

# **Intensive and more sustainable aquaculture practices. How it can work together?**

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# The challenges in Aquaculture

Choose the species

Keep the fish

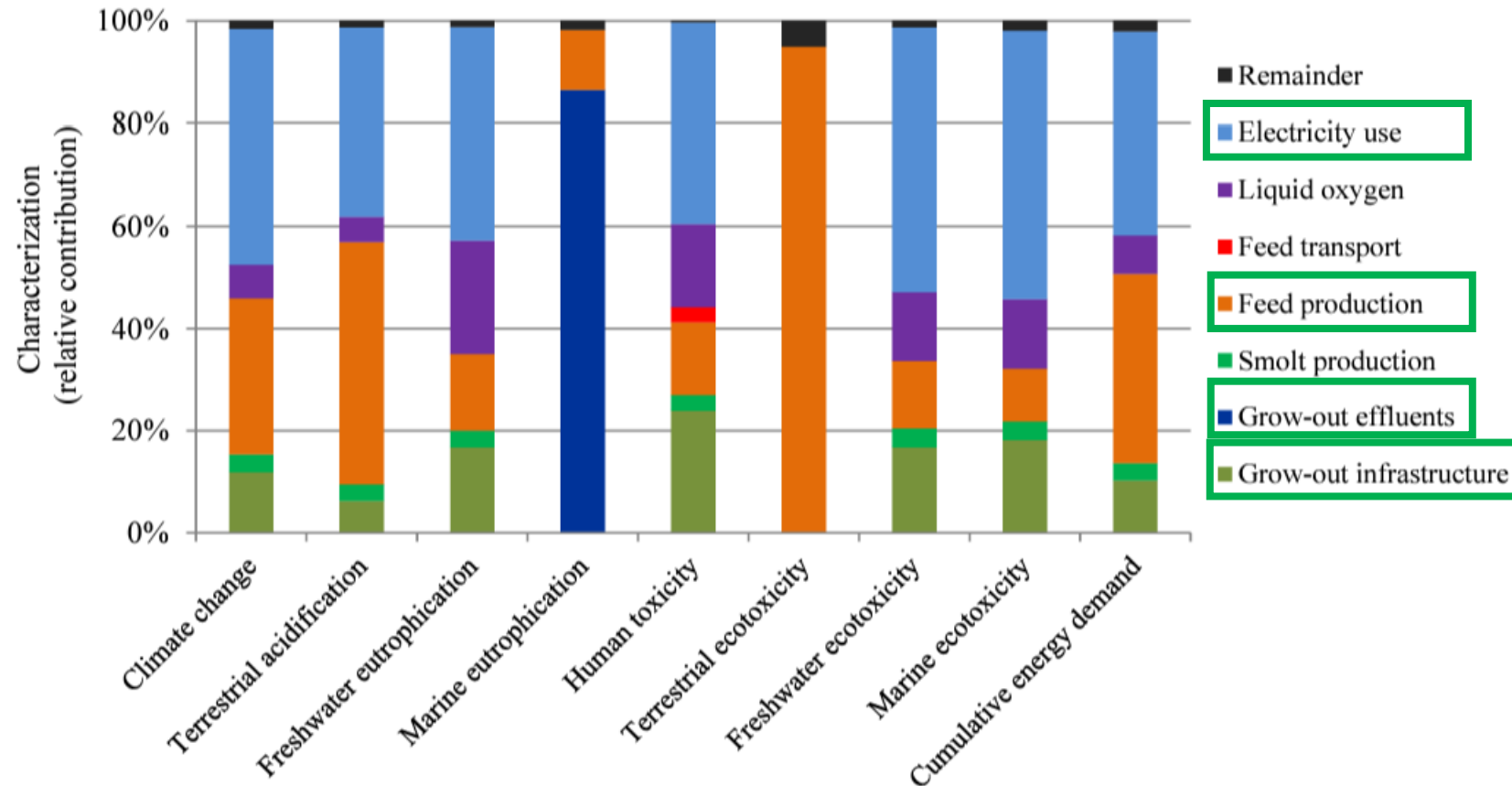
Make the feed

Handle the waste

Produce quality fish

And how does  
MATIS support the  
development

# The challenges in Aquaculture: What matters for sustainability?



**Figure 2** Life cycle contribution analysis of one tonne salmon harvested at the grow-out farm (cradle-to-farm gate) using the ReCiPe method. The term Remainder refers to the sum of processes each less than 2% of the total potential

