

# UF/IFAS Extension

## The Journey to Sustainability Begins with Education



# URBAN AGRICULTURE

## A Participatory, Primer Course Part 1b: Production Systems



## 2017-18 Urban Ag Certificate Course

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# Urban Ag Production Systems



# Urban Ag Production Systems

Let's Watch a Short Trailer of the Movie, "Growing Cities", That Documented the Diversity of Urban Farm Production Systems and Urban Farmers in the U.S. – see <http://www.growingcitiesmovie.com/the-film/#Trailer>



# Urban Ag Production Systems

## Production Techniques

- Starting small
  - Tremendous amounts of vacant urban space
- Developing markets
  - Tremendous opportunities in niche markets
- Farming in urban soils
  - A system to match any soils



# Urban Ag Production Systems

## In-ground Raised beds

- Advantages
  - Low cost and easy to build w/ correct equipment
  - Improve drainage, aeration and concentration of fertility
- Challenges
  - Time consuming to build w/o proper equipment
  - Lose some planting area to pathways and bed shoulder
  - Soil must be tested!



# Urban Ag Production Systems

## ❖ Farming In-Ground

## ❖ BioIntensive (i.e., “Double digging”) Farming

1. Dig. Place dirt in wheelbarrow.

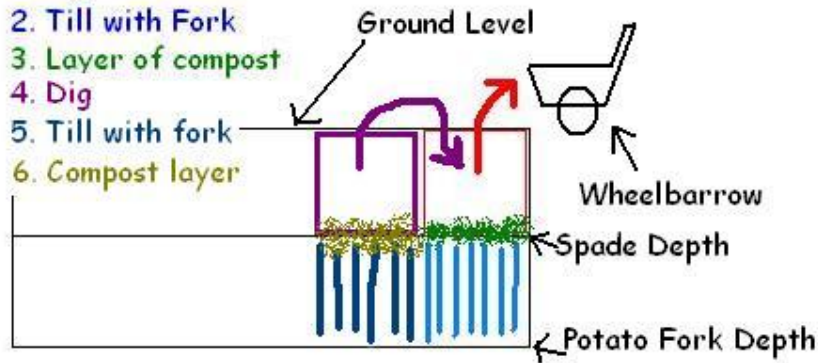
2. Till with Fork

3. Layer of compost

4. Dig

5. Till with fork

6. Compost layer



## Seven features of Jeavons' BioIntensive

Permanent double-dug beds

Compost for soil fertility

Hexagonal close-packed planting

Companion planting in time & space



Carbon-efficient crops

Calorie-efficient crops



Open-pollinated seeds



Watch video at

<http://youtube.com/watch?v=Jx9pM9tPOWM&feature=related>

<http://www.growbiointensive.org/>

# Urban Ag Production Systems

❖ Farming In-Ground

❖ Permaculture Farming



Videos available at <https://www.youtube.com/playlist?list=PLEgB--CmfB1V5hKTRS1xyPjpts3F4cpwl>



# Urban Ag Production Systems

## Wood/ Metal raised beds

- Advantages

- Improve drainage, aeration and concentration of fertility
- Easy to harvest
- Match aesthetics of site

- Challenges

- Time consuming/ expensive to build.



# Urban Ag Production Systems

## Cinderblock raised beds

- Advantages

- Excellent drainage, aeration and concentration of fertility
- Much easier harvest and maintenance

- Challenges

- Time consuming/ expensive to build w/o proper equipment
- Lose some planting area to width of cinder block



# Urban Ag Production Systems

## Container gardening

- Advantages
  - Excellent drainage and concentration of fertility
  - Easy to harvest and maintain
  - Can get pots for free
- Challenges
  - Need greenhouse or covering
  - Must be watered frequently



# Urban Ag Production Systems

## Greenhouses/ Hothouses

- Advantages

- Increases season
- Control moisture level in soil

- Challenges

- Expensive to build and maintain
- Must be watered frequently



# Urban Ag Production Systems

## Edible Landscaping



# Urban Ag Production Systems

## Rooftop Farming

- Where: Manhattan Warehouse Rooftop
- What: Vegetables, greens, herbs and flowers grown. Chickens and bees kept.
- Size: 6,000 square feet.

On the shoreline of the East River and with a sweeping view of the Manhattan skyline, Eagle Street Rooftop Farm is a green roof organic vegetable farm.



# Urban Ag Production Systems



Use Urban Farming Technologies to  
Supplement Traditional Farming -  
Agricultural Revolution

- Hydroponics
- Vertical Farming
- Aquaponics

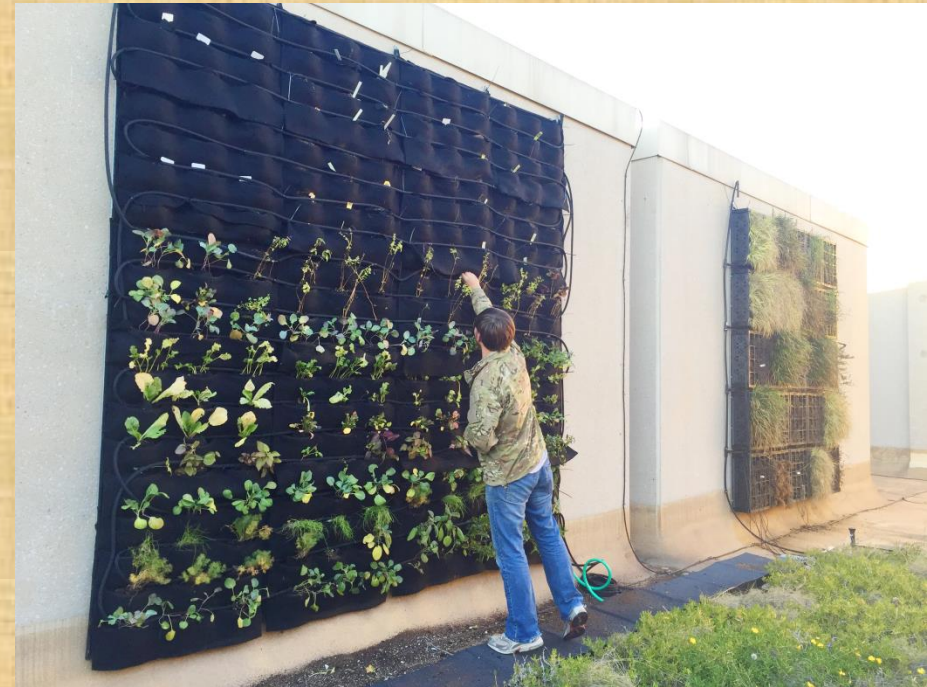
# Hydroponics at Home





# Urban Ag Production Systems

## ‘Living Walls’ Hydroponics



A freestanding central greenhouse serving as a growing and retailing area (pick your own)

<http://www.urbangardensweb.com/2013/01/05/urban-vertical-farm-and-pick-it-yourself-market/>

# Urban Ag Production Systems

## Here Are Some Short Videos of Vertical Farms

- An urban farming aquaponics project – see <http://pittsburgh.cbslocal.com/2016/10/12/aquaponics-lab-debuts-in-pittsburgh-as-urban-farming-project/>
- An urban vertical farm that uses no soil and 95% less water compared to conventional farming – see <https://www.youtube.com/watch?v=-tvJtUHnmU>



# Urban Ag Production Systems

## Diversified Small Scale Farm Example



# Urban Ag Production Systems

## “Growing Power - A Model for Urban Agriculture in Milwaukee”

- ❖ A short video of a large scale urban farm that integrates vegetables, herbs, fruit and aquaculture production

❖ See this video at

<https://www.youtube.com/watch?v=vs7BG4IH3m4>

# 2013 National Survey of Urban Ag Commercial Farms Profile “Production Systems”

*Table 7: Production Practices and Structures Used on Urban Farms, 2013 National Survey of Urban Farms*

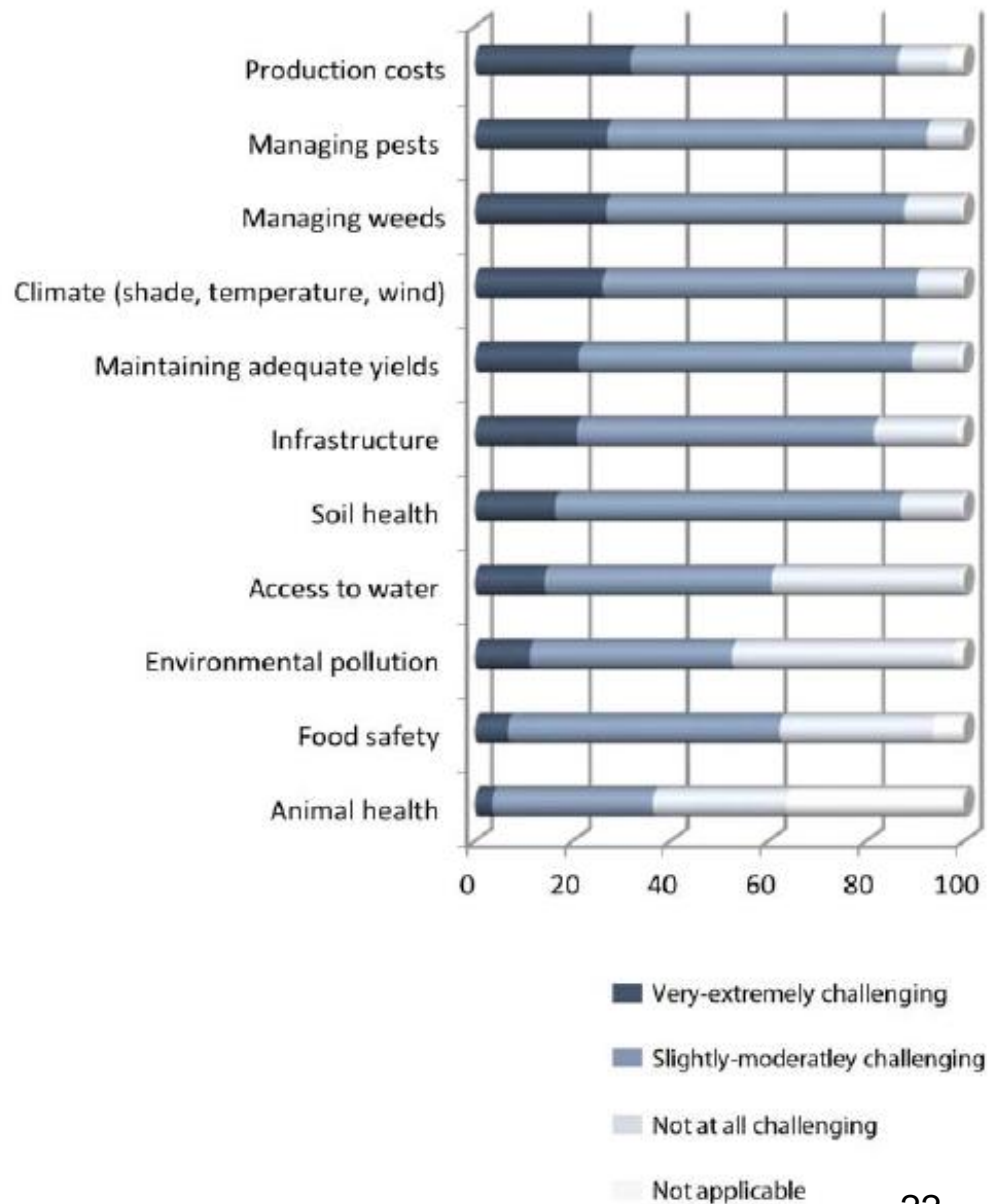
| Practices/Structures | Frequency | Percent of Respondents |
|----------------------|-----------|------------------------|
| Raised beds          | 203       | 64.4                   |
| Greenhouse           | 130       | 41.3                   |
| Container gardens    | 118       | 37.5                   |
| High tunnel          | 92        | 29.2                   |
| Vertical farming     | 56        | 17.8                   |
| Aquaponics           | 24        | 7.6                    |
| Hydroponics          | 17        | 5.4                    |
| Rooftop farming      | 9         | 2.9                    |

