



# Ag-X Georgia Environmental Conference

August 24, 2016

Stan Vangilder



ENERGY INNOVATION CENTER  
*Inventing The Future*

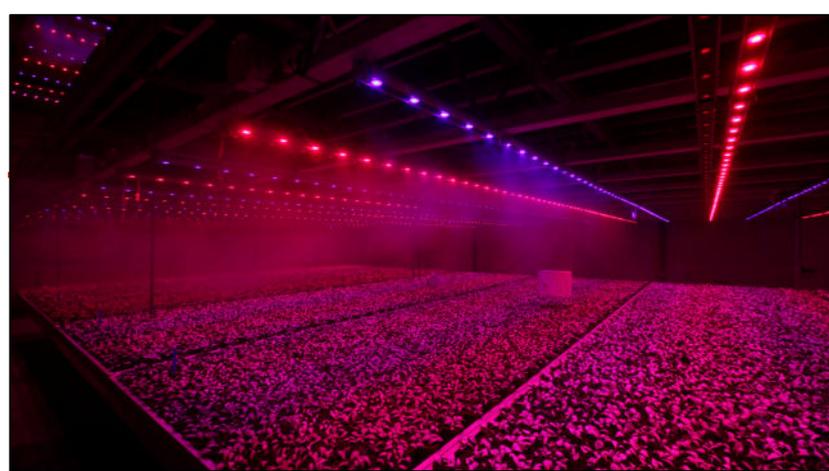
# What is Indoor Agriculture?

- Definition: Growing produce/herbs/ornamentals indoors under controlled conditions using artificial light and oftentimes other technologies that allow plants to grow indoors with increased output.
- “Agriculture today is pretty much a two-dimensional operation. We need to figure out how to do it in the third dimension” -- J. Michael Gould, director of Texas A&M's AgriLife Research and Extension Center.
- Various names for / subsets of indoor farming:
  - Indoor agriculture (we will use this term throughout this report)
  - Urban agriculture
  - Controlled-environment agriculture
  - Vertical farming
  - Building integrated agriculture
  - Hydroponics – use water and a non-soil growing medium to provide plants with nutrients.
    - Many different civilizations have used hydroponic growing techniques throughout history.
  - Aquaponics – plants are grown on small rafts floating in water filled with nutrients that come from waste produced by fish in a separate tank.
  - Aeroponics – roots are hanging in the air where they can be sprayed with water and nutrients.
- Indoor agriculture is more conducive to compact produce.
  - Greens, tomatoes, peppers, cucumbers, herbs and strawberries.
  - Some flowers/ornamental plants are also appropriate for indoor agriculture.





