

North American Greenhouse Overview from emerging GH Structure(s), crops to pesticide registration process and products.

[Part 1]

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- Ph.D. Entomology University of Florida
 - Minor Plant Pathology
- 22 years with Chevron and Valent USA
 - Field Research and Regulatory
- 18+ years with Village Farms
- Married 43 years next week to Jan (Back of the room)
- Live in Orlando Florida area.
- Chair (USA) IR-4 CLC and GH representative in Canadian PMC

Mike Bledsoe

- Personal Intro
- Who is Village Farms
- Why GH over field
- NA GH History
- Survey of NA GH
- Trends- Semi-closed
- Minor Use Regist.
- GH Challenges
 - Tomato
 - Cucumber
- Seed Testing



Agneda

Good for the earth. Garden fresh flavor.



Greenhouse Grown



Overview of VF Capabilities 2016

Good for the Earth®

www.villagefarms.com

We Are Village Farms

We are the Leader in hydroponic Greenhouse Grown produce in North America

- Largest greenhouse producer in North America
- Fresh vine ripened tomatoes, bell peppers & cucumbers
- 2016 marks our 27th Year of Operations
- Grower and Marketer of Exclusive Tomato Varieties
- Vertically integrated grower, marketer, **shipper with year-round direct capabilities**
- Strong reputation as the industry leader in quality, service and food safety
- Primus Global Food Safety certified
- Public company listed on Toronto Stock Exchange TSX:VFF



Highly Sustainable

- “Local” grower
- Small carbon and physical footprint
- State-of-the-art environmentally friendly solutions and high-tech sustainable controlled environment

Operating in Canada, US & Mexico

- Greenhouse facilities owned by VF - BC (110 acres), TX (130 acres)
- Extreme climate proprietary technology 30-acre GATES® greenhouse
- Four distribution centers in US and CA
- Exclusive marketing arrangements with US, Mexican, Canadian growers



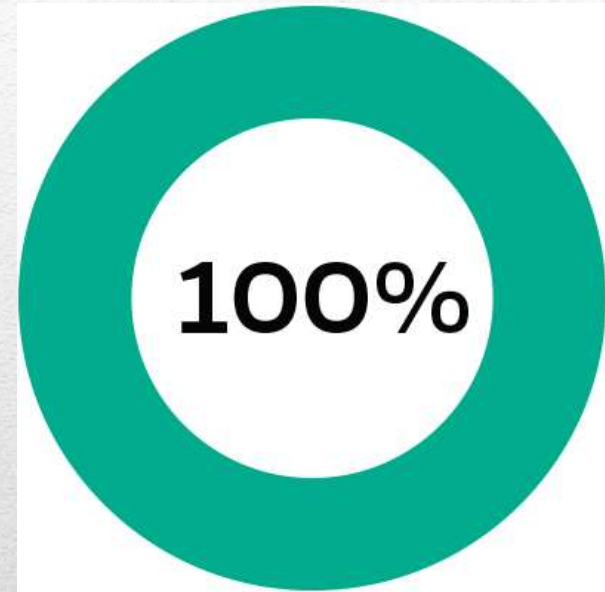
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The Greenhouse Advantage

All of Village Farms company owned greenhouse facilities are audited by third party food safety professionals under the standards certified by Primus Global Food Safety™

Village Farms on average
SCORES 99-100% CONSISTENTLY
during audits across all of its facilities

Village Farms has the logistics and distribution capabilities to ensure fresh high quality produce that meets our retail partners needs. We boast 99% on-time customer delivery, one the highest in the industry today.



Good for the Earth®



Social Responsibility

Community Support

- Over the past 28 years Village Farms has contributed Hundreds of Thousands of Dollars to Local Community Scholarship Funds, Sports Teams, and Charities

Opportunities for Employee Advancement

- Village Farms support our local workers by providing comfortable working environments, benefits and bonuses, opportunities for advancement, and fair market wages.