# 2013 National Survey of Urban Ag Commercial Farms Profile

## “Production Risks”

<https://attra.ncat.org/attra-pub/summaries/summary.php?pub=558>

Figure 1: Production Risks and Challenges for Urban Farms, 2013 National Survey of Urban Farms



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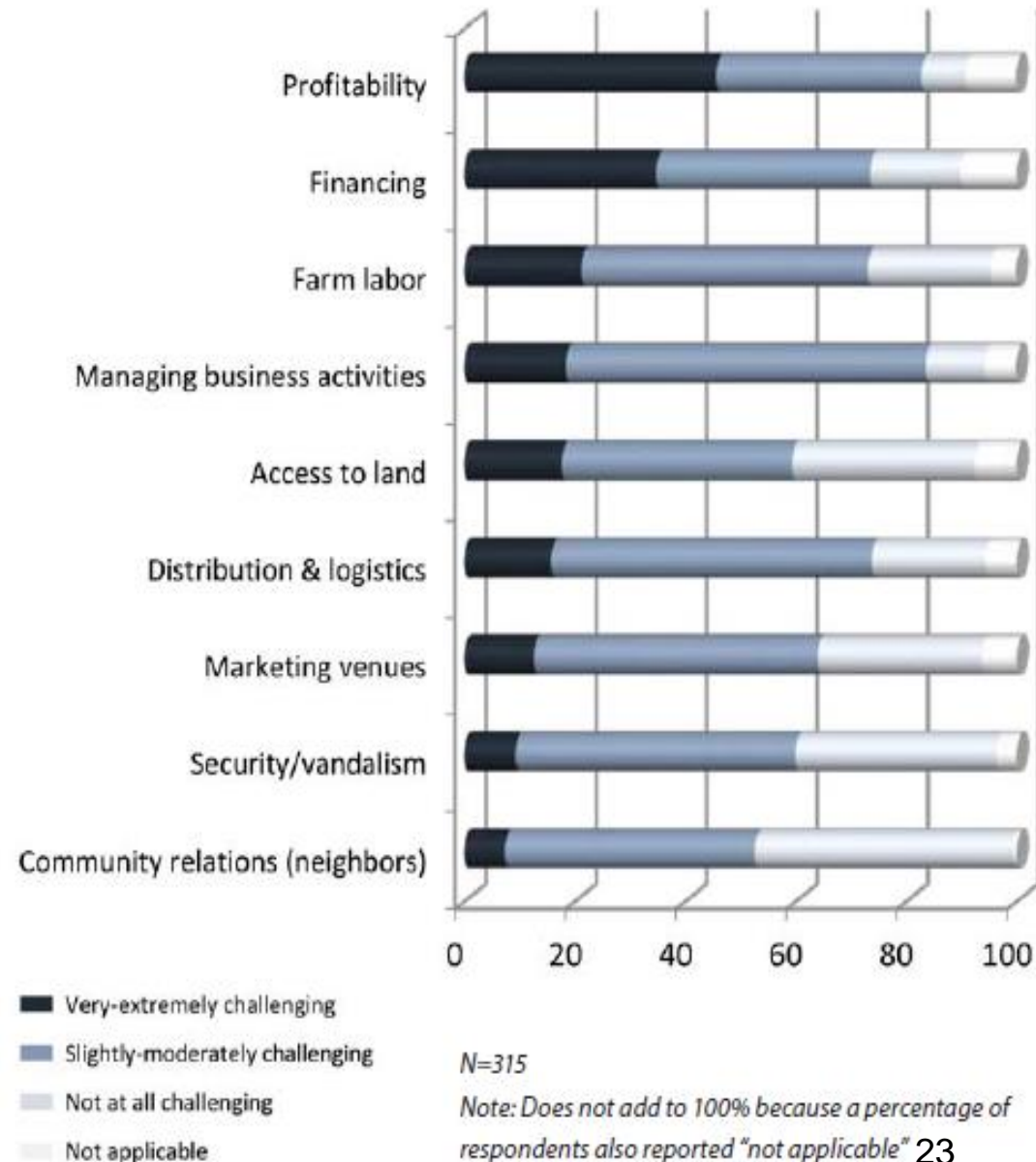
Note: Does not add to 100% because a percentage of respondents also reported “not applicable.”

# 2013 National Survey of Urban Ag Commercial Farms Profile

## “Other Challenges”

<https://attra.ncat.org/attra-pub/summaries/summary.php?pub=558>

Figure 2: Other Challenges for Urban Farms, 2013 National Survey of Urban Farms



# Crop Production

## General Planning Steps

- ✓ Use planting guide for information
  - vegetables & cultivars suited to Florida gardens
  - planting distances and depths
  - planting dates by areas and hardiness
  - days to harvest and expected yields
- ✓ Design the urban farm to meet your food production goals (fresh, canning, selling, etc)
- ✓ Select a location of good, well-drained soil with adequate water supply/quality and sunlight



# Crop Production

## General Planning Steps (Cont.)

- ✓ Soil preparation with amendments
  - Compost/organic matter for soil life
  - liming and minerals additions according to soil tests
- ✓ Irrigate according to crop needs
  - use best management practices
  - learn critical growth stages

# Crop Production

## General Planning Steps (Cont.)

### ✓ Weed control

- shallow cultivation and hoeing of small weeds are advised due to soil weed seedbank
- use mulch to suppress weeds

### ✓ Insect & disease control

- plant resistant & disease/pest-free varieties
- practice integrated pest management (IPM)

# Crop Production: Seasons



## Four Seasons of FRESHNESS

Florida Produce Availability *at a glance*

|                 | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| AVOCADOS        |     |     |     |     |     |     |     |     |     |     |     |     |
| BLUEBERRIES     |     |     |     |     |     |     |     |     |     |     |     |     |
| CABBAGE         |     |     |     |     |     |     |     |     |     |     |     |     |
| CANTALOUPE      |     |     |     |     |     |     |     |     |     |     |     |     |
| CARAMBOLA       |     |     |     |     |     |     |     |     |     |     |     |     |
| CARROTS         |     |     |     |     |     |     |     |     |     |     |     |     |
| CAULIFLOWER     |     |     |     |     |     |     |     |     |     |     |     |     |
| CELERY          |     |     |     |     |     |     |     |     |     |     |     |     |
| CHINESE CABBAGE |     |     |     |     |     |     |     |     |     |     |     |     |
| CUCUMBERS       |     |     |     |     |     |     |     |     |     |     |     |     |
| EGGPLANT        |     |     |     |     |     |     |     |     |     |     |     |     |
| GRAPEFRUIT      |     |     |     |     |     |     |     |     |     |     |     |     |
| GREEN BEANS     |     |     |     |     |     |     |     |     |     |     |     |     |
| GREEN PEPPERS   |     |     |     |     |     |     |     |     |     |     |     |     |
| LETTUCE         |     |     |     |     |     |     |     |     |     |     |     |     |
| MANGOES         |     |     |     |     |     |     |     |     |     |     |     |     |
| ORANGES         |     |     |     |     |     |     |     |     |     |     |     |     |
| RADISHES        |     |     |     |     |     |     |     |     |     |     |     |     |
| SQUASH          |     |     |     |     |     |     |     |     |     |     |     |     |
| STRAWBERRIES    |     |     |     |     |     |     |     |     |     |     |     |     |
| SWEET CORN      |     |     |     |     |     |     |     |     |     |     |     |     |
| TANGERINES      |     |     |     |     |     |     |     |     |     |     |     |     |
| TOMATOES        |     |     |     |     |     |     |     |     |     |     |     |     |
| WATERMELON      |     |     |     |     |     |     |     |     |     |     |     |     |

# Crop Production Factors

## Core Management Topic Areas :

- Location
- Season
  - Temperature
  - Photoperiod
- Water
- Soil
- Crops
- Pests

# Location: Site Selection Factors

- Light (photoperiod)  
≥ 6 hours
- Proximity to Trees  
Shrubs, & Buildings
  - Shade
  - Nutrient competition
- Air /Water Drainage