*Left:* Specially colored LEDs achieve faster plant growth



*Right:* This lab in the Netherlands is testing blue and red LEDs



*Left:* FarmedHere indoor vertical farm in Bedford Park, Illinois



*Right:* Legal cannabis growing operation

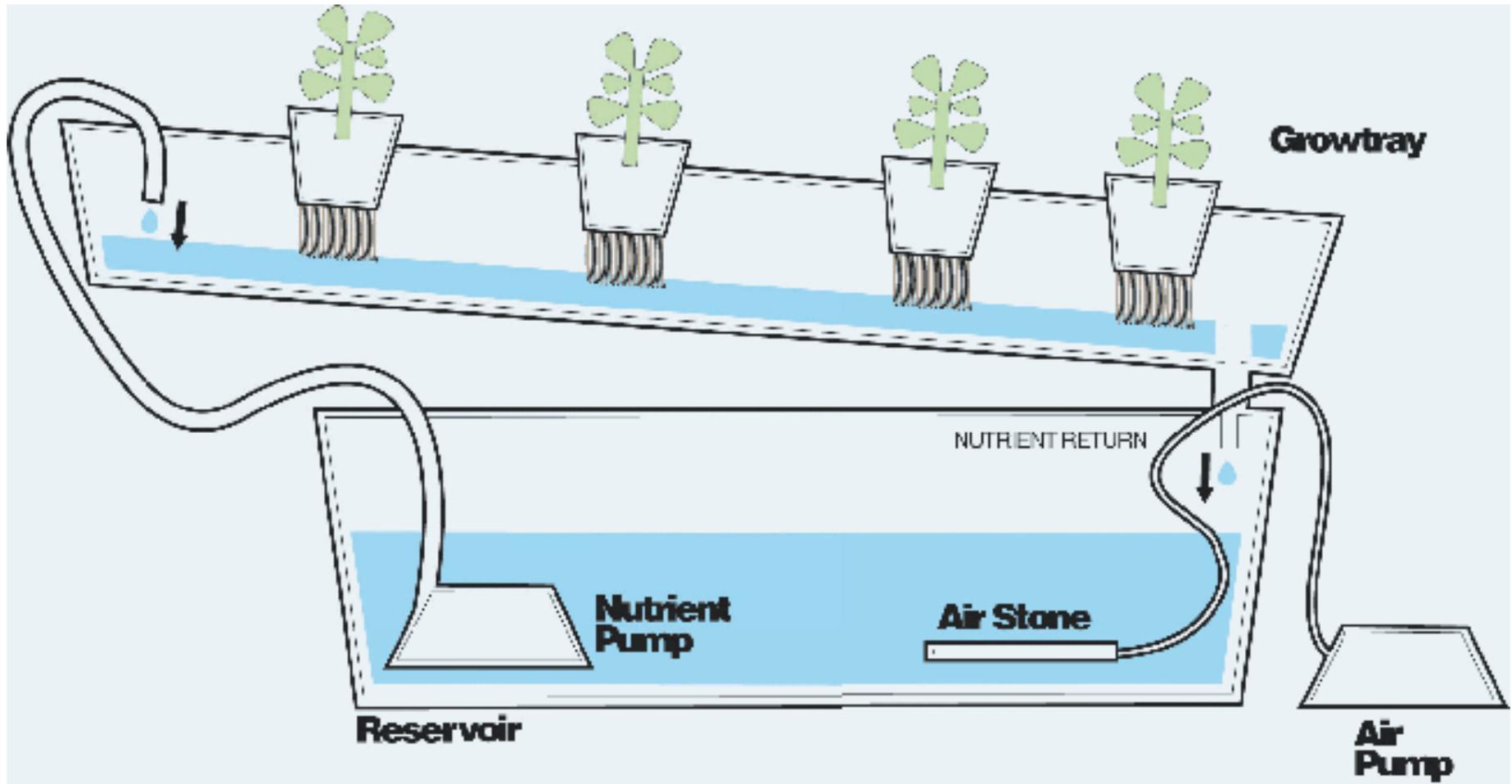


*Left:* Japanese farmer grows lettuce in a former Sony semiconductor factory (pic from GE)

