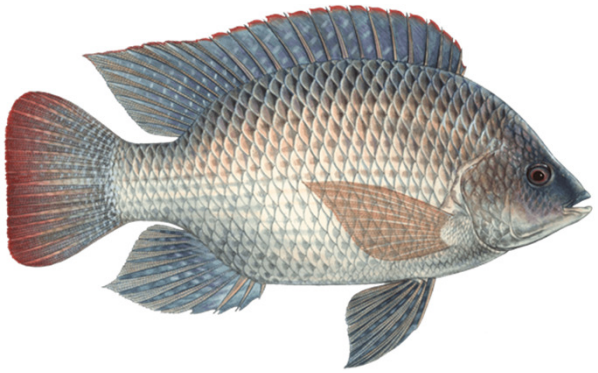
Ministry of **Agriculture**

Emerging Sectors in BC:

Aquaponics



Myron Roth, Ph.D., P.Ag.

Team Lead Aquaculture & Marine Fisheries

Sector Development Branch

Ministry of **Agriculture**

What we will cover today…

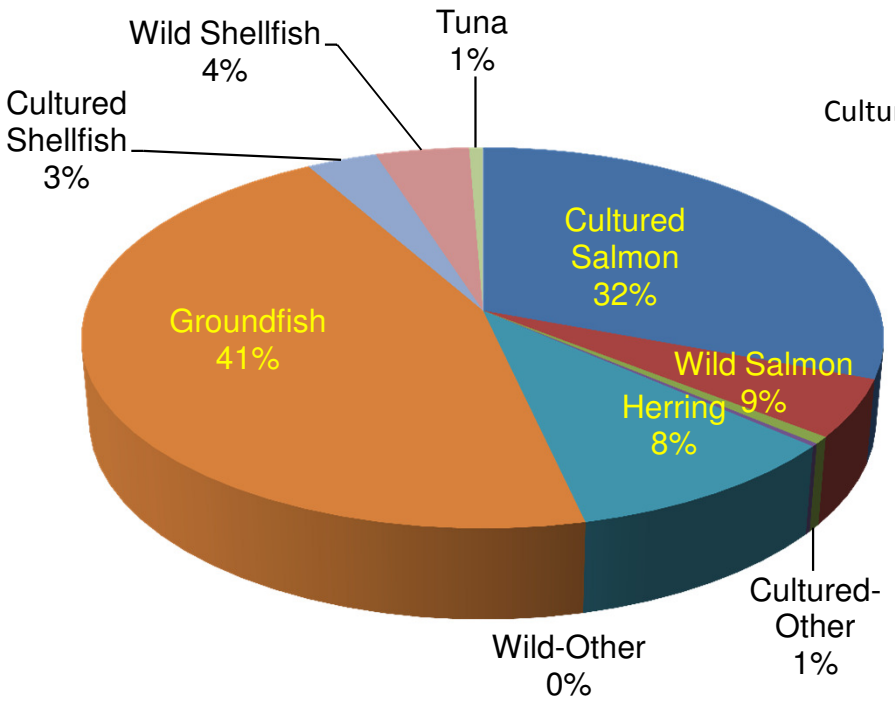
1. Aquaculture in BC
2. Aquaculture Systems
3. Land-Based Recirculating Aquaculture Systems
4. Aquaponics Methods/Systems
5. Why Aquaponics Can Help Feed the World!

