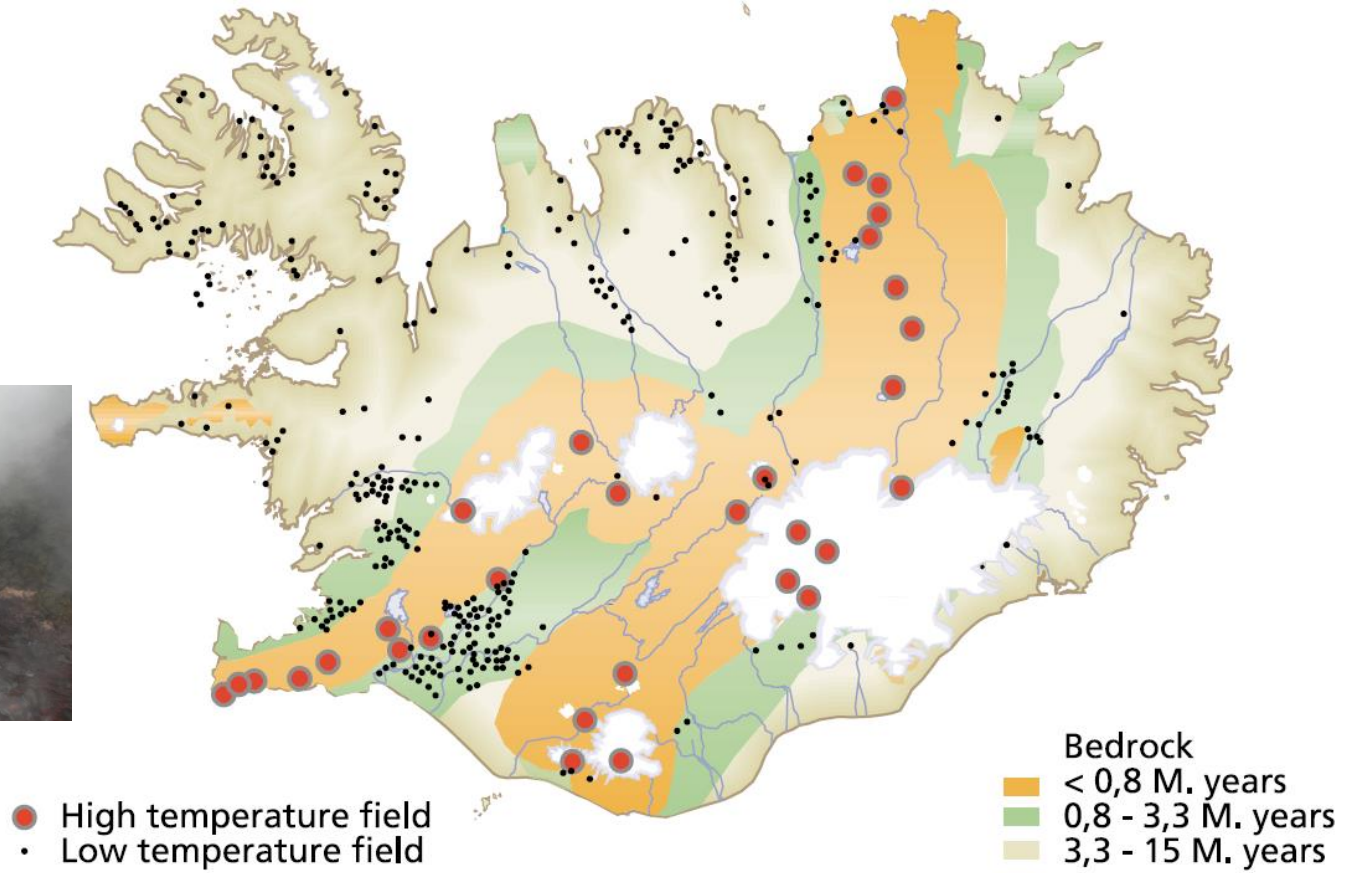


Overview of cultivation opportunities related to geothermal heat

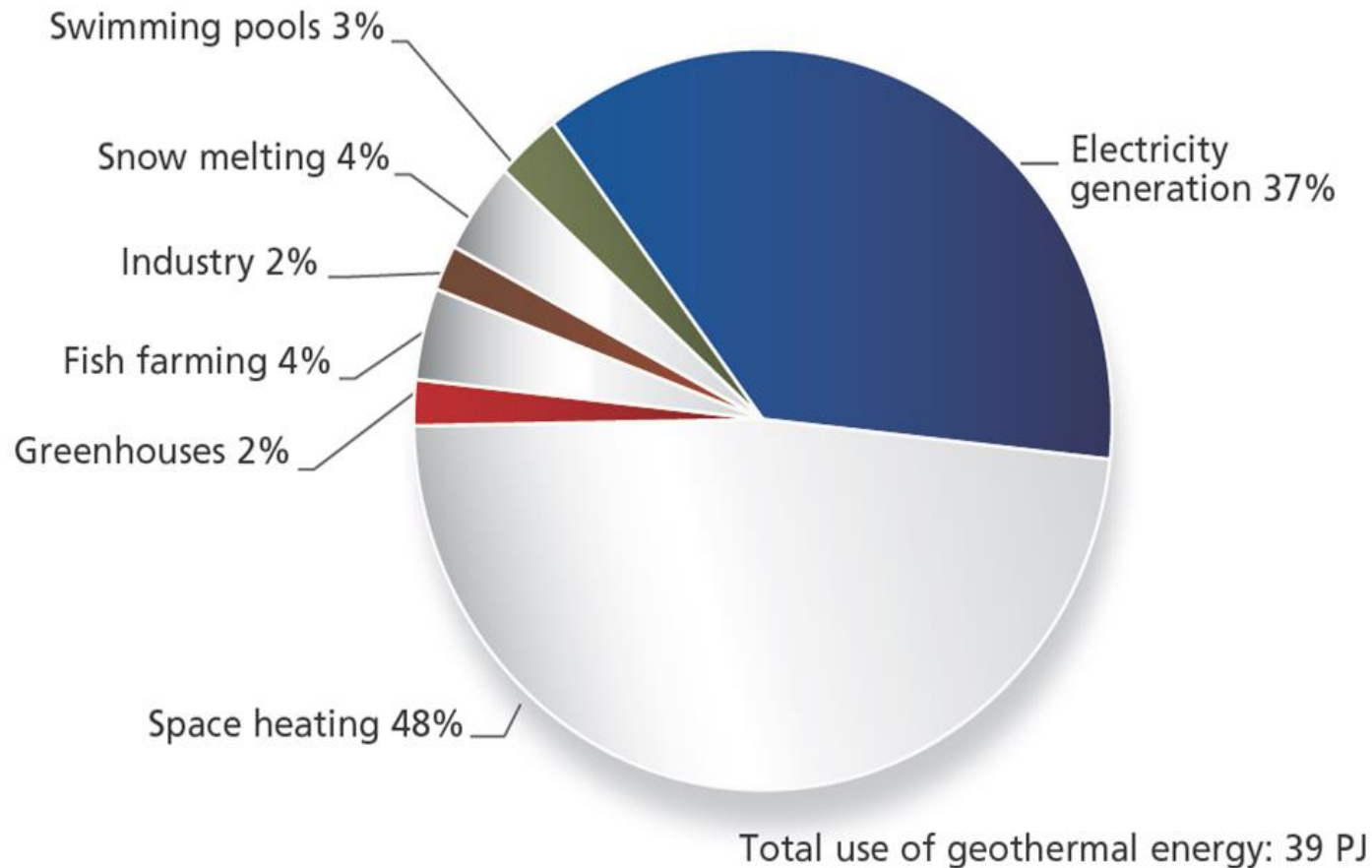