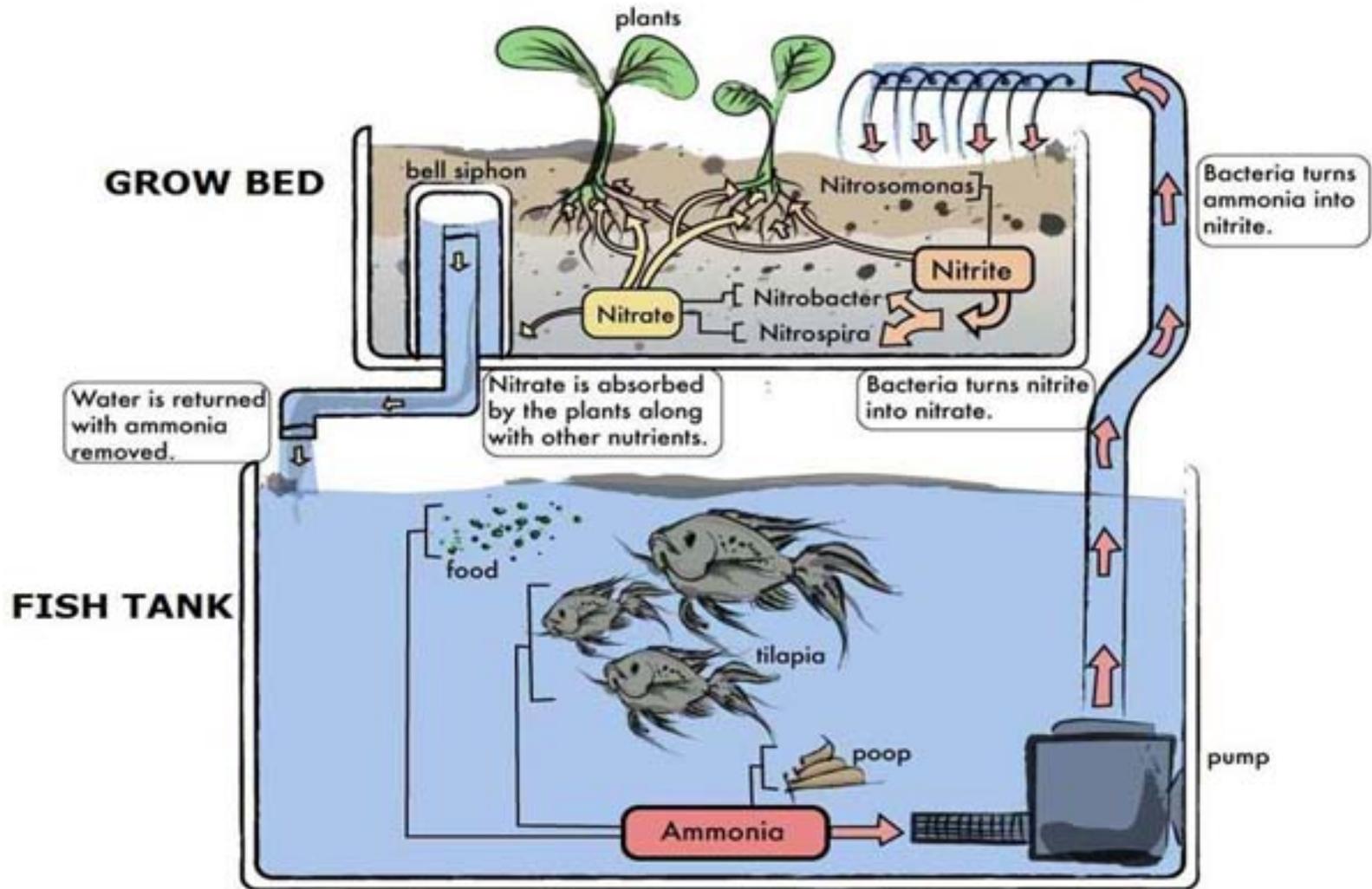


*Right:* A nutrient solution is pumped through towers; no water evaporates or is wasted.

# Hydroponics



# Aquaponics



# Advantages of Indoor Agriculture

- Uses 90%+ less water than traditional agriculture
- Uses no pesticides or herbicides
- Uses 70%+ less fertilizer
- Eliminates agricultural runoff
- Reduces carbon footprint:
  - No tractors, plows, etc - minimal shipping of product – reduced spoilage – increased freshness
- Much more efficient use of land:
  - Can get 8 – 12 more harvests per year; 1 indoor acre is equivalent to 4 - 20 outdoor acres or more, depending upon the crop, Year-round crop production
- Allows food to be grown and consumed in areas that cannot support crops.
- No crop failures due to droughts, floods, pests, etc.
- Can convert abandoned urban properties into food production centers
- Potential for job creation in depressed areas.
- Spectrum of technology evolves over time

# Ted Talk / YouTube

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<https://www.youtube.com/watch?v=xRdsCu5CcQ8>