Source: Summerfelt/Superior Fresh

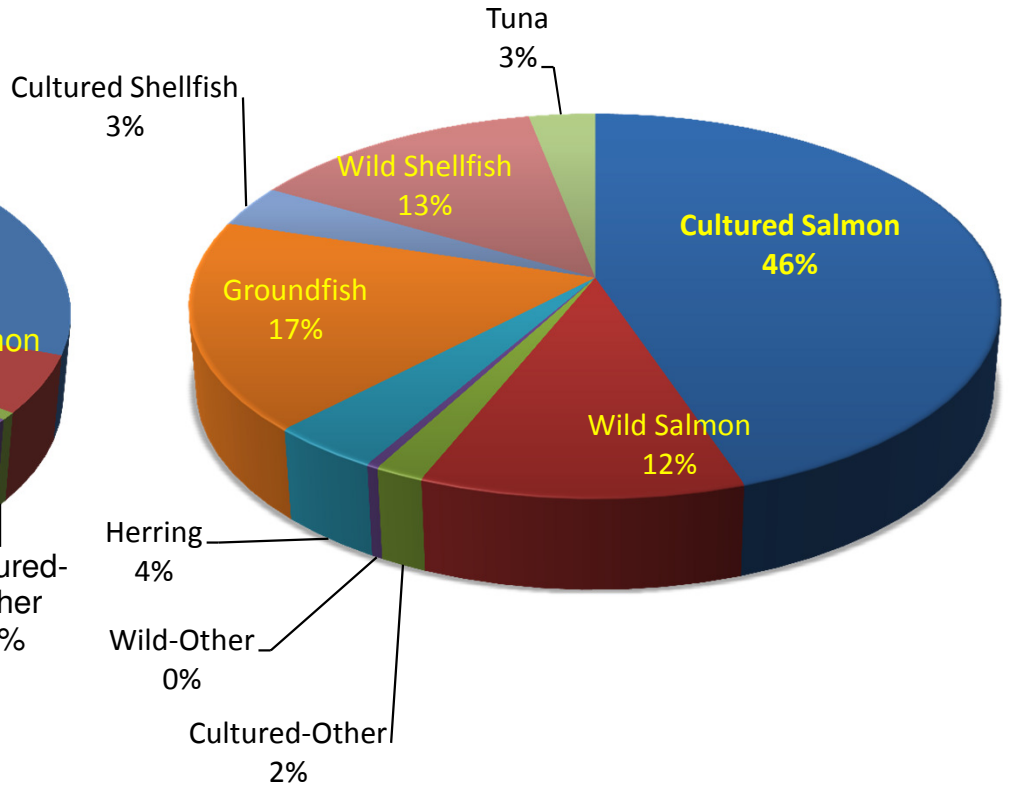
Ministry of **Agriculture**

BC Seafood Production: 2017

Volume
Total – 279,400 Tonnes



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

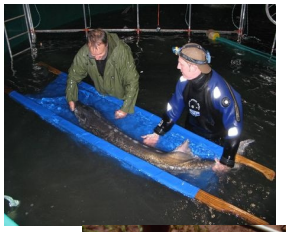


Ministry of **Agriculture**

Aquaculture Species

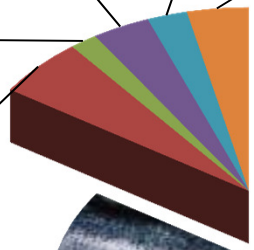
Oysters $29

Scallops & Mussels $20



