



UNIVERSITY OF ILLINOIS
EXTENSION

Illinois Migrant Council

PREPARING A NEW GENERATION OF ILLINOIS FRUIT AND VEGETABLE FARMERS

a USDA NIFA BEGINNING FARMER AND RANCHER
DEVELOPMENT PROGRAM PROJECT
GRANT # 2012-49400-19565

<http://www.newillinoisfarmers.org>



**GROWING A NEW GENERATION
OF ILLINOIS FRUIT AND VEGETABLE FARMERS**

CONVERTING TO YEAR-AROUND GREENHOUSE PRODUCTION: WHY AND HOW

J. D. Kindhart

February 2015

Converting a high tunnel

- Carefully evaluate market and income potential
- Evaluate crops being raised and cultural systems to be used
- Add heat
- Lighting?
- Energy conservation possibilities

Why convert?

- Year round demand?
- Potential to make income?
- No longer have winters off!

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[\[PDF\] Greenhouse Tomato Budgets for Mississippi](#)
[msucare.com/pubs/publications/p2766.pdf](#) [\[PDF\]](#)
 Growing greenhouse vegetable crops and growing tomatoes hydroponically are popular among small producers who want to diversify their farms and ...

[Crop budgets for vegetable and berry growers](#)
[www.uvm.edu/vtvegandberry/budgetlinks.html](#) [\[PDF\]](#) University of Vermont *
 Crop Production Budgets for Vegetable and Berry Growers ...
 greenhouse tomato budget · N. Carolina Farm Stewardship - 1 acre organic crop budgets ...

[Economics/Crop Budgets | North Carolina Cooperative ...](#)
[tomatoes.ces.ncsu.edu/tomatoes-economicscrop-budgets/](#) [\[PDF\]](#)
 Also included are sample budgets associated with greenhouse tomato production ... Cost budgets are reported for 20 vegetable crops as combinations of crop, ...

[Crop Production Budgets | UMass Amherst Vegetable ...](#)
[https://extension.umass.edu/vegetabl...](#) [\[PDF\]](#) University of Massachusetts Amherst *
 Below are "Process Budgets" for various crops grown in Massachusetts. A Process Budget is a description of the production practices followed in growing a crop, ...

[Center for Crop Diversification Crop Budgets](#)
[www.uky.edu/Ag/CCD/budgets.html](#) [\[PDF\]](#) University of Kentucky *
 Nov 19, 2014 - ... Budget updates. 2013 Vegetable and Melon budgets ... Virtual Grower An energy cost calculator for greenhouse growers from the USDA ...

[\[PDF\] Budget for Greenhouse Tomatoes - Agricultural Marketi...](#)
[www.agmrc.org/media/c/ms/p2257_47C17DE16225E.pdf](#) [\[PDF\]](#)
 crop and make the right decisions at the right time. Not as much information is available about greenhouse tomatoes as compared to field vegetables, This can ...

[\[PDF\] Greenhouse Vegetable Production Potential Greenhou...](#)
[www.hort.vt.edu/ghvegetables/.../Greenhouse_Vegetable_Production_Al...](#) [\[PDF\]](#)
 Spring Crop. • Fall Crop. – Retail. • Spring Crop. • Fall Crop. – Greenhouse and. Field. • Long Season (April 1 to December 31). Greenhouse Tomato. Budgets.

[Organic Greenhouse Vegetable Production | ATTRA ...](#)
[https://attra.ncat.org/.../view...](#) [\[PDF\]](#) National Center for Appropriate Technology *
 Tomatoes are the leading greenhouse vegetable crop, followed by European cucumbers, lettuce, peppers, and culinary ... Cheap sources of energy are key.

[Helpful Links - Vegetable Production - The University of ...](#)
[vegetables.tennessee.edu/links.html](#) [\[PDF\]](#)
 Mississippi State University, Budget for green house tomatoes · North Carolina Fruit and Vegetable Crop Budgets · South Carolina Vegetable and Melon ...