Philips GreenPower LED Lighting

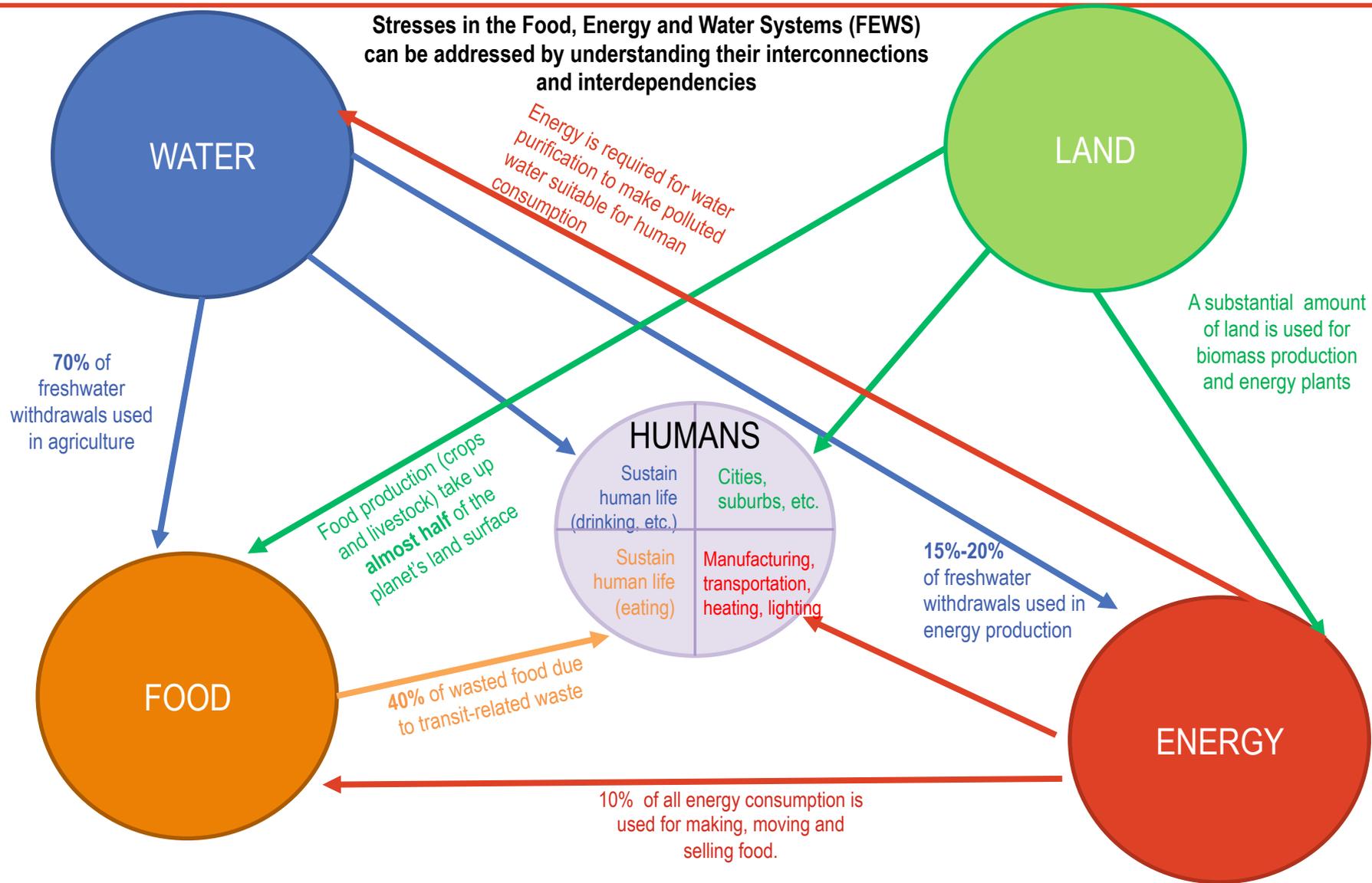
[https://www.youtube.com/watch?v=Uh\\_zJ09jUc0](https://www.youtube.com/watch?v=Uh_zJ09jUc0)

PBS Future of Farming

<https://www.youtube.com/watch?v=ILzWmw53Wwo>

TEDx Talk Indoor Agriculture “MythBusters”

# Connection Between Food and Energy



# Strategic Value of Indoor Agriculture to Southern

Indoor Agriculture can add value across a number of dimensions

## Innovation – Evolve our Business Model

- **Low Investment w/ High Potential**
- **“Infrastructure”** – Food, Energy and Water Systems
- **Research and Development:** Opportunities to define the future of farming - custom flu vaccines and cancer treatments.
- **Distributed generation, renewables and related technologies** – this project wants / needs these services - good opportunity to gain experience.



- **Economic Development** – attract jobs and investment across our territory, all components of value chain
- **Sales & Marketing** – Energy intensive industry (1MW/acre) w/ high DSM flexibility. Increase kwh sales, sales of new products and services, desire for DG options
- **Food Distributed Infrastructure** – Creating the future of farming

## Jump-Start the Industry

## Corporate Responsibility

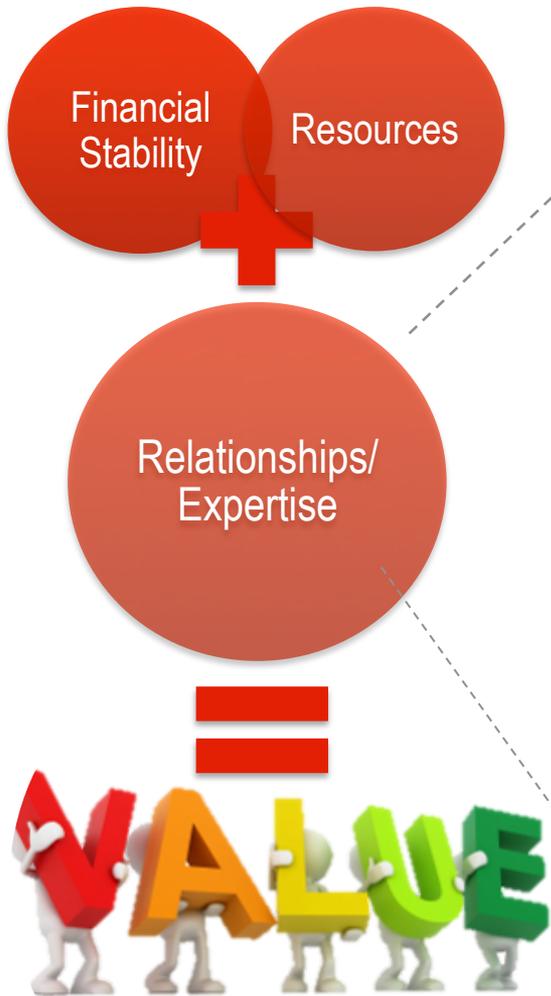
- **Environmental commitment** – water, land conservation, lower carbon footprint
- **Community Development** – repurpose abandoned buildings
- **Sustainability** – food safety and security
- **Energy for Life** – improving the lives of our customers
- **Corporate Relations** – build and maintain relationships with key, organizations in the community
- **Education** – experiential learning raises test scores and graduation rates – lowers absenteeism