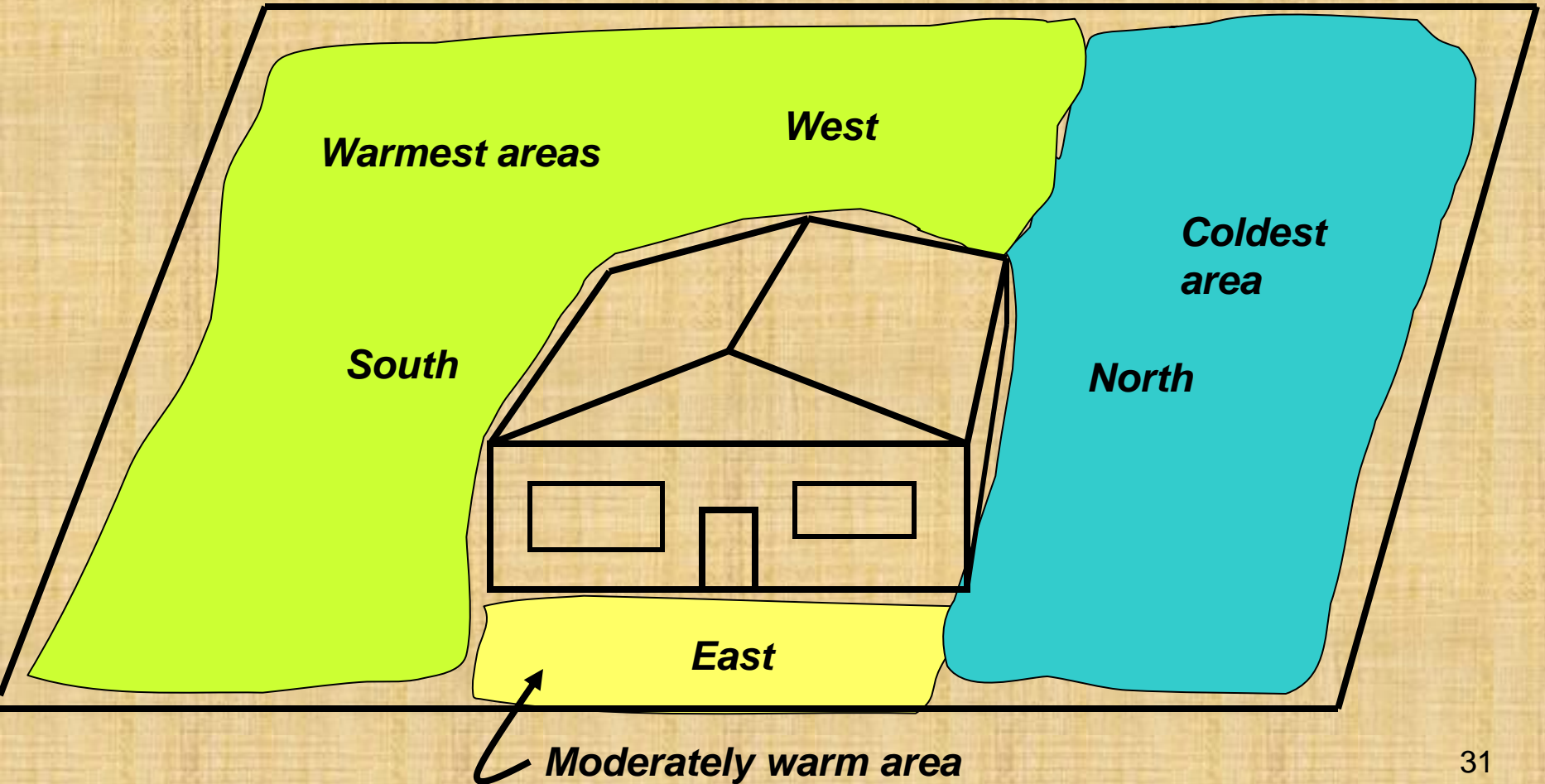


# Location: Shade Tolerant Vegetables

| Crop            | Shade Notes                                                                                                                                                                                           | Growing Tips                                                                                                                                                                                                                                                                                                               |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Arugula         | At least three to four hours of sun per day.                                                                                                                                                          | Arugula welcomes shade, as this crop is prone to bolting as soon as the weather turns warm if in full sun.                                                                                                                                                                                                                 |
| Asian greens    | At least two hours of sun per day.                                                                                                                                                                    | Asian greens such as bok choy (also spelled "pac choy" and "pak choy"), komatsuna and tatsoi will grow wonderfully with a couple hours of sun plus some bright shade or ambient light.                                                                                                                                     |
| Chard           | If you grow chard mainly for its crisp stalks, you will need at least five hours of sun per day; if you grow it mainly for the tender baby leaves, three to four hours of sun per day will be enough. | Expect chard grown in partial shade to be quite a bit smaller than that grown in full sun. Baby chard leaves are excellent cooked or served raw in salads.                                                                                                                                                                 |
| Culinary herbs  | At least three hours of sun per day.                                                                                                                                                                  | While many culinary herbs need full sun, chives, cilantro, garlic chives, golden marjoram, lemon balm, mint, oregano and parsley will usually perform well in shadier gardens.                                                                                                                                             |
| Kale            | At least three to four hours of sun per day.                                                                                                                                                          | You'll notice only a small reduction in growth if comparing kale grown in partial shade with kale grown in full sun.                                                                                                                                                                                                       |
| Lettuce         | At least three to four hours of sun per day.                                                                                                                                                          | Lettuce is perfect for shadier gardens because the shade protects it from the sun's heat, preventing it from bolting as quickly. Often, the shade can buy a few more weeks of harvesting time that you'd get from lettuce grown in full sun.                                                                               |
| Mesclun         | One of the best crops for shady gardens. Grows in as little as two hours of sun per day and handles dappled shade well.                                                                               | The delicate leaves of this salad mix can be harvested in about four weeks, and as long as you leave the roots intact, you should be able to get at least three good harvests before you have to replant.                                                                                                                  |
| Mustard greens  | At least three hours of sun per day for baby mustard greens.                                                                                                                                          | Mustard grown for baby greens is best-suited for shady gardens.                                                                                                                                                                                                                                                            |
| Peas and beans  | At least four to five hours of sun.                                                                                                                                                                   | If growing these crops in partial shade, getting a good harvest will take longer. Try bush and dwarf varieties rather than pole varieties.                                                                                                                                                                                 |
| Root vegetables | At least four to five hours of sun per day for decent production.                                                                                                                                     | Beets, carrots, potatoes, radishes and turnips will do OK in partial shade, but you'll have to wait longer for a full crop. The more light you have, the faster they'll mature. Alternatively, you can harvest baby carrots or small new potatoes for a gourmet treat that would cost an arm and a leg at a grocery store. |
| Scallions       | At least three hours of sun per day.                                                                                                                                                                  | This crop does well in partial shade throughout the growing season.                                                                                                                                                                                                                                                        |
| Spinach         | At least three to four hours of sun per day.                                                                                                                                                          | Spinach welcomes shade, as it bolts easily if in full sun. If you grow it specifically to harvest as baby spinach, you'll be able to harvest for quite a while as long as you continue to harvest the outmost leaves of each plant.                                                                                        |

# Location: Temperature Differences

## *\*Home Site Example\**



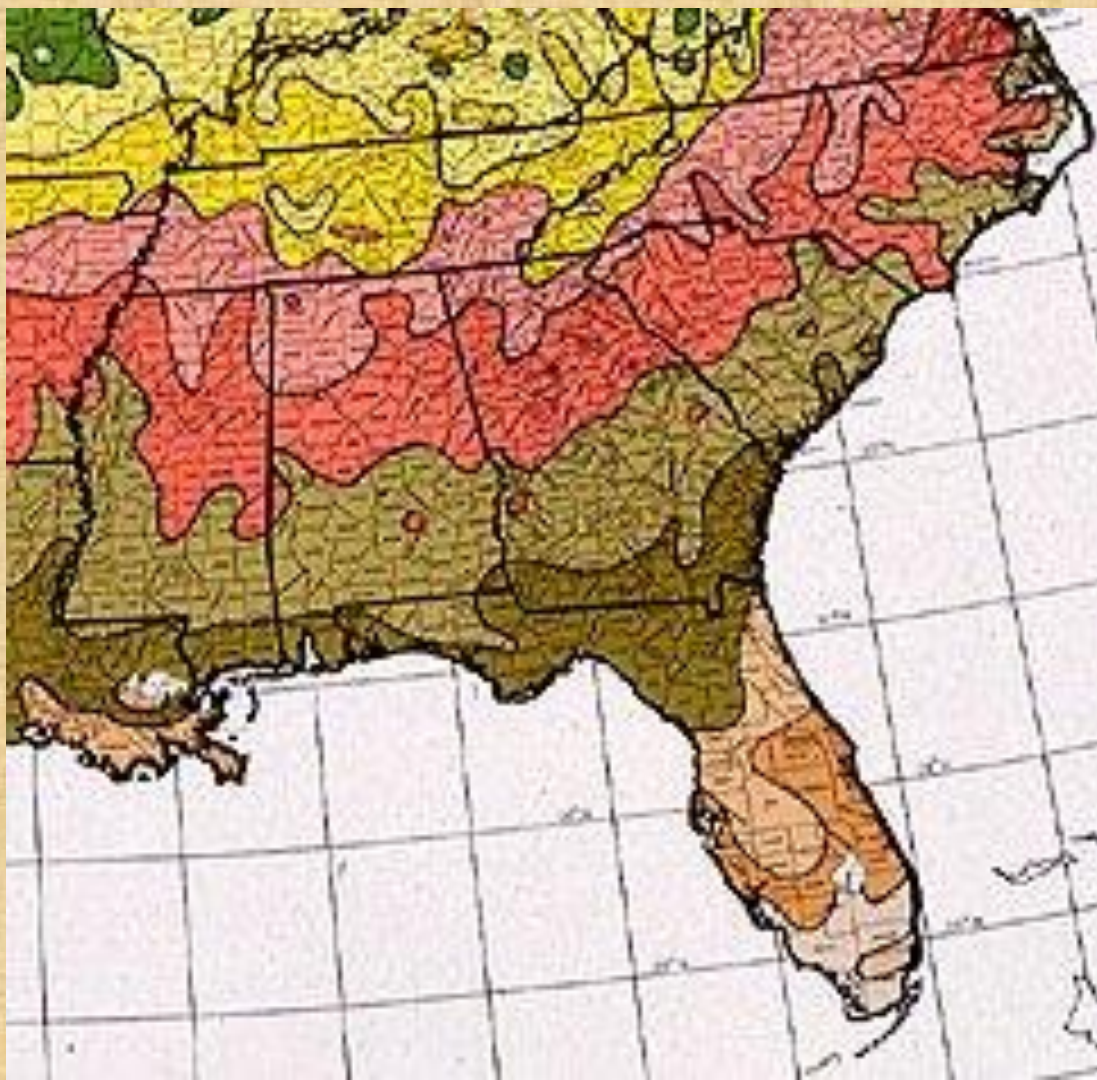
# Location: Air/Water Drainage

- Low-lying areas are subject to unseasonable frosts & water-logged soils.
- South-facing slopes warm more quickly.
- Wind protection is desirable in 'wind tunnel' situations:
  - Prevents physical damage to plants.
  - Reduces water loss.
  - Preserves heat that may be lost through transpiration.