Other $30

Clams $14

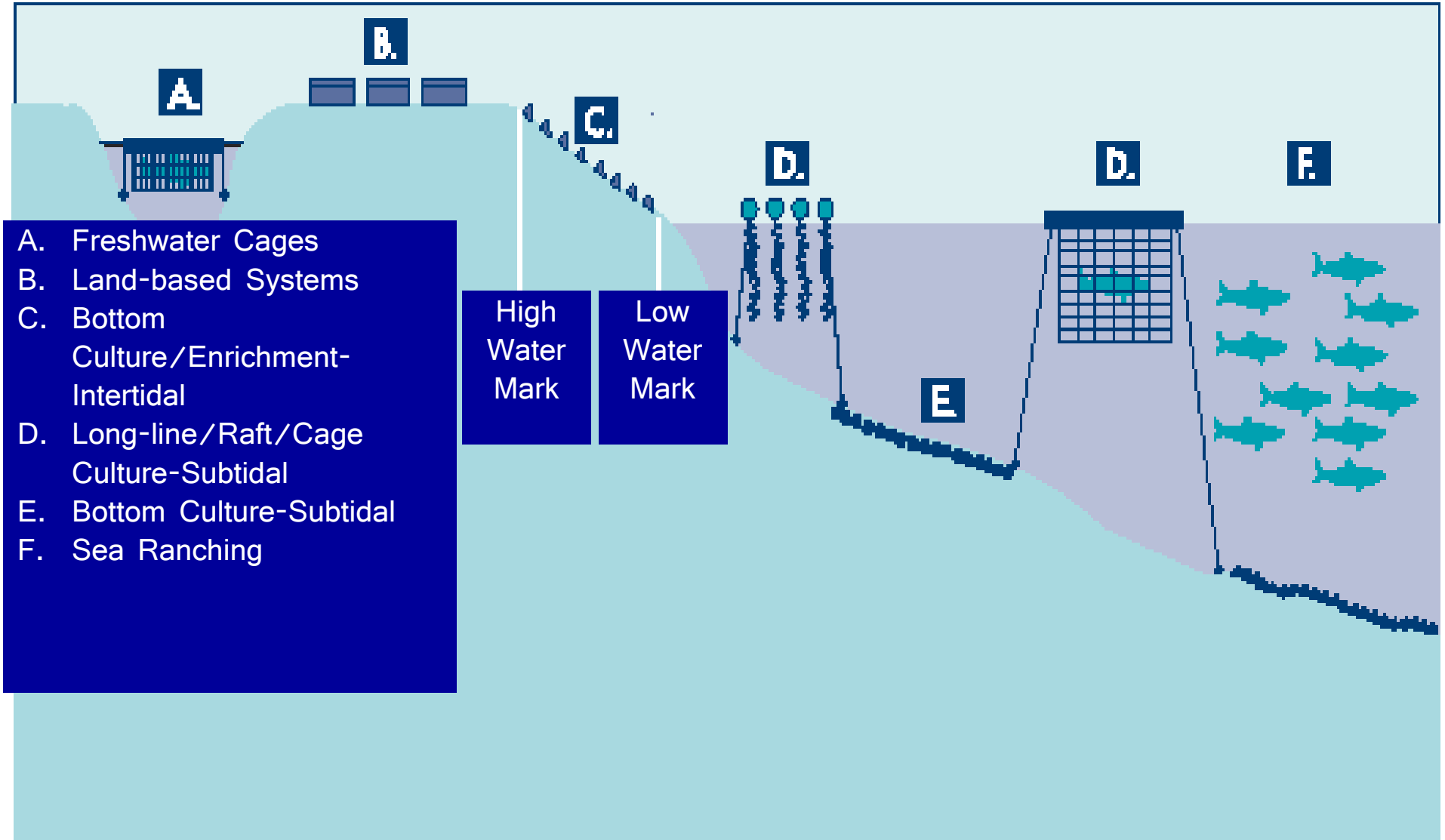


Pacific Salmon $44

Atlantic Salmon $734

Wholesale Value – 2017 – $871 M

Ministry of **Agriculture**



Ministry of **Agriculture**

Ministry of **Agriculture**

What is Aquaponics?

aquaculture

= growing animals (usually fish) in water

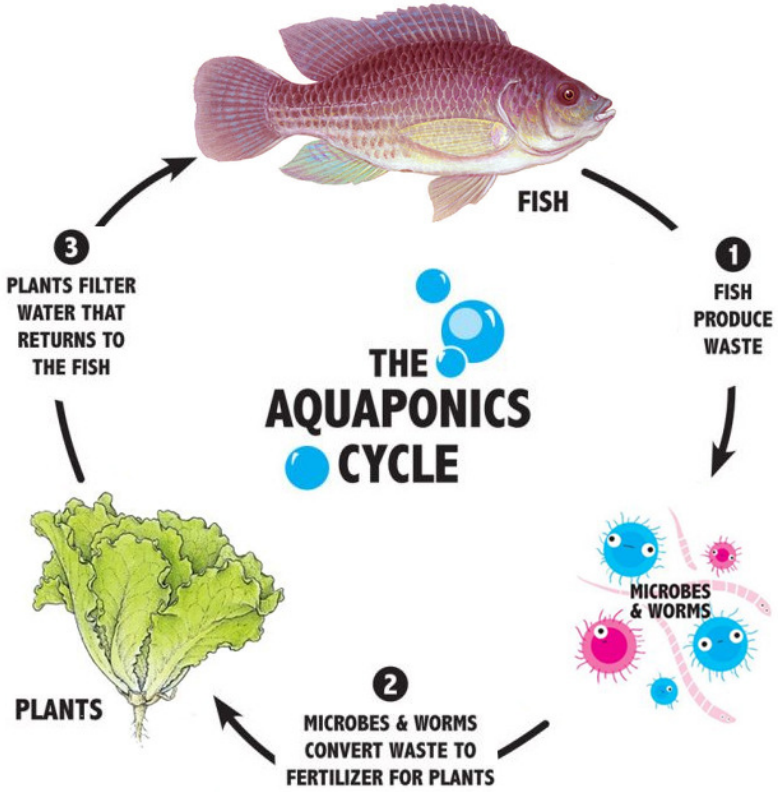
+

hydroponics

= growing plants in water (without soil)