[\[PDF\] An Economic Analysis of Sequential Cropping Systems...](#)
[economics.aotk.edu/publications/horticulture/rs0901.pdf](#) [\[PDF\]](#)

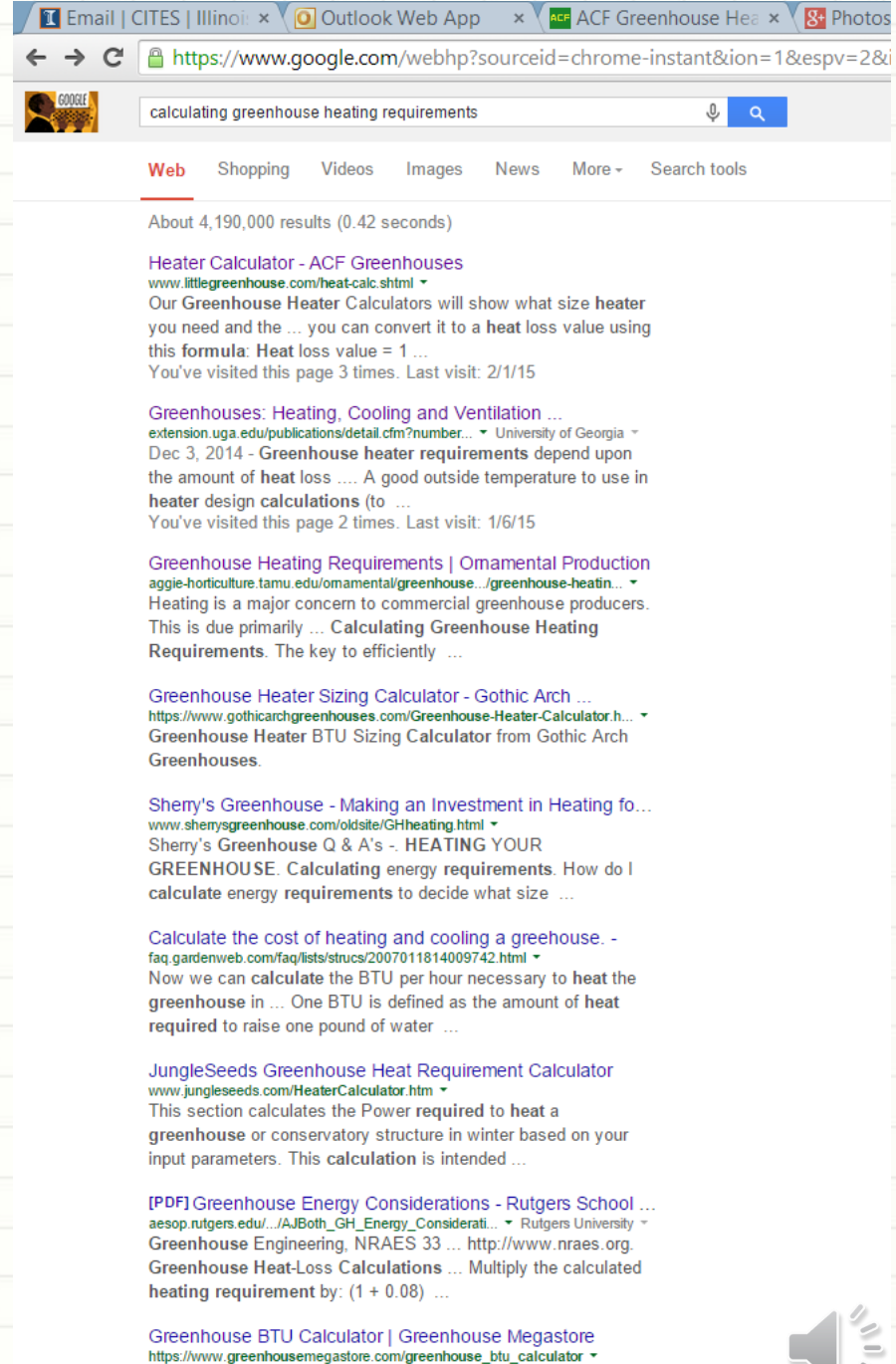


Heating options

- Hot water / Boiler
 - Boiler Types
 - Fire tube
 - Water tube
 - Water jacket
 - Fuels
 - Waste wood/biofuel
 - Waste Oil
 - Firewood/Coal
 - Gas
- Unit Gas Fired Heaters

