International training of hydroponics

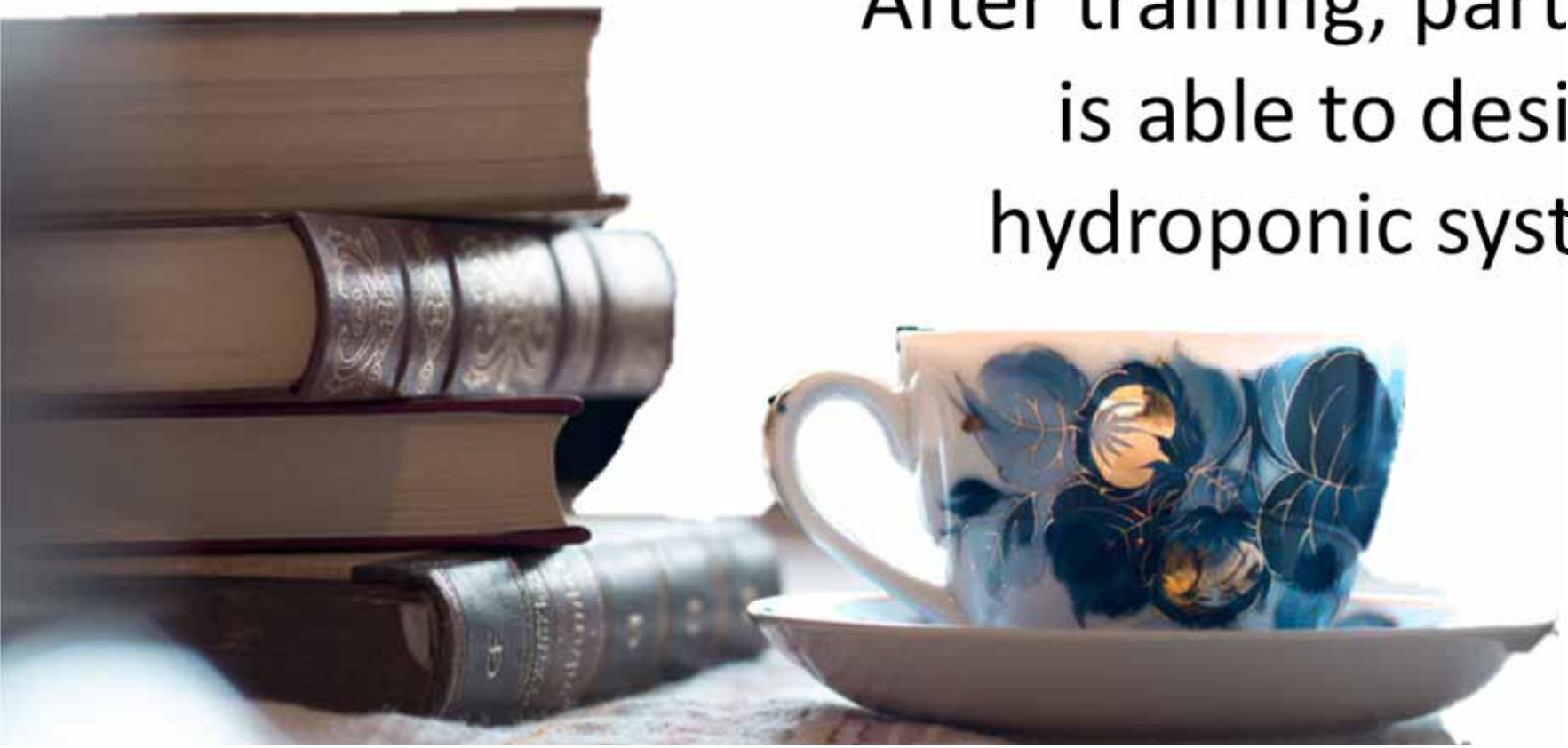
Instalation System HYDROPONICS

Facilitator team
ICAT Lembang

MINISTRY OF AGRICULTURE
BADAN PENYULUHAN&PENGEMBANGAN SDM PERTANIAN
BALAI BESAR PELATIHAN PERTANIAN LEMBANG
TAHUN 2021

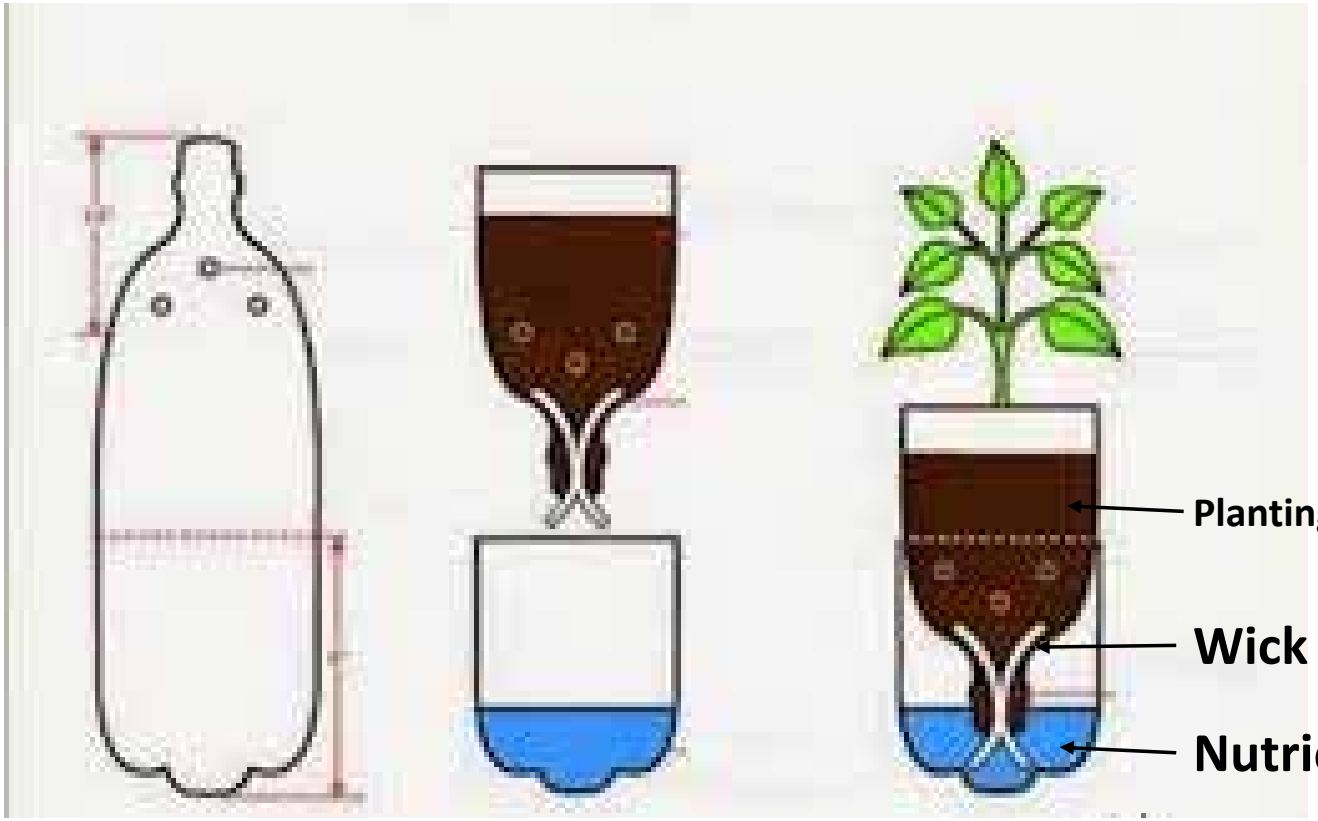
Learning Objectives

After training, participants is able to design hydroponic systems



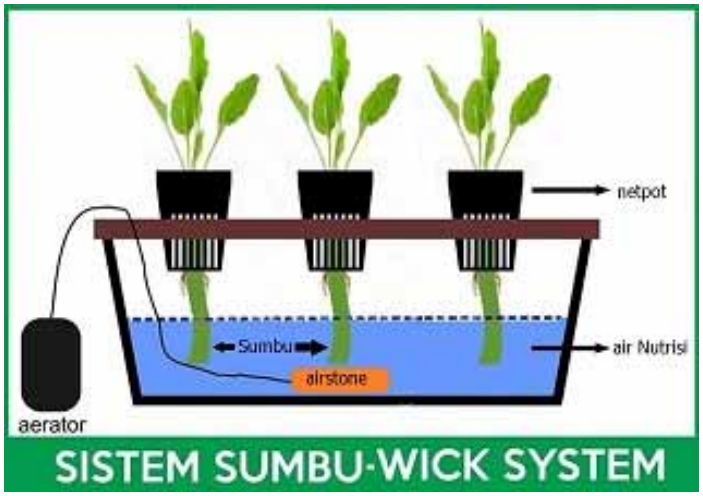
1

Wick System

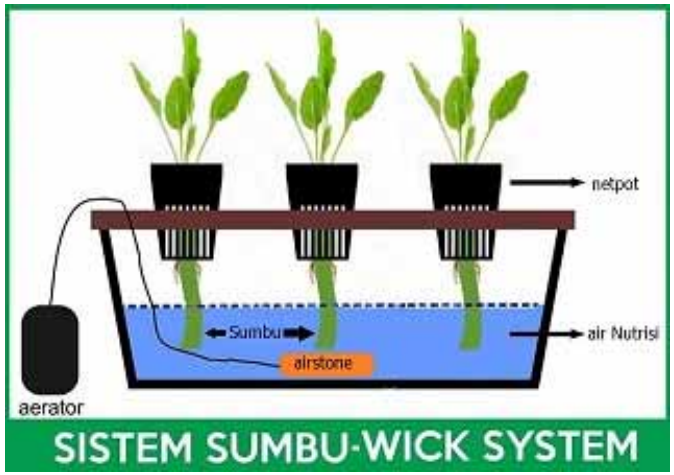


- **Wick System: one of the systems in hydroponics that distributes a nutrient solution to plants using wick with capillary system**
- **The wick can be made of cloth, cotton, or other absorbent material.**
- **Wick system is the simplest system in hydroponics.**
- **The basic materials for making a wick system can be started from used materials, such as mineral water bottles, used paint containers, and others.**
- **Pros: cheap, easy, simple, without using electrical energy**
- **Weaknesses: The root area does not get oxygen intake, is prone to root rot, and the plant is underdeveloped.**