Dr. Ragnheidur I Thorarinsdottir

GEORG
April 8th 2014

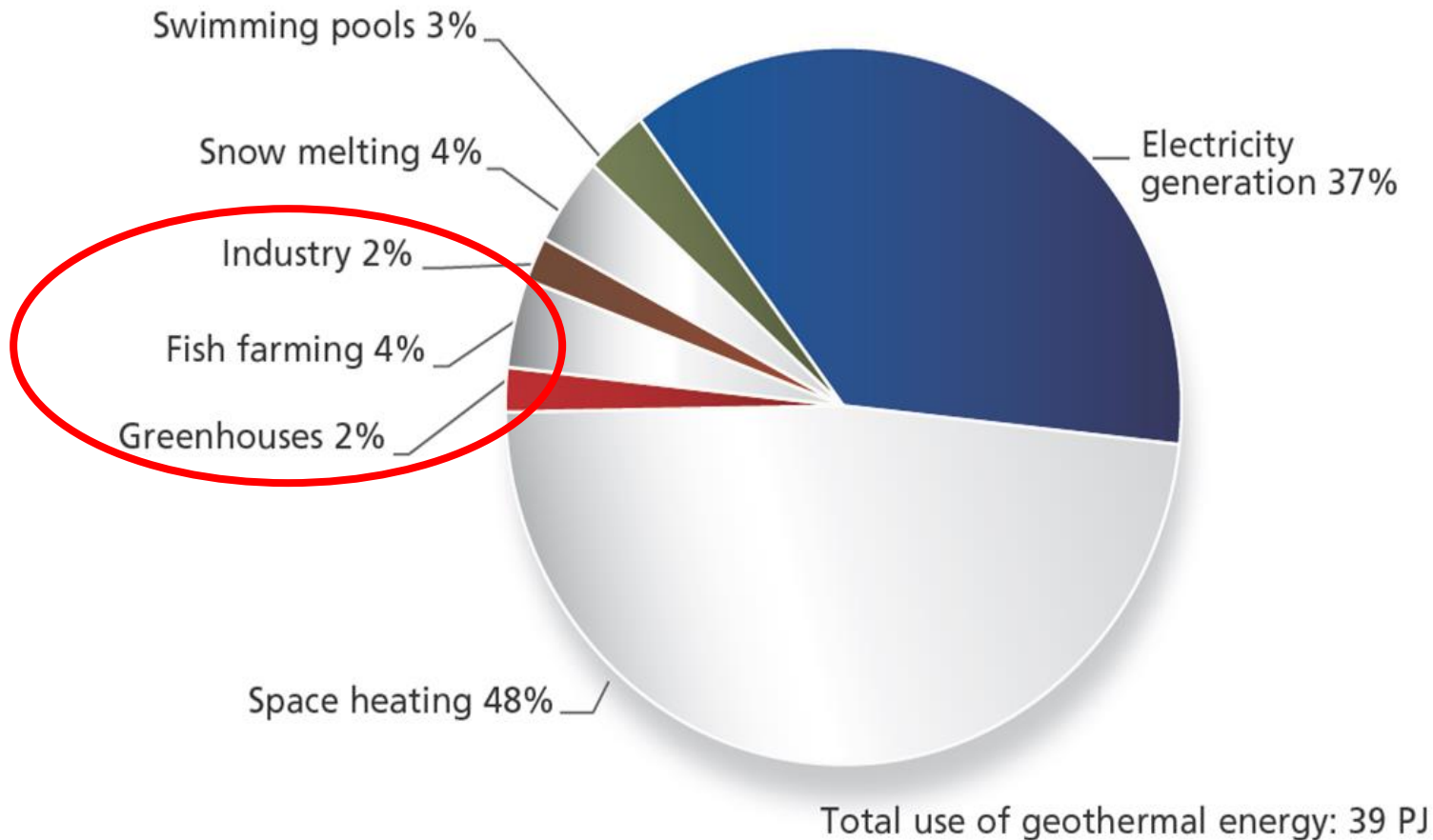
Geothermal resources