Food Bank Support

- Village Farms donates thousands of pounds of product to local food banks to provide for those in need.

Worker Friendly Environments and Conditions

- At Village Farms we have a zero tolerance for anything other than optimum safe working conditions and benefits.



Good for
the Earth®

Good for the earth™



70%
less land

- Soiless growing preserves precious land resources
- 20-30x Higher Yields pre acre
- 50 acre Greenhouse can produce same as 1500 acre Farm
- Plant roots are supported by recycled coconut fiber husks

86%
less water



- In hydroponics plant roots are in nutrient rich water
- Water is re-circulated up to five times in the greenhouse
- 100% of water reaches the plant roots
- We use 86% less water than the average tomato grown outdoors

less
chemicals



- Beneficial insects are used to control pests
- Leading to more use of Biological chemical Products.
- Integrated Pest Management



a significant
reduction
in CO₂

- We recycle CO₂ from our heat boiler into the greenhouse
- Plants use CO₂ in the process of photosynthesis
- CO₂ is converted into oxygen

happy & healthy 

Village Farms delivers safe and nutritious produce grown for a healthy future and a happy planet



Strategically Located Operations



VF Greenhouses

British Columbia – 110 total acres

Production: March - November

- Tomatoes-on-the-vine
- Beefsteak tomatoes
- Grape tomatoes
- Campari tomatoes
- Cherry tomatoes
- Heirloom tomatoes
- Mini San Marzano tomatoes
- Specialty tomatoes

Texas – 130 total acres

Marfa & Fort Davis – 100 acres

Production: Year Round

*Beefsteak September – June

- Tomatoes-on-the-vine
- Beefsteak tomatoes*
- Roma tomatoes
- Grape tomatoes
- Campari tomatoes
- Cherry tomatoes
- Heirloom tomatoes
- Mini San Marzano tomatoes
- Specialty tomatoes