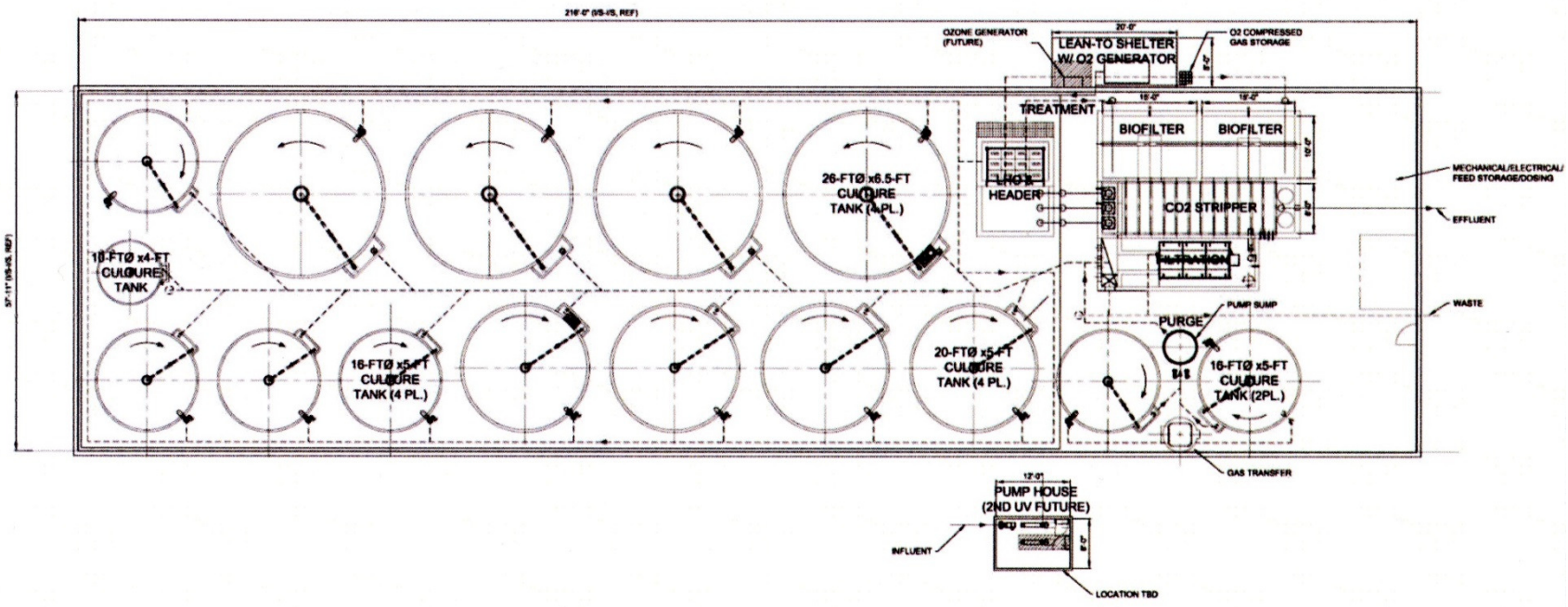
Aquaponics grows 2 foods (fish and produce) with 1 input – fish food