Utilization of geothermal energy



Utilization of geothermal energy

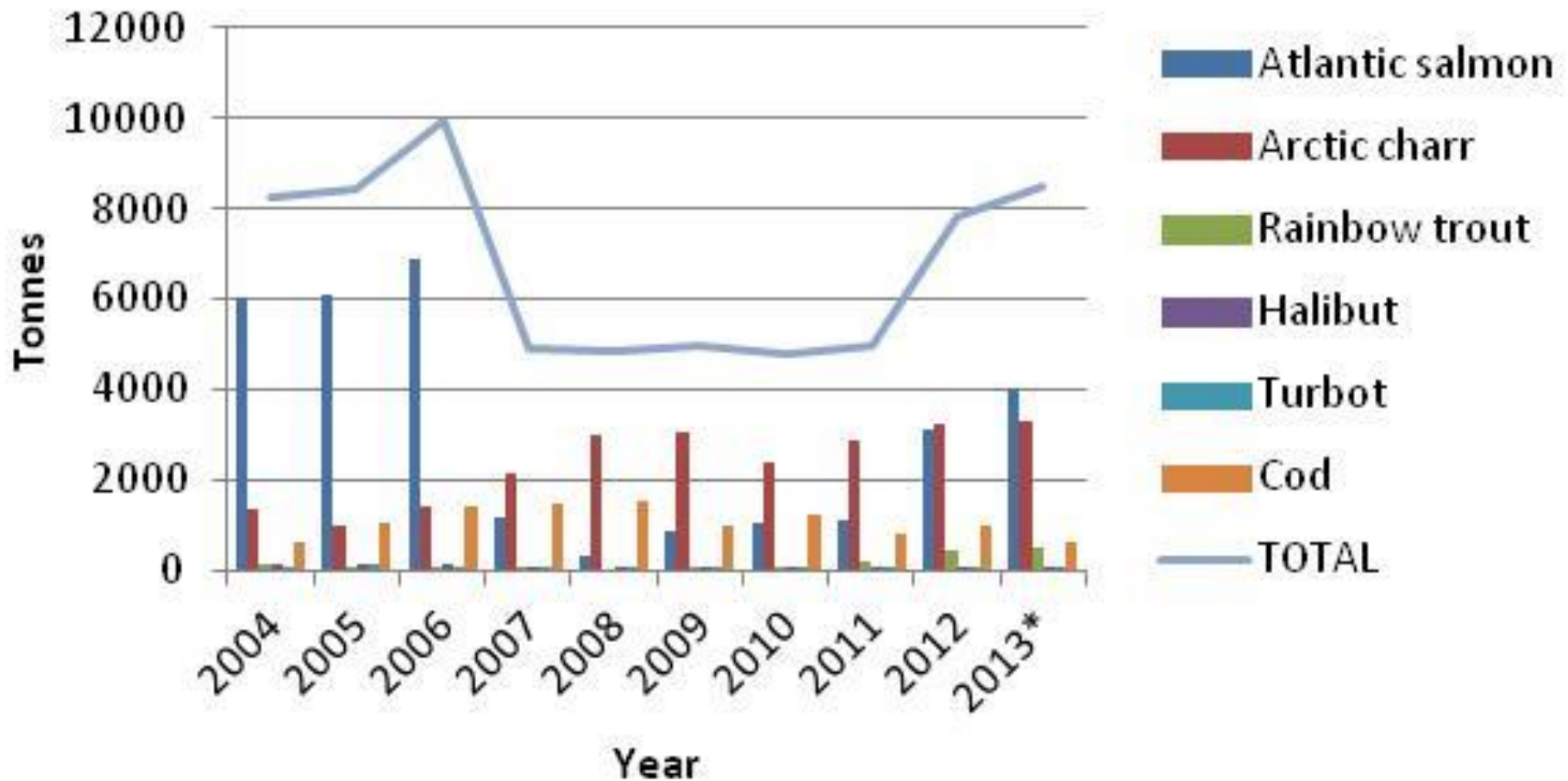


Possibilities

- Aquaculture
- Greenhouses
- Aquaponics
- Algae production
 - Drying – freeze drying
 - Health products/service
 - Tourism
 - Etc.