Permian Basin – 30 acres

Production: Year Round

- Tomatoes-on-the-vine
- Long English Cucumbers



Partner Greenhouses

Ontario - 70 total acres

Production: Year Round

- Tomatoes-on-the-Vine
- Mini San Marzano Tomatoes
- Campari Tomatoes

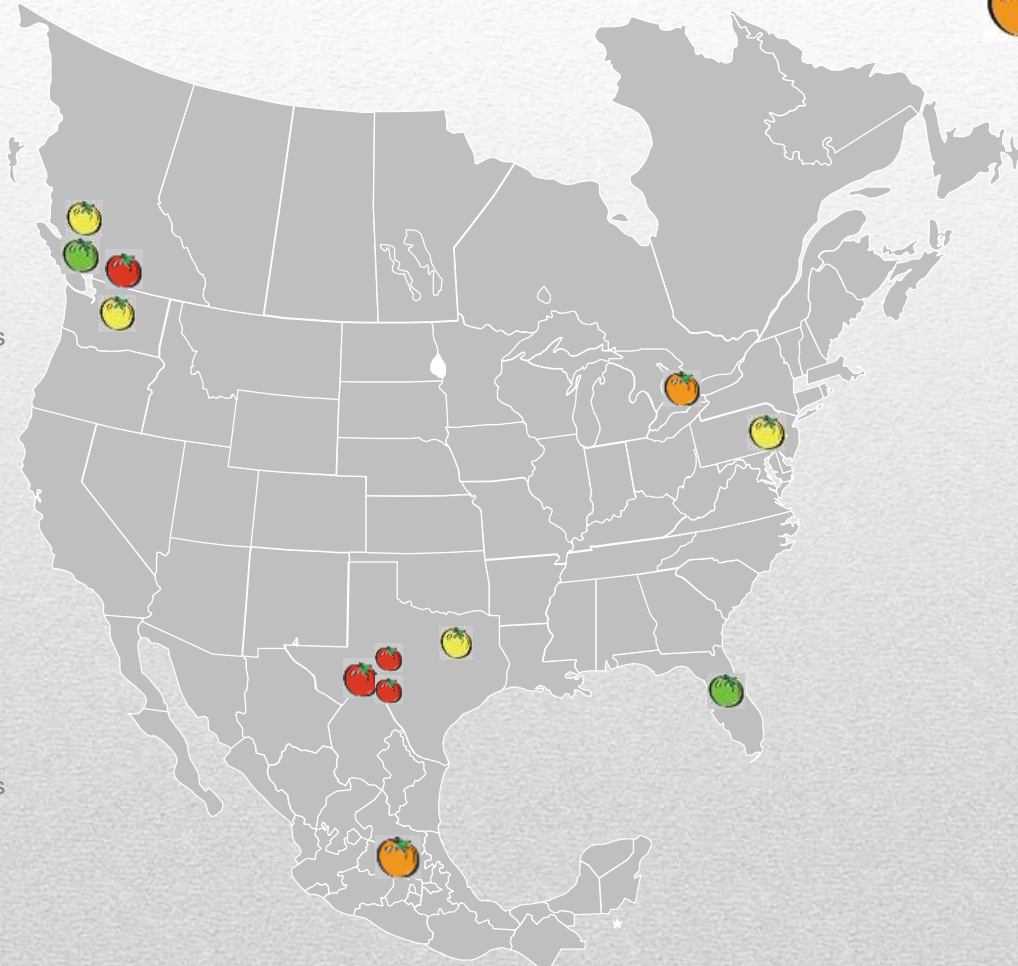
Production: March - November

- Sweet Bell Peppers
- Long English Cucumbers
- Cherry Tomatoes
- Grape Tomatoes
- Beefsteak Tomatoes
- Organic Beefsteak Tomatoes
- Organic Campari Tomatoes

Mexico - 50 total acres

Production: Year round

- Tomatoes-on-the-Vine
- Beefsteak Tomatoes
- Grape Tomatoes
- Campari Tomatoes
- Mini San Marzano Tomatoes
- Specialties
- Mini Cucumbers
- Roma Tomatoes
- Cherry Tomatoes
- Long English Cucumbers



VF Greenhouse



Partner Greenhouse



Distribution Center



Corporate Office



Greenhouse Grown

Branded Premium Quality Products

Heavenly Villagio Marzano®

- 10oz, 1lb or 1.5lb zip handle pouch
- 10oz or 2lb clamshell
- 12oz tray or 1.5lb bowl topseal

Sinfully Sweet Campari®

- 1lb or 2lb clamshell

Delectable TOV®

- bulk 11lb box
- 1.5lb poly bag
- netted bag
- 2lb clamshell
- 4lb or 5lb box

Lip-Smackin Grapes®

- 10oz or 2lb clamshell
- 10oz zip handle pouch
- 11lb box
- 500g bowl



Juicy Beefsteak®

- 3lb or 6ct clamshell
- bulk 15lb box
- 5lb box

Savory Roma®

- 1.1lb, 2lb, or 3lb clamshell

Baby Beefs®

- 1lb or 1.25lb 4cnt clamshell

Mini Sensations®

- 12oz netted bag
- 12oz clamshell



www.villagefarms.com



Greenhouse Grown

Branded Premium Quality Products



Sweet Bells® Sweet Bell Peppers

- 11lb bulk Red, Yellow, or Orange
- 6cnt or 2lb bag R, R/Y/O, Y/O
- 3cnt Rainbow bag



Scrumptious Mini® Cucumbers

- 1lb & 2lb handle bag
- 8 cnt tray/6 cnt tray / 1 lb tray



Luscious Seedless Long English® Cucumbers

- 12, 16, 18, & 24 count box
- Single, 2 pack, 3 pack wrapped



- Village Farms locally grown seals to support growing interest in locally sourced fruits and vegetables.
 - Texas
 - British Columbia
- All of Village Farms' varieties are grown using conventional growing methods.
- We are **GMO FREE** always





Nature friendly pioneers
growing vine-ripened
premium produce.

