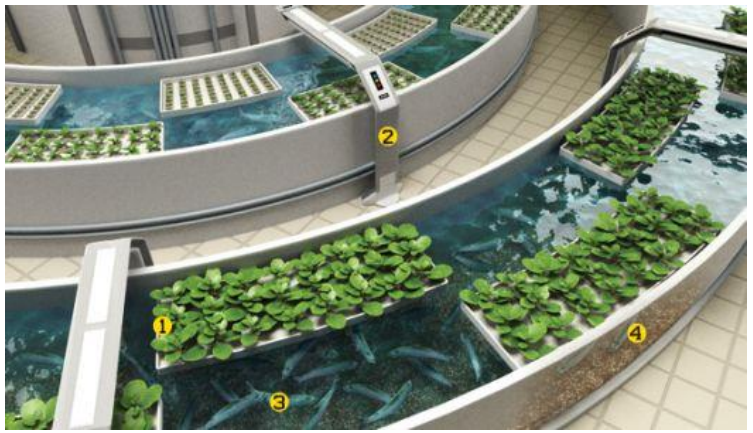
Cross visit Czech Republic 30.11-1.12. 2020

Jan Mráz, University of South Bohemia

This project has received funding from the European Union's
Horizon 2020 research and innovation programme
under grant agreement No 818351

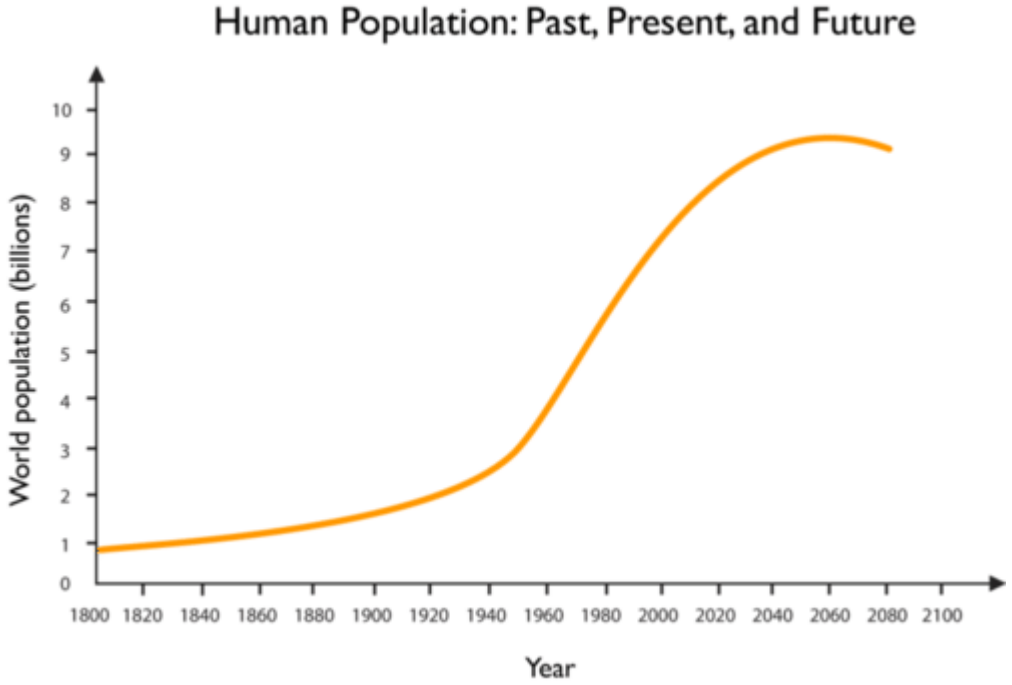
Aquaponics as an example of long term sustainable food production