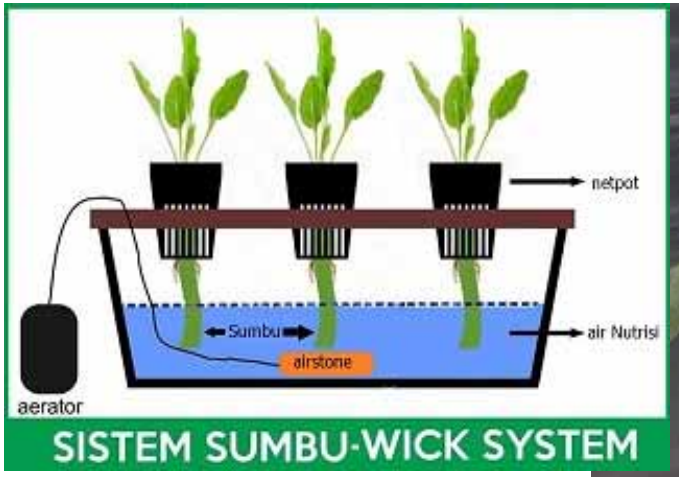
Various Design of Wick Sistem



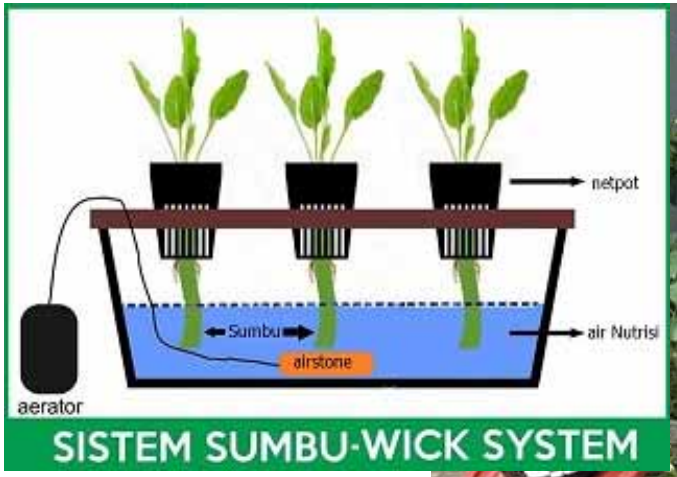
Various Design of Wick Sistem



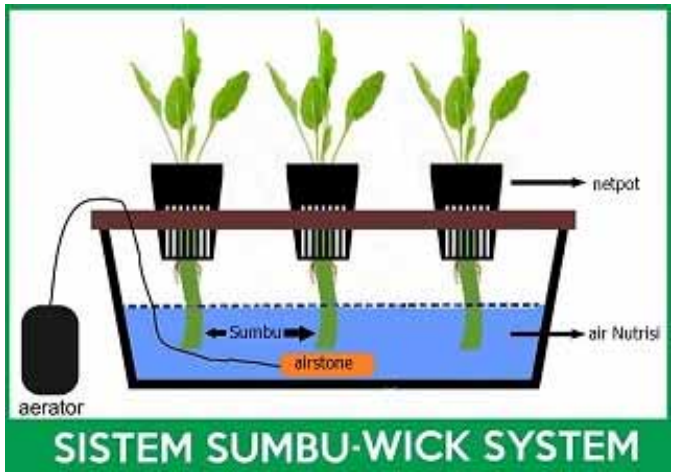
Various Design of Wick Sistem



Various Design of Wick Sistem

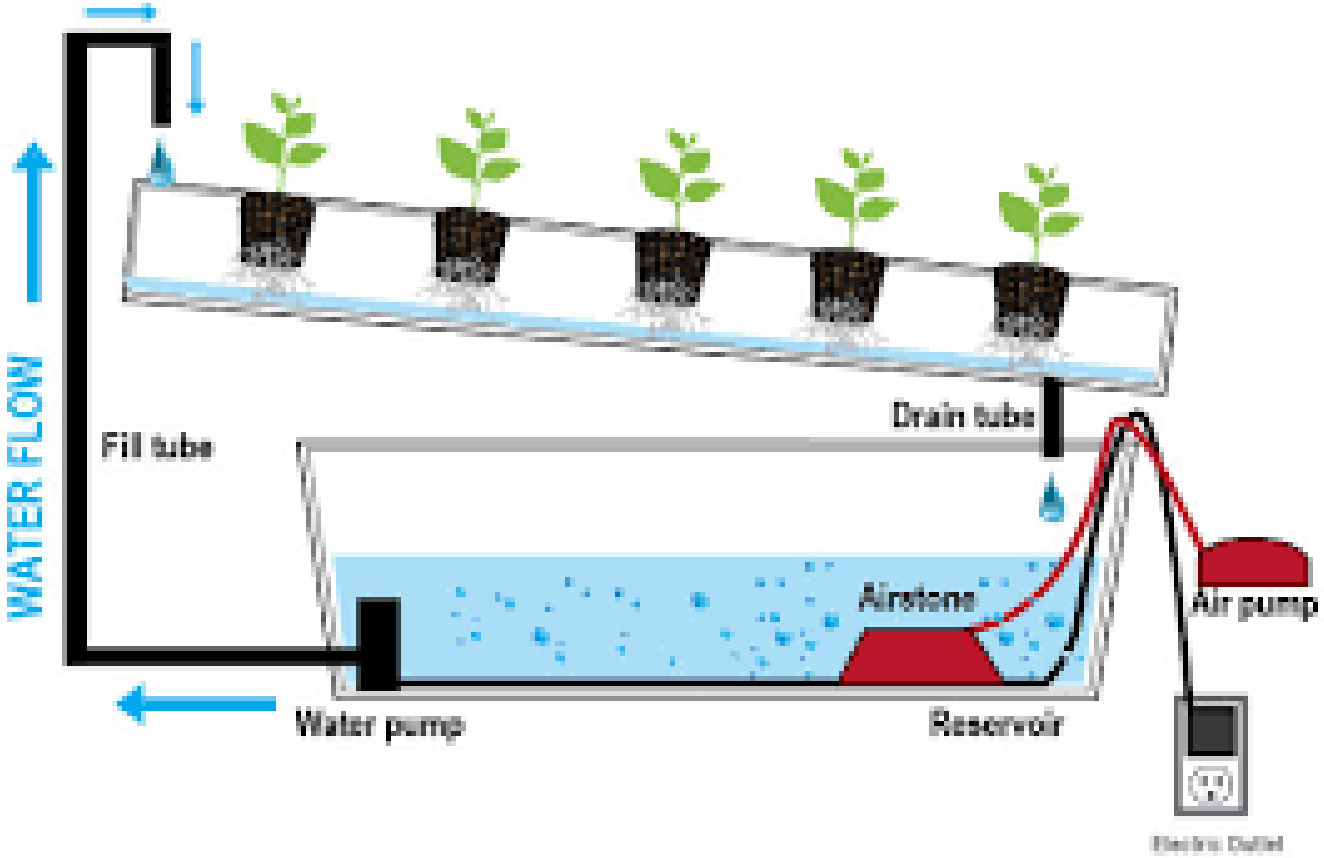


Various Design of Wick Sistem



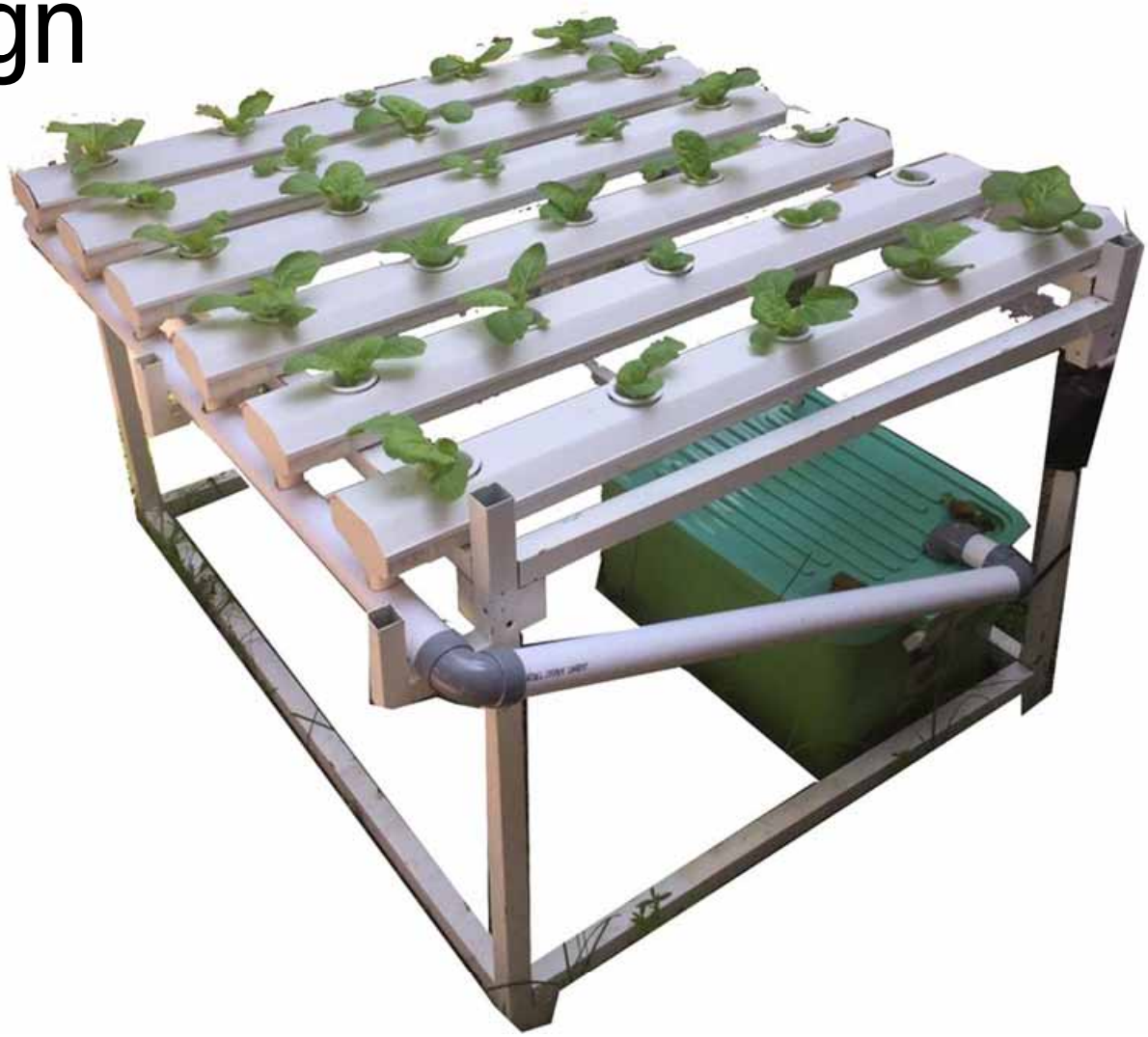
2

NFT

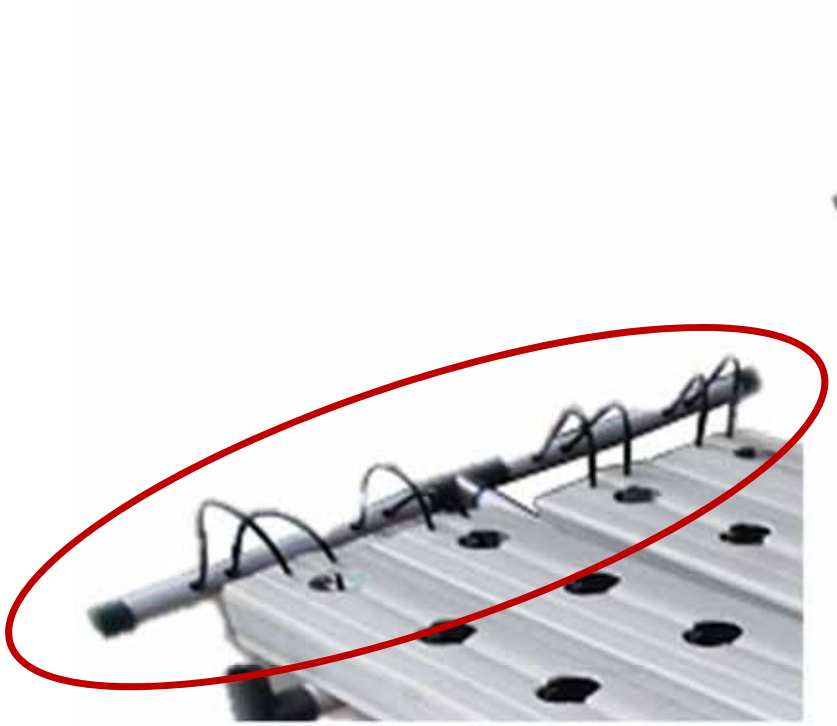

WATER FLOW
Fil tube
Drain tube
Airstone
Air pump
Water pump