- **STEM Workforce** – students excited about science and technology early – leads to more engineering and technology graduates entering the workforce
- **Healthy Lifestyle:** Southern Lifestyle wellness program extended to external public. Well-documented health benefits
- Connect with customers

## Education and Public Outreach

# Southern's Value Contribution

Southern can help indoor ag business in a number of ways



## Internal Services

- Industry and overall economic forecasting
- Demographic/workforce data, research and projections
- Award-winning internal R&D team
- Energy Innovation Center

## Industry Expertise

- Agribusiness leadership
- Centers of innovation
- Community and economic development professionals across the region
- National Accounts (major grocers, restaurants, etc.)
- Food processing companies, methods, and equipment

## Federal and State

- State and local leadership (i.e. city councils, legislators, Chamber of Commerce, state agencies, county commissions)
- Educational and research institutions (research at Ga Tech, high school science curriculum)
- Incentives for various industries
- Environmental agencies and regulations

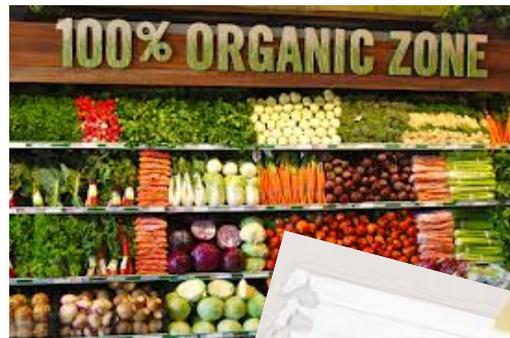
## Utility Leverage

- Distributed generation, load management, backup power (PowerSecure)
- Proactive electricity rate design
- Real estate and land use

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# Specific Examples of Downstream Markets

- Chain restaurants like Chipotle and Zoe's Kitchen that specialize in healthy and organic food.
- Specialty supermarkets like Whole Foods, Trader Joe's, Sprouts.
- Big box retailers and traditional grocers like Wal-mart, Kroger.
  - “Locally Grown” and “Farm-to-Table” products can generally be priced higher.
- Upscale restaurants and “Farm-to-Table” restaurants.



8 Fast Food Chains That Serve Local, Organic, Vegan Food  
Diane MacEachern | August 2, 2014 | 2:30 pm | 119 comments



# What's Happening in California?

- About half of the nation's vegetables and nearly 2/3rds of our fruits and nuts come from California.
  - The following chart shows crop values (in millions of dollars) from states in our footprint compared to California and U.S. total.

State	Field and miscellaneous crops	Fruits and nuts	Commercial vegetables	Total value of principal crops
Alabama	1,047	38	31	1,116
Florida	1,241	2,277	1,334	4,852
Georgia	2,328	393	488	3,254
Mississippi	2,633	25	4	2,662
California	5,016	15,255	6,366	26,636
Total U.S.	175,398	24,162	12,489	212,050

berries, bananas, figs, grapes, and various tree nuts. Commercial vegetables include lettuce, peppers, squash, tomatoes, broccoli, beans, sweet corn, and others. Data comes from USDA, National Agricultural Statistics Service, Crop Values 2013 Summary.

- Among California's top ten valued commodities are lettuce, strawberries and tomatoes, all of which are good candidates for indoor agriculture.
  - While some commodities saw an increase in cash receipts from 2011 to 2012, lettuce and spinach saw notable decreases.
  - In addition, a shortage of tomatoes is predicted with the water situation having an impact on yields in some areas; some growers reporting major impacts.