Jan Mráz

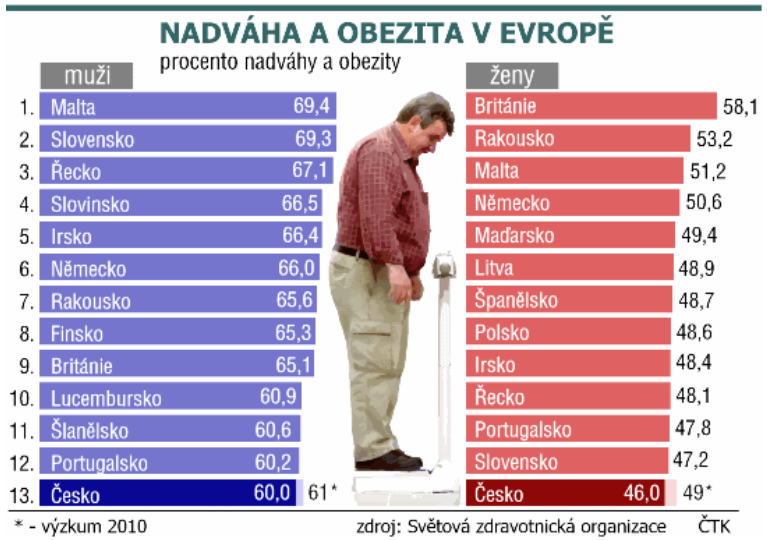


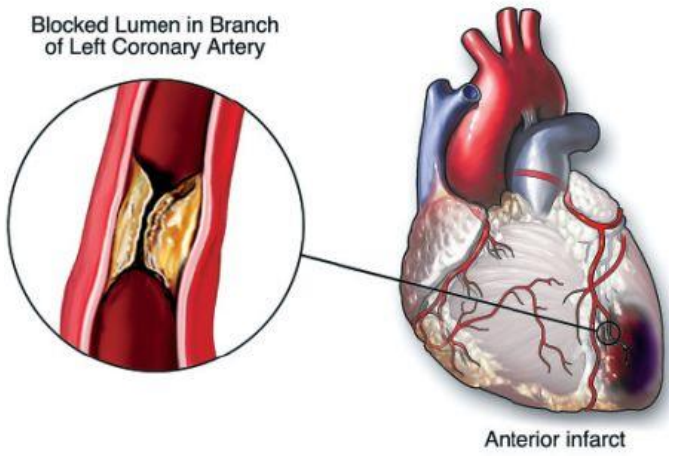
World megatrends

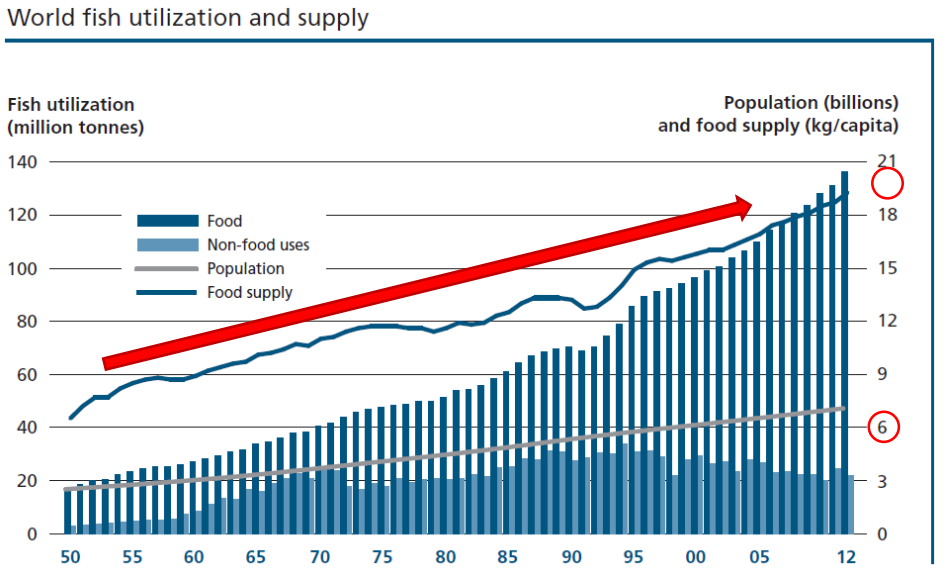
7.8 bilions