# Temperatures: Growing Zones

## ❖ USDA Plant Hardiness Zone Map



### Average Annual Minimum Temperature

Temperature (F)      Zone

|            |     |
|------------|-----|
| Below -50  | 1   |
| -45 to -50 | 2a  |
| -40 to -45 | 2b  |
| -35 to -40 | 3a  |
| -30 to -35 | 3b  |
| -25 to -30 | 4a  |
| -20 to -25 | 4b  |
| -15 to -20 | 5a  |
| -10 to -15 | 5b  |
| -5 to -10  | 6a  |
| 0 to -5    | 6b  |
| 5 to 10    | 7a  |
| 10 to 15   | 7b  |
| 15 to 20   | 8a  |
| 20 to 25   | 8b  |
| 25 to 30   | 9a  |
| 30 to 35   | 9b  |
| 35 to 40   | 10a |
| 40 to 45   | 10b |
| 45 +       | 11  |

# Temperature: Crop Requirements

- **Cool season crops**

- Develop best <50°F
- Tolerate frost.
- Quality deteriorates under warm conditions.
- Peas, spinach, cole crops



Peas

- **Warm season crops**

- Develop best at temps >50°F.
- Killed by frost.
- Beans, tomatoes, peppers, eggplant, sweet corn, cucurbits.



Peppers,  
Eggplant

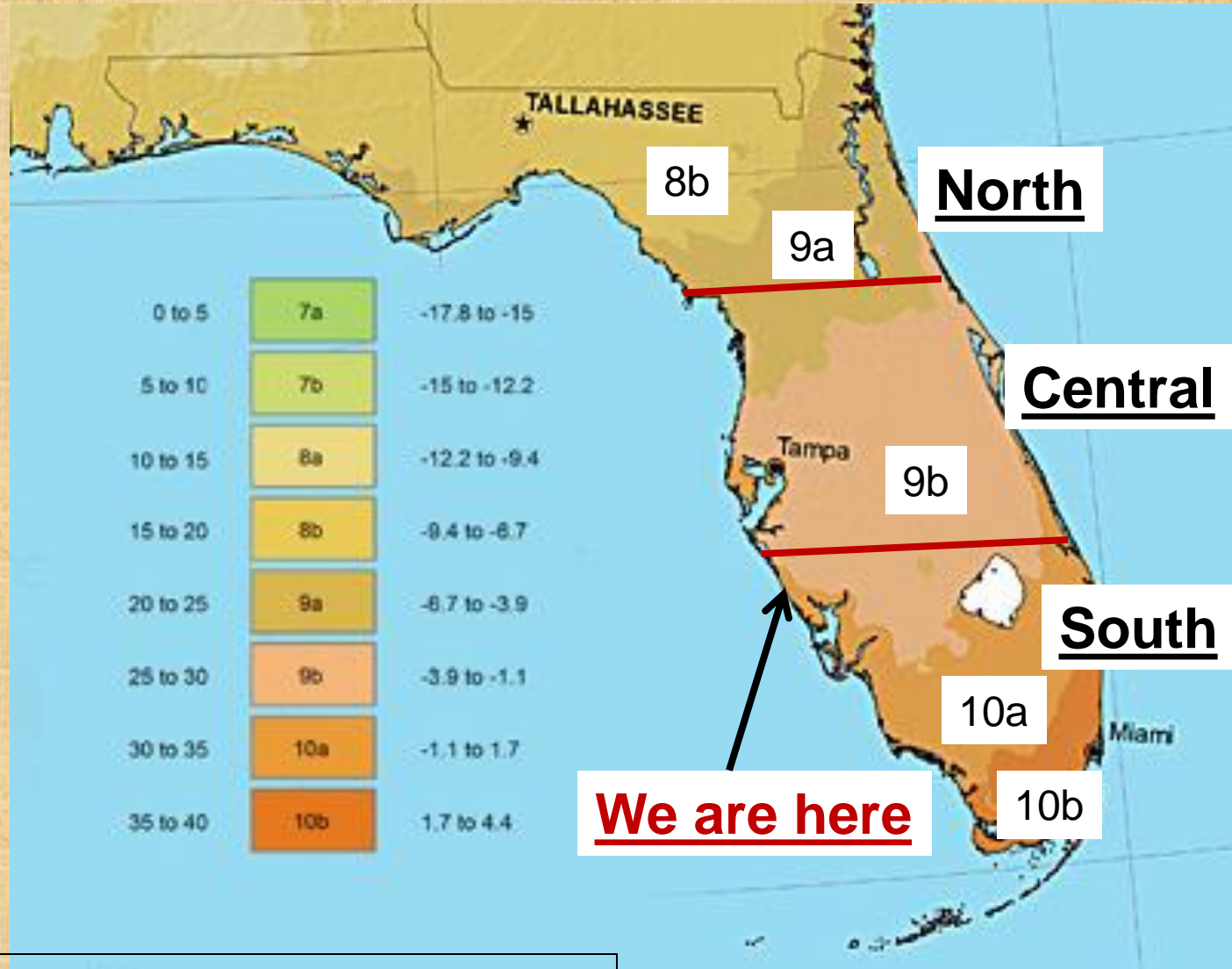
# Temperatures: Growing Zones

## 2012 USDA Plant Hardiness Zone Map



# Temperature: Growing Zones

## UF/IFAS Vegetable Planting Guide



<http://edis.ifas.ufl.edu/pdffiles/VH/VH02100.pdf>

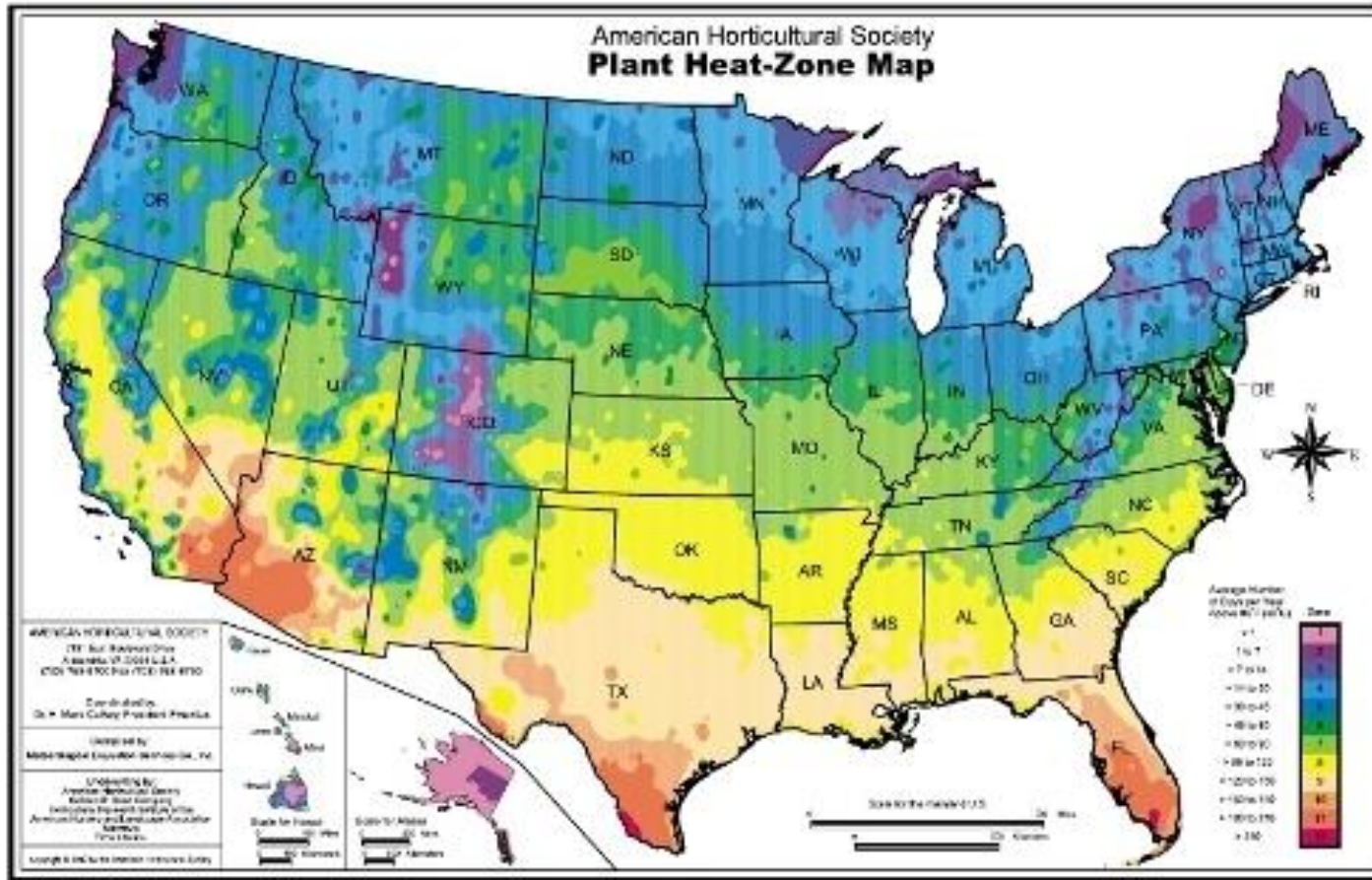
<http://centralfloridagardening.com/page/2/>

