



*WFP SSTC COVID-19 Opportunity Fund Pilot in Libya supported by  
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# SOILLESS CULTURE

*Liu Wei, Ph.D. Vegetable Science, Professor*

**WFP Centre of Excellence for Rural Transformation  
Beijing Academy of Agriculture and Forestry Sciences**



## Expert's Profile



Ms. Liu Wei

- PhD of Vegetable Science
- Professor of Beijing Academy of Agriculture and Forestry Sciences (Beijing, China)
- Research Fields: Soilless Culture, Vegetable Physiology, Protected Horticulture, Urban Agriculture



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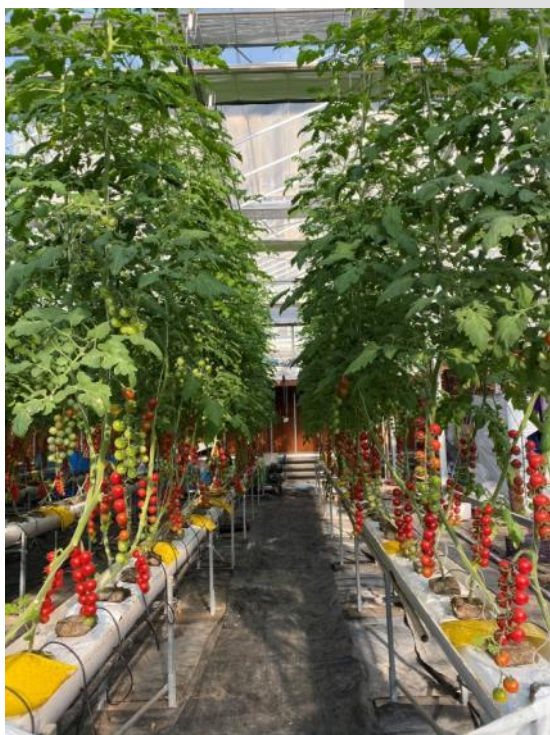
Vegetable Production



01

# Introduction

# Course content



- Definition
- Why soilless culture
- Advantages of Soilless Culture
- Developing fields of Soilless Culture
- Facilities for soilless culture

## Definition

Soilless culture (soilless cultivation) can be described as the use of any method of growing plants which does not involve the employment of natural soil or soil-based composts and similar complexes.

- Substrates
- Without the use of any solid substrates

## Why soilless culture

- Overcome unfavorable soil conditions
- Achieve high yield and Quality



# Advantages of Soilless Culture

(Howard M. Resh, 1987)

| Cultural Practice             | Soil                                                                                                                                               | Soilless                                                                                                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Plant nutrition               | Highly variable, localized deficiencies, often unavailable to plants due to poor soil structure of pH, unstable conditions.                        | Complete controlled, relatively stable, homogeneous to all plants, readily available in sufficient quantities, good control of pH.                                                          |
| Plant spacing                 | Limited by soil nutrition and available light.                                                                                                     | Limited only by available light, therefore closer spacing is possible, increased number of plants per unit area, more efficient use of space which results in greater yields per unit area. |
| Weed control, cultivation     | Weeds present, cultivate regularly.                                                                                                                | No weeds, no cultivation.                                                                                                                                                                   |
| Diseases and soil inhabitants | Many soil-borne diseases, nematodes, insects and animals that can attack crop, often use crop rotation to overcome buildup of infestation.         | No diseases, insects, animals in medium, no need for crop rotation.                                                                                                                         |
| water                         | Inefficient use of water, much is lost as deep percolation past the plant root zone and also by evaporation from the soil surface.                 | Efficient water use, no loss of water to percolation beyond root zone or surface evaporation, if managed properly water loss should equal transpiration loss.                               |
| Fertilizers                   | Broadcast large quantities over the soil, no uniform distribution to plants, large amount leached past plant root zone (50%~80%), inefficient use. | Use small quantities, uniformly distributed to all plants, no leaching beyond root zone, efficient use.                                                                                     |
| Plant maturity                |                                                                                                                                                    | With adequate light conditions, plant can mature faster under a soilless system than under soil.                                                                                            |
| Fruit quality                 | Often fruit is soft or puffy due to potassium and calcium deficiencies. This results in poor shelf life.                                           | Fruit is firm with long shelf life. This enables growers to pick vine-ripened fruit and still be able to ship it relatively long distances.                                                 |
| Yield                         | Greenhouse tomatoes 10~20 kg/year/m <sup>2</sup>                                                                                                   | 80~100 kg/year/m <sup>2</sup><br>(Liu, 2017)                                                                                                                                                |
| Others                        |                                                                                                                                                    | Medium labor is saved, water and electricity is also saved, less sustainable.                                                                                                               |

## Developing Fields of Soilless Culture

1. Soil unsuitable for cultivation  
(Desert, island, polar zones, space station...)
2. Commercial growing for high yield and quality
3. Domestic gardening
4. Scientific research
5. Others

## Facilities for soilless culture

- (1) Modern greenhouse
- (2) Solar greenhouse (sunlight greenhouse )
- (3) Plastic house/tunnel
- (4) Others

# Modern greenhouse



# Solar greenhouse



# Plastic house



# Thank You

**Contact info:**

**Beijing Academy of Agriculture and Forestry Sciences**

**Beijing 100097, China**

**E-mail: [liuwei@nercv.org](mailto:liuwei@nercv.org)**

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