World megatrends

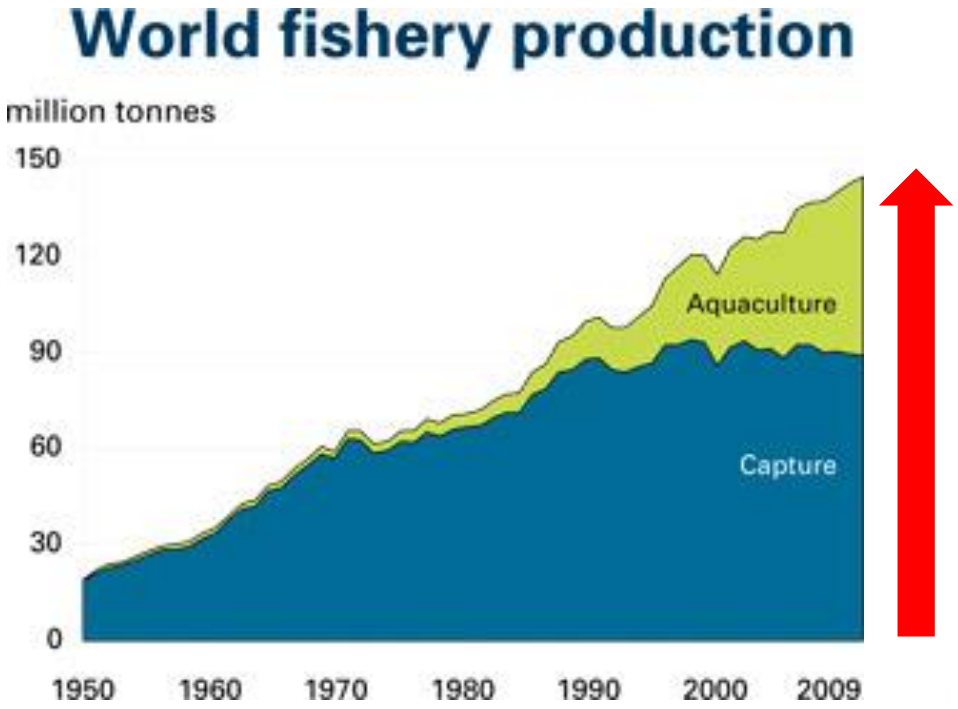


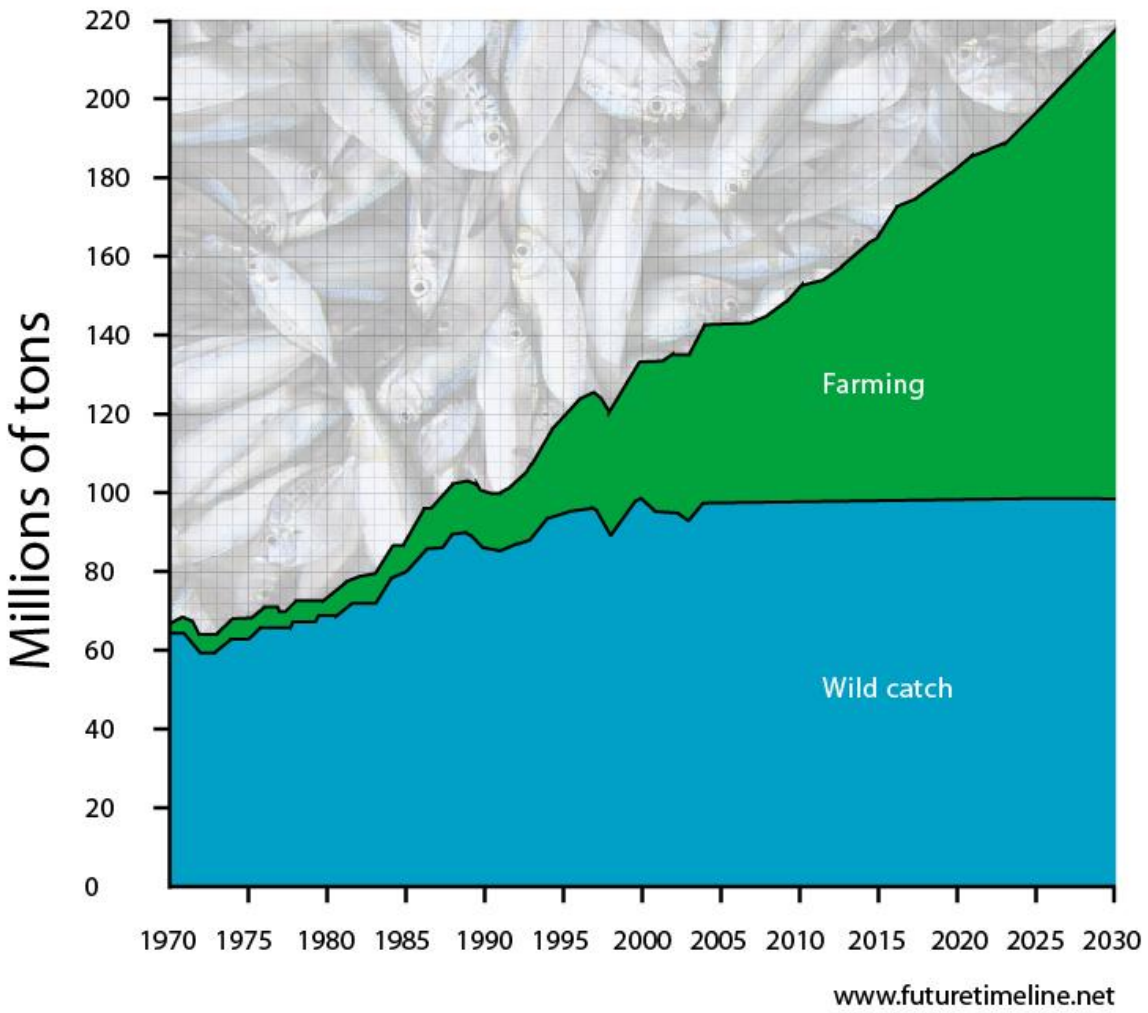




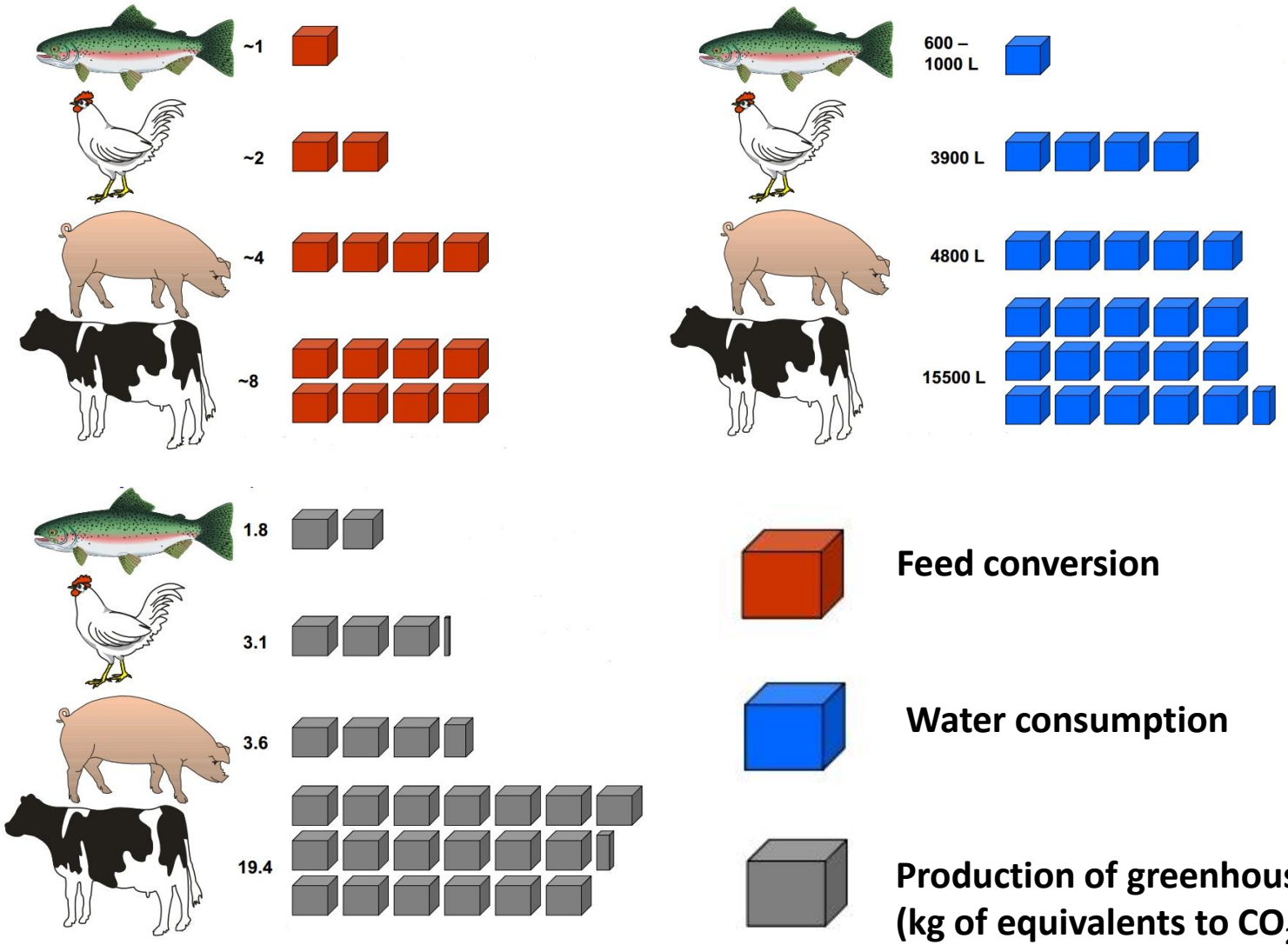
World megatrends

Introduction:




Millions of tons
220
200
180
160
140
120
100
80
60
40
20
0
1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030
Farming
Wild catch
www.futuretimeline.net

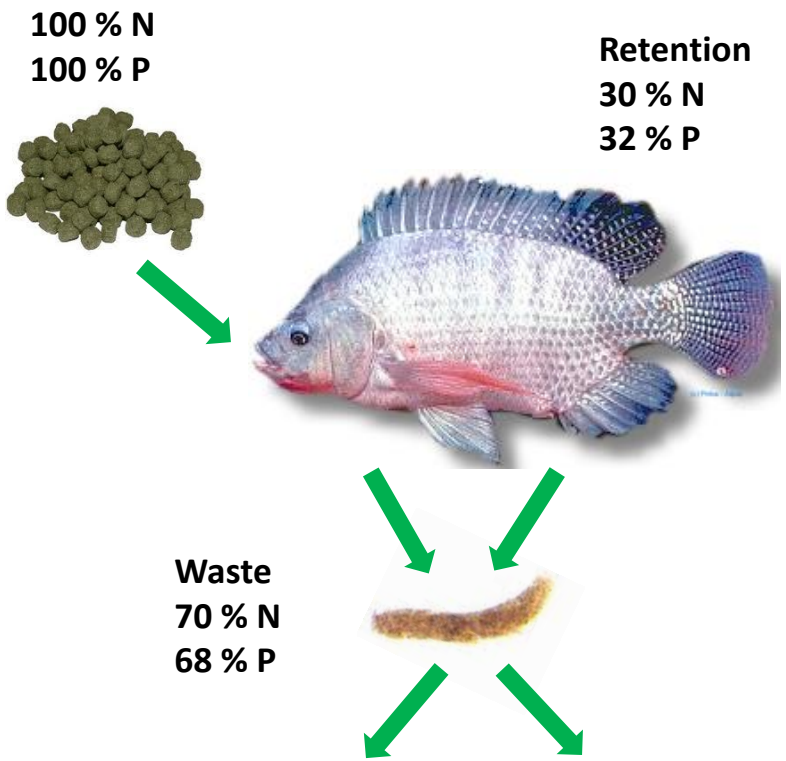

CO_2



(Kloas et al., 2011)

- Hydroponics
  - low need of water
  - soilless
  - no weeds and diseases
  - close to consumption
  - optimal conditions
  - fast growth
  - even quality

- Aquaculture
  - low need of water
  - no need of ponds, streams or seas
  - close to consumption
  - optimal conditions
  - fast growth
  - even quality


100 % N
100 % P
Retention
30 % N
32 % P
Waste
70 % N
68 % P
Dissolved
87 % N
Suspended
13 % N

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and Protection
of Waters

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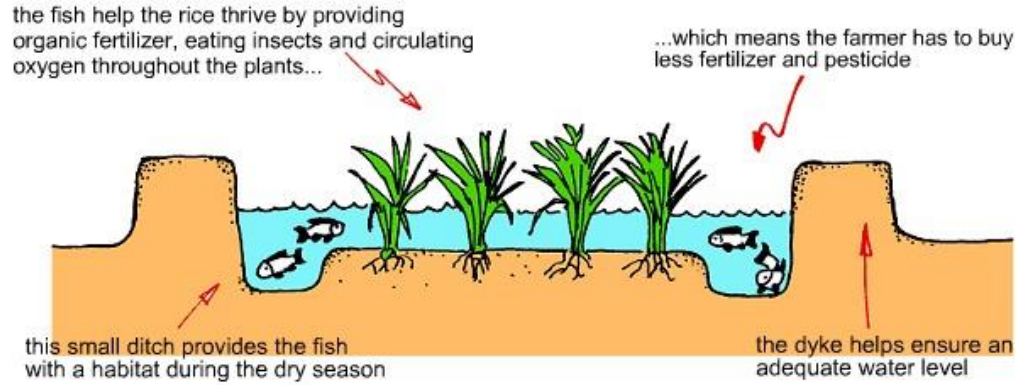
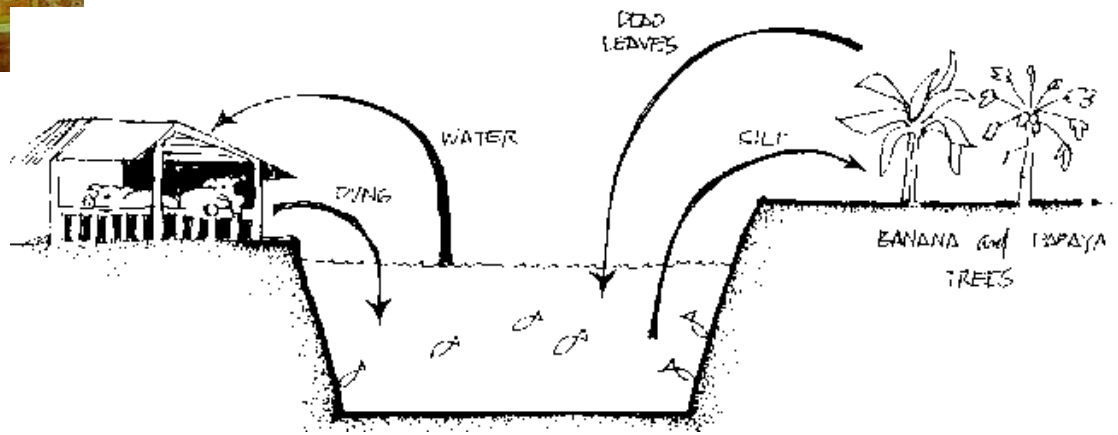
in České Budějovice
Czech Republic