# Strategies to Capture the Indoor Ag Market

1. Identify and contact existing and potential indoor agriculture growers and markets to determine growth options inside the Southern Company retail footprint.
2. Pursue listing of vacant warehouses, buildings, locations, etc. that would meet Indoor Agriculture specifications throughout the Southern Company footprint
3. Identify all applicable state, federal, and local incentives available to support indoor agriculture industry within the Southern Company footprint
4. Provide useful guidance to persons wanting to get into the indoor agriculture business and succeed as a grower
5. Explore new rate options for Indoor Agriculture
6. Approach indoor agriculture from the plant-based biopharmaceuticals
7. Develop a target list of higher education partners, i.e. Auburn University, University of Georgia, Mississippi State that have colleges in both pharmacy and agriculture with the potential to develop a project similar to the *GreenVax Project at Texas A&M* and assess the feasibility.

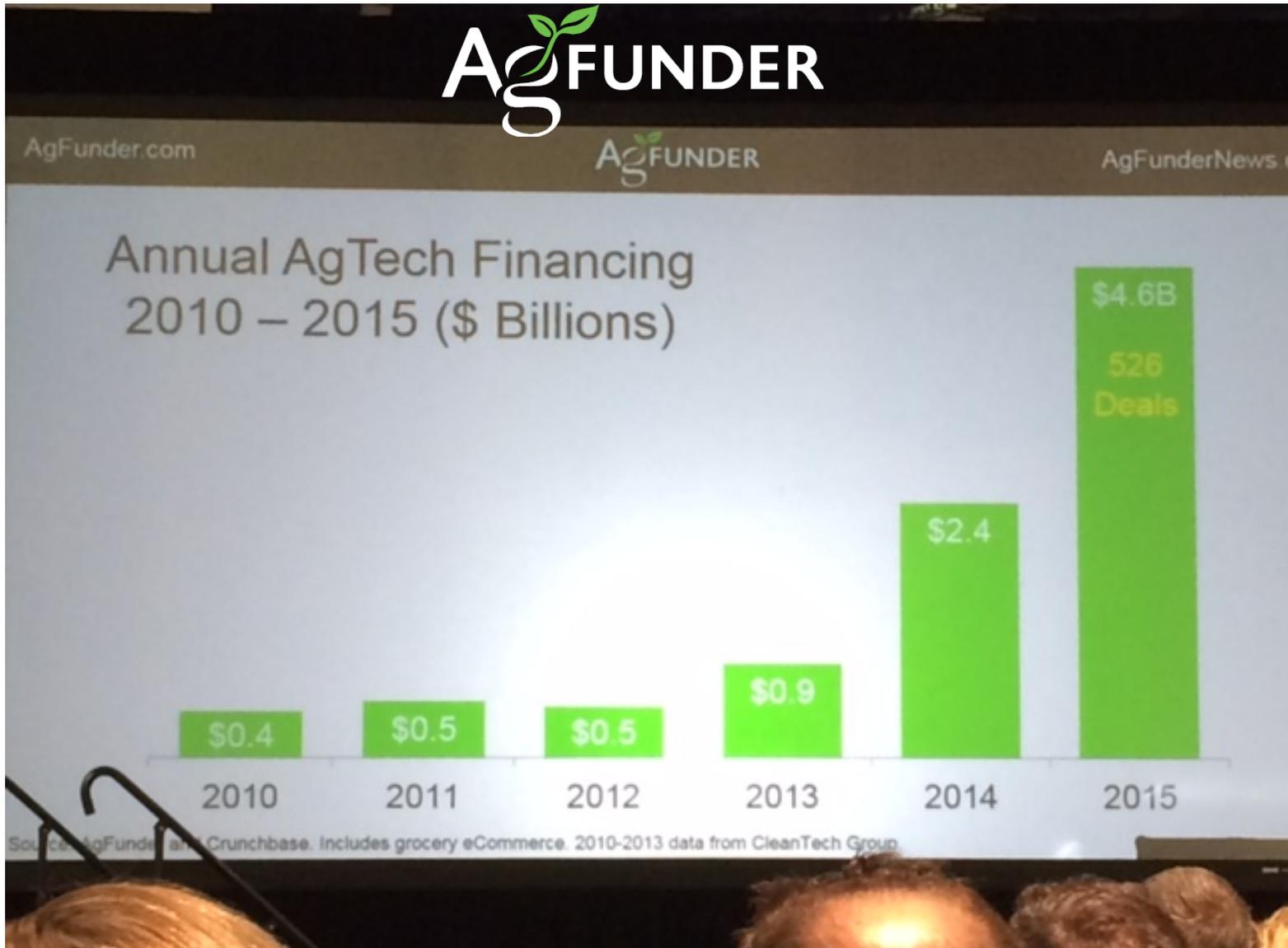
# M. Agnes Jones Elementary School Aquaponics Lab (April, 2016)



# “Zip Grow” Towers (April, 2016)



# Indoor Ag Con



# Some Key Projects

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- M. Agnes Jones Elementary School
- Georgia and Alabama – Supply Chain study
- ArkFab community garden
- Fort McPherson / Food Innovation Zone
- Central State Hospital / Agribusiness Incubator
- Direct investment proposal

Preview Mode

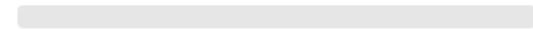
KEEP EDITING

LAUNCH YOUR FUNDRAISER!