Reservoir

- **Nutrient Film Technique (NFT): hydroponic technique by flowing and circulating nutrient solution to the roots of the plant**
- **NFT systems are designed with the right channel slope, the right flow rate, and the right channel length.**
- **Installation of NFT systems can be made of bamboo, wood, iron, mild steel, PVC, gully, regulator hoses, and others.**
- **The circulation rate of the nutrient solution should not be less than 1 liter per minute.**
- **The channel length cannot be more than 10 meters.**
- **Pros: plant roots get a maximum supply of water, oxygen and nutrients.**
- **Weakness: plant roots do not get a supply of nutrient solution if the power out.**

Various NFT Design



Various NFT Design



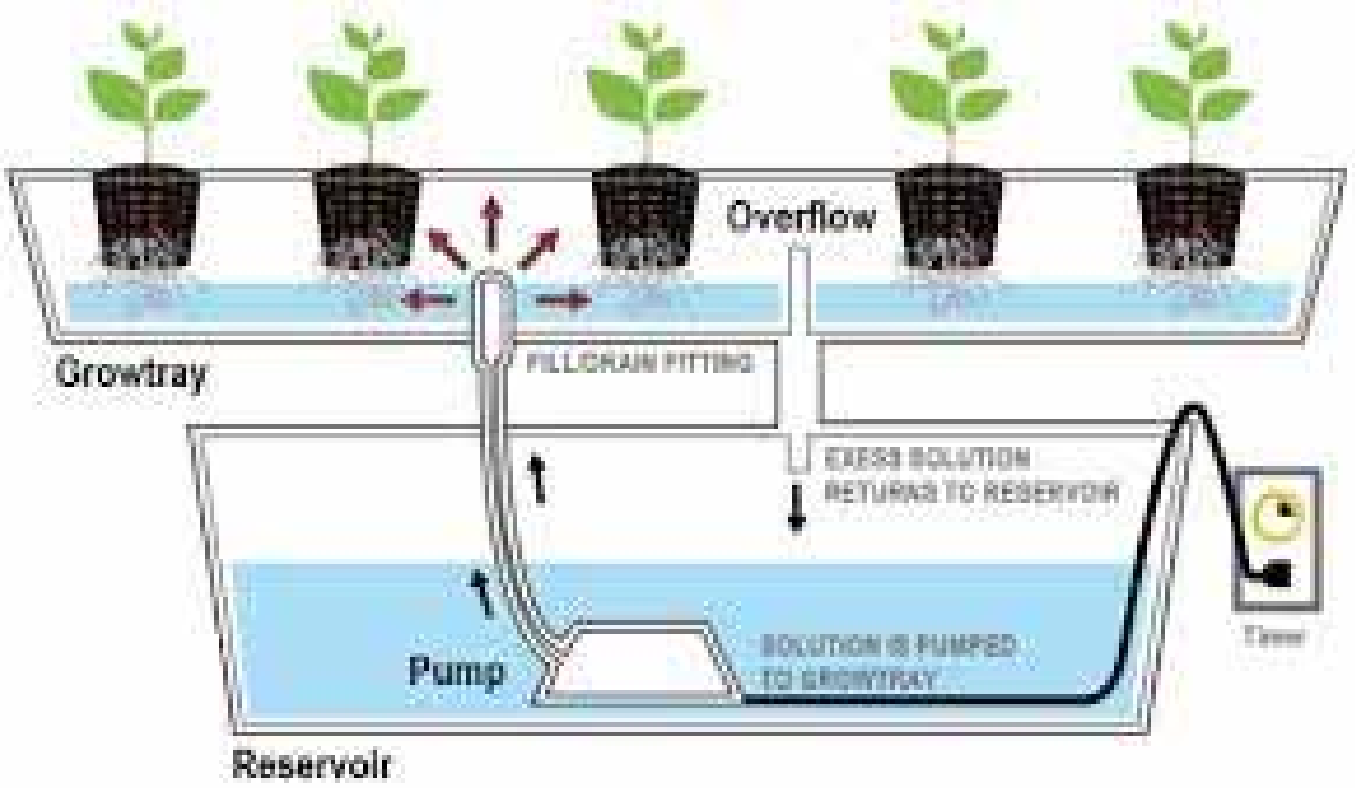
Various NFT Design

Various NFT Design

Various NFT Design

3

DFT


Overflow
Growtray
FILLCRAIN FITTING
EXESS SOLUTION
RETURNS TO RESERVOIR
Pump
SOLUTION IS PUMPED
TO GROWTRAY
Reservoir

