

Course 2: Smart Irrigation and Fertilisation

M4: Integrated Irrigation & Fertilization Systems



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What will you learn?

This module aims to introduce the principles of integrated irrigation and fertilization systems, known as **fertigation**. You will learn what fertigation systems are and how they enable plants to simultaneously deliver water and nutrients directly to the roots. You will also learn about best practices for implementing fertigation, which help to achieve high yields with fewer resources. This module is a great opportunity to discover how modern technologies support sustainable and smart farming

Understand...

...the concept of fertigation.

Identify...

... advantages of using fertigation systems.

Explain...

...principles of fertigation systems.

contents

This module introduces fertigation—the technique of delivering water and nutrients simultaneously through irrigation systems. Learners explore system design, injection methods, and best practices that enhance crop quality while reducing input use, showing how integrated approaches can boost productivity and sustainability in modern farming.

- 01 Overview of fertigation systems
- 02 Designing systems for simultaneous water and nutrient delivery
- 03 Best practices for implementation
- 04 Let's Practice!



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01

OVERVIEW OF FERTIGATION SYSTEMS

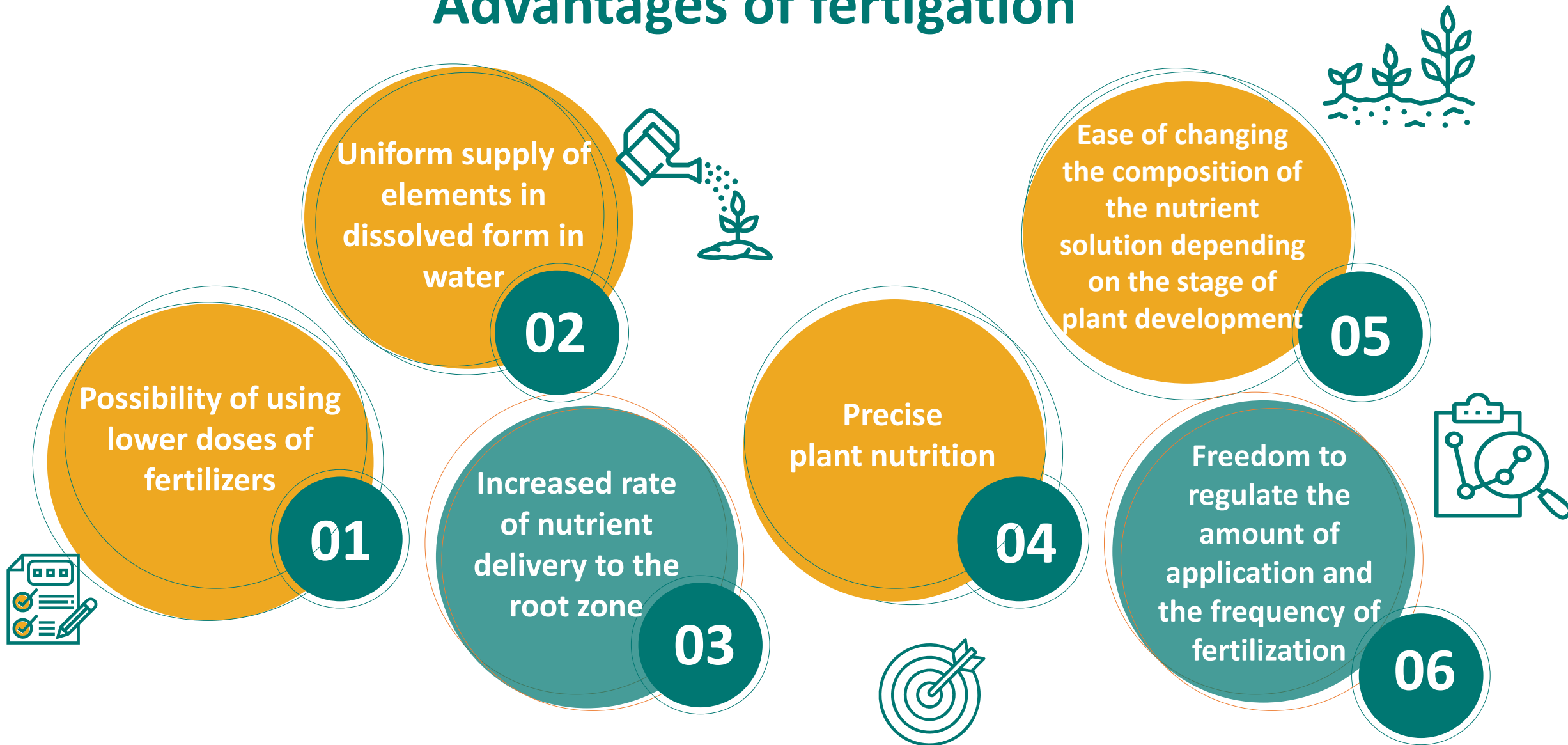


What is fertigation?

Fertigation is the application of fertilization during irrigation using irrigation systems. Fertigation is a common way of fertilizing horticultural crops under cover and crops on inert substrates. It is also used to fertilize field vegetable crops, fruit crops, berry plantations, and ornamental plant nurseries.