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/

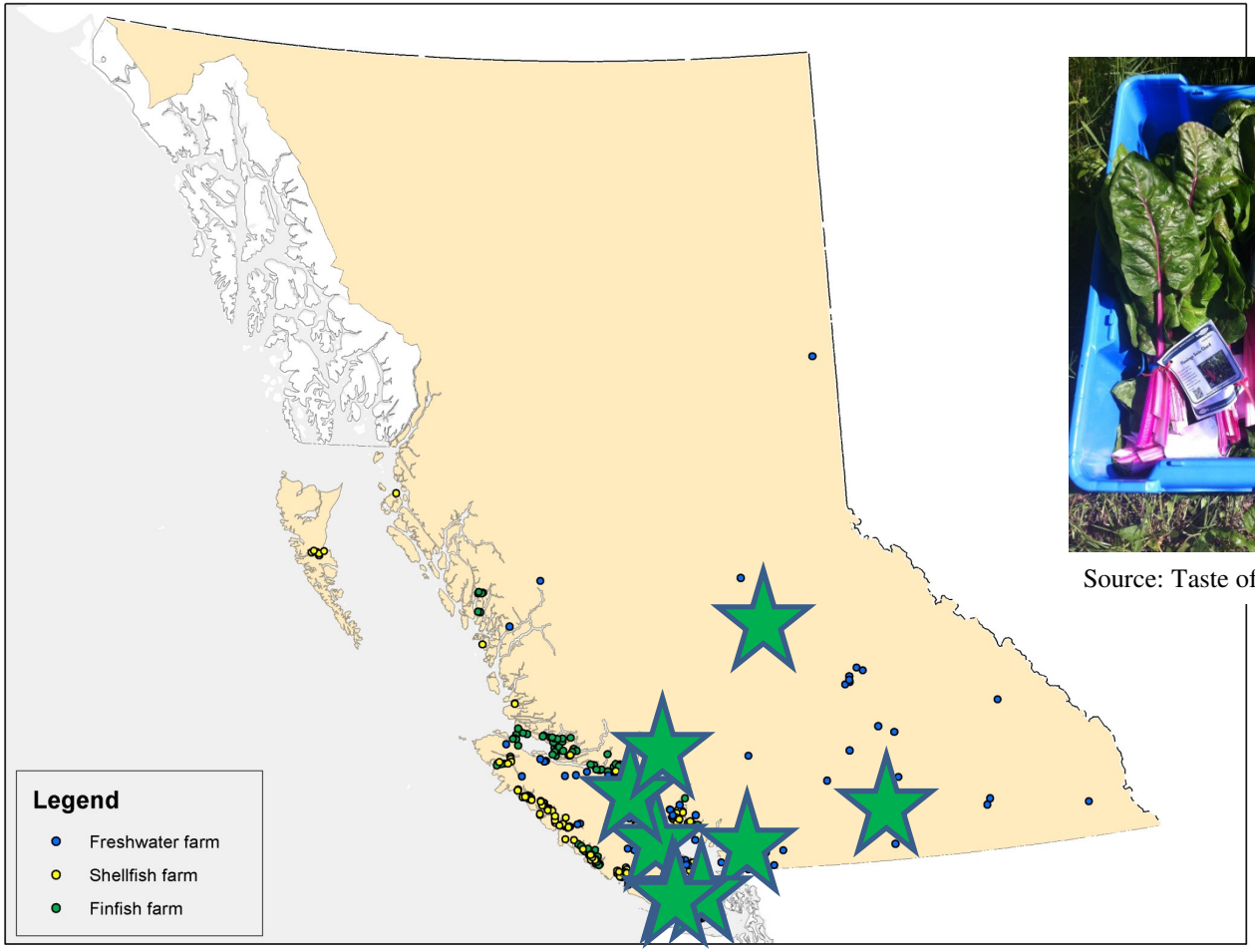
Land-Based Fish Farming



Ministry of **Agriculture**

Ministry of **Agriculture**

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)

