



# Fact Sheet on Hydroponics

## Introduction

Namibia has an arid climate and is prone to dry seasons ranging from June to August. Climate change considerably burdens the country, with mass desertification rendering 92% of the land arid (World Bank, 2021). Windhoek is predicted to have a mean temperature increase of 0.69 °C between 2020 and 2039 (World Bank, 2021), significant for crop yield and groundwater evaporation rates.

The effects of severe droughts and lack of urban agriculture in Namibia have restricted access to food, resulting in staggering household food insecurity rates (Food and Agriculture Organization of the United Nations, n.d.). Most food in Namibia is sourced from mass imports and has become costly. To improve food security, alternative growing methods must be considered. One promising option is hydroponics, a sustainable way of growing crops (Niu & Masabni, 2022).

## What is Hydroponics?

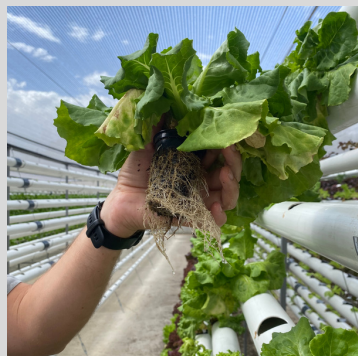
Hydroponics is a technique by which plant roots are suspended in a nutrient solution, requiring substantially less water and land area for healthy crop growth (Nguyen et al., 2016). These systems save up to 90% water compared to soil-based gardening methods. There are a variety of hydroponic models, including nutrient film technique, ebb and flow, and deep water culture (Niu & Masabni, 2022).

## Hydroponics in Namibia

Hydroponics offers farmers in Namibia several advantages, including water conservation, faster growth, and higher yields.

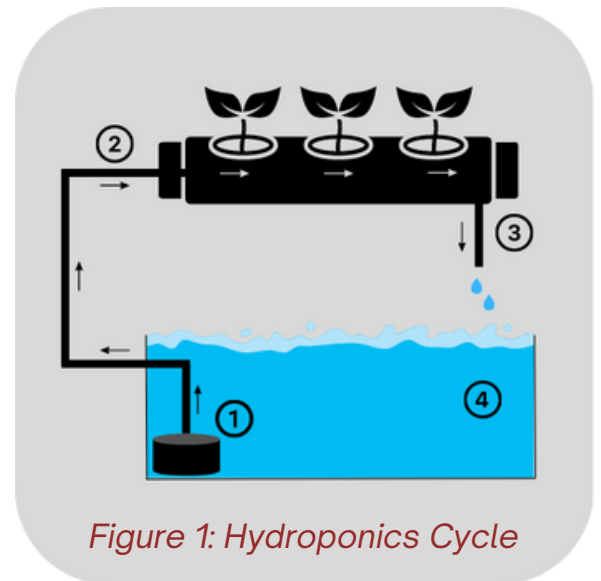
### Urban Harvest

A Windhoek-based urban farming initiative that designs, implements and maintains various hydroponics systems around the city.



*Figure 2: Hydroponics at Urban Harvest*

## Ebb and Flow Cycle



*Figure 1: Hydroponics Cycle*

- ① A nutrient solution is pumped from a water tank into PVC pipes that hold plant roots.
- ② The nutrient solution floods pipes, covering the plant roots which take up the necessary nutrients.
- ③ The nutrient solution runoff is drained from the pipes and back into the reservoir.
- ④ The cycle repeats, with the nutrient solution pumped into the pipes and then drained.



### Deane Spall

Deane is the CEO and co-founder of Urban Harvest

## Advantages of Hydroponics

### Water Conservation

Hydroponics systems use 90% less water than soil-based gardening methods (Urban Harvest, 2023).

### High crop yield

A controlled environment optimizes plant growth and nutrient distribution.

### Growth year-round

Crops can be grown year-round regardless of climate conditions.

## Disadvantages of Hydroponics

### High setup cost

The specialized water pumps and electrical components are costly.

### Technical Expertise

Expertise in water pH, plant nutrition, and electrical engineering may be needed.

### Water Source

Hydroponic systems need a constant supply of clean water (Niu and Masabni, 2022).

## Glossary

### Hydroponics

Growing plants using a nutrient-rich water solution instead of soil (Niu & Masabni, 2022).

### Nutrient Solution

The water-based mixture of nutrients is used to feed plants in a hydroponic system (Nguyen et al., 2016).

### Desertification

Fertile land that becomes increasingly arid-like due to climate change and unsustainable practices

### Food Insecurity

The lack of regular access to enough safe and nutritious food for normal development and healthy life to enough safe and nutritious food for normal development and healthy life (Food and Agriculture Organization of the United Nations, 2022).

### Ebb and Flow

The method of hydroponics involves periodically flooding plant roots with nutrient solution and draining them away (Niu & Masabni, 2022).

## References

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