# Temperature: Growing Zones



# Temperature: Growing Zones

## ❖ AHS Heat Zone Map



# Temperature: Growing Zones

## ❖ AHS Heat Zone Map



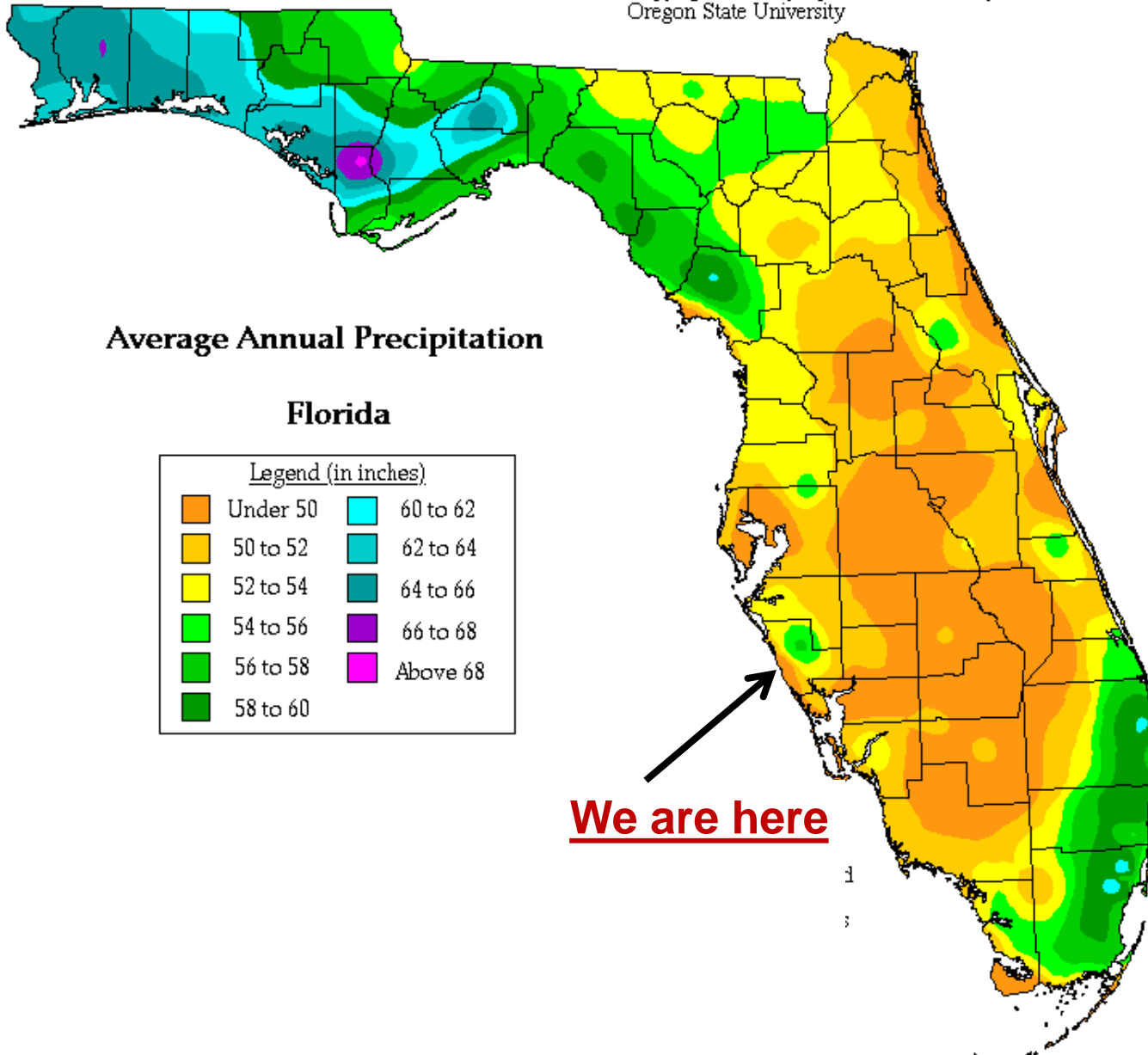
# Photoperiod: Effects on Crop Growth

- Increasing or decreasing day length affects
  - Flower initiation
  - Bulbing & tuber development
- Short day plants:
  - Sweet potato
- Long day plants flower when light exceeds a certain number of hours.
  - Lettuce
  - Spinach
  - Radish
- Day neutral plants – flowering not related to light
  - Cucumber
  - Beans
  - Peas
  - Peppers