O_2

CO_2

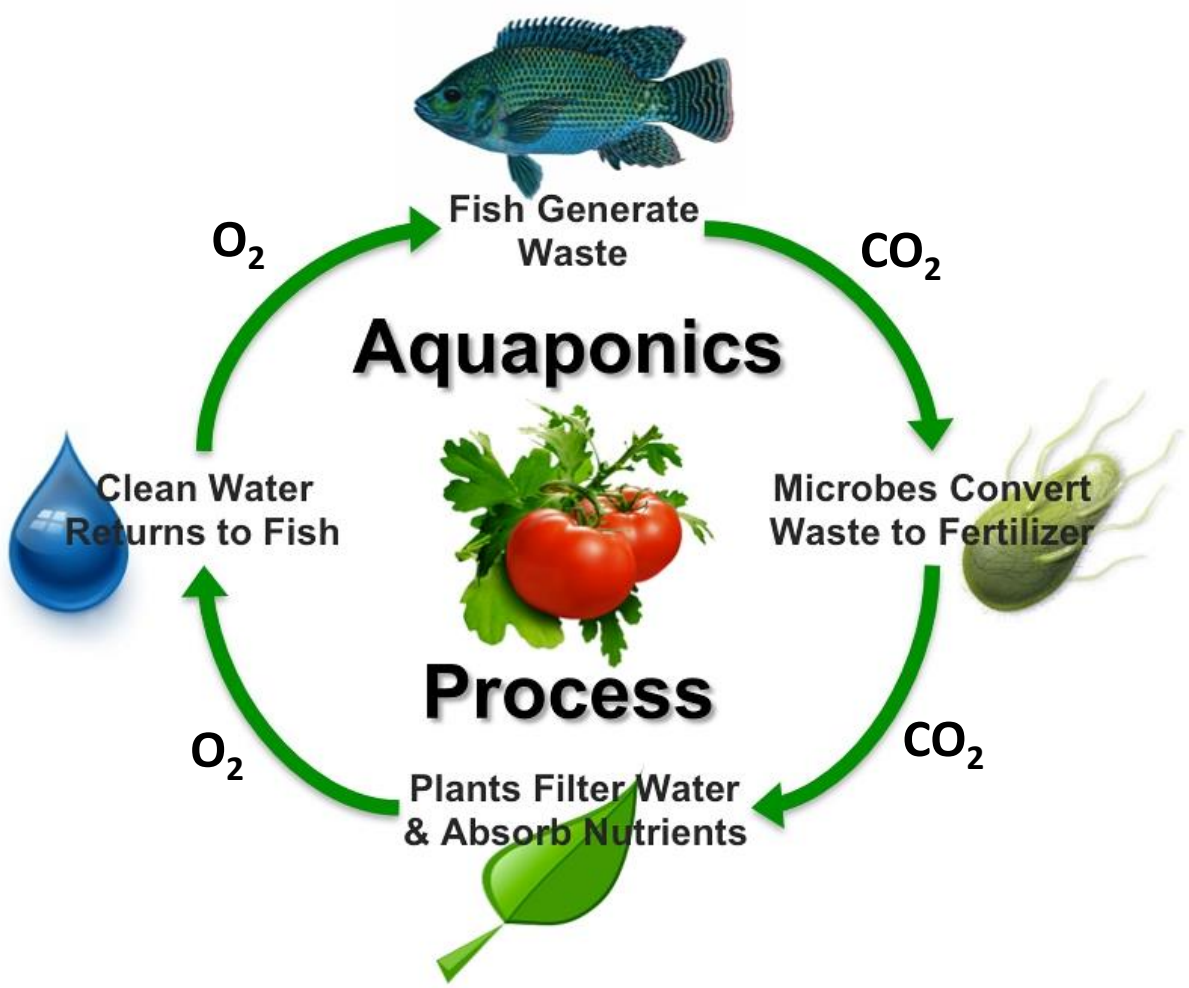
Rich in nutrients

CO_2

Rich
in nutrients

O_2

Aquaculture + Hydroponics = Aquaponics



1.5 kg

1 kg

2 kg

CO_2

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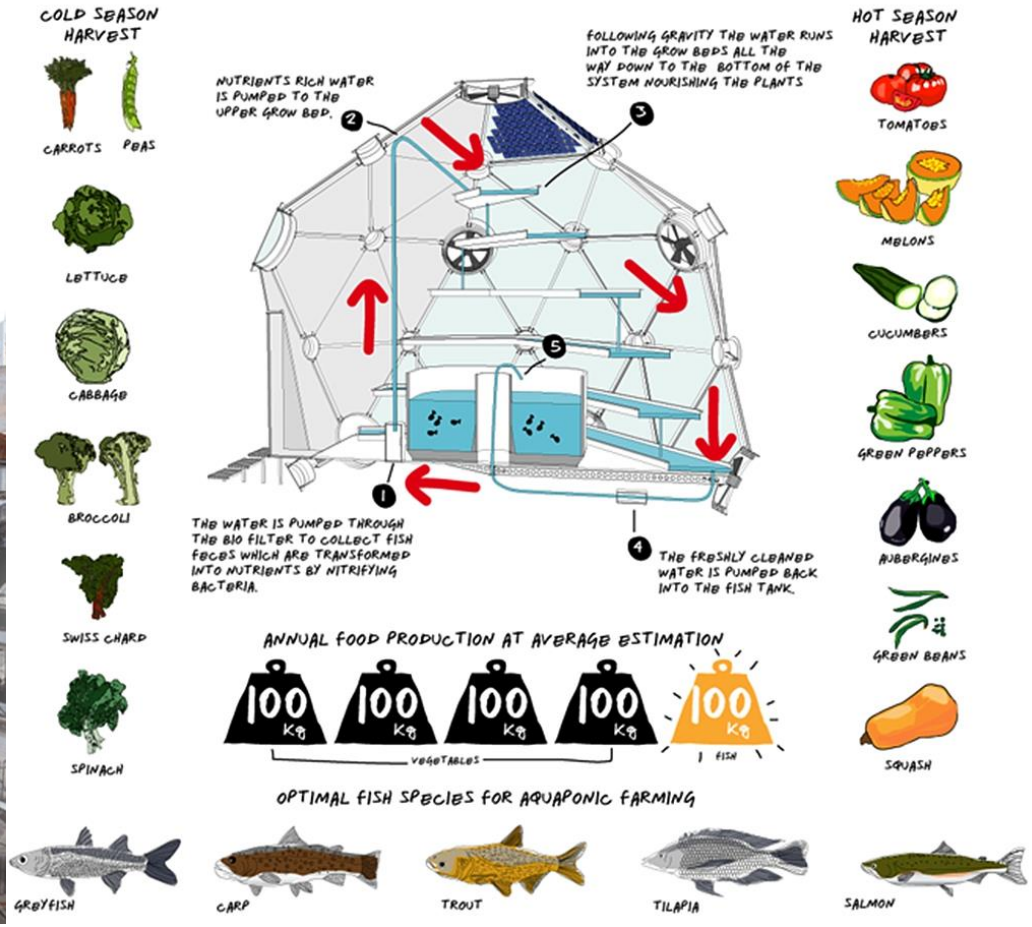
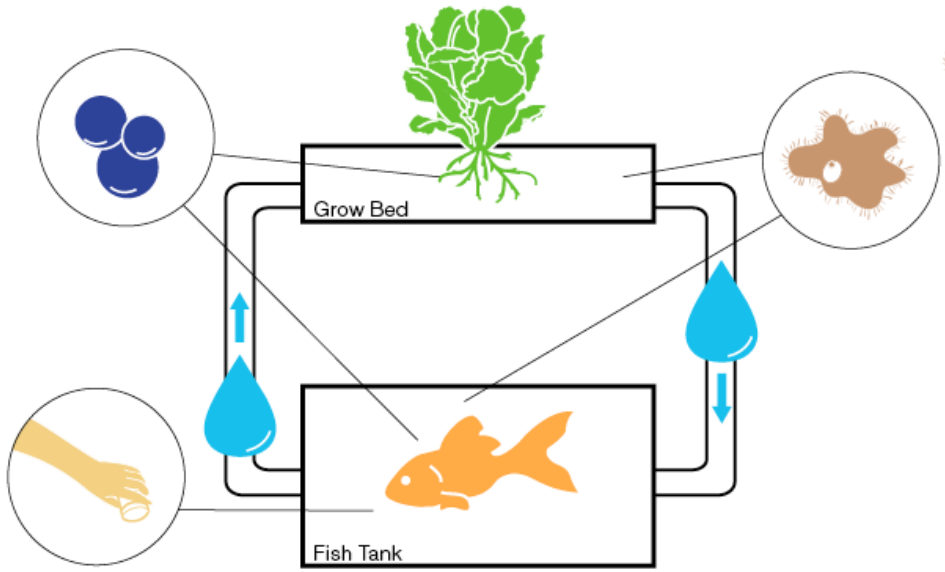


https://www.youtube.com/watch?v=OvHVLHZiXHk&feature=player_embedded


clinic
food court


URBAN FARMERS

Aquaponics – how it works



- Fish produce waste, amonia (toxic)
- Microbes convert amonia to nitrites and nitrates
- Plants use nitrates and other nutrients from water
- Water is cleaned and oxygenated through growbeds
- Clean and oxygen rich water goes back to fish tank

Aquaponics - plants

POWER4BIO
REGIONS FOR
BIOECONOMY

- They dont invest energy in root growth
- Continual excess of nutrients
- Excess of CO_2, NO_3^-
- Warm water
- No weeds

Aquaponics – design

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REGIONS FOR
BIOECONOMY

- Drip irrigation
- Media-Based Growbed
  (Ebb and Flow)
- Raft System
- NFT
  (Nutrient Film Technique)
- Towers, VertiGro
- Aeroponics