- **Deep Flow Technique (DFT): a hydroponic system that places plant roots in a circulating nutrient solution with a depth of about 4 cm.**
- **The DFT system is designed with a flat channel surface, so that there is a puddle in the root area.**
- **NFT system installations can be made of bamboo, wood, iron, mild steel, PVC, and others.**
- **Pros: plant roots still get a supply of nutrients even if there is a power cut**
- **Weakness: oxygen supply varies in each channel, so plant growth is less uniform**

Various DFT Design

Various DFT Design

Various DFT Design

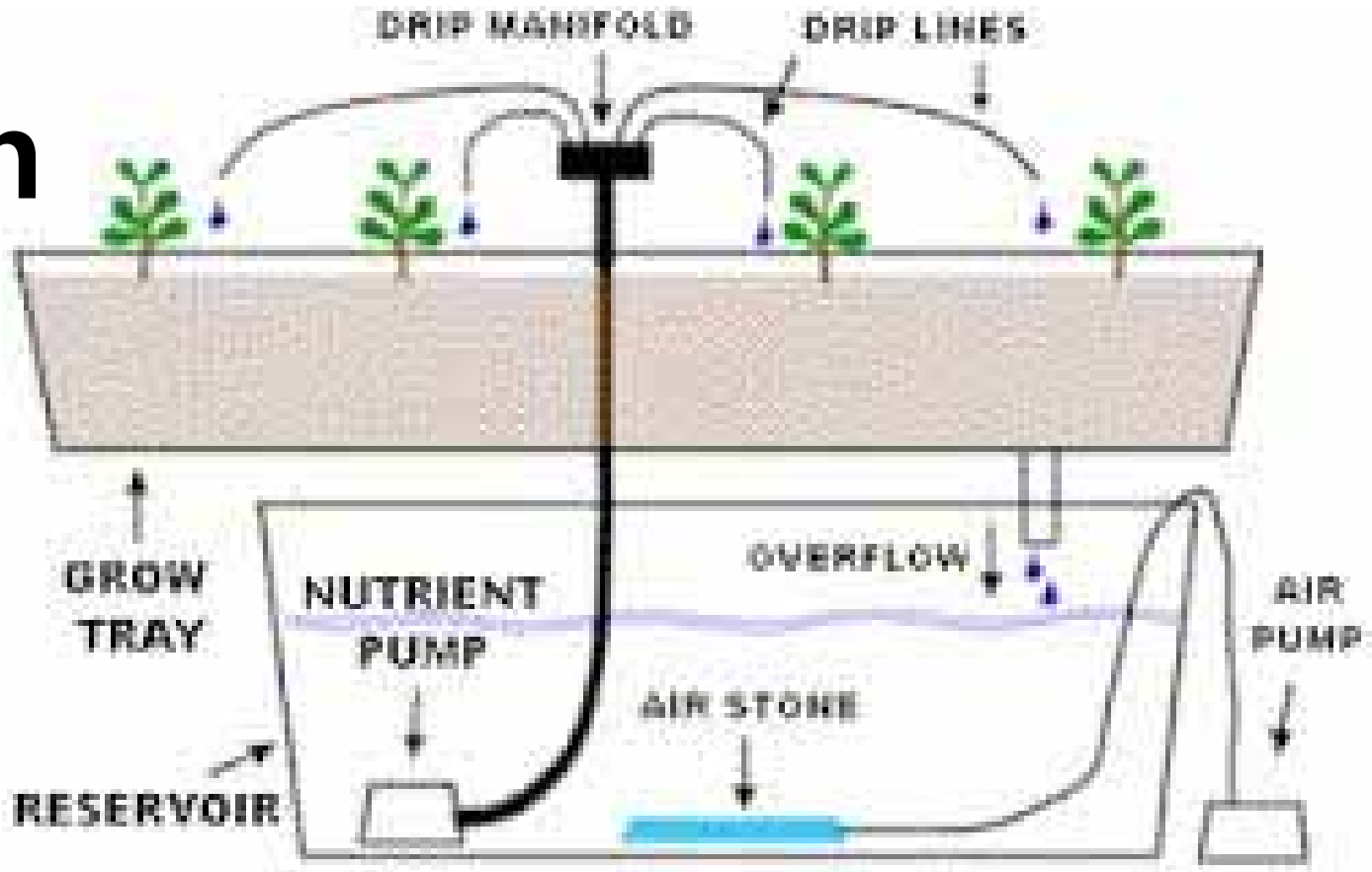
Various DFT Design

Various DFT Design

Various DFT Design

Drip Irrigation

4



- **Drip Irrigation: system that providing a supply of nutrient solution droplets to the roots of the plant at a very low speed (2-20 liters / hour).**
- **The drip irrigation system is designed from a system of small diameter plastic pipes equipped with outlets called emitters or drippers.**
- **The nutrient solution is drained near the plant so that only part of the soil where the roots grow is wetted.**
- **Pros: more efficient use of water and nutrients,**
- **Weakness: frequent blockage of the irrigation canals, so it requires more frequent maintenance. Clean water and free of sediment is needed, to avoid frequent clogging.**

