

Hydroponics: Benefits and Risks

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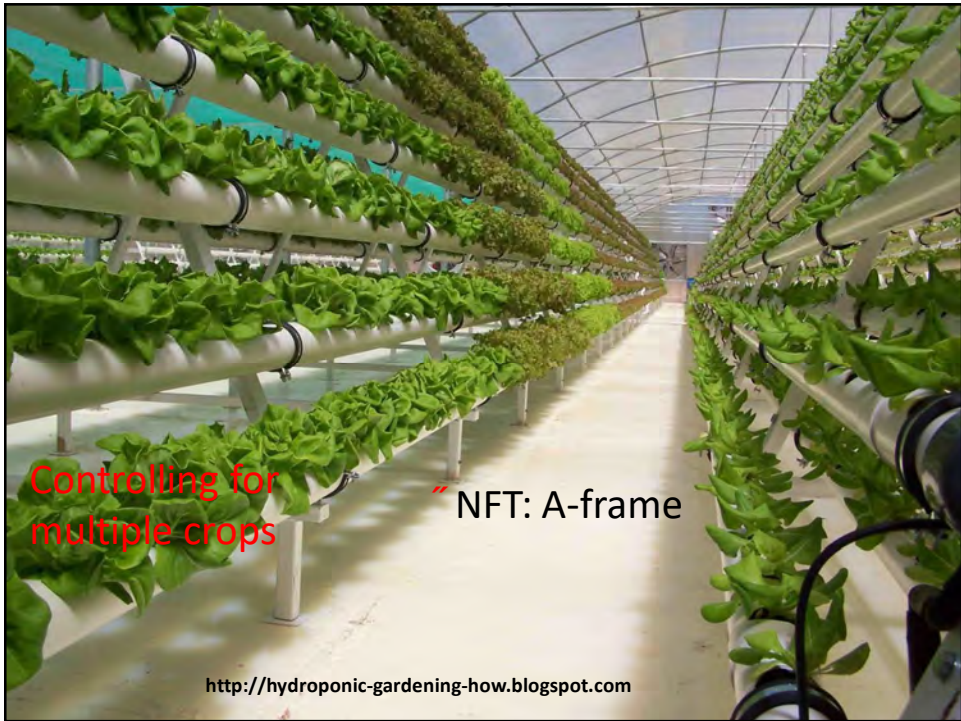
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“ Hydroponics

- Definition: The cultivation of plants by placing the roots in a liquid nutrient solution rather than in soil; a.k.a. soilless growing system
- Growers typically use a small amount of soilless rooting medium to start the plants (e.g., rockwool, oasis). For some crops, additional rooting media is added later
- The absence of soil allows for better control of the root environment (soil can bind certain nutrients, soil can harbor pathogens)
- The nutrient solution is often recirculated
- Examples (with some of the **risks and challenges**):











Hydroponic tomatoes

Supplemental lighting

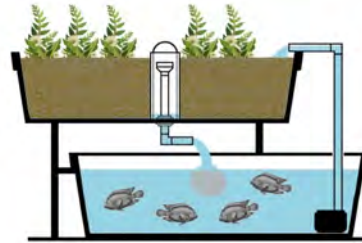


Hydroponic tomatoes, Bato bucket system with perlite

Extreme outdoor climate

“ Crop growing systems related to hydroponics:

- Aeroponics: Roots are hanging in air and frequently sprayed with a nutrient solution
- Aquaponics: Combining aquaculture (fish production) with hydroponics



<http://aquaponichowto.com/>

Combining
fish and plants

“ Emerging opportunities (I): Shipping Containers



“ Emerging opportunities (II): Rooftop greenhouses



“ Emerging opportunities (III): indoor farming





“ Additional resources (textbooks and websites)

Paul V. Nelson (2011) Greenhouse Operation & Management (7th ed.)

Howard Resh (2013) Hydroponic Food Production (7th edition)

Kozai et al. (2016) Plant Factory

Stanghellini et al. (2019) Greenhouse Horticulture

Cornell Univ.: <http://www.greenhouse.cornell.edu/index.html>

Univ. of Arizona: <http://ceac.arizona.edu/>

Ohio State: <http://u.osu.edu/cepptlab/>

Michigan State: <https://www.canr.msu.edu/floriculture/resources/>