

Controlled Environment Agriculture

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THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

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Controlled Environment Agriculture

Inputs:

- Light
- Water
- Growing Medium
- Nutrients
- Temperature
- Oxygen
- Carbon Dioxide
- Pesticides/Fertilizer



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Controlled Environment Agriculture

- High Yield
- High Quality
 - Produce Safety
- Minimum Resources Used
 - Water, Pesticides, Fertilizers
- Year-Round Production
- Initial Cost
- Maintenance Costs

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Tomato shortage hitting some fast-food restaurants

Updated March 4, 2020 at 5:55 PM. Posted March 4, 2020 at 5:55 PM

By John Harten, The Plain Dealer, jharten@plaind.com



View full size Associated Press A ripe tomato is left unpicked on dead plants in a field Thursday, March 4, 2020, in Plant City, Fla. The recent cold weather in Florida has been especially hard on tomato farmers and is predicted to drive the up prices at the grocery store. It's rotten news these days for tomato lovers.

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Yuma romaine lettuce outbreak tied to contaminated canal water

AP BY: Associated Press
POSTED: 3:30 PM, Jan 18, 2018
TAG: yuma | southern arizona



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RESTAURANT BUSINESS

FOOD

WENDY'S IS MAKING A BIG CHANGE TO ITS TOMATOES

The company plans to use tomatoes grown in greenhouses or hydroponic farms by 2019.
By Jonathan Mace on Jan. 05, 2018



<https://www.restaurantbusinessonline.com/food/wendys-making-big-change-to-tomatoes>

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Ohio

NatureFresh Farms

Grow More, Spend Less

OUR PRODUCTS



TOMATOES *



BELL PEPPERS *



CUCUMBERS *

132% Increase in Veg and Herbs from 2012-2107

Ohio #1 State with Increase of 292%

2019 USDA Census



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Gotham Greens
Brooklyn, NY

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7

Gotham Greens
Brooklyn, NY

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8

Gotham Greens
Brooklyn, NY

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Everyday
SavingsOrganic
Salad Mixes
From California
\$4.99
14 OZWHOLE
FOODS
MARKET
amazonextra
10%

\$4.99 per pound

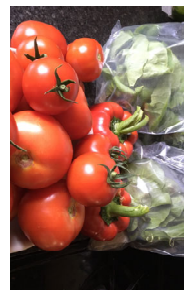
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\$14.19 per pound



What can be grown in CAE?

- Not every crop is suited for CEA
- Leafy Greens
- Tomatoes
- Peppers
- Cucumbers
- Strawberries
- Herbs



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Controlled Environment Agriculture

- Hydroponics
- Aeroponics
- Aquaponics

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Aeroponics

- Developed by NASA in the 1990's
- Deliver nutrients to plants via mist or vertical drip method
- Uses up to 90% less water than traditional farming

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THE PRIMARY MODULE

Used as the ideal starting point for your modular farm, well constructed and well supported, the Primary Module provides all requirements for production, from seedling to packaged food. Our fleet of modulars recognizes the Primary Module's all inclusive low price.

Imagine producing in a 50' x 75' area as much food as a 16-acre farm.



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ZipGrow™ Farm Wall
from \$499.00

Aero Farm

- Newark, NJ
- 9+ farms
- 95% less water
- 390X yield/sq. ft.
- \$30 Million
- Old steel mill
- 100 employees



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Aero Farm



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Urban Gems




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**Urban
Gems**

Yield = 9.6# of lettuce in 30 days



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**WELCOME TO OUR
SMARTFARM!**

ESTABLISHED JULY 2017

FIRST INDOOR, VERTICAL AND LED-LIT
HYDROPONIC GARDEN IN A CONVENTION CENTER

—GENERATES UP TO 2 TONS OF HERBS AND
VEGETABLES EACH YEAR—

PRODUCE IS GROWN TO BE USED THROUGHOUT
THE CONVENTION CENTER AND ALSO DONATED TO
LOCAL CHARITIES

CAN BE SCALED TO FIT CONVENTION CENTERS AS
WELL AS HOMES

Grown 75 feet from our kitchen.
Local Enough?

INVENTION & CRAFTING MEET HERE
Greater Columbus Convention Center



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Aquaponics

- Closed System
- Fish provide the nutrients
- Bacteria modify the nutrients
- Circulate the water
- Plants filter the water for the fish
- Multiple types of aquatic inputs
- Theory -> Two harvestable products
- Theory -> Sustainable

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Hydroponic Methods

- Nutrient Film Technique
- Deep Water Culture
- Ebb and Flow
- Soilless Culture with Drip

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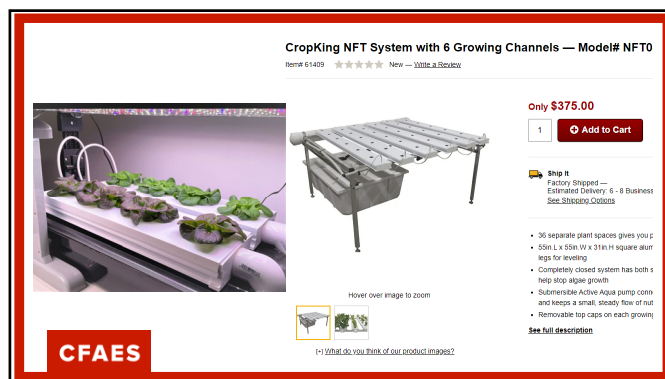
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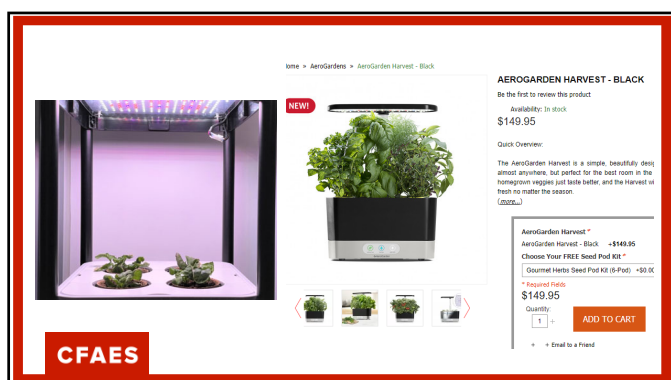
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