Various Drip Irrigation Design

Various Drip Irrigation Design

Various Drip Irrigation Design

Various Drip Irrigation Design

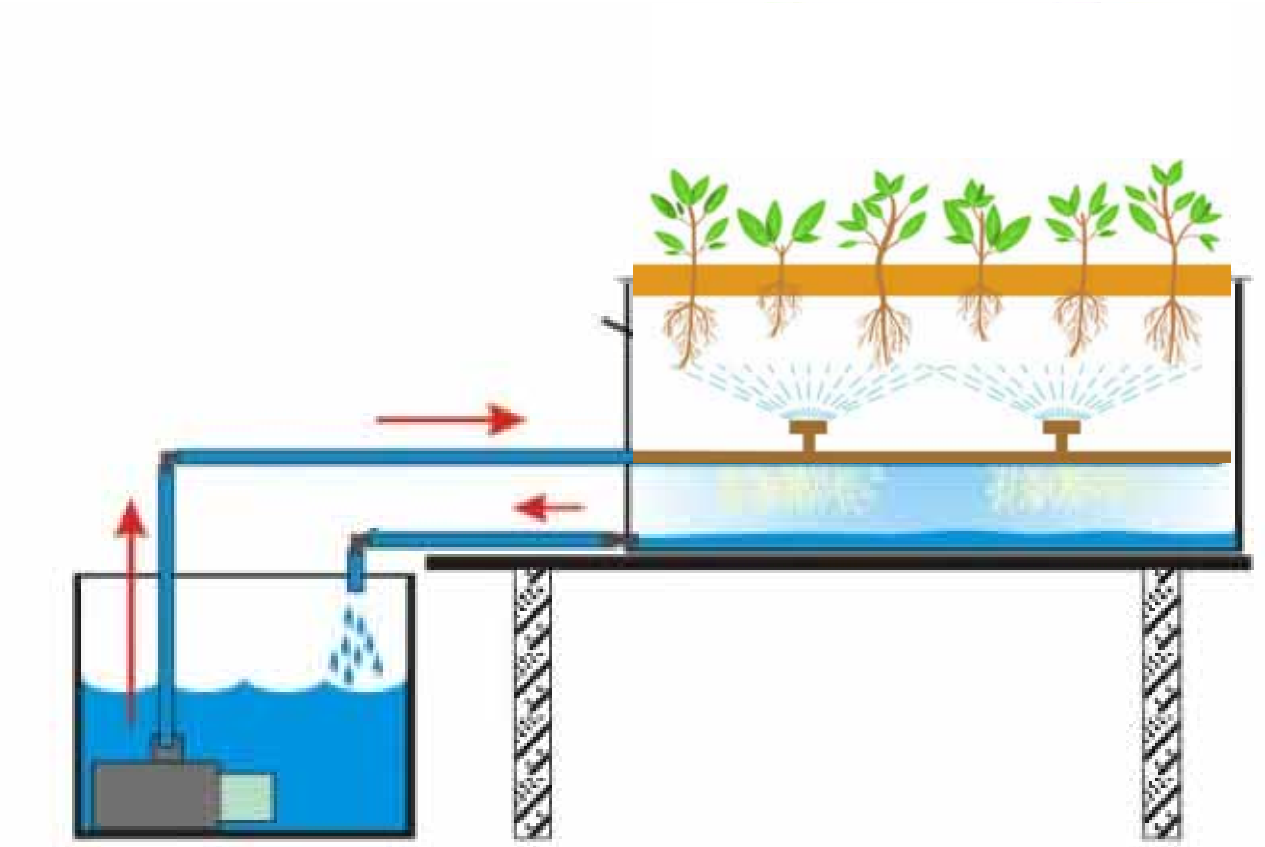
Various Drip Irrigation Design

Various Drip Irrigation Design

Various Drip Irrigation Design

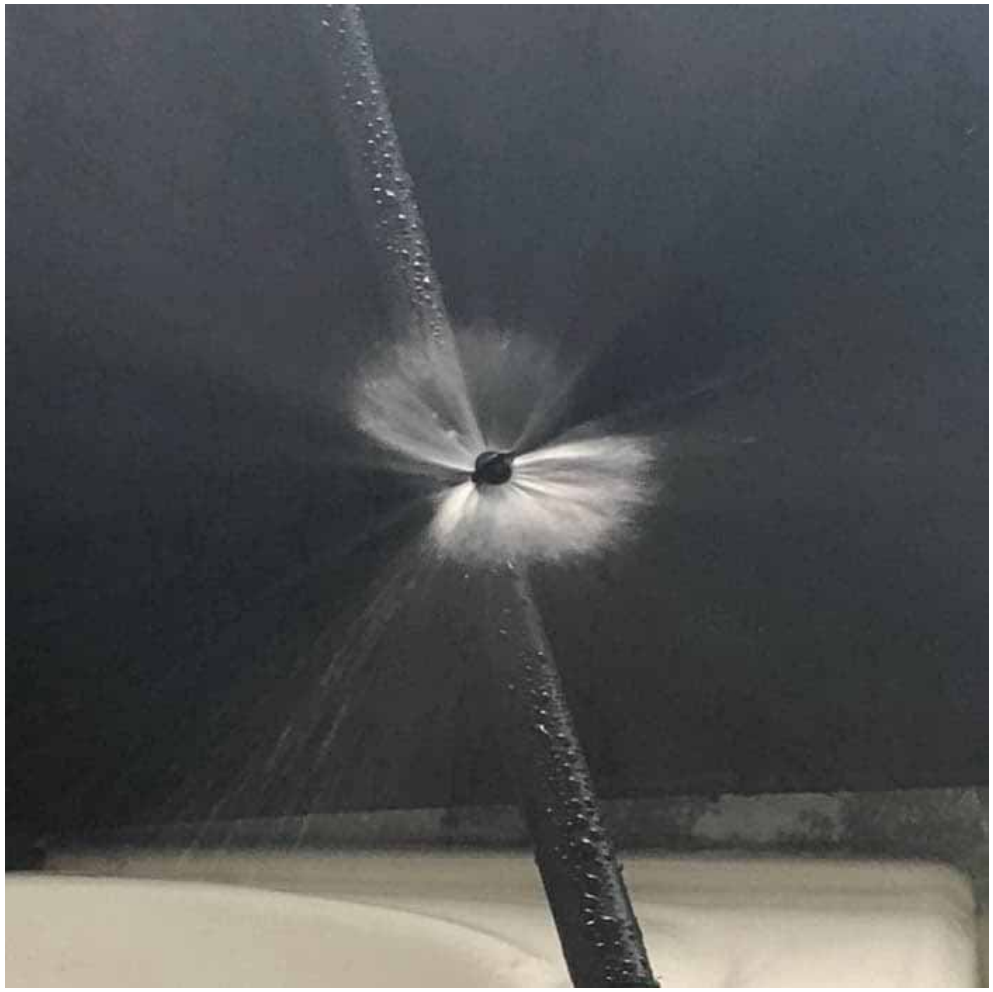
5

Aeroponic

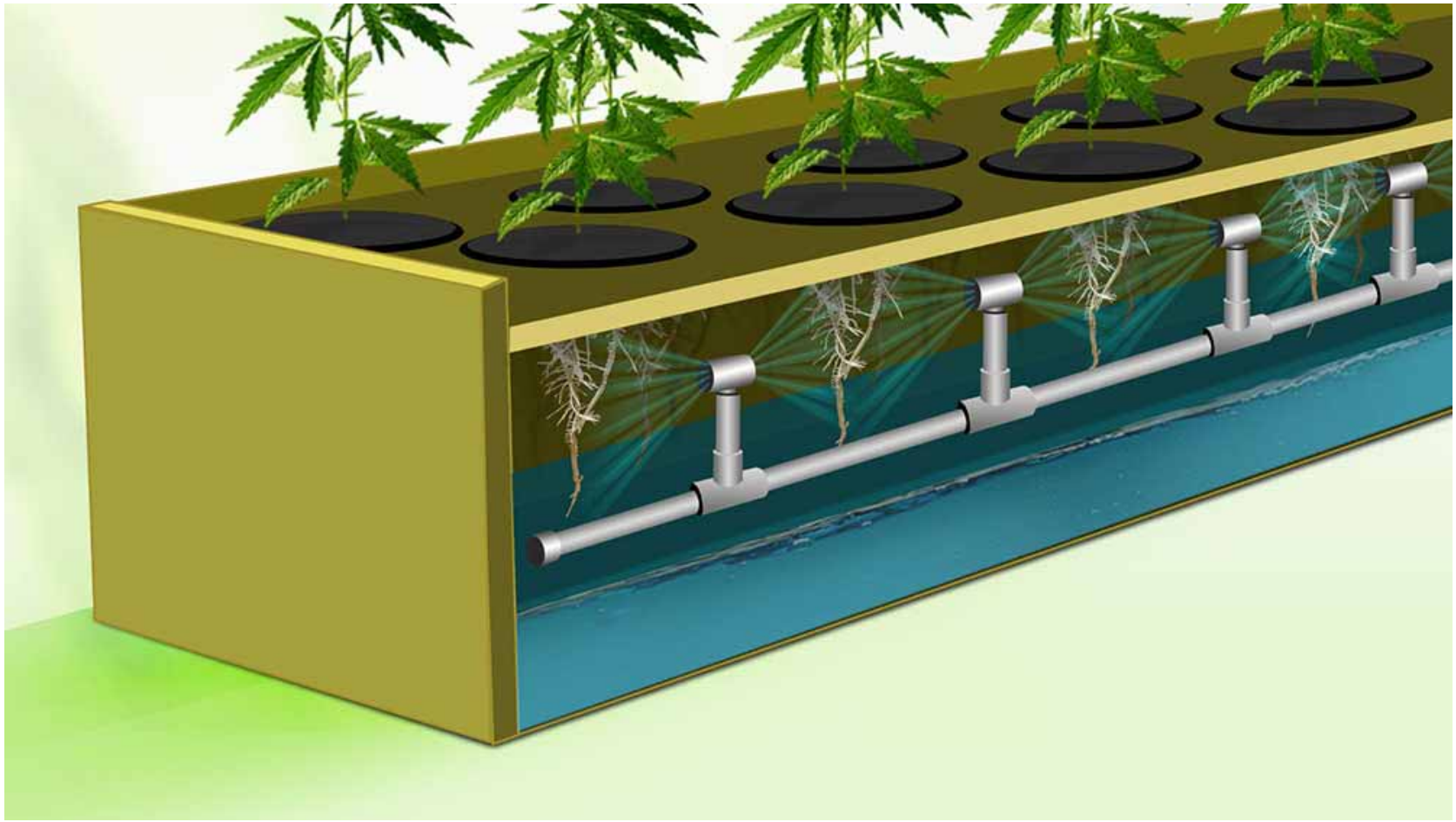


- **Aeroponic: a hydroponic system that provides a supply of nutrient solution to the hanging parts of the plant roots without planting media by misting.**
- **The roots of the plant are grown in a closed or semi-closed environment.**
- **The roots are grown hanging in the air with a continuous intake of micro water and nutrients.**
- **Advantages: the intake of oxygen, water and nutrients are maximally and evenly distributed, minimizing the attack of pests and plant diseases in the root area.**
- **Weaknesses: the growth of plants is easily disturbed, if the intake of nutrient solutions is stopped due to power outages or blockages of nutrient channels.**

Nutrient Solution Spray Conditions



Various Aerophonic Design



Various Aerophonic Design

Various Aerophonic Design

Various Aerophonic Design

Various Aerophonic Design

Various Aerophonic Design


Thank you.....