Village
farms®

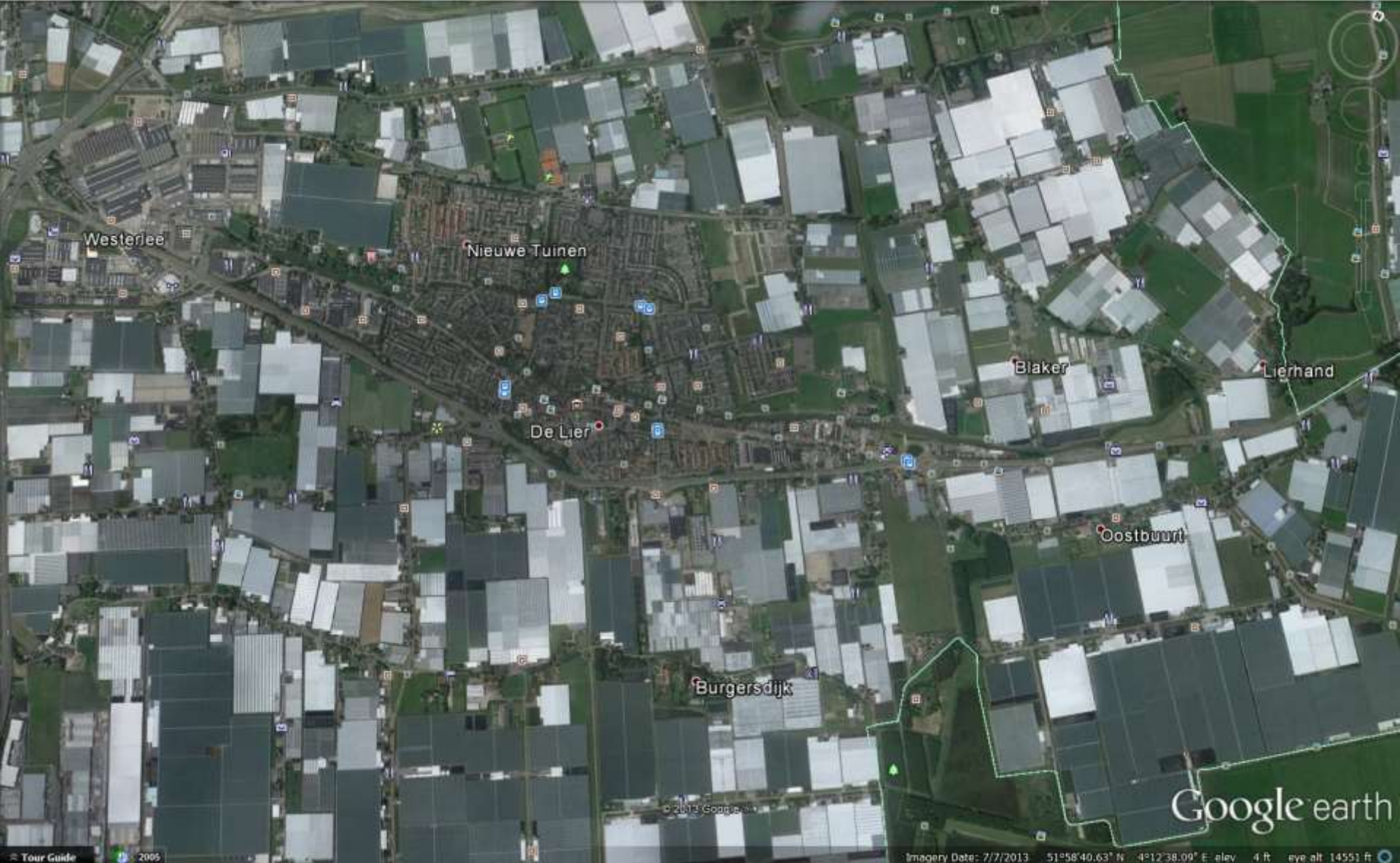
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We are Village Farms



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Greenhouses around the world