Kreislauf B


BRIGHT

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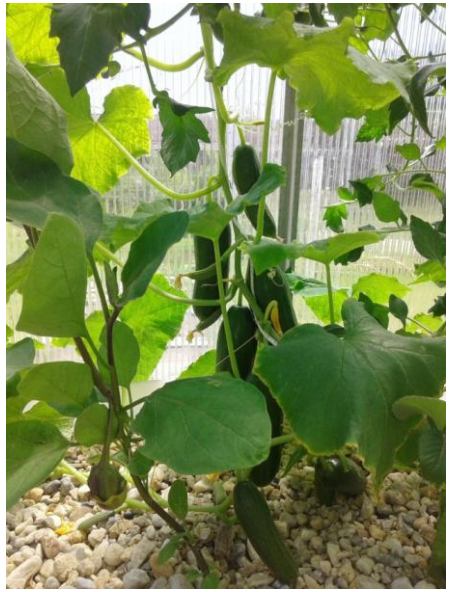
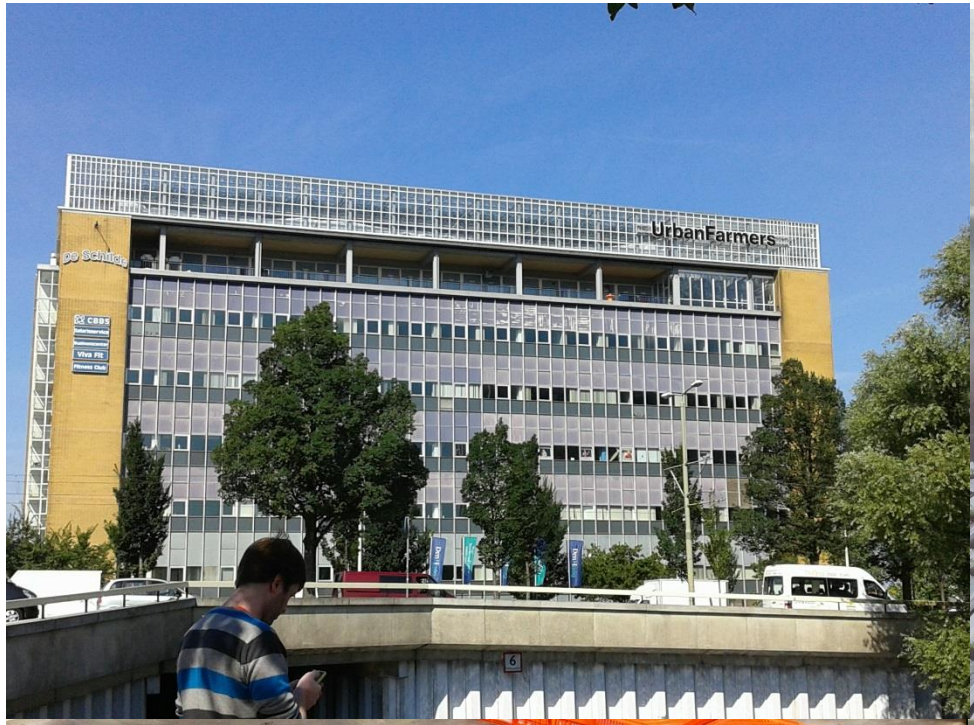
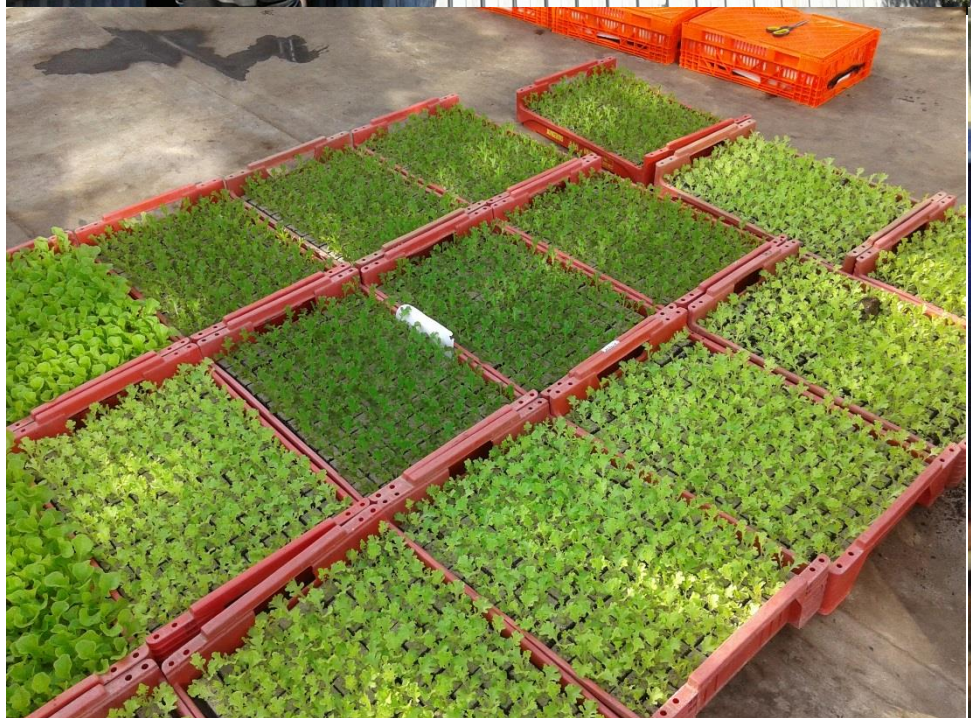


OWER4BIO
GIONS FOR
DECONOMY



WER4BIO
IONS FOR
CONOMY



Aquaponic research center at FFPW, USB

6 x independent RAS
4 x types of hydroponic systems
(each with 6-12 replicates

Future or today reality?

