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For more information on Small Farms, visit our website at: http://smallfarms.ifas.ufl.edu/ or contact your local County Extension Agent.

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*Suggested Citation:* Author Full Name. Title of Presentation or Handout. 2013 University of Florida-IFAS and Florida Agricultural and Mechanical University-CAFS Florida Small Farms and Alternative Enterprises Conference. August 2-4, Kissimmee, FL.
AQUAPONICS
a field guide to be profitable

By
JORGE PANG
Director of Aquaponics
Selovita, LLC
Aquaponics

DEFINITIONS
What is Aquaponics?

• Is the happy marriage between aquaculture and hydroponics
What is Aquaponics?

- is a sustainable food production system that combines conventional aquaculture, (raising aquatic animals such as snails, fish, crayfish or prawns in tanks), with hydroponics (cultivating plants in water) in a symbiotic environment.
What is Aquaponics?

Aquaponics is a method of growing plants and raising fish in an integrated system. The fish provide waste products such as ammonia and nitrites, which are used as nutrients for the plants. The plants then turn these nutrients into nitrate, which is then absorbed by the fish. This process creates a self-sustaining system that reduces the need for synthetic fertilizers and chemical treatments.

Key components of an aquaponics system include:
- Fish tank
- Grow bed
- Nitrogen cycle (Nitrosomonas, Nitrobacter, Nitrosospira)
- Light source
- Water circulation system
- Ammonia treatment

The diagram illustrates the flow of nutrients and waste between the fish and plants, demonstrating the symbiotic relationship in an aquaponic system.
• Aquaculture, also known as aquafarming, is the farming of aquatic organisms such as fish, crustaceans, mollusks and aquatic plants. Both, freshwater and saltwater.
Why Aquaculture vs Fisheries

AAARGH!
RED TIDE!
WHAT COULD POSSIBLY BE WORSE?

OH, SEA LICE,
MERCUERY,
BOTTOM TRAWLERS,
FISH FARM POLLUTION...
What is Hydroponics?

- The process of growing plants in sand, gravel, inert media or liquid, with added nutrients but without soil.
Why Aquaponics?

- SAVES 95% of the water required by in-ground growing,
- Grows Vegetables and Fruits faster,
- No need to water,
- No need to weed,
- No need for pesticides, fertilizers, herbicides or fungicides,
- No need for antibiotics or hormones,
- Aquaponic Systems can be used in very cold or very hot climates,
- Most systems pay for themselves in about three years,
- Maintenance is minimal,
- These systems ARE portable,
- The systems can produce YEAR-ROUND vegetables, fruits and fish,
- The entire system can be Solar-Powered and Completely Automated.
What Can I Grow?

• Lettuce
What Can I Grow?

- Tomatoes
What Can I Grow?

- Basil
What Can I Grow?

- Strawberries
What Can I Grow?

- Leafy Greens,
- Herbs,
- Medicinal Herbs,
- Squash,
- Peas,
- Cabbages,
- Eggplant,
- Zucchini,
- Kale,
- Brussels sprouts,
- Peppers,
- Broccoli,
- Spinach,
- Cauliflower,
- Beets,
- Green onion,
- Garlic,
What Can I Grow?

- Tilapia
What Can I Grow?

• Koi
What Can I Grow?

- Aquarium species

![Fresh Water Fish]

- Angelfish
- Half Black Angelfish
- Black Veil Tail Angelfish
- Glasscat
- Wakin Goldfish
- Black Ranchu Goldfish
- Small Red Goldfish
- Calico Goldfish
- Black Wakin Goldfish
- Blue Glass Guppy
- Red Mosaic Guppy
- Neonteta
- Black Neonteta
- Glowlight Neonteta
- Green Neonteta
What Can I Grow?

- Peacock Bass
What Can I Grow?

- Sturgeon
- Carps
- Catfish
- Trout
- Salmon
- Bream
- Eel
What Can I Grow?

- Freshwater Shrimp
What Can I Grow?

• Crawfish
How Much Does It Cost?

• Depends on what do you want to do?
  – Hobby systems starts at $50,
  – To support a family of 4-5 start at $8,000,
  – Commercial systems start at $300,000.
Hobby System
Commercial System
What Do I Need To Get Started?

• Before you start, ask yourself this questions?
  – Do you LOVE working with animals and/or plants?
  – Do you REALLY care for the environment?
  – Do you LOVE working hard?

If you answered NO to one of this questions, then Aquaponics is not for you.

If you answered YES to all.......
What Do I Need To Get Started?
What is your USP?

• Unique
• Selling
• Proposition
• You should be able to convince the buyer why he/she should buy from you
### Organic vs Non-Organic

<table>
<thead>
<tr>
<th></th>
<th>Organic</th>
<th>Nonorganic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics</td>
<td>❌</td>
<td>✔</td>
</tr>
<tr>
<td>Growth Hormones</td>
<td>❌</td>
<td>✔</td>
</tr>
<tr>
<td>Preservatives</td>
<td>❌</td>
<td>✔</td>
</tr>
<tr>
<td>Cloning</td>
<td>❌</td>
<td>✔</td>
</tr>
<tr>
<td>Genetic Modification</td>
<td>❌</td>
<td>✔</td>
</tr>
<tr>
<td>Environmentally Friendly</td>
<td>✔</td>
<td>❌</td>
</tr>
<tr>
<td>Consistent Quality</td>
<td>✔</td>
<td>❌</td>
</tr>
</tbody>
</table>
## EWG’s Shopper’s Guide to Pesticides in Produce