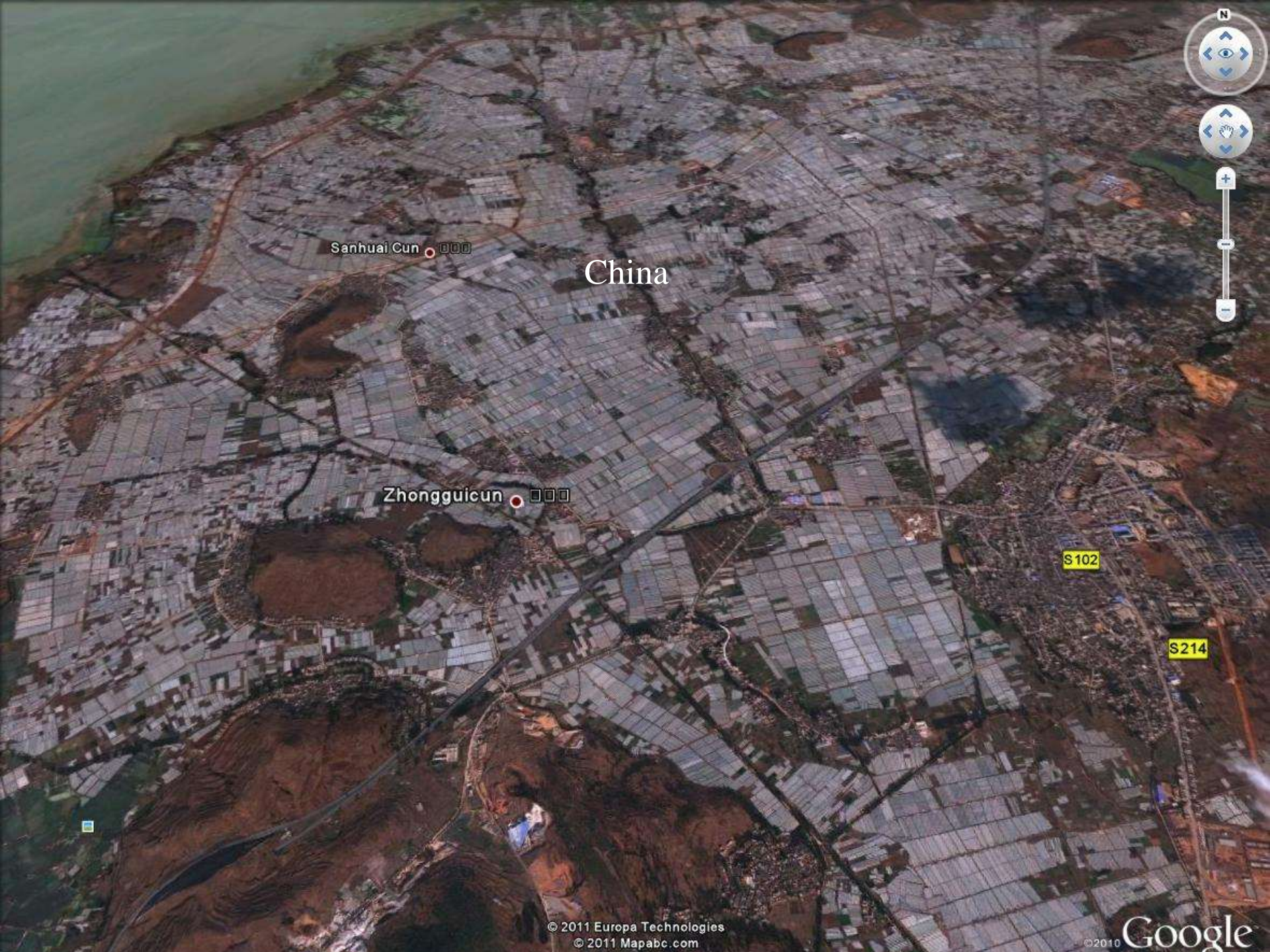




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Greenhouses around the world





China

Sanhuai Cun

Zhongguicun

S102

S214



- Production
 - Year round high quality, Protected environment.
 - Much higher per acre than field (10-30X)
- Requires less water (84% less per pound)
- Food Safety (Controlled Environment)
 - Key to todays markets
- Ability to maximize use of beneficials
- Far less affects from environment on quality of produce.