\$0 USD

raised by 0 people in 2 months



0% of \$25,000 goal

FUNDRAISER ENDED

Share on Facebook

### Energy for Life - ArkFab

Community

Atlanta



Stan Vangilder, Organizer

— for —

Contact

What is Generosity?

[Read our mission statement.](#)

Truly Living Well Center for Natural Urban Agriculture



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COMPANY GROUPS

Indoor Agriculture

Indoor Corner

Business Fellowship

Technologies

Indoor

Indoor

Be the EIC

Indoor Enthusiasts 2

Indoor 2

Surface Pro 6

20+

20+

Groups X

Groups you can collaborate with people in your company. [Learn more.](#)

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# Indoor Agriculture

UNREAD CONVERSATIONS

ALL CONVERSATIONS

FILES

NOTES

Update Poll Praise Announcement

Share something with this group...



**Stan Vangilder** – Friday at 11:03am

There's so much going on! We presented our report to the City of Atlanta's Urban Agriculture Task Force on July 7th, and several of our recommendations will likely be implemented ASAP. We completed our crowdfunding site for the ArkFab project in CollegeTown Gardens - expect to launch soon. Next week, we will be meeting with R&D for a 2-hour Indoor Ag deep dive, meeting with Atlanta Public Schools about urban agriculture at Pullman Yard, and meeting with Clark Atlanta about their campus container farm project.

LIKE REPLY SHARE ...



Write a reply



**Stan Vangilder** – June 28 at 8:34am

On June 21, we toured HATPonics in Rossville Georgia. Our group included members of the SCS R&D team, Market Research, and the Industrial Segment team for Food. HATPonics has installations all over the world, including more than 50 in Metro Atlanta Schools. More on HATPonics here: <http://www.hatponics.com/>

# Indoor Agriculture Opportunities in Atlanta

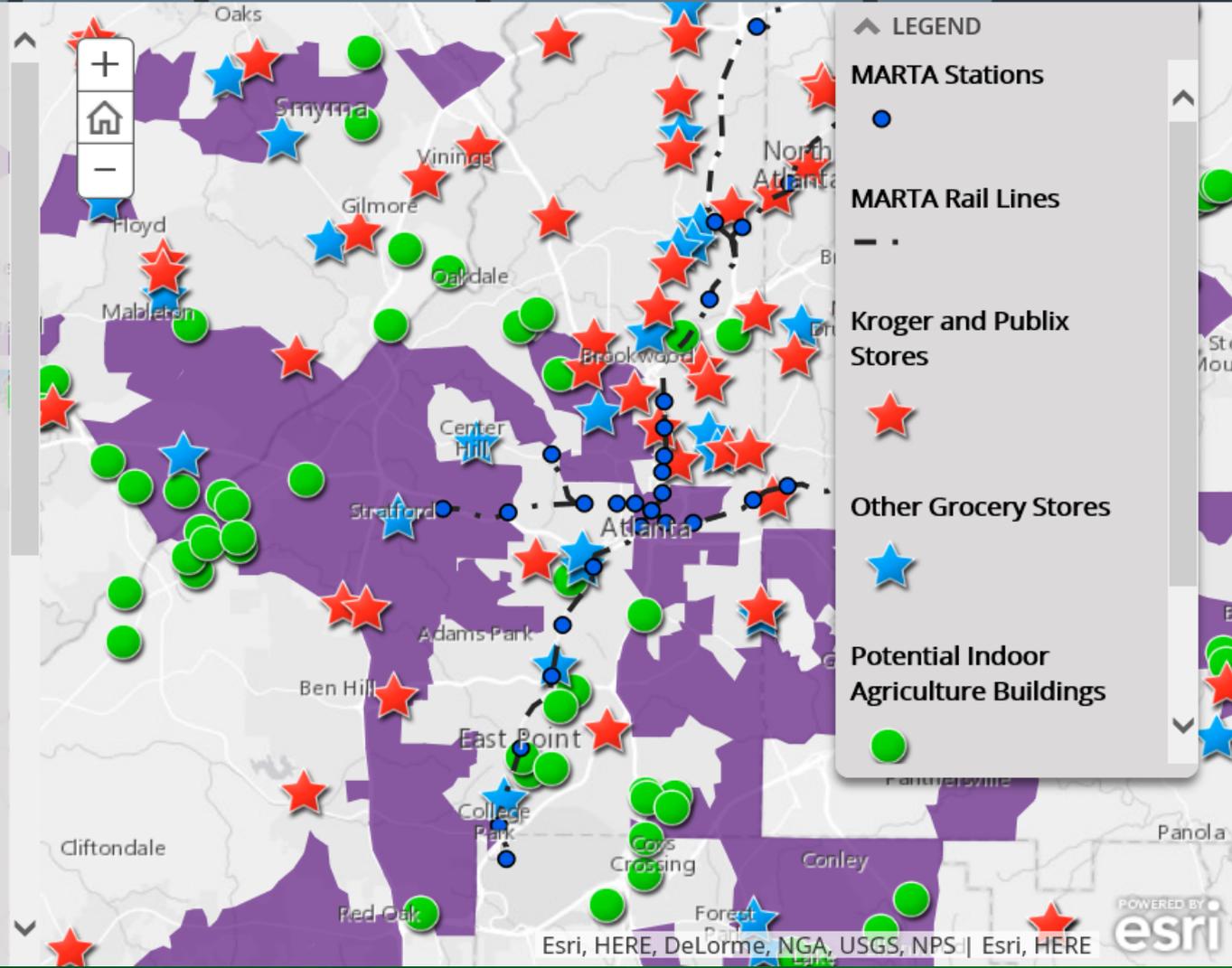
- Food Deserts
- Incentive Zones
- Population
- Population Growth
- Median House Hold Income
- Crime