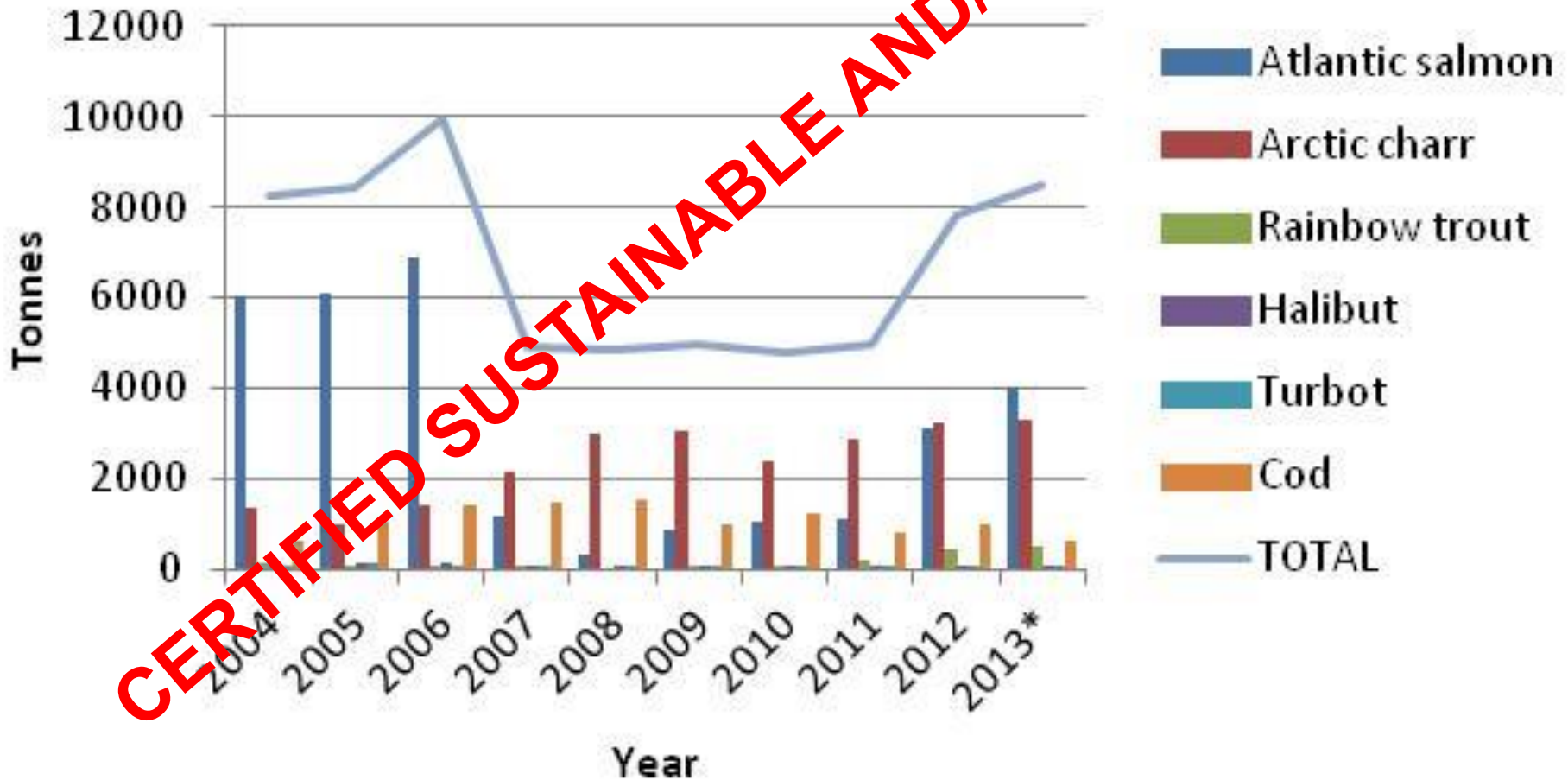
Aquaculture

Annual production in aquaculture in Iceland



Aquaculture

Annual production in aquaculture in Iceland



CERTIFIED SUSTAINABLE AND/OR ORGANIC

New warm water species

- Senegalese sole
 - Warm sea water used for cooling in Reykjanes Geothermal Power Plant
 - 500 tonnes annual production
- Sea cucumber
- Abalone
- European lobster
- Tilapia
- And more...