Heat Requirement

- Hand calculation
 - Greenhouse volume
 - GH surface area
 - R-value of glazing
 - Etc.etc.etc.
- Online calculators



R value of some common glazing materials

Single layer 6 mil poly $R = 1.15$

Double inflated 6mil poly film $R = 0.7$

Polycarbonate 10mm double wall $R = 0.53$



Other heat considerations

- Split required BTU amount to avoid a zero heat situation
- Have back up systems in place
 - Extra fuel
 - Stand by electrical generator
 - Wired with disconnect switch
 - Fired periodically to make sure it will work when needed





Crown Royal Stones
STAINLESS STEEL







WARNING
OPEN FLAME AND HOT SURFACES
SURFACE TEMPERATURE EXCEEDS 1000°F











MODINE

Technical specifications and safety information label.

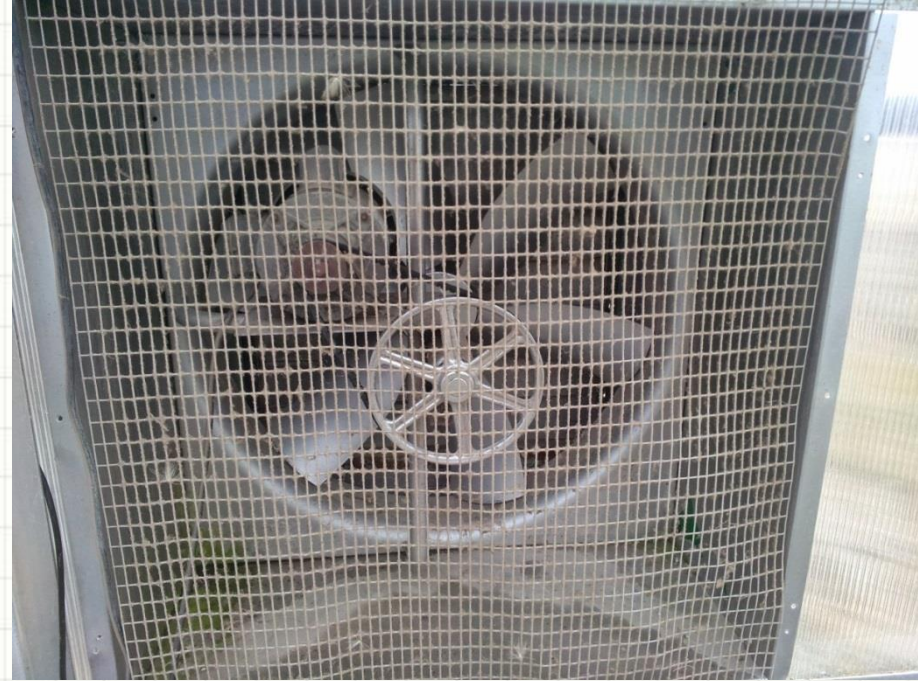
Warning label with safety instructions.





Greenhouse Cooling

- Ventilation fans
- Whitewash
- Shade cloth
- Fan and pad











Crops

- Tomato
- Pepper
- Cucumber
- Lettuce
- Herbs

Cultural Systems

- Soil
- Hydroponic

Bonuses

- Better ability to control humidity
- More rapid crop development
- More predictable

Drawbacks

- EXPENSE
- Insect pests

January 5



January 12



Reck-Hear
Heavy-Duty
Propagation Mat
Model No. **PHD2110**
Size: 21" x 10"
Voltage: 120 volts
Output: 300 watts