# Water: Average Rainfall

Copyright 2000 by Spatial Climate Analysis Service,  
Oregon State University

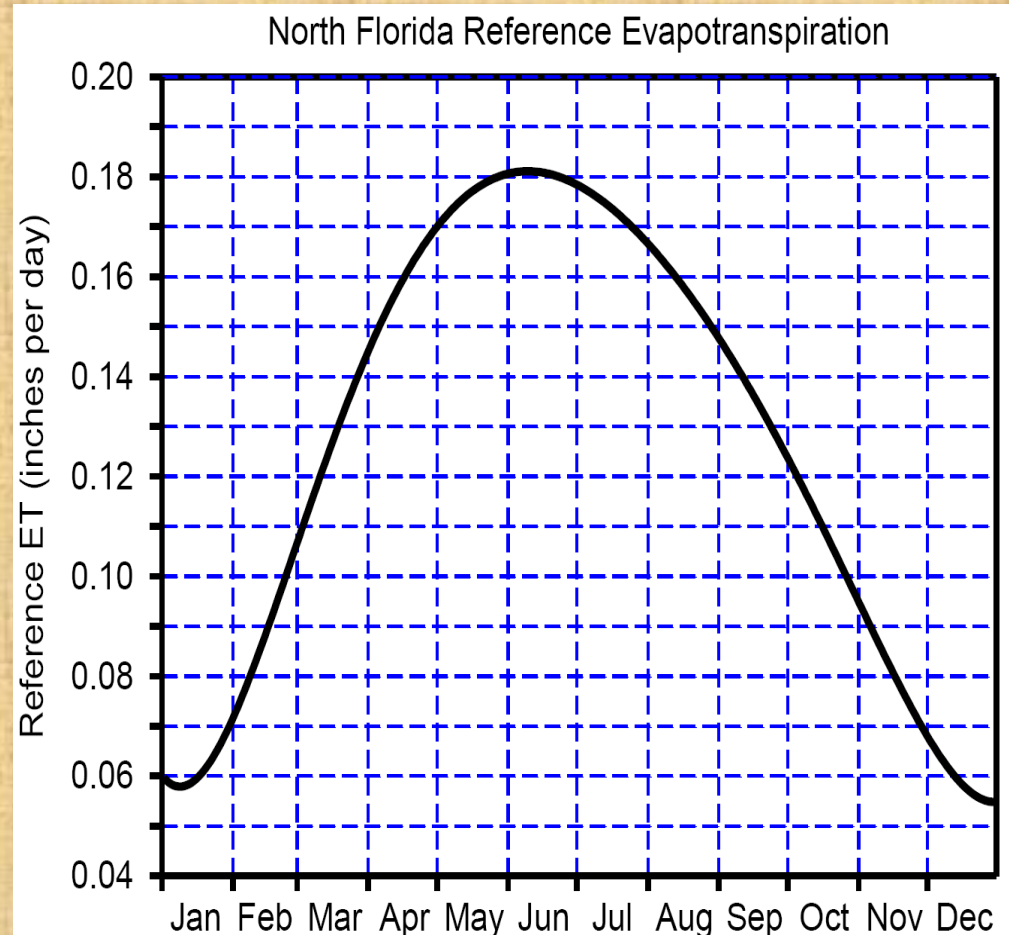


# Water: Seasonal Crop Usage

- **Florida Automated Weather Network Resource**

<http://fawn.ifas.ufl.edu/>

- Evapotranspiration data
- Freeze warnings
- Temperature data and forecasts



# Water: Seasonal and Growth Crop Stage Use Comparison

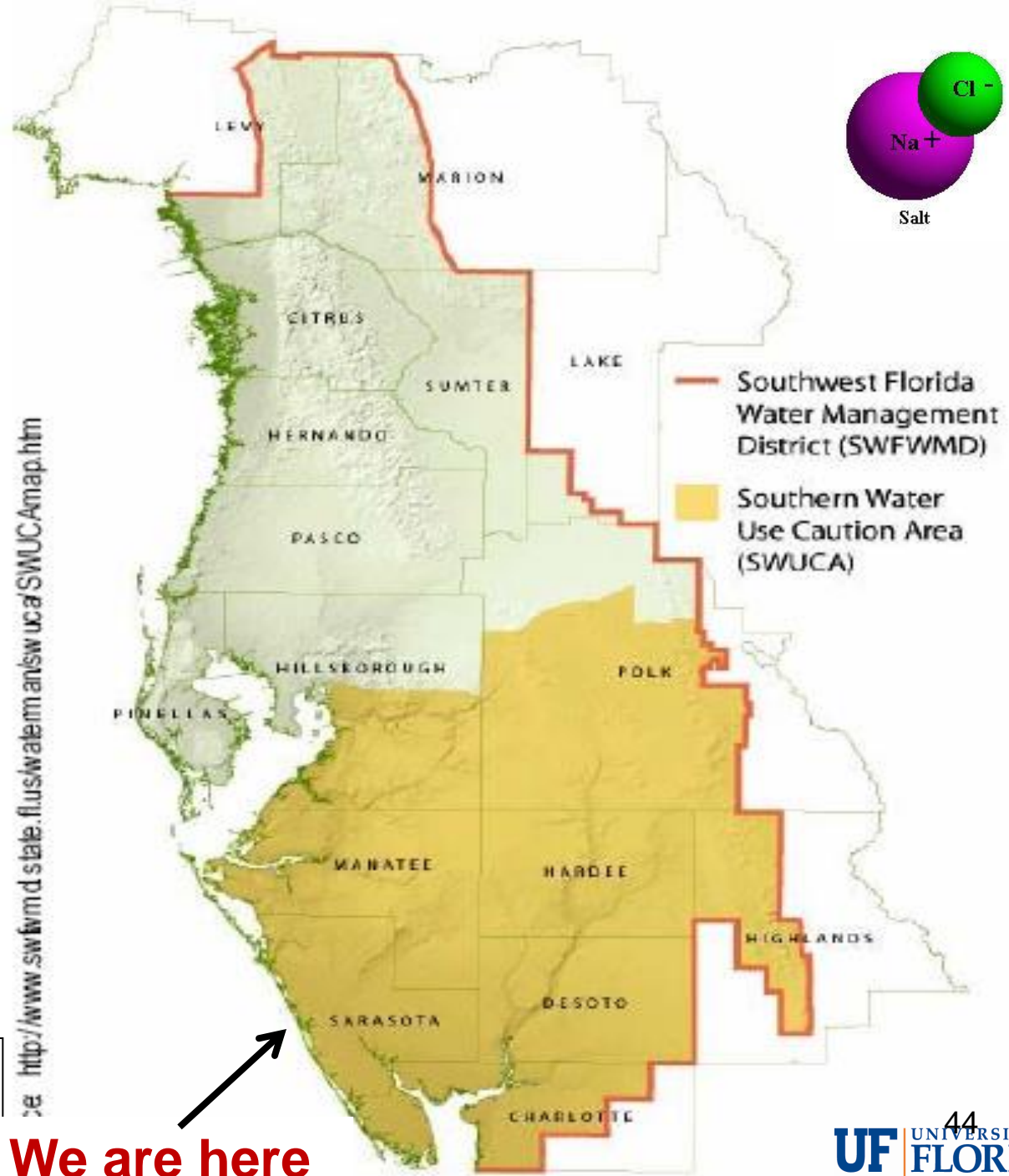
Average water use for **CABBAGE** in inches/day.

| Month | Small plants                     |   | Growing plants |   |      |   |      |   | Head development |    |    |    |
|-------|----------------------------------|---|----------------|---|------|---|------|---|------------------|----|----|----|
| Aug   | 0.05                             |   | 0.07           |   |      |   |      |   |                  |    |    |    |
| Sep   | 0.04                             |   | 0.06           |   | 0.09 |   | 0.12 |   |                  |    |    |    |
| Oct   | 0.02                             |   | 0.05           |   | 0.08 |   | 0.10 |   | 0.11             |    |    |    |
| Nov   | 0.02                             |   | 0.04           |   | 0.06 |   | 0.08 |   | 0.08             |    |    |    |
| Dec   | 0.01                             |   | 0.03           |   | 0.04 |   | 0.06 |   | 0.06             |    |    |    |
| Jan   | 0.01                             |   | 0.03           |   | 0.04 |   | 0.06 |   | 0.06             |    |    |    |
| Feb   | 0.02                             |   | 0.04           |   | 0.06 |   | 0.08 |   | 0.09             |    |    |    |
| Mar   | 0.02                             |   | 0.06           |   | 0.09 |   | 0.11 |   | 0.13             |    |    |    |
| Apr   |                                  |   |                |   | 0.10 |   | 0.14 |   | 0.16             |    |    |    |
| May   |                                  |   |                |   |      |   |      |   | 0.18             |    |    |    |
|       | 1                                | 2 | 3              | 4 | 5    | 6 | 7    | 8 | 9                | 10 | 11 | 12 |
|       | Approximate weeks after planting |   |                |   |      |   |      |   |                  |    |    |    |

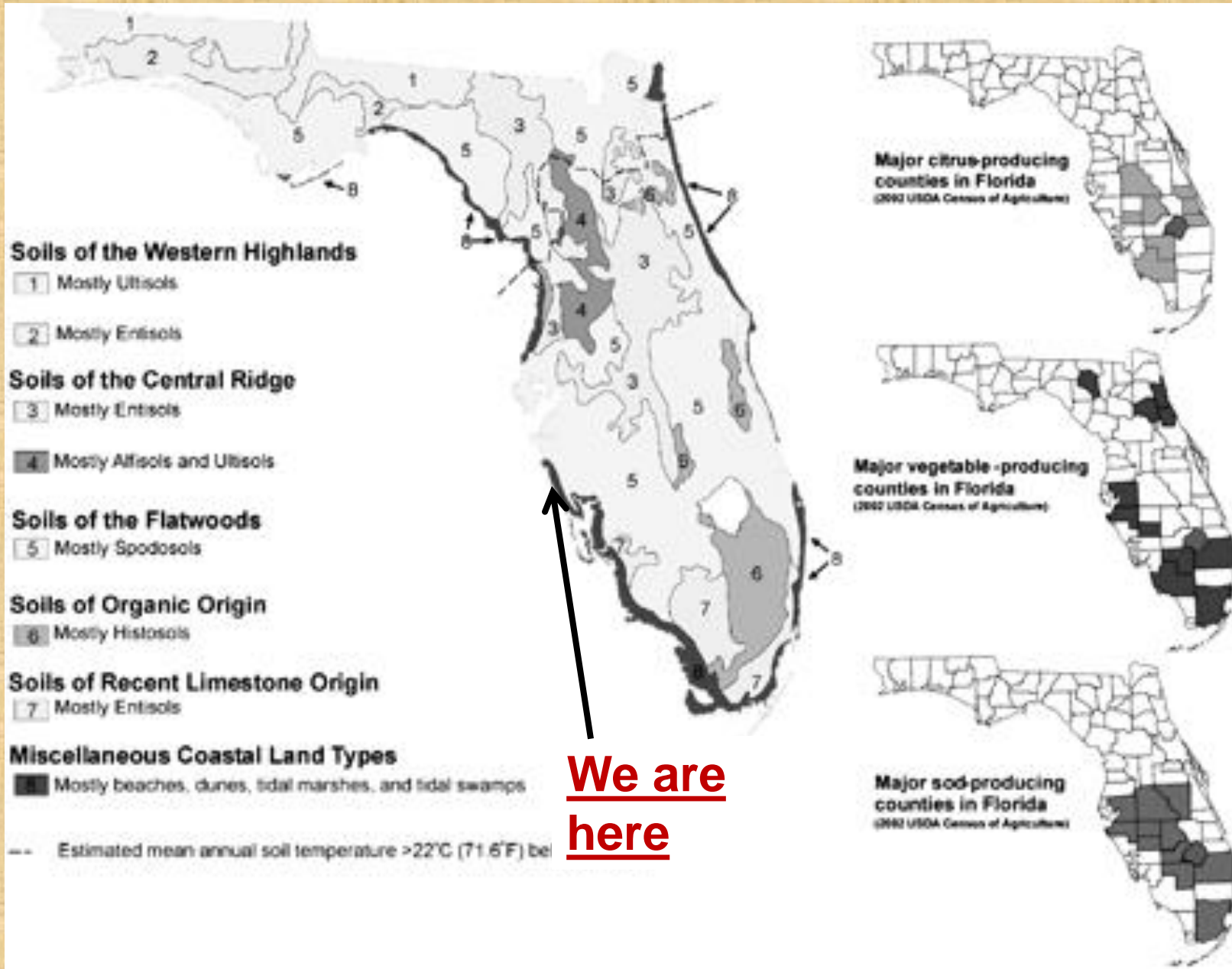
# Water: Quality

## Southern Water Use Caution Area Salt Water Intrusion

[http://www.chastainskillman.com/downloads/articles/SWUCA\\_II.pdf](http://www.chastainskillman.com/downloads/articles/SWUCA_II.pdf)

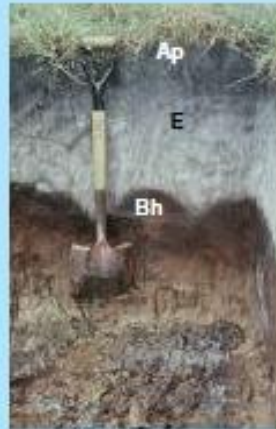


# Soils: Types & Distribution Map



# Overview of Florida Soils

- Very diverse array – sands, mucks, marl, and rock-plowed
- ALL used in horticulture
- Represent contrasting media for plant propagation
- Marked differences even among sandy soils
- Seven soil orders occur here



1. Spodosols:  
Well-expressed  
Bh



2. Entisols:  
Only A, E, Bw, or C  
Within 2 meters depth



3. Ultisols:  
Bt or Btg with low base  
status



4. Histosols:  
≥12% organic C  
to ≥40 cm depth



5. Alfisols:  
Bt or Btg with high base  
status



6. Mollisols:  
Thick dark A horizon  
with high base status  
throughout profile

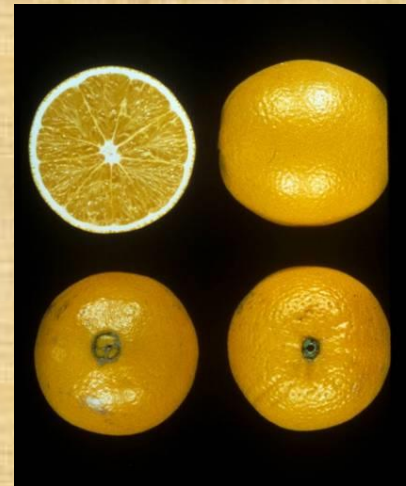
# Soils: Urban



- Urban soils range from slightly disturbed to completely man-made.
- Sand, gravel & clay are mined and used as important materials for many purposes, such as constructing foundations, leveling, filling, shaping, draining & compacting building sites
- Urban soils present unique challenges to horticulturalists, landscape architects, engineers and urban planners.