Why Greenhouse?

Type of Production	KG/M2	Lbs/Yard2	Increase per Acre against Field Production
Average Large Scale GH (>10 Acre) 1988-2004	60-75	110-120	20x
New Semi-closed GH (>10 Acre)	80-114+	147-210	30x
Field Production	3.0.-3.6 (USDA Average)	5.5-6.6	1
Small Scale GH < 10 Acres	30-35	55-110	10X

**Fresh Tomato Production
USA using USDA Field data**





1989: Canadian Greenhouses, but new to US and Mexico in General

- Greenhouse Tomato **Less than 0.5% of US Retail sales in 1989**
 - Today: Retail Groceries: **~50+%**
 - Big Box: **~72+%**
 - Costco
 - Sam's (Walmart)
 - BJ's

Snapshot of North American Large Scale History 1989 - 1996



Canada: Earliest High Tech Development in NA

- 3600 Acres (1456 Ha) of Vegetable GH
 - 1/3 Vancouver, BC;
 - 2/3 Leamington, ON
 - Why? 49th latitude (Netherlands 52nd)
- Mexico: 5000+ acres (2000+ Ha) (mixed protected
 - Field, shade cloth, soil, high tech)
- USA: 1500 acres (607 Ha)
 - Small: 200 acres (81 Ha)
 - <10 acre (4 Ha)
 - Large: 1300 acres (526 Ha) Large scale GH
 - CA, TX, AZ, ME, MI, UT, VA, OH
- **Today's trend is for Canadian and Mexican companies to do new development in the USA.**
 - **Electricity and Markets**



Current Demographics Hydroponic Vegetable





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Greenhouse Definitions in North America

- **Controlled Environment:** Controlled environment produce are limited to those tomatoes grown in a fully-enclosed permanent
 - aluminum or fixed steel structure clad in glass, impermeable plastic, or polycarbonate
 - using automated irrigation and climate control, including heating and ventilation capabilities, in an artificial medium using hydroponic methods.
 - **Adapted Environment:** includes shade cloth and temporarily covered crops.
-

- Tomato: 92%



- Cucumber: 4%



- Pepper: 2%



- Eggplant: 1%



- Lettuce: 1%



NA Hydroponic Vegetable %

- Mexico
- Canada
- USA

Survey of NA Markets and GH



Lower – tech greenhouses

Mexico >5,000 acres (Split low to high technology)





Greenhouse Definitions in North America

- **Controlled Environment:** Controlled environment produce are limited to those tomatoes grown in a fully-enclosed permanent
 - aluminum or fixed steel structure clad in glass, impermeable plastic, or polycarbonate
 - using automated irrigation and climate control, including heating and ventilation capabilities, in an artificial medium using hydroponic methods.
 - **Adapted Environment:** includes any type of covering, including shade cloth and temporarily covered crops.
-

Sinaloa Mexico







- **CANADA 3600 Acres/ 1457 Ha**
 - Leamington 2400 Acres/971 Ha
 - British Columbia 1200 Acre/ 486 Ha
 - Similar latitudes to Dutch production
 - Northern NA Production type
 - First NA large scale production
 - Most are High tech greenhouses







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Horizontal ! Greenhouses





Opening Food Service Markets

USA Acreage

- 1500 acres/607 Ha
- NA Hydroponics is split between Northern and Southern
 - Northern: Generally not year round and not inter-planted
 - Northern USA and Canada
 - Southern: Year round, with or without cleanout period.
 - Southern USA and Mexico