RE
He
V



January 20



January 30













28/06/2012





28/06/2012



CLERMONT



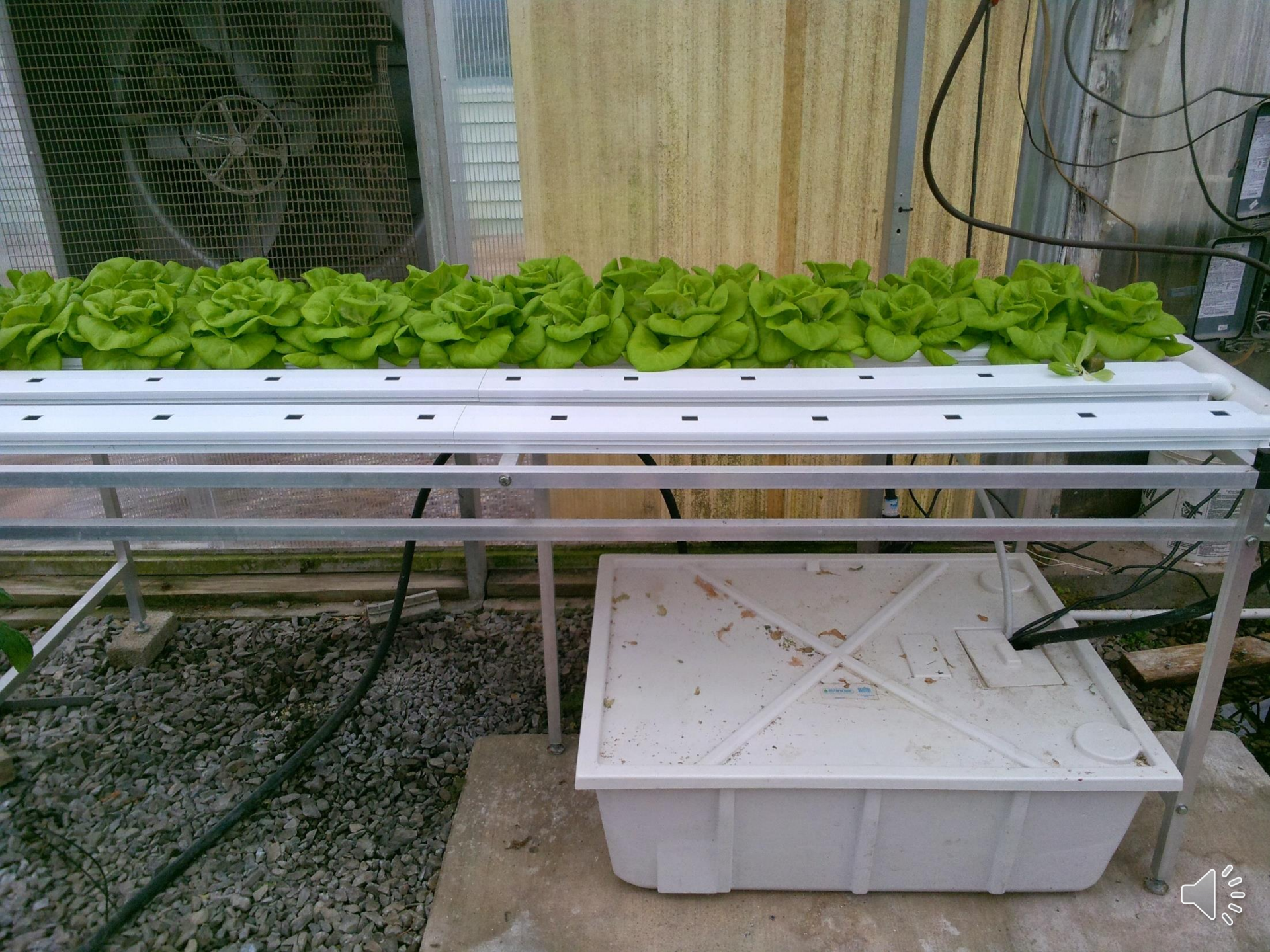
















To reach us

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If you have questions ...

- University of Illinois Extension Local Food Systems and Small Farms team
 - <http://web.extension.illinois.edu/smallfarm/>
- USDA's Start2Farm site
 - <http://www.start2farm.gov/>