# Aquaponics: a primer for producers

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North Central Aquaculture Conference Feb 23, 2014 Toledo, OH

### **Environmental Pollution**





# Recirculating Aquaculture



# University of the Virgin Islands



#### **Kentucky Aquaponics**





**Kentucky State University** 

# Lethbridge College



### What is Aquaponics?

- Not Just Hydroponics plus Aquaculture
- Balanced or De-Coupled
- Commercial or Smaller
- Don't ask the Regulators or Inspectors! Educate them.
- Associations
- Certification
- Is it Organic?

# Development of a Mature Ecosystem

Aquaponics vs. hydroponics Yield 2003 Aquaponics Hydroponics 80 70 60 Yield, kg/m<sup>2</sup> **50** 40 30 20 10 0 **Tomatoes** Cucumbers

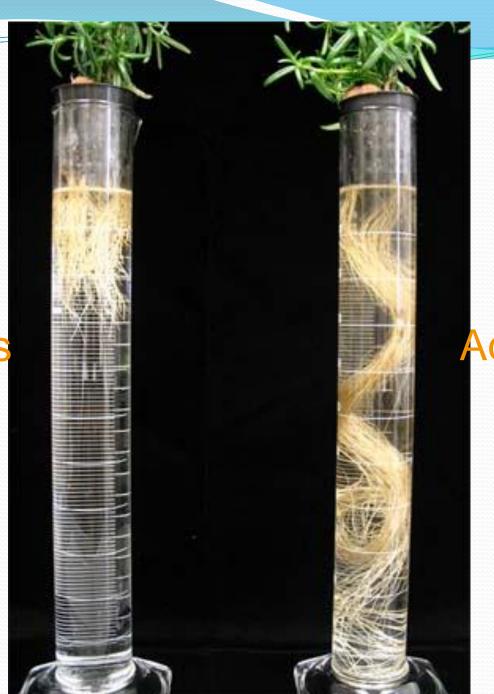
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**Tomatoes** 

Cucumbers

# Rosemary roots

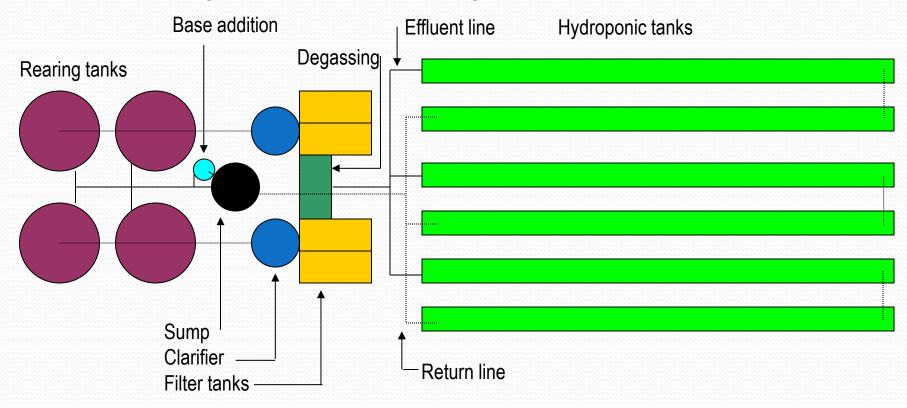
**Hydroponics** 



Aquaponics

# Balanced Aquaponic Systems

# UVI System Layout



Total water volume - 29,000 gallons Land area - 1/8 acre 2,300 ft2 plant area



# Keep Feed Input Relatively Constant

- Provides a constant level of nutrients for plant growth
- Two methods:
- (1) Multiple rearing tanks and staggered production Example: UVI system, 4 rearing tanks, 24-week production cycle, one tank harvested every 6 weeks, feed input decreases ~80% in harvested tank, feed input to system decreases 25-30% at harvest

Advantages: saves labor, good control of stock Disadvantages: wasted space, higher capital cost



#### Keep Feed Input Relatively Constant

 (2) A single rearing tank with multiple size groups of fish (sequential rearing):

Example: 6-month production cycle, 6 size groups, monthly harvest of large fish with grader, restock equal number of fingerlings

Advantage: conserves space, reduces capital costs

Disadvantage: increases labor costs, increases mortality, disrupts feeding, stunted fish accumulate