United States of America

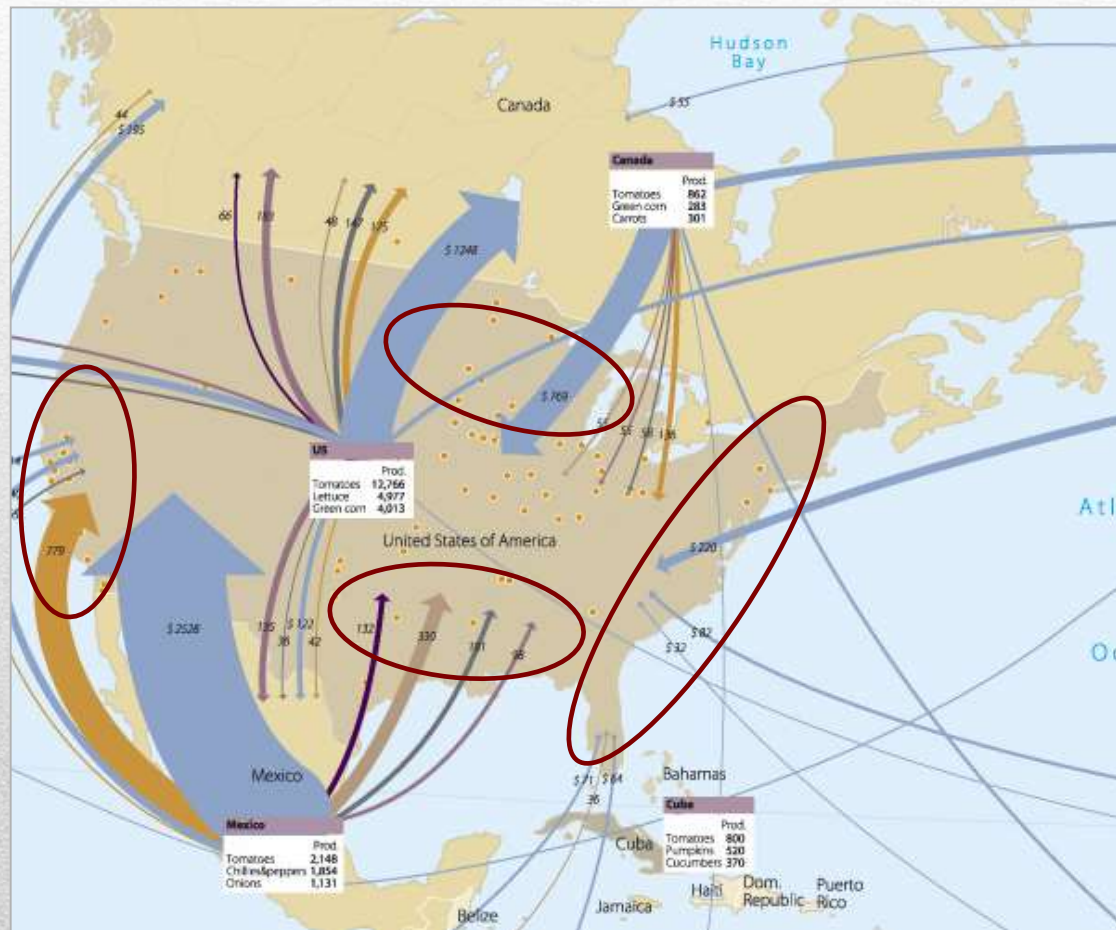
“The Primary NA Market for Produce”

1. Level land
2. Natural Gas line/supply
3. Water
4. Cool nights
5. Bright sunny days
6. Low Humidity
7. Manpower
8. Transportation
9. Distance from other Agriculture
10. Low cost electricity

10 filters to selecting locations?

The US is a net importer of produce

In 2009, the gap between imports and exports of produce in the United States was nearly **-\$6B**.



