Emerging Sectors in BC:
Aquaponics

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What we will cover today...

1. Aquaculture in BC
2. Aquaculture Systems
3. Land-Based Recirculating Aquaculture Systems
4. Aquaponics Methods/Systems
5. Why Aquaponics Can Help Feed the World!

Source: Summerfelt/Superior Fresh
BC Seafood Production: 2017

Volume
Total – 279,400 Tonnes

- Groundfish: 41%
- Cultured Salmon: 32%
- Wild Salmon: 9%
- Herring: 8%
- Wild-Other: 0%
- Cultured-Other: 1%
- Wild Shellfish: 4%
- Tuna: 1%

Wholesale Value
Total - $1,748,700,000

- Cultured Salmon: 46%
- Wild Salmon: 12%
- Groundfish: 17%
- Herring: 9%
- Wild-Other: 0%
- Cultured-Other: 2%
- Wild Shellfish: 13%
- Tuna: 3%
Aquaculture Species

- Atlantic Salmon: $734
- Pacific Salmon: $44
- Clams: $14
- Oysters: $29
- Scallops & Mussels: $20
- Other: $30

Wholesale Value – 2017 – $871 M
A. Freshwater Cages
B. Land-based Systems
C. Bottom Culture/Enrichment-Intertidal
D. Long-line/Raft/Cage Culture-Subtidal
E. Bottom Culture-Subtidal
F. Sea Ranching
What is Aquaponics?

aquaculture
= growing animals (usually fish) in water

+ hydroponics
= growing plants in water (without soil)
Aquaponics grows 2 foods (fish and produce) with 1 input – fish food

1. Fish eat fish food and produce ammonia
2. Ammonia is transformed into nitrate by micro-organisms
3. Plants “eat” the nitrate (plant food) in the water

Source: http://aquaponyhof.de/aquaponics/
Land-Based Fish Farming
Distribution of B.C. Aquaculture Industry

Source: Taste of BC Aquafarms
Why Aquaponics

• Currently, agriculture uses 70% of freshwater resources, and food shortages are linked to water scarcity.¹

• Aquaponics uses a mere 10% of the water required by soil based agriculture and less water than hydroponic agriculture.²

• Based on population trends, world food demand will increase by 30% by 2050.

• Aquaponics can grow food almost anywhere since fertile soil is not a requirement and can produce a much higher yield (up to twice as fast as soil and higher densities per sq. ft. of land)


Source: Canadian Aquaponics (http://www.canadianaquaponics.com)
Why Aquaponics – Continued...

• Almost 80% of the world's fisheries are fully-exploited, over-exploited, depleted, or, in a state of collapse.
• Global demand for seafood will continue to rise and will require farming of fish and other seafood.
• Aquaponics provides a closed containment system that utilizes most of its residual nutrients and poses little to no impacts to wild fish stocks.
System Configuration

Recirculating Aquaponic System

1. Fish Tank
   Produces tasty fish and nutrient rich water

2. Pump
   Moves water up into grow beds

3. Gravity
   Returns clean and oxygenated water back to fish

4. Plants
   Take up nutrient and filter the water

Source: Mason Street Farms

Source: Urban Organics
Traditional System

University of the Virgin Islands

- Fish culture tanks
- Solids removal (settling tanks/filters)
- Fine solids remove within the roots of floating plants
- Nutrient removal by plants
- Aeration provide in fish tanks
- Annual Yield
  - 5,000 kg of fish
  - 1,400 cases of lettuce
  - 5,000 kg basil
  - 2,900 kg okra
- Plant area to fish area ~ 7:1

Source: Losordo/UVI
Plant Culture Methods

1. Nutrient Film Technique (NFT)

Source: VIU/AEG
2. Vertical Columns

Source: VIU/AEG
Plant Culture Methods

3. Deep Water Trays

Source: Urban Organics

Source: VIU/AEG
Plant Culture Methods

4. Media Beds

Source: VIU/AEG
VIU – Aquaponics Experimental Greenhouse

**Success with:**
- Fruiting veggies: tomatoes, cucumbers, peppers
- Leafy greens: lettuce, kale, Swiss chard
- Herbs: basil, parsley, cilantro,
- Root veggies: radish
- Grains: quinoa

![Lettuce and Basil](image)

*Source: VIU/AEG*
Licensing (BC)

No

- Ornamental Fish
  - No discharge to fish bearing waters
  - Bio-secure
- Food Fish
  - For personal consumption
  - May be gifted dead or if live to a non-licensed facility

Yes

- Food Fish
  - Any sales
  - Any fish gifted to a licensed aquaculture facility

Note - Risk Assessment is required when:
- Prohibited Species
- Ornamental fish if systems discharges to fish bearing waters
- Ornamental fish held in a uncontained environment

When in Doubt – Consult with DFO Aquaculture Management
Resources

https://scitech.viu.ca/fisheries-aquaculture

https://raincoastaquaponics.com/
– 100 mt salmon
– 600 – 1,000 mt:
  – Micro greens
  – Baby greens
  – Head lettuce
  – Power Mix
  – Spring Mix

Source: Summerfelt/Superior Fresh
Thanks...

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Questions?

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