AQUAPONICS 101

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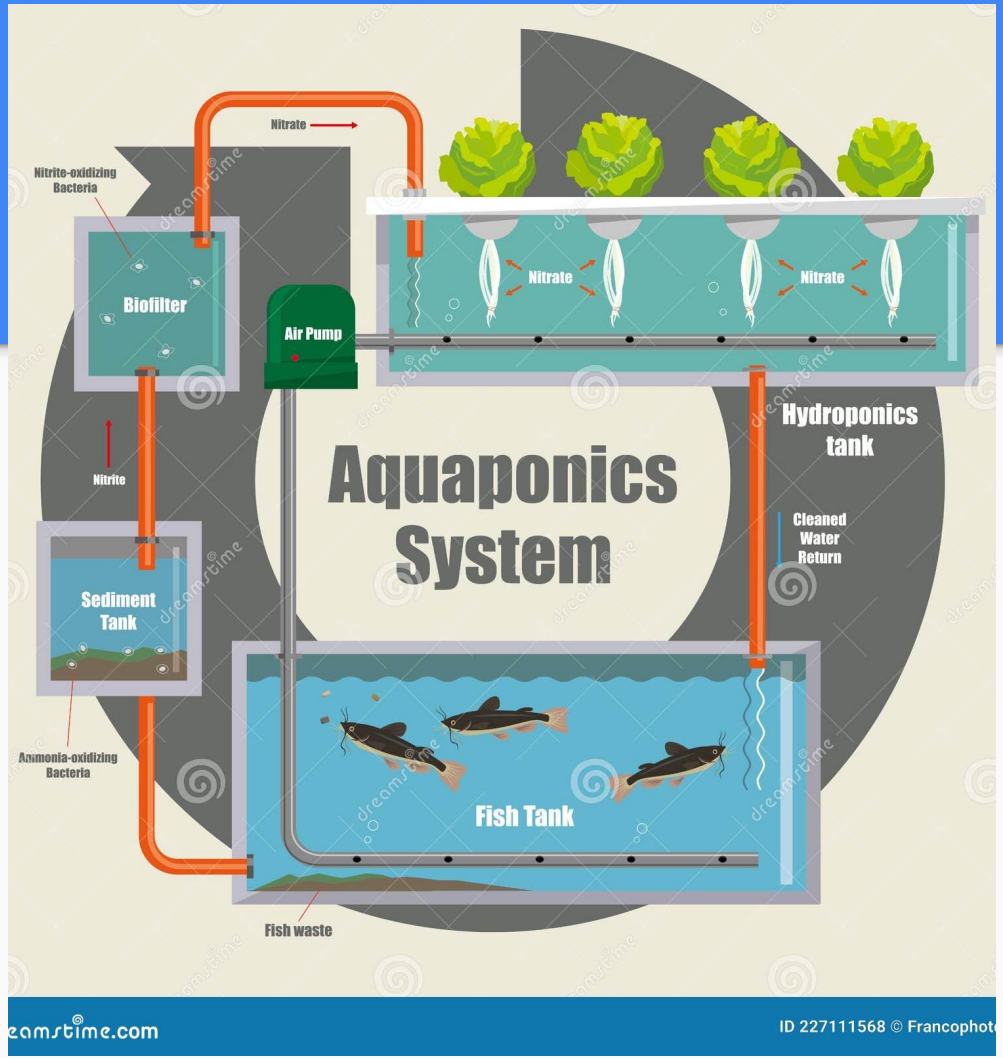
WHAT IS AQUAPONICS

Aquaponics is a sustainable farming method that combines aquaculture (raising fish) and hydroponics (growing plants without soil).

The synergy between fish and plants creates a self-sustaining ecosystem.

HOW IT WORKS

1. Fish are fed and produce ammonia-rich waste.
2. Beneficial bacteria convert ammonia into nitrites and then nitrates.
3. Nitrate-rich water is pumped into the grow beds.
4. Plants absorb nutrients from the water, acting as a natural filter.
5. Clean water is returned to the fish tank.



About Roothouse

- 100% Rainwater
- Natural Sunlight
- Supplemental Lighting
- Fresh Rural Air
- 8500 sq.ft.
- Certified Naturally Grown
- Ohio Proud
- Non-GMO from Feed to Seed
- IPM: Biological Controls Only
  - Beneficial Insects
  - Natural Controls
- Supplement ONLY for pH and Iron

- ~2,300 Nile Tilapia
  - Grown to AVG 2.5#s in 9 Months
  - Purge for 5-7 Days
  - Sold Whole On-Ice or Live
  - Manually Fed 3-5x Per Day
  - Interested In Precise Feed Automation
  - Now Dark/Blue Tilapia Only
- Roughly 12,000 Plants at Any Given time

SYSTEM COMPONENTS

Fish Tanks

- Appropriate tanks for chosen species

Biological Filtration

- Solids Separator
- Mineralization Tanks
- Bio Reactor
- Degassing

Grow Areas

- Deep Water Culture / Raft Culture
- Media Beds / Living Filter
- Bato / Dutch Bucket
- Fertigation

Sump Tank

- Lowest Point In System
- Pumps Return Water to Fish Tanks

Temperature Exchanger

- Heater / Chiller Loop

Aeration

- In Fish Tanks, Degassing, Grow Areas

HEALTHY SYSTEM PRINCIPALS

WATER QUALITY - Backbone of Aquaponics

- pH, Temperature, D.O., Ammonia, Nitrite, Iron, Nitrate
- Full Spectrum Water Tests: All Macro & Micro Nutrients
- Maintain quality to meet the needs and allowable ranges of all 3 living elements - Plants, Fish, Bacteria

QUALITY INPUTS

- FISH
- Fish Feed
- IMP Treatments
- pH Adjusters
- Water Source
- Sunlight/Artificial

FISH & PLANTS

Fish Selection

- Always a tradeoff in AP
- Balancing for 3 Living Elements
- Tilapia are common for good reason
  - Hearty
  - High Feed to Weight Ratio
  - Wide range of allowable water parameters

Plant Selection

- What is your market
- What grows well in an AP system - Vegetative Greens
- Microgreens, Edible Flowers, Herbs, Lettuces

OTHER FOCUSES

Integrated Pest Management
- Fungal & Pests
- Develop Routine for common pests/funguses in your area
- CRITICAL - Fish Safe Only - Test if Necessary

GH CLIMATE CONTROL
- Temperature
- Relative Humidity
- Air Circulation
- Light

Biosecurity
- Hand Washing / Sanitizing
- Boot Mat
- Clean Clothes & Shoes
- System Cleanliness
- Sourcing Fish
- Maintain high standards for all things entering growing area - People, Plants, Pets, etc.

MORE FOCUSES

RECORD KEEPING (more is more)

- Fish feeding Data
- Stocking Data
- Seeding & Harvest Data
- Biosecurity / IPM Data
- Visitors Log

SCHEDULE ROUTINE TASKS

- Develop a Routine to be repeated for regular tasks
- Develop strong SOPs for each task in your operation - document and detail
- Things change often - refine and find more efficiencies - engineer equipment - update SOPs

BENEFITS OF AQUAPONICS

Benefits of Aquaponics

Sustainability

- Reduced water usage compared to traditional farming.
- No need for synthetic fertilizers.

Space Efficiency

- Ideal for urban environments and limited space.

Reduced Environmental Impact

- Zero Waste Output is easily achieved - leaving the surrounding environment with little to no negative impact

Better Food

- Healthier Produce
- No Harmful Chemicals
- Longer Shelf Life
- Typically No Need To Wash

Q&A