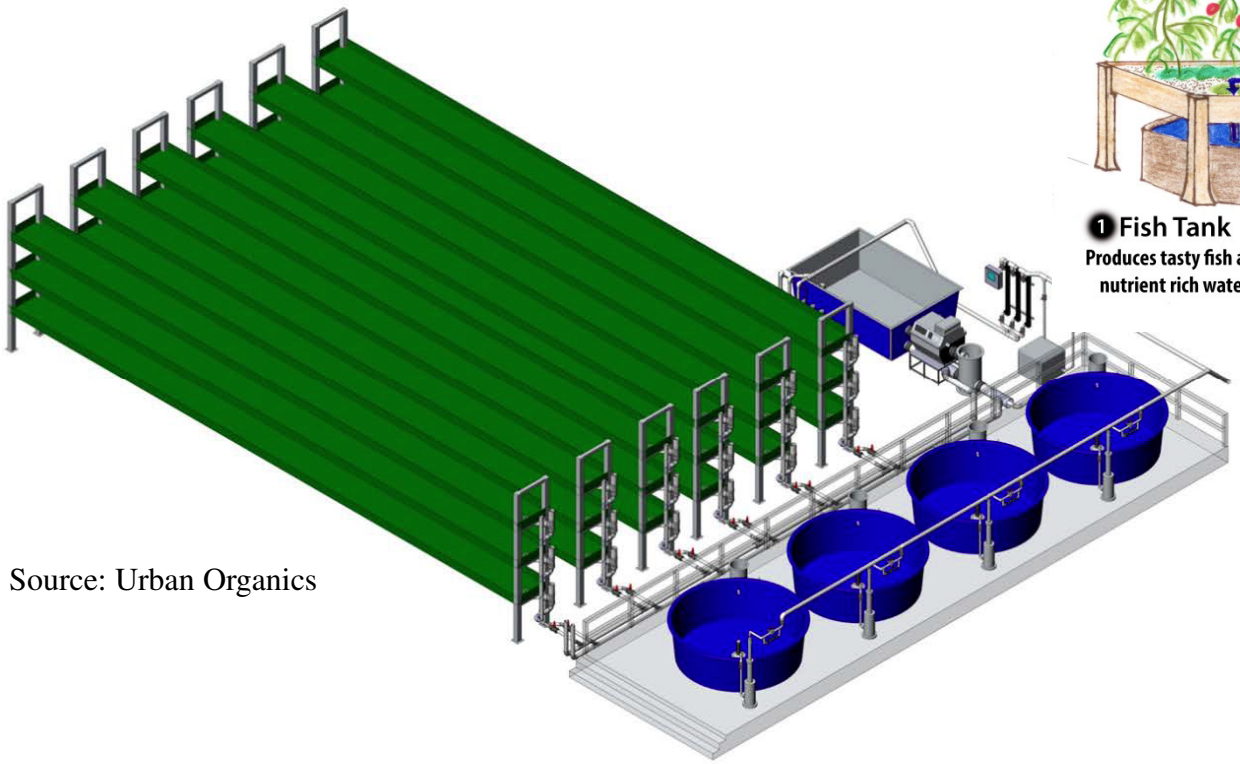
1. U.N. News, November 28, 2011 (https://news.un.org/en/story/2011/11/396332-land-degradation-and-water-shortages-threaten-global-food-production-un)
2. Geoff Wilson, Convenor, Aquaponics Network Australia. February 17, 2006.

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

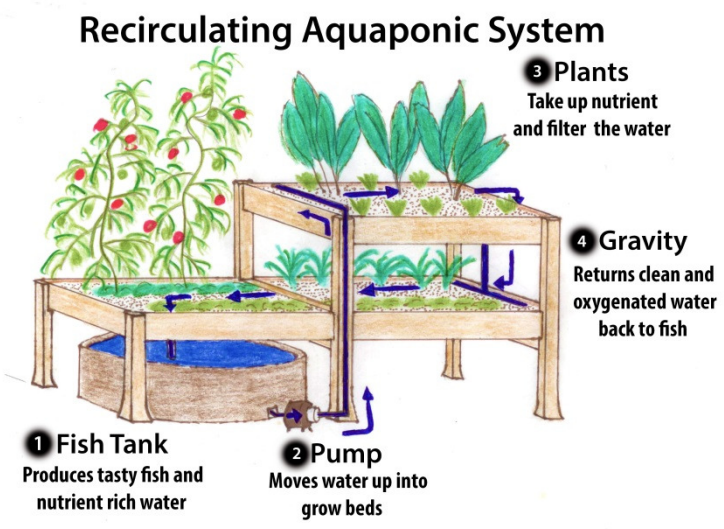
Why Aquaponics – Continued…

- 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



Source: Urban Organics



Source: Mason Street Farms

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

Plant Culture Methods

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

Ministry of **Agriculture**

VIU – Aquaponics Experimental Greenhouse

Success with:

