

# Western SARE How-To



## Quick Guide

August 2021

# Growing Vegetables in Non-Circulating Hydroponic Beds



Photo by Toni Leano.

Plants ready for harvest

Growing vegetables hydroponically, such as bok choy or lettuce, can improve access to fresh produce in remote communities dependent on imported food. Additionally, the quality of locally grown produce can be higher than imported produce that can wilt during shipping.

A Western SARE funded project in American Samoa researched and quantified benefits of a non-circulating hydroponics system for limited-resource growers. Later demonstrations to farmers, village groups and government agencies, as well as a companion Teachers Hydroponics Resource Kit, documented a modern method of farming – while raising awareness of healthy lifestyles, developments in sustainable agriculture, and food security.

### Benefits of Hydroponic Systems

- Crop yields higher than using conventional growing methods
- Better protection from pests
- Protection from extreme weather, such as heavy rain
- Ability to supply and monitor required nutrients easily
- Easy to adopt system for limited resource growers
- Provide access for local communities to fresh nutritious food

### Steps to Take

Hydroponic systems are typically built inside greenhouses, hoop houses or other structures. The project in American Samoa began with construction of an 18x30 foot hoop house to protect the hydroponic beds from the island's heavy rains and to provide better disease and pest control. (Check out these [SARE resources](#) on constructing a hoop house.)

### Hydroponic Beds

Some hydroponic systems use pumps to circulate water, but this non-circulating system is better suited for remote locations because it doesn't need pumps or electricity. (Get more details [here](#).)

### What Are Quick Guides?

SARE and state Extension services produce a variety of how-to publications, bulletins and project reports.

Western SARE Quick Guides distill this information into a short, easy-to-digest format. They are intended as a supplement to these more extensive publications.

Producers adopting new practices are encouraged to consult with local Extension agents and ag professionals.

# Growing Leafy Greens Hydroponically

The planting beds were simple boxes made out of 1×6 lumber frames built around a plywood base. These boxes were lined with black plastic to hold water. The size of the planting beds can be varied to fit the available space, but be sure you can reach the center rows from an edge. A cover across the beds, drilled with rows 2-inch holes, holds the seedlings.

## Nutrients and Management

Add nutrients based on the number of gallons of water used in each reservoir. Popular hydroponic fertilizer Master Blend nutrient mix was used in this project. For every gallon of water, two grams of Master Blend, two grams of calcium nitrate, and one gram of epsom salt may be used according to manufacturer instructions. Growers can calculate their nutrient based on container volume or use an online [Master Blend calculator](#) available for various plants.

Use Total Dissolved Solids or an electrical conductivity meter to check the strength of the nutrient solution and check for appropriate pH levels with a pH meter. Nutrients, electrical conductivity, and pH levels should be monitored weekly.

## Planting

Make a sequential plant-to-harvest plan that utilizes different hydro planting beds and extends your growing and harvesting season. Start seeds at least two to three weeks before transplanting into the hydro-beds. Transplant the next set of seedlings approximately a week or two later into other hydro-beds. Stagger as many rounds of starts as you have available beds. After transplanting, plants take about 45 days to harvest.

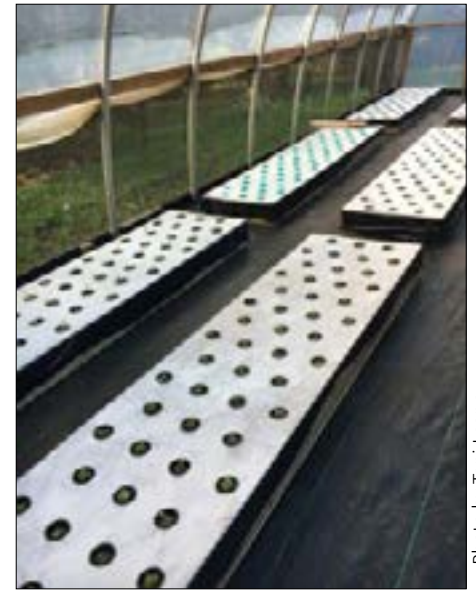
## For Teachers

This project was designed as a demonstration project for both farmers and local schools. A Teachers Hydroponics Resource Kit was developed as a guide for science-based activities and modified for English Language Learners. See a sample lesson plan [here](#).

## For More Information

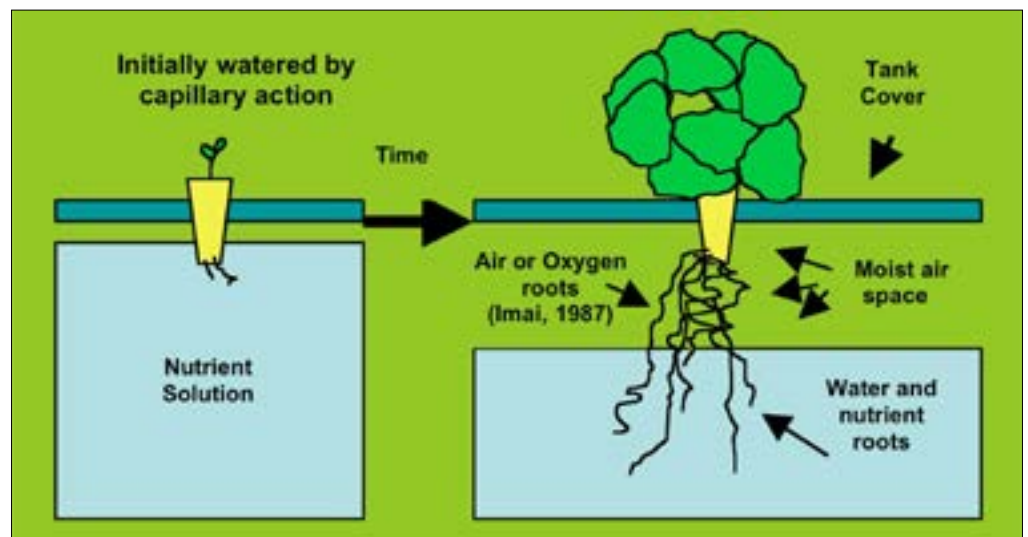
Final Report: [projects.sare.org/project-reports/fw19-352/](https://projects.sare.org/project-reports/fw19-352/)

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Transplanted seedlings.

Photo by Toni Leano.



A diagram showing how a non-circulating hydroponic system works.

Illustration by B.A. Kratky, University of Hawaii.

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