exercises:**
    - Exploring soil types and distinguishing each one
    - Creating an appropriate mix of local and improved soils suitable for several types of crops: planting seeds, planting seedlings of seasonal vegetables, planting trees, and planting forage crops
    - Growing the seeds of selected vegetable plants in the nursery
    - Knowing the proper shapes of seeds and seedlings and their good specifications
    - Growing a wide range of vegetable seedlings on the garden farm of the Qatar Foundation Nursery.



Unit (2): Water challenges and modern irrigation methods

- The climate in Qatar and its water sources
- Challenges facing water and rationalization methods in agriculture
- Water rationing of some vegetable plants that are good for cultivation under the conditions of the Qatari climate
- The permissible limit of mineral elements in irrigation water for vegetable plants
- Modern irrigation methods (drip irrigation, spray irrigation, subsurface irrigation)
- The scientific basis for establishing a modern, water-efficient irrigation network
- **Practical exercises:**
    - Exploring the types of modern irrigation tubes used in local agriculture
    - Identifying the requirements for establishing a water-efficient irrigation network
    - Applying the mathematical rules used to calculate the amount of water, the percentage of disposal, and the diameters in the designs of field irrigation networks
    - See the different systems for plant irrigation (drip irrigation, sprinkler irrigation, pivot irrigation)
    - Designing models of differently purposed irrigation networks by students in the garden farm in the Qatar Foundation nursery

Unit (3): Plant nutrition and the ideal methods for high productivity

- Definition of the macro and micro nutrients of the plant
- Introduction to organic fertilization
- Plant fertilization methods
- Symptoms of deficiency of elements in plants.
- An introduction to organic farming and the fertilizers used in it
- **Practical exercises:**
    - Sorting different types of mineral and organic fertilizers
    - Practical training on adding mineral fertilizers by various methods according to the needs of each crop on the farm
    - Dissolving compost with water and identifying non-dissolving fertilizers
    - Identifying the signs of deficiency of elements in plants on the farm through sampling and the identification of symptoms

Unit (4): Plant pests and diseases

- Introduction to plant diseases and their division
- The most famous disease that affects vegetable plants in Qatar
- Methods of disease prevention during the cultivation process
- Methods of treatment using:
    - Pheromone traps
    - Natural enemies
    - Chemical pesticides
- Safety precautions in storing pesticides and proper spraying methods
- **Practical exercises:**
    - Counting the diseases that hit crops through direct field observations of disease symptoms in plants
    - Review of these diseases with lecturer, with each group developing a treatment program to eliminate pests and diseases
    - Choosing the appropriate pesticides and determining the biosafety periods for each pesticide used in the program

Unit (5): Non-traditional agriculture in Qatar

- An introduction to non-traditional agriculture includes hydroponics, aquaponics, and LED cultivation
- Hydroponics in Qatar
- The crops suitable for hydroponics
- The temperatures required to establish a hydroponic farm
- Water cycle and its nutrient distribution system
- Advantages and disadvantages of hydroponics
- **Practical exercises:**
    - Making a mixture of the nutrient solution used in hydroponics in a mathematical way, according to the type of crop used and the scientific model adopted for each group of crops
    - Create a hydroponic model on a small scale, by combining tubes that carry water and nutrient solution and planting seedlings in pots suitable for hydroponics