<table>
<thead>
<tr>
<th>Dirty Dozen</th>
<th>Buy these organic</th>
<th>Clean 15</th>
<th>Lowest in Pesticide</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Apples</td>
<td>1</td>
<td>Onions</td>
</tr>
<tr>
<td>2</td>
<td>Celery</td>
<td>2</td>
<td>Sweet Corn</td>
</tr>
<tr>
<td>3</td>
<td>Strawberries</td>
<td>3</td>
<td>Pineapples</td>
</tr>
<tr>
<td>4</td>
<td>Peaches</td>
<td>4</td>
<td>Avocado</td>
</tr>
<tr>
<td>5</td>
<td>Spinach</td>
<td>5</td>
<td>Asparagus</td>
</tr>
<tr>
<td>6</td>
<td>Nectarines – imported</td>
<td>6</td>
<td>Sweet peas</td>
</tr>
<tr>
<td>7</td>
<td>Grapes – imported</td>
<td>7</td>
<td>Mangoes</td>
</tr>
<tr>
<td>8</td>
<td>Sweet bell peppers</td>
<td>8</td>
<td>Eggplant</td>
</tr>
<tr>
<td>9</td>
<td>Potatoes</td>
<td>9</td>
<td>Cantaloupe – domestic</td>
</tr>
<tr>
<td>10</td>
<td>Blueberries – domestic</td>
<td>10</td>
<td>Kiwi</td>
</tr>
<tr>
<td>11</td>
<td>Lettuce</td>
<td>11</td>
<td>Cabbage</td>
</tr>
<tr>
<td>12</td>
<td>Kale/collard greens</td>
<td>12</td>
<td>Watermelon</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sweet potatoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Grapefruit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mushrooms</td>
</tr>
<tr>
<td>Product</td>
<td>Average Price Non-organic</td>
<td>Average Price Organic</td>
<td>Percent Difference for Organic</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------</td>
<td>-----------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td><strong>Dairy and Eggs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yogurt</td>
<td>$0.06/oz.</td>
<td>$0.13/oz.</td>
<td>117%</td>
</tr>
<tr>
<td>Milk</td>
<td>$3.79/gal.</td>
<td>$7.26/gal.</td>
<td>94%</td>
</tr>
<tr>
<td>Cheddar Cheese</td>
<td>$0.26/oz.</td>
<td>$0.57/oz.</td>
<td>104%</td>
</tr>
<tr>
<td>Eggs</td>
<td>$2.59/doz.</td>
<td>$4.18/doz.</td>
<td>61%</td>
</tr>
<tr>
<td><strong>Grain Products</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oatmeal</td>
<td>$0.17/oz.</td>
<td>$0.16/oz.</td>
<td>-5%</td>
</tr>
<tr>
<td>Cereal</td>
<td>$0.23/oz.</td>
<td>$0.25/oz.</td>
<td>9%</td>
</tr>
<tr>
<td>Brown Rice</td>
<td>$0.10/oz.</td>
<td>$0.09/oz.</td>
<td>-10%</td>
</tr>
<tr>
<td>Bread</td>
<td>$0.14/oz.</td>
<td>$0.17/oz.</td>
<td>21%</td>
</tr>
<tr>
<td><strong>Produce</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romaine Lettuce</td>
<td>$1.76/head</td>
<td>$3.54/head</td>
<td>99%</td>
</tr>
<tr>
<td>Carrots</td>
<td>$0.77/lb.</td>
<td>$1.51/lb.</td>
<td>96%</td>
</tr>
<tr>
<td>Bananas</td>
<td>$0.57/lb.</td>
<td>$0.89/lb.</td>
<td>56%</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>$2.82/lb.</td>
<td>$4.05/lb.</td>
<td>44%</td>
</tr>
<tr>
<td>Red Peppers</td>
<td>$2.76/lb.</td>
<td>$5.89/lb.</td>
<td>113%</td>
</tr>
<tr>
<td>Yellow Onion</td>
<td>$0.93/lb.</td>
<td>$1.57/lb.</td>
<td>69%</td>
</tr>
<tr>
<td>Apples</td>
<td>$1.57/lb.</td>
<td>$2.34/lb.</td>
<td>49%</td>
</tr>
<tr>
<td><strong>Protein Products</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanut Butter</td>
<td>$0.12/oz.</td>
<td>$0.27/oz.</td>
<td>125%</td>
</tr>
<tr>
<td>Tofu</td>
<td>$0.15/oz.</td>
<td>$0.19/oz.</td>
<td>27%</td>
</tr>
<tr>
<td>Frozen Chicken Breasts</td>
<td>$3.46/lb.</td>
<td>$5.07/lb.</td>
<td>47%</td>
</tr>
<tr>
<td>Beef Burgers</td>
<td>$3.58/lb.</td>
<td>$8.39/lb.</td>
<td>134%</td>
</tr>
<tr>
<td><strong>Other Products</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canned Tomatoes</td>
<td>$0.06/oz.</td>
<td>$0.14/oz.</td>
<td>133%</td>
</tr>
<tr>
<td>Grape Juice</td>
<td>$0.05/oz.</td>
<td>$0.07/oz.</td>
<td>40%</td>
</tr>
</tbody>
</table>

Melissa White Pillsbury is MOFGA's organic marketing coordinator. You can contact her at Melissa@mofga.org.
Organic Certification Agencies in Florida

- Quality Certification Services
- Americert International
“My grandfather used to say that once in your life you need a doctor, a lawyer, a policeman and a preacher, but every day, three times a day, you need a farmer.”

Brenda Schoepp
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