Advantages of fertigation



A photograph of a person wearing a hat and a long-sleeved shirt, standing in a greenhouse. They are looking down at a small plant in a white bag. The greenhouse is filled with many similar white bags containing young plants, arranged in long rows. The person is in the background, and the focus is on the plants in the foreground. There are some yellow and teal decorative blocks in the top left corner of the image.

Basic proper fertigation

The installation of a fertigation system should start with **water and soil analysis**. In the case of water, it is important to check its pH, as well as to test its electrical conductivity and hardness. In the case of soil, the pH index is the most important, because knowledge of this parameter allows you to determine the absorption of nutrients by plants and select the most appropriate minerals for specific plants.

02

DESIGNING SYSTEMS FOR SIMULTANEOUS WATER AND NUTRIENT DELIVERY





Injection methods and devices

The correct injection equipment is as important as choosing the right nutrient. Incorrect equipment can damage the irrigation system, affect the efficiency of the system's operation, or reduce the effectiveness of nutrients.

Applicable equipment:

- injector
- dosing pump

Injector

The injector works on the basis of a phenomenon known as the **Venturi effect**. Its functioning is based on creating a pressure difference during the flow of water. The negative pressure created by the water, flowing through the system, sucks the nutrient solution into the irrigation system.

Dosing pumps

Dosing pumps are used to apply ready-made liquid fertilizer mixtures by injecting a pressurized solution into irrigation systems. With the help of pumps, it is possible to feed nutrients and fertilizing acids directly into the root system at the same time.

Principles of operation of the injector

Watch this video that explains in simple terms what fertigation is and what is the principle of the injector's operation.

[Venturi effect](#)



03

BEST PRACTICES FOR IMPLEMENTATION



The main application of fertigation in agriculture

Fertigation is most often used in field crops of species that are prone to water shortages or when the producer wants to obtain the highest quality of the crop. These species include mainly strawberries, raspberries, blueberries, but also in vegetables: cucumbers, peppers, tomatoes, broccoli. Fertigation is widely used in crops under cover, where it is a basic element.



Growing tomatoes under cover

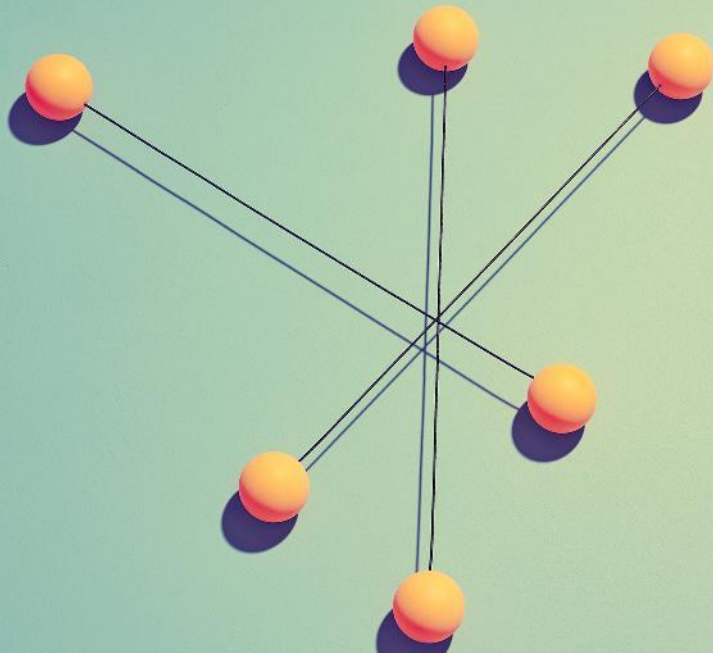
Precise irrigation and fertilization in tomato cultivation under cover affects the quantity and quality of crops. This video presents the fertilization plan and the positive effects of fertigation.

[Fertygacyjne odżywanie pomidorów pod osłonami](#)



04

LET'S PRACTICE



Learner Exercise: Scenario

You take over a strawberry plantation from your parents. You intend to continue cultivating this species in the coming years. You are planning a change in your approach to cultivation and investments. **Choose the most advantageous solution**

Answer A

I will install sprinklers to irrigate plantations during periods of drought

Answer B

I will apply appropriate fertilization using a drip irrigation system for plants

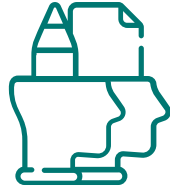
Answer C

I will conduct soil tests and apply fertilization tailored to the needs of the plants.

Feedback on answers

Option A

A good start. Plants like these need the right amount of water throughout the growing season



Option B

Sensational! Fertigation is an effective way to provide your plants with water and proper fertilization

Option C

Proper fertilization is the basis for high yields and savings. Analyze whether this is a sufficient step to ensure your success. Pay attention to the water needs of strawberries.



GREAT JOB!

You already know what fertigation is and what its use is in agriculture.
Check how renewable energy sources can be used in the irrigation process.
Take a look at module 5 and enrich your knowledge!





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Follow our journey



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