# The challenges in Aquaculture

## The most relevant species.



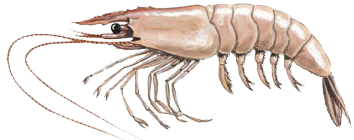
Carp species  
(*Cyprinus carpio* and Indian carps)



Atlantic salmon  
(*Salmo salar*)



Nile tilapia  
(*Oreochromis niloticus*)



Whiteleg shrimp  
(*Litopenaeus vannamei*)

MATIS

NO

YES

YES

YES



Choose the species

# The challenges in Aquaculture Feeds need new raw materials

## Latest news & developments on insect protein

<p>20-06   News <b>Black soldier fly prepupae fortified with selenium for feed</b></p> 	<p>10-05   News <b>The first cricket farm is launched in Russia</b></p> 
<p>09-05   News <b>Insect enters booming US chicken feed market</b></p> 	<p>13-04   News <b>UK Ag-Tech Start-Up raises \$16m to expand insect mini-farms</b></p> 
<p>07-04   Article <b>Legislation hinders a full circular feed economy realisation</b></p> 	<p>04-04   Article <b>Australia: Ensuring feed-insects are free of animal materials</b></p> 
<p>31-03   News <b>New insect research laboratory launched in UK</b></p> 	<p>14-03   Article <b>Role of insects in the circular economy has far reaching potential</b></p> 
<p>14-02   Article <b>Black Soldier fly larvae as beef cattle feed – price models</b></p> 	<p>04-02   News <b>Black soldier fly promising enrichment of layers</b></p> 
<p>21-01   News <b>Survey: 25% of UK consumers happy to try edible insects</b></p> 	<p>14-12-2021   News <b>UK retailer to replace soy with insects to cut carbon</b></p> 

## Latest news & developments on algae

<p>27-07   Article <b>The potential of microalgae as fish feed</b></p> 	<p>11-07   News <b>Consortium wins EU grant to upscale seaweed production</b></p> 
<p>07-04   Article <b>Legislation hinders a full circular feed economy realisation</b></p> 	<p>22-11-2021   Article <b>Feed of the future</b></p> 
<p>23-09-2021   News <b>First scalable production of algae from carbon emissions</b></p> 	<p>30-06-2021   News <b>Animal nutrition company joins forces to enrich human health</b></p> 
<p>16-06-2021   Article <b>Protein value of Norwegian seaweed evaluated for feed</b></p> 	<p>07-06-2021   Article <b>How macroalgae can support young animal health</b></p> 
<p>21-05-2021   Article <b>The Seaweed Company: Seaweed so many possibilities</b></p> 	<p>23-04-2021   Article <b>Marine microalgae in biofilm for sustainable animal feed</b></p> 
<p>22-02-2021   Article <b>Seaweed in feed has no effect (yet) on methane production</b></p> 	<p>21-09-2020   Interview <b>Startup Volta Greentech on reducing methane</b></p> 

## The latest news & developments on grain legumes

<p>15-07   News <b>Camelina can partly replace soybean meal in broiler diets</b></p> 	<p>16-06   Article <b>Gorlinka as a protein alternative in livestock diets</b></p> 
<p>08-11-2021   Article <b>Russia is on a fast track to a new pea industry</b></p> 	<p>11-10-2021 <b>Nutritional benefits of perennial legumes in dairy cattle</b></p> 
<p>25-02-2021   Article <b>US: First application for hemp as feed for poultry</b></p> 	<p>30-11-2020   Article <b>Use of canola meal in pigs, poultry and aquaculture species</b></p> 
<p>26-11-2020   News <b>Chickpeas for cattle nutrition: hummus not just for humans</b></p> 	<p>24-07-2020   Article <b>Canola meal in dairy rations</b></p> 
<p>19-05-2020   News <b>Growth performance of pigs fed processed field pea</b></p> 	<p>04-03-2020   News <b>Pigs thrive on protein from clover grass</b></p> 
<p>13-01-2017   Article <b>Field peas as a protein source for dairy cows</b></p> 	<p>19-09-2016   News <b>German pig project to look at soy alternatives</b></p> 

Single Cell Protein

**Nutreco seeks startups for its 2022 feed and food tech challenge**  
Nutreco is looking for startups and other innovators with innovative and disruptive ideas to produce new feed with better resources.