According to the the US Food and Drug Administration, food deserts are defined as urban neighborhoods and rural towns without ready access to fresh, healthy, and affordable food. Instead of supermarkets and grocery stores, these communities may have no food access or are served only by fast food restaurants and convenience stores that offer few healthy, affordable food options. The lack of access contributes to a poor diet and can lead to higher levels of obesity and other diet-related diseases, such as diabetes and heart disease.

Census tracts qualify as food deserts if they meet low-income and low-access thresholds:

1. They qualify as "low-income"





# Indoor Agriculture

## GEORGIA: A GREAT ENVIRONMENT FOR INDOOR AGRICULTURE

### Why Georgia for Indoor Agriculture?

- Growing population center with strong buying power
- Robust and established agriculture industry
- Excellent accessibility to market and transportation infrastructure
- Abundant and affordable workers
- Skilled technical talent
- Growing entrepreneurial talent with technology forte
- World-class research and development resources
- Venture capital availability
- Business-friendly environment
- Clean, safe, reliable and affordable electricity
- Growing population with appetite for local and organic products
- Expanding wholesale and retail customer base
- Growing food processing industry

## Indoor Agriculture Poised for Growth

Georgia is at the heart of the super-charged Southeast. With its economic vitality fueled by robust population growth and pro-business climate, Georgia is an attractive destination for businesses, including pioneers in indoor agriculture

Home to 680 food processing companies and 50,000 farms which together account for \$26 billion in GDP, Georgia has an exceptional agricultural and food production infrastructure. These resources, when applied toward the establishment and nurturing of a new indoor agriculture industry cluster, will benefit indoor agriculture operations that make Georgia home.

### Momentum for Indoor Agriculture in Georgia

Georgia's reputation for being the most business-friendly state in the U.S. certainly extends to indoor agriculture. Over the past year, initiatives in Atlanta have reinforced leadership's commitment to fostering indoor agriculture operations in the

area. The City of Atlanta is especially dedicated to enhancing a sustainable food supply for its residents while Georgia consumers are increasingly demanding products that are locally grown.

- Atlanta mayor appoints first ever Urban Agriculture Director, October 2015
- Atlanta establishes an Urban Agriculture Task Force that will study "Controlled Environment Agriculture", March 2016
- The Atlanta Local Food Initiative continues to partner for a sustainable food system in Metro Atlanta
- Georgia Tech participates in FEWS initiatives, Nexus of Food, Energy and Water Systems
- Utilities get creative with cost-cutting rate plans for qualified customers
- Georgia's Center of Innovation for Energy provides research, business planning and market support for indoor agriculture companies

# The Challenge for Economic Developers:

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- Low capital investment and jobs
- Jumpstarting an industry / Chicken-Egg
- Supply AND demand
- Confusion around incentives

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How can we / you help?