1. Hickman, Gary. *Greenhouse Vegetable Production Statistics, July 09 Survey*. Cuesta Roble Greenhouse Consultants, www.cuestaroble.com
Table 15. Major Countries Exporting Greenhouse Tomatoes to the US, 2008 (Mexico = 299,045 Mtons, Canada = 117,000 Mtons, US Domestic Production = 170,000)
2. Table 31. Average Number of Greenhouse Vegetable Production Employees

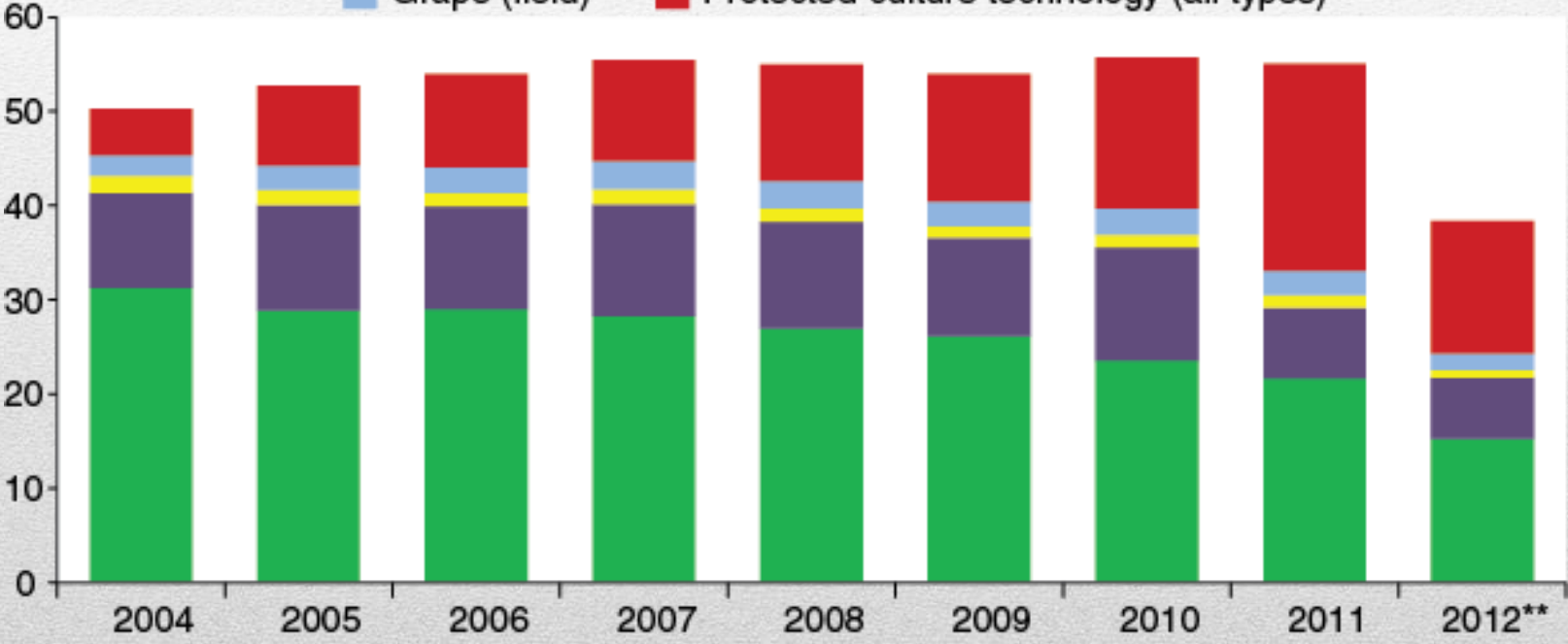


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Protected-culture tomato share of U.S. supply grows as the field share declines

Million pounds

- Round (field)
- Plum (field)
- Cherry (field)
- Grape (field)
- Protected-culture technology (all types)*



125,000

113,000

* Includes beefsteak, tomatoes-on-the-vine (TOV), cherry, grape, and plum.

** 2012 data cover January through September only.

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Source: USDA, Economic Research Service using data from USDA, Agricultural Marketing Service.
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