**Unibio starts shipping gas derived protein product to Danish Agro**  
Danish innovation, Unibio, has made its first sale to a European based feed company of the world's first gas derived protein product.

**SCP pioneer raises US\$39m in funding round led by BP venture arm**  
High yield protein producer, Calysto, announced a US\$39m financing round led by the high tech venture arm of BP, bp venture, to support global scale up of its microbial SCP protein made in a fermenter, which is targeted at feed.

**Feed protein producer Unibio generates \$15m in financing round**  
Single cell protein producer, Unibio, has announced the successful completion of a US\$15m financing round, predominantly from existing investors.

**Cargill's Henstrom to head up single cell protein player**  
Specialized protein producer, Unibio, has appointed David Henstrom as its new CEO. Henstrom's portfolio includes managing feed mills.

**Single-cell protein innovator secures funding to accelerate scale-up**  
Single Cell Protein Innovator

**Calysto on track to deliver novel feed protein ingredient to Chinese customers this year**  
Calysto, a joint venture between Nutreco and Calysto, has successfully completed a successful trial of its novel microbial SCP protein made in a fermenter, which is targeted at feed.

**EIT Food reveals new cohort of impactful agrifood startups**  
EIT Food has announced the third group of companies to join the European Agrifood Innovation Partnership (EIT-AP) agrifood innovation ecosystem, aimed at the support and scaling up of innovative agrifood and food tech startups.

**Norwegian protein production out of air and water**  
Newly founded single cell protein (SCP) producer, BioFeed (BIO), is getting set for its first production with its gas-derived microbial protein plant in Oslo.

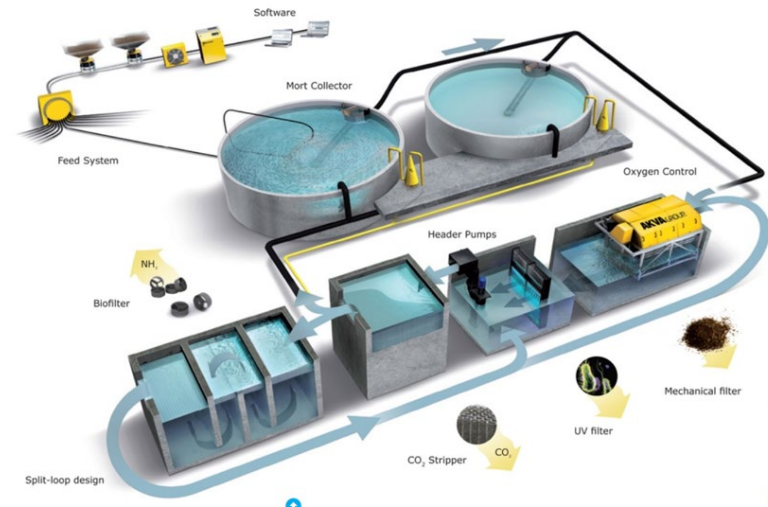
**Deep Branch anticipates first commercial production of its single cell protein in 2022**  
Single cell protein producer, Deep Branch, is collaborating with the National Research Council of Canada, a leading research organization, to assess the feasibility of building its first commercial scale plant in Canada.

**Finnish SCP startup building pilot plant, planning financing round**  
Newly founded single cell protein (SCP) producer, BioFeed (BIO), is getting set for its first production with its gas-derived microbial protein plant in Oslo.

Feed navigator.com

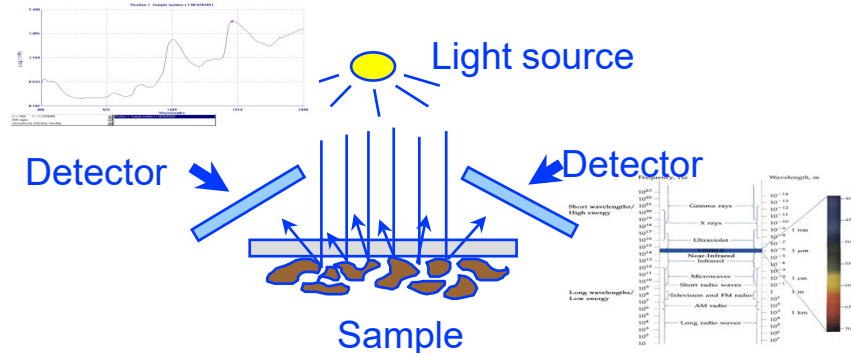
Make the feed

# The challenges in Aquaculture Choice of husbandry system.