Greenhouse production

- Pesticide free environment
- Clean energy
- Land space

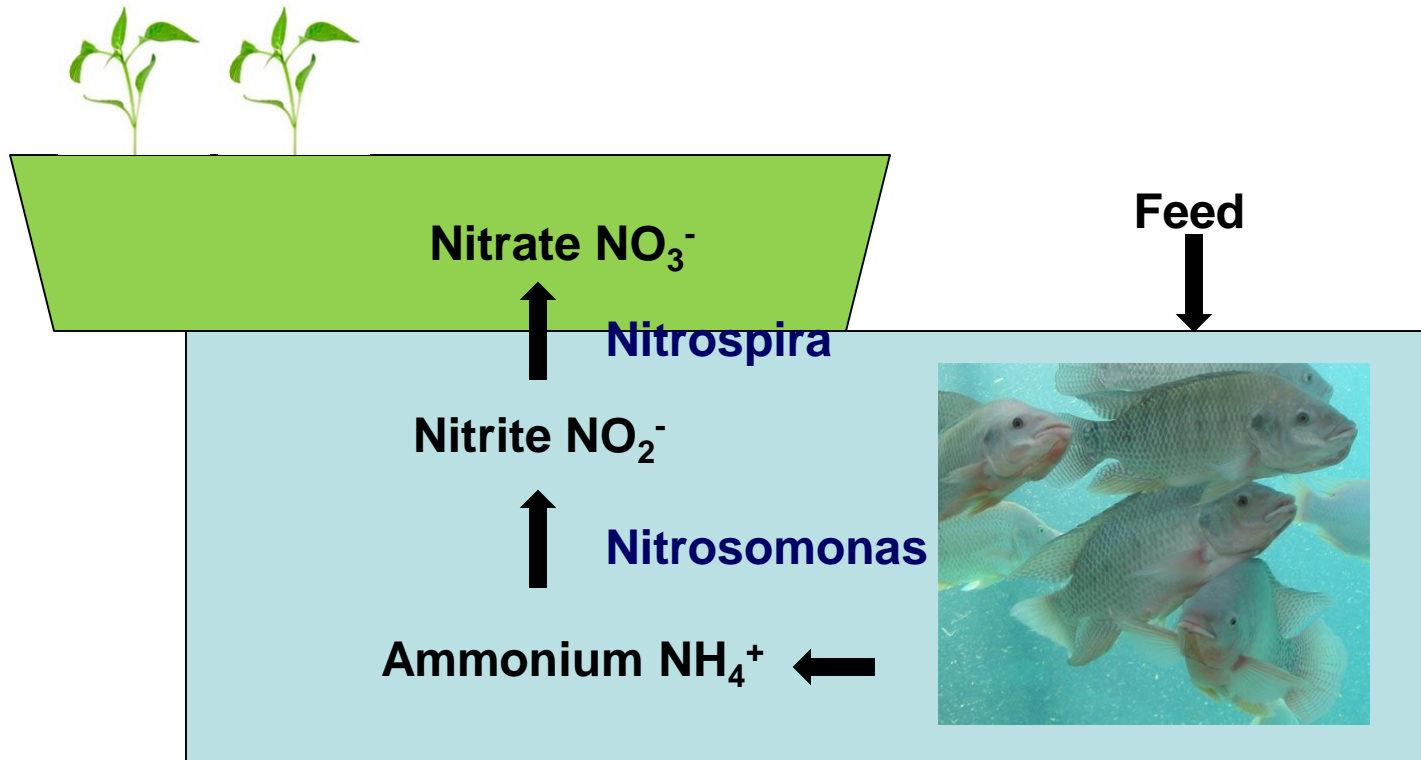


Aquaponics

- A combination of the words aquaculture and hydroponics
- Waste water from fish is used as a resource in the horticulture production
- Plants take up the nutrients and the water is returned to the fish

Healthy balanced system

- Bacteria play a large role converting ammonia to nitrates



Grow bed



Raft



Nutrient film technique



Algae

- Increased interest
- Projects ongoing in several parts of Iceland
 - High quality health products
 - Food/Feed ingredients
 - Energy
 - Integrated multitrophic aquaculture (IMTA)

Drying / freeze drying

- Increased production – more high quality raw material for processing
 - Export / low transport cost
 - High shelf life

Health products / services

- Geothermal spas
- Health products from nature

Tourism

- Increasing steadily
- Appr. 1 million tourists
 - Three times the countries inhabitants
 - Annual increase estimated 7%
- Experience Tourism
 - Health, food, nature, education

A multidisciplinary approach

- Joining aquaculture, horticulture and tourism developing new products and services
- Integrated new methods
- Value added products and services
- Job creation
- Spin-off opportunities
- Education – young people involved

Project ideas

- Aquaculture
 - Sustainable certified production
 - New species
 - Use effluents as fertilizers
- Greenhouse production
 - Increased production / new products
 - Certifications?
- Aquaponics – Aquaculture + hydroponics
- Algae production and processing
- Biochar production – from organic waste
- Processing / Drying / Freeze drying
 - Silica
 - Fish, herbs, berries etc.
- Tourism