Fruiting veggies: tomatoes, cucumbers, peppers

Leafy greens: lettuce, kale, Swiss chard

Herbs: basil, parsley, cilantro,

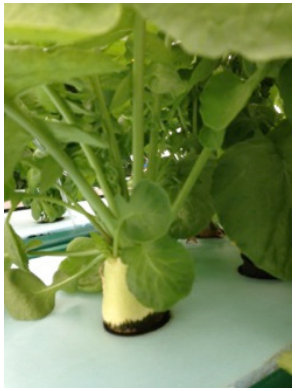
Root veggies: radish

Grains: quinoa

Lettuce and Basil

Peppers

Radish



Tomatoes

Quinoa

Source: VIU/AEG

Source: Mason Street Farms

Source: Northern Bioponics

Ministry of **Agriculture**

Licensing (BC)

No ⟷ Yes

- 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

- 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

Ministry of **Agriculture**

Resources

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

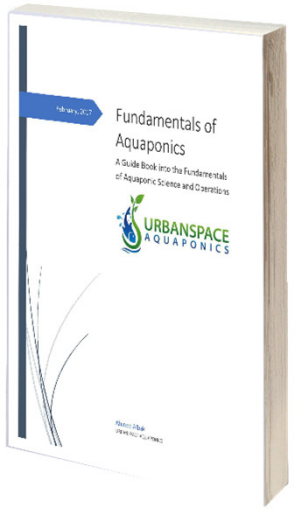
https://raincoastaquaponics.com/

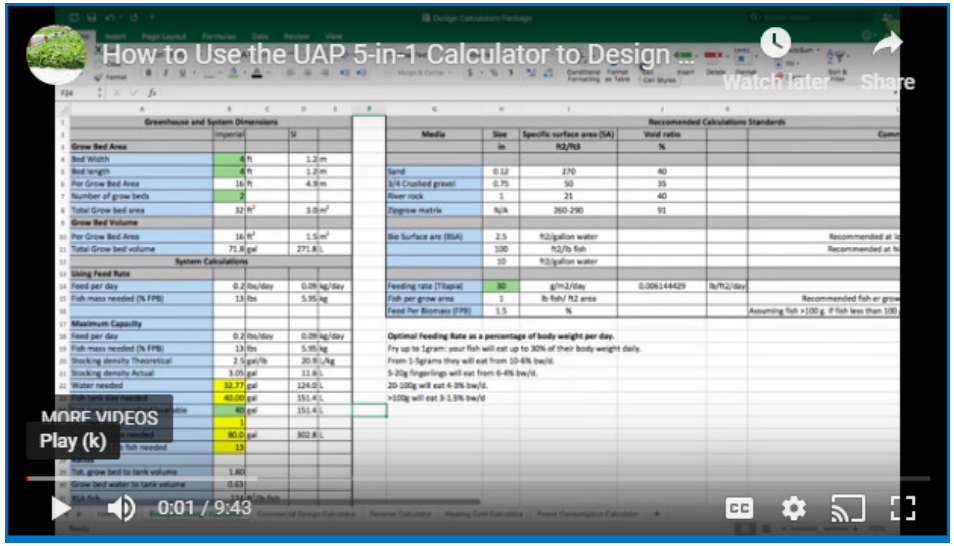
Ministry of **Agriculture**

Resources

URBANSPACE AQUAPONICS

https://urbanspaceaquaponics.com/





Ministry of **Agriculture**

- 100 mt salmon
- 600 – 1,000 mt:
  - Micro greens
  - Baby greens
  - Head lettuce
  - Power Mix
  - Spring Mix

Source: Summerfelt/Superior Fresh

Ministry of **Agriculture**

Thanks…

Kevin Romanin: Senior Fisheries & Seafood Policy Analyst,
BC Ministry of Agriculture

Dr. Dan Baker: Professor, Fisheries & Aquaculture Programs, VIU

Ministry of **Agriculture**

Questions?

Contact:

Email: myron.roth@gov.bc.ca

Tel: 778-698-3404