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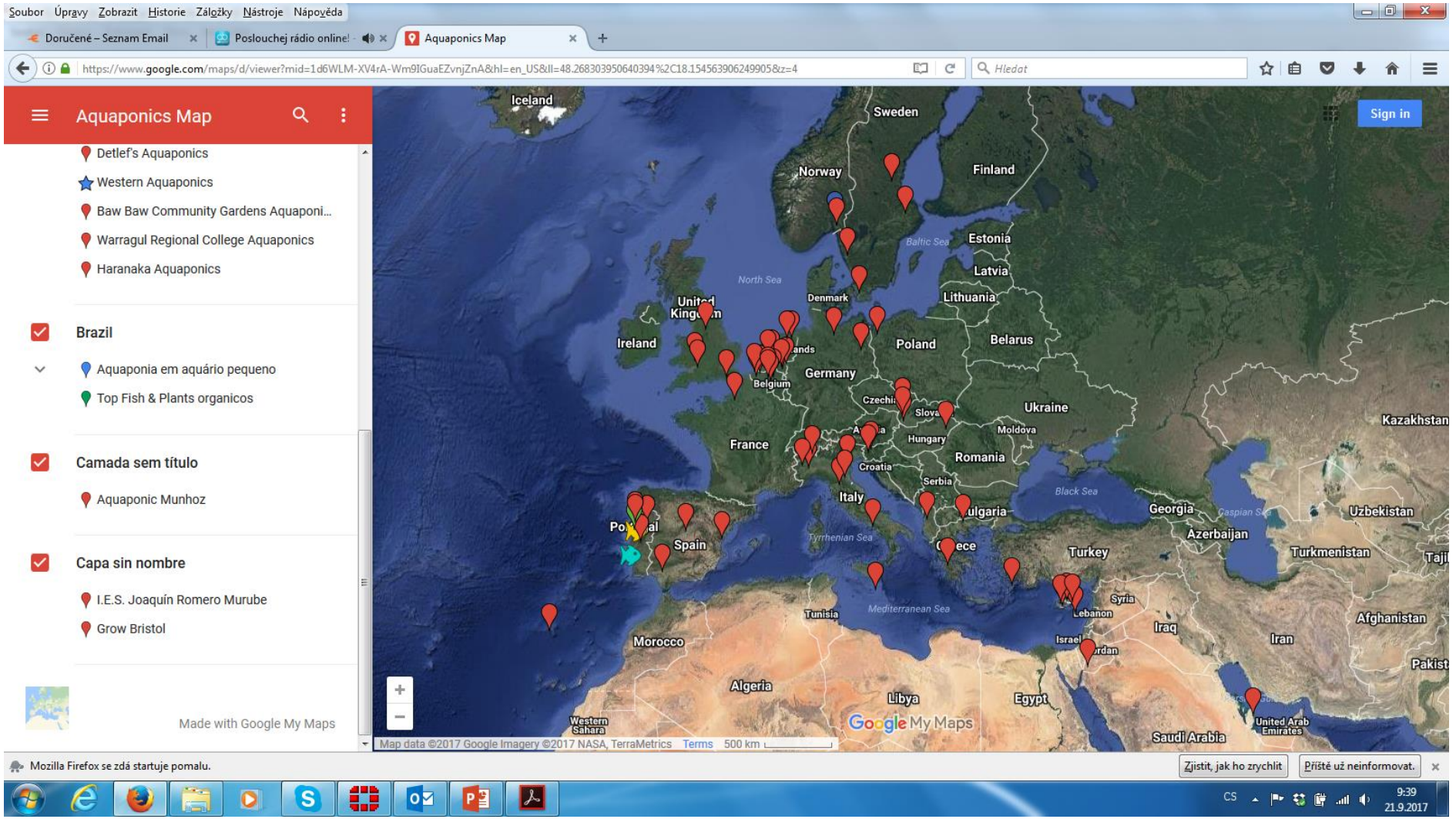

Challenges

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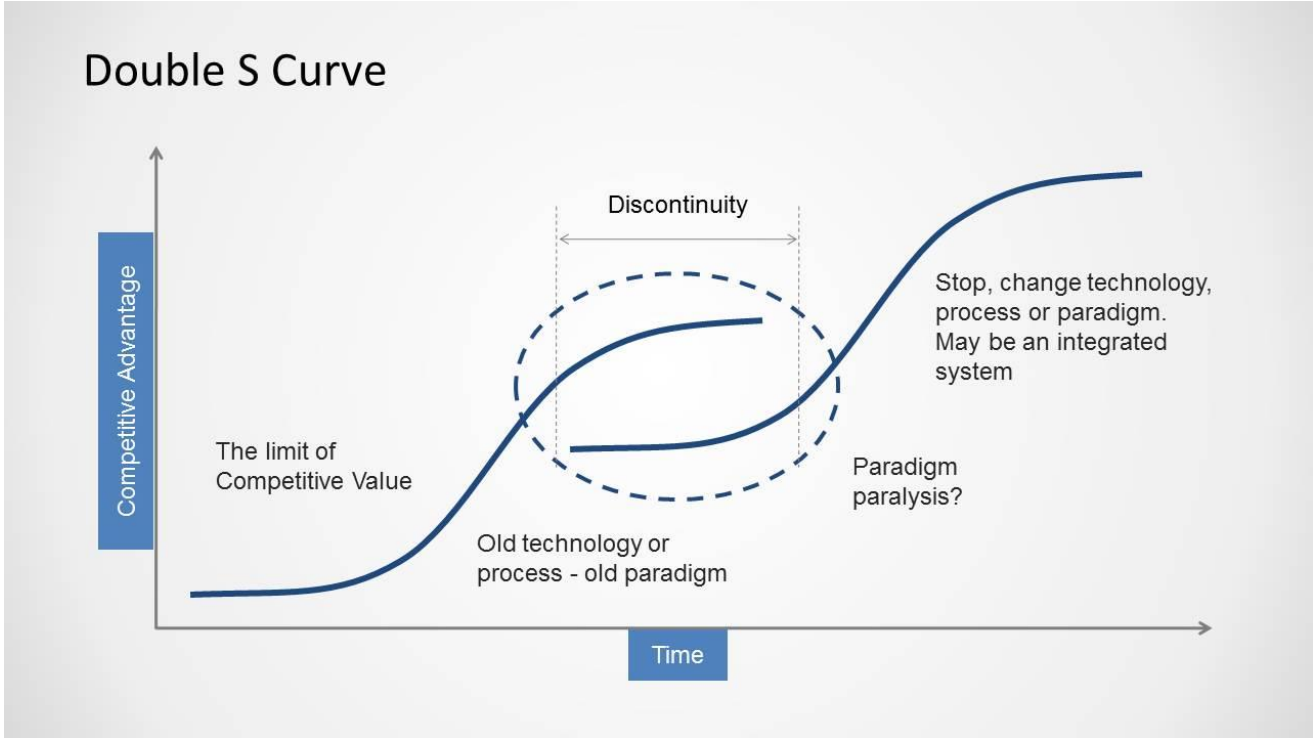
- Beginning, lack of experience
- Philosophy as motivation
- Lack of research and legislation
- High initial costs and risk of failure
- The market doesnt know about it



POWER4BIO website and social media

www.power4bio.eu

@power4bioproject

@power4bio

@power4bio

Thank you for your attention

Jan Mráz

University of South Bohemia

Faculty of Fisheries and Protection of Waters

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