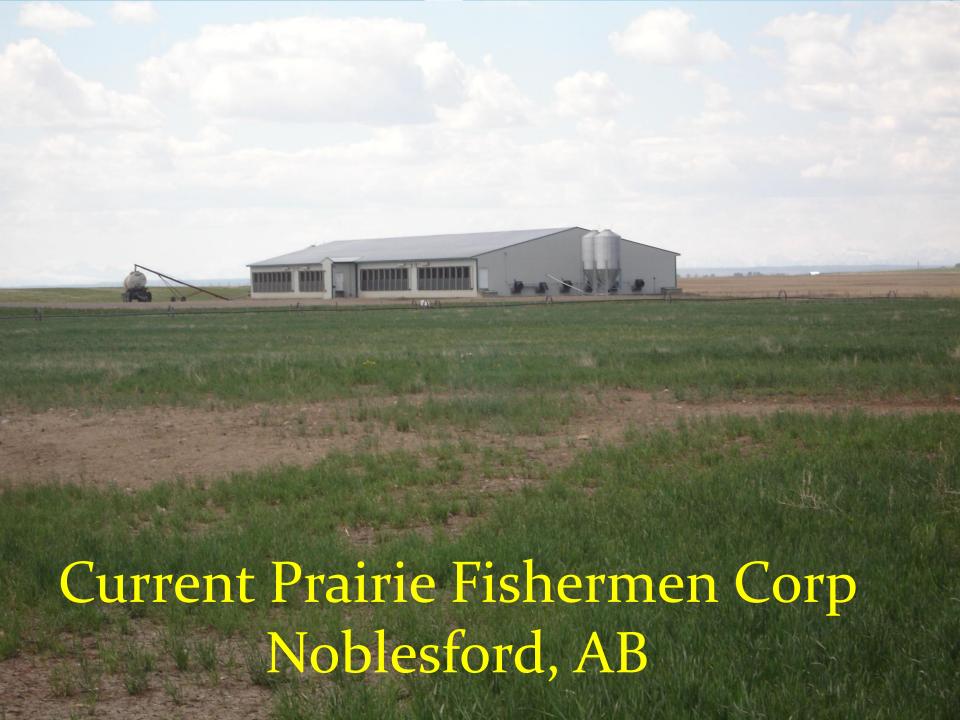


# De-coupled Aquaponic Systems

# Lethbridge College



Alberta, Canada



#### Education

- Conferences
- Specialized Courses
- Internet
- Books
- Extension specialists
- Internships
- University

### Marketing the Story

- Tell the Positive Attributes
- Ecotourism
- Niche Crop Mix
- Do Your Market Homework First!

# It's a Great Story!





# Which species of fish?





# Sludge Management

Discharge it

Mineralize it (zero-discharge)





# System Design

- NFT
- Media
- Deep Water Culture
- Aeroponics
- Hybrid

# Nutrient Film Technique (NFT)





# Media Based Systems





# Deep Water Raft Culture (DWT)





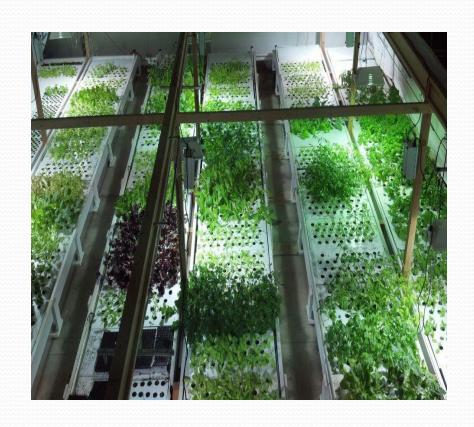
### Controlled Environment Option





#### **Urban Aquaponics**

Aquagrowers (Livonia, MI) Foodchain (Lexington, KY)





#### Fish, Plant and Human Health

- Non-approved inputs NOT allowed
- IPM and Biological Controls for Plant Pest Management
- Best Husbandry Practices and Quality Diet for Fish
- Maintain optimal WQ conditions for both fish and plants
- Food Safety must be addressed

#### Vendors

- Supplies
- Courses
- Fish
- Plants
- Pest Control
- Greenhouse
- Heat/Cooling
- Lighting
- Processing/Marketing
- Beware of the Aquashyster!

# Are You Making Money?

- Economies of Scale
- Analyze Financial Statements
- Do an Energy Audit
- You Don't Make Money Growing Fish and Plants...
- You Make Money SELLING them!

# Questions?



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