# Crops: Types

- A wide variety of foods can be grown in SW Florida
- You need to be aware of limitations
  - Varieties
  - Diseases
  - Insects
  - Climate
  - Soil



**Fruits**



**Herbs**



**Vegetables**



# Crops: Vegetable Categories for SW Florida

- Temperate



Broccoli

- Subtropical

Sweet Potato



- Tropical



Amaranth

# Crops: Fruit Categories for SW Florida

- Temperate



- Subtropical



- Tropical



<http://trec.ifas.ufl.edu/fruitscapes/>

# Crops: Herb Categories for SW Florida

- Temperate



Comfrey

- Subtropical

Sweet Basil



- Tropical



Chinese Chives 51

# Crops: Edible, Native & Cut Flowers

- Expand your crop list to include flowers

- Sunflower
- Celosia
- Zinnia
- Snapdragon
- Nasturtium
- Sweet pea
- Coreopsis
- Black-eyed



Susan

<http://solutionsforyourlife.ufl.edu/lawn-and-garden/flowering-plants/>

# Crops: Edible Natives for SW Florida

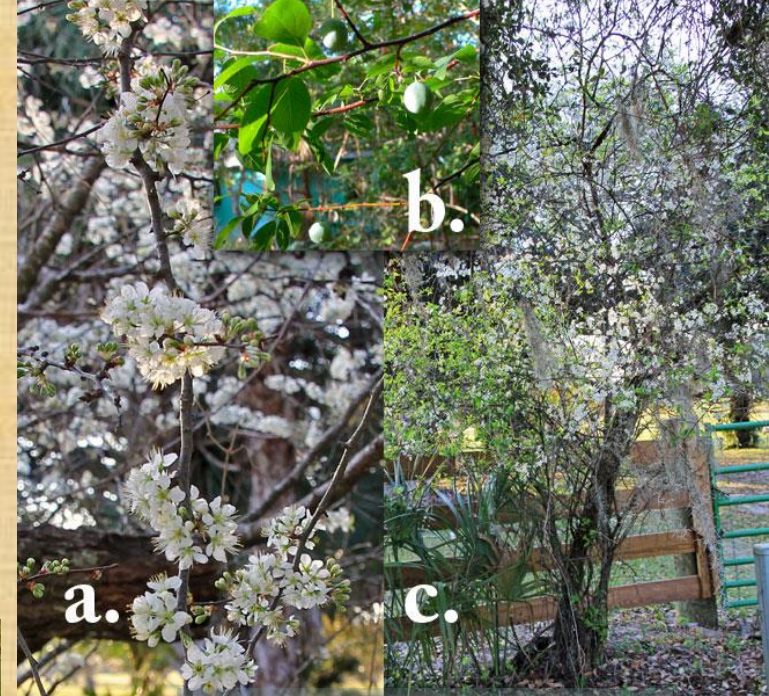
**Elderberry**



<http://gardeningolutions.ifas.ufl.edu/plants/ornamentals/native-plants.html>



**Red Mulberry**



**Plum Flatwoods**

<http://nbbd.com/edibleplants/>

**American Persimmon**

# 2013 National Survey of Urban Ag Commercial Farms Profile

## “Crops”

<https://attra.ncat.org/attra-pub/summaries/summary.php?pub=558>

*Table 5: Types of Production on Urban Farms, 2013  
National Survey of Urban Farms*

| Percentage of Farm's Total Production                                                 | Mean | St Dev | Range |
|---------------------------------------------------------------------------------------|------|--------|-------|
| Fresh vegetables                                                                      | 67.5 | 33.8   | 0-100 |
| Nursery items (including plants, mushrooms, herbs, and flowers)                       | 8.2  | 19.0   | 0-100 |
| Fresh fruits                                                                          | 8.1  | 14.8   | 0-100 |
| Meat & poultry                                                                        | 5.5  | 18.0   | 0-100 |
| Value-added food products (e.g., processed and prepared food, baked goods, preserves) | 2.8  | 8.6    | 0-98  |
| Milk & dairy                                                                          | 1.9  | 11.3   | 0-100 |
| Honey                                                                                 | 1.7  | 6.6    | 0-80  |
| Fish                                                                                  | 0.2  | 2.4    | 0-40  |

N=284

# Crop Production: Urban Agroecology

## Concept of Biodiversity

### Diversifying Cropping Systems



# Crop Production: Diversification

## - Benefits -

- Increased resource efficiency
  - nutrients, water, space, equipment, etc
- Crop synergisms
  - e.g., enhanced pest and disease control
- Expanded growing and harvest seasons
- Exploit profitable niche markets
- Reduced risks of production
- Promote local ag economic development
- Enhanced agroecosystem sustainability



# Crop Production: Diversification

## - Challenges -

- Market development. Expect to conduct substantial research.
- Information on varietal performance, best management practices and post-harvest handling and storage may be hard to find.
- Seed selection may be limited and plant establishment may be difficult.
- Pest management information for alternative crops may not be available.
- A need to modify or replace equipment. Consider that hand labor may occasionally be the only viable option.

# Crop Production: Diversification

## - Challenges -

- Harvesting, post-harvest handling and storage considerations, with possible additional costs.
- Locating local businesses and infrastructure for handling, transporting, processing, storing and marketing.
- Price swings for alternative crops.
- Contracts. Sometimes contracts are not available for alternative crops every year – or at all.

# Crop Production: Diversified Production Examples



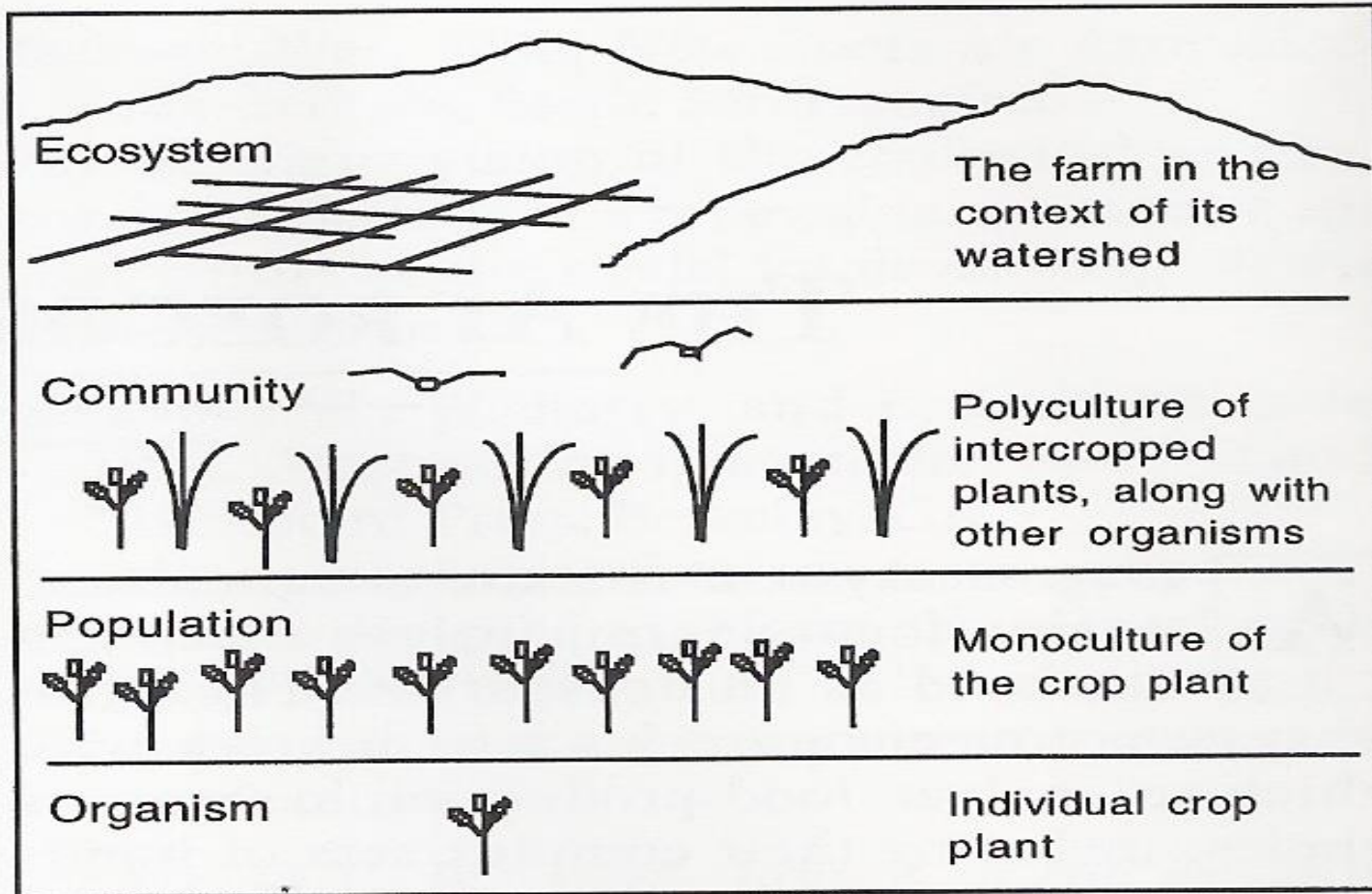
**Strip Cropping of Vegetables**



**Permaculture**

# Crop Production: Urban Agroecology

## Concept of “Hierarchical Scale”



✓ Crop diversification can be applied at various scales

# Crop Production: Urban Agroecology

## Concept of “Succession”

### Early Stages

1. Bare soil



2. Annual monoculture



3. Annual polyculture



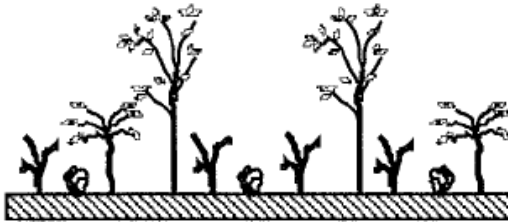
4. Polyculture of mixed annuals and short-lived perennials



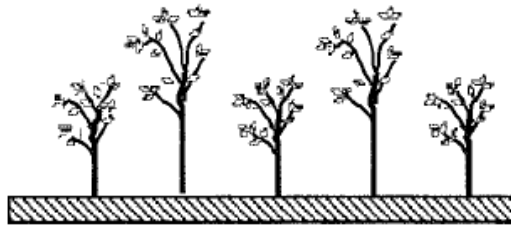
5. Annual/perennial polyculture with tree seedlings



6. Agroforestry



7. Tree crop agroecosystem



### Late Stages

### Example Techniques:

- agroforestry,
- interplanting
- rotational cropping



✓ Mimick natural ecosystems for enhanced stability.

THANK YOU . . .



# WAIT ! Preparations for Next Class

- Read 'Start a Farm in the City: Change Your Community by Growing What You Eat' – see <https://attra.ncat.org/attra-pub/download.php?id=21>
- Watch the short video “Urban agroecology” – see [https://www.youtube.com/watch?v=ODo\\_d69xd0Y](https://www.youtube.com/watch?v=ODo_d69xd0Y)
- Download free manual “Building a Sustainable Business” - see <http://www.sare.org/Learning-Center/Books/Building-a-Sustainable-Business>
  - read pp. 19-25 and complete Task One
  - read pp. 97-103 and complete Task Three

# Crops: Variety Information

- ✓ EDIS Publications – see <http://edis.ifas.ufl.edu/>
- ✓ UF/IFAS Research & Education Centers: Food Crop Trials Reports & Publications – see <http://solutionsforyourlife.ufl.edu/map/index.html>





# Crops: UF/IFAS Online Newsletters

- **“Vegetarian Newsletter”**
  - A Vegetable Crops Extension Publication by UF Horticultural Sciences Department
  - See <http://hos.ufl.edu/newsletters/vegetarian>
- **“Extension Berry/Vegetable Times”**
  - By UF/IFAS Gulf Coast Research and Education Center at Balm - see <http://strawberry.ifas.ufl.edu/BerryTimes/BVTNewsletters.htm>
- **“South Florida Vegetable Pest and Disease Hotline”**
  - By Hendry County Extension Office
  - See [http://hendry.ifas.ufl.edu/agriculture/sw\\_fl\\_pest\\_hotline/index.shtml](http://hendry.ifas.ufl.edu/agriculture/sw_fl_pest_hotline/index.shtml)

# UF/IFAS Crop Production Guides

- **Vegetable Production Handbook – see**  
[http://edis.ifas.ufl.edu/topic\\_vph](http://edis.ifas.ufl.edu/topic_vph)
- Florida Vegetable Gardening Guide – see  
<http://edis.ifas.ufl.edu/pdf/vh/vh02100.pdf>
- **Organic Vegetable Gardening in FL – see**  
<http://edis.ifas.ufl.edu/hs1215>
- Edible Landscaping – see <http://edis.ifas.ufl.edu/ep146>
- **Fruits, Vegetables and Herbs – see**  
<http://solutionsforyourlife.ufl.edu/lawn-and-garden/fruits-vegetables-and-herbs/>
- Manual of Minor Vegetables – see  
[http://edis.ifas.ufl.edu/topic\\_minor\\_vegetables](http://edis.ifas.ufl.edu/topic_minor_vegetables)
- **Aquaponics – see**  
[http://orange.ifas.ufl.edu/uf\\_workshop/pdf/HS125200.pdf](http://orange.ifas.ufl.edu/uf_workshop/pdf/HS125200.pdf)
- Hydroponics – see  
<http://smallfarms.ifas.ufl.edu/crops/hydroponics/index.html>

# Crops: Variety Seed Sources

- **Seed Company Examples**

- **SE USA Region**

- E.O.N.S. (<http://www.eonseed.com/>)
- FL Tomato Growers Supply Company (<http://www.tomatogrowers.com/>)
- Southern Exposure Seed Exchange (<http://www.southernexposure.com/index.html>)
- E.C.H.O. (<http://www.echonet.org/>)

- **USA Region**

- Seed Savers Exchange (<http://www.seedsavers.org/>)
- Johnny's Selected Seeds (<http://www.johnnyseeds.com/default.aspx>)
- High Mowing Seeds (<http://www.seedsofchange.com/default.aspx>)

# References and Resources

- ATTRA. Urban and Community Agriculture – see [https://attra.ncat.org/attra-pub/local\\_food/urban\\_ag.html](https://attra.ncat.org/attra-pub/local_food/urban_ag.html)
- Bailkey, M. and J. Nasr. 1999. From Brownfields to Greenfields: Producing Food in North American Cities – see <http://alivebynature.com/uploads/BrownfieldsArticle-CFSNewsFallWinter1999.pdf>
- Bellows, A., K. Brown, J. Smit. 2004. Health Benefits of Urban Agriculture – see <https://community-wealth.org/content/health-benefits-urban-agriculture>
- Byczynski, L. 2006. Market Farming Success: Resources – see <https://www.growingformarket.com/articles/market-farming-success-resources/print>
- Cornell Small Farms Program. Rooftop Gardening – see <http://smallfarms.cornell.edu/2017/05/02/13-roof-top-gardening/>
- eXtension. Urban Agriculture – see <http://articles.extension.org/pages/71005/urban-agriculture>

# References and Resources

- Gliessman, S. 2015. Agroecology: The Ecology of Sustainable Food Systems. CRC Press
- International Network for Urban Agriculture – see <https://www.inuag.org/>
- Johns Hopkins Center For A Livable Future.
  - Ecological and Urban Farming – see <http://www.foodsystemprimer.org/food-production/ecological-and-urban-agriculture/index.html>
  - Food Policy Networks– see <http://www.foodpolicynetworks.org/>
- Montenegro, M. 2013. ‘Urban Agroecology: A Lighthouse of Sustainability’ – see [http://www.earthisland.org/journal/index.php/elist/eListRead/urban\\_agroecology\\_a\\_lighthouse\\_of\\_sustainability/](http://www.earthisland.org/journal/index.php/elist/eListRead/urban_agroecology_a_lighthouse_of_sustainability/)
- Lee, A. and P. Foreman. 1993. Backyard Market Gardening: the Entrepreneur's Guide to Selling What You Grow.

# References and Resources

- RUAF Foundation – Urban Agriculture Distance Learning Course – see <http://www.ruaf.org/distance-learning-courses>
- Smit, J. 2001. Urban Agriculture: Food, Jobs, and Sustainable Cities – see <http://jacsmi.com/book.html>
- U.N. - FAO. International Symposium on Agroecology for Food Security and Nutrition – see <http://www.fao.org/about/meetings/afns/en/>
- UNESCO. Sustainable Agriculture: Teaching and Learning for a Sustainable Future – see [http://www.unesco.org/education/tlsf/mods/theme\\_c/mod15.html](http://www.unesco.org/education/tlsf/mods/theme_c/mod15.html)
- Urban Agroecology – see <http://www.urban-agroecology.org/>
- USDA Urban Agriculture Toolkit – see <https://www.usda.gov/sites/default/files/documents/urban-agriculture-toolkit.pdf>
- USDA National Agricultural Library. Urban Agriculture – see<sup>70</sup> [https://pubs.nal.usda.gov/sites/pubs.nal.usda.gov/files/urban\\_0.htm](https://pubs.nal.usda.gov/sites/pubs.nal.usda.gov/files/urban_0.htm)

# Video/Webinar/Podcasts Resources

- Agroecology In Action. Urban Agroecology – see [https://www.youtube.com/watch?v=ODo\\_d69xd0Y](https://www.youtube.com/watch?v=ODo_d69xd0Y)
- ATTRA.
  - Urban Farms: Commercial Farms or Socially Minded Operations? – see <https://www.youtube.com/watch?v=fzXS9zJKnBU&feature=youtu.be>
  - Managing Risks on an Urban Farm – see <https://www.youtube.com/watch?v=dkX5YSDXxY0&feature=youtu.be>
- Audiopedia. What Is Agroecology? – see <https://www.youtube.com/watch?v=hqRt7Yviyro>
- Cooking Up A Story. An Urban Farmer in the City – see <https://cookingupastory.com/an-urban-farmer-in-the-city>
- Couple Thinkers. Kimbal Musk: Can real food feed the world? – see <https://www.youtube.com/watch?v=ILbs8SHnHZM>

# Video/Webinar/Podcasts Resources

- Food Abundance. Urban Agroecology: 6,000 lbs of food on 1/10th acre - Urban Homestead - Urban Permaculture – see <https://www.youtube.com/watch?v=NCmTJkZy0rM>
- Olivier de Schutter: What is agroecological farming? And why should it be upscaled? – see <https://www.youtube.com/watch?v=938PECAJ920>
- PBS. Urban Farming: America Revealed – see <https://www.youtube.com/watch?v=kEPs3Ta-6eg>
- Prairie Farm Report. See How Urban Farming Works – see <https://www.youtube.com/watch?v=FoJCUAXQBmE>
- Permaculture Urban Farming – see <https://www.youtube.com/playlist?list=PLEgB--CmfB1V5hKTRS1xyPjpts3F4cpwl>
- Sustainable Farming through Agroecology – see <https://www.youtube.com/watch?v=ObffHbRuJgc>



# Video/Webinar/Podcast Resources

- Mother Earth News Podcasts. Writing Urban Ag Policy – see <https://www.motherearthnews.com/podcast/urban-ag-policy-zepz1711zcbu>
- NPR. Stories of Urban Farming – see [https://www.frontiersin.org/files/Articles/218353/fpls-07-01386-HTML-r2/image\\_m/fpls-07-01386-g001.jpg](https://www.frontiersin.org/files/Articles/218353/fpls-07-01386-HTML-r2/image_m/fpls-07-01386-g001.jpg)
- Ted Talks. Ron Finley: A Guerilla Gardener in South Central L.A. – see [https://www.ted.com/talks/ron\\_finley\\_a\\_guerilla\\_gardener\\_in\\_south\\_central\\_la](https://www.ted.com/talks/ron_finley_a_guerilla_gardener_in_south_central_la)
  - The urban agriculture revolution | David Gingera – see <https://www.youtube.com/watch?v=oH1fcCiaT20>
- The Good Stuff. Why We Should Be Urban Farming – see <https://www.youtube.com/watch?v=XaEKJ5Vv3Zg>
- Urban Agriculture Podcasts – see <http://www.microbe.tv/urbanag/>
- Why is agroecology the solution to hunger and food security – see <https://www.youtube.com/watch?v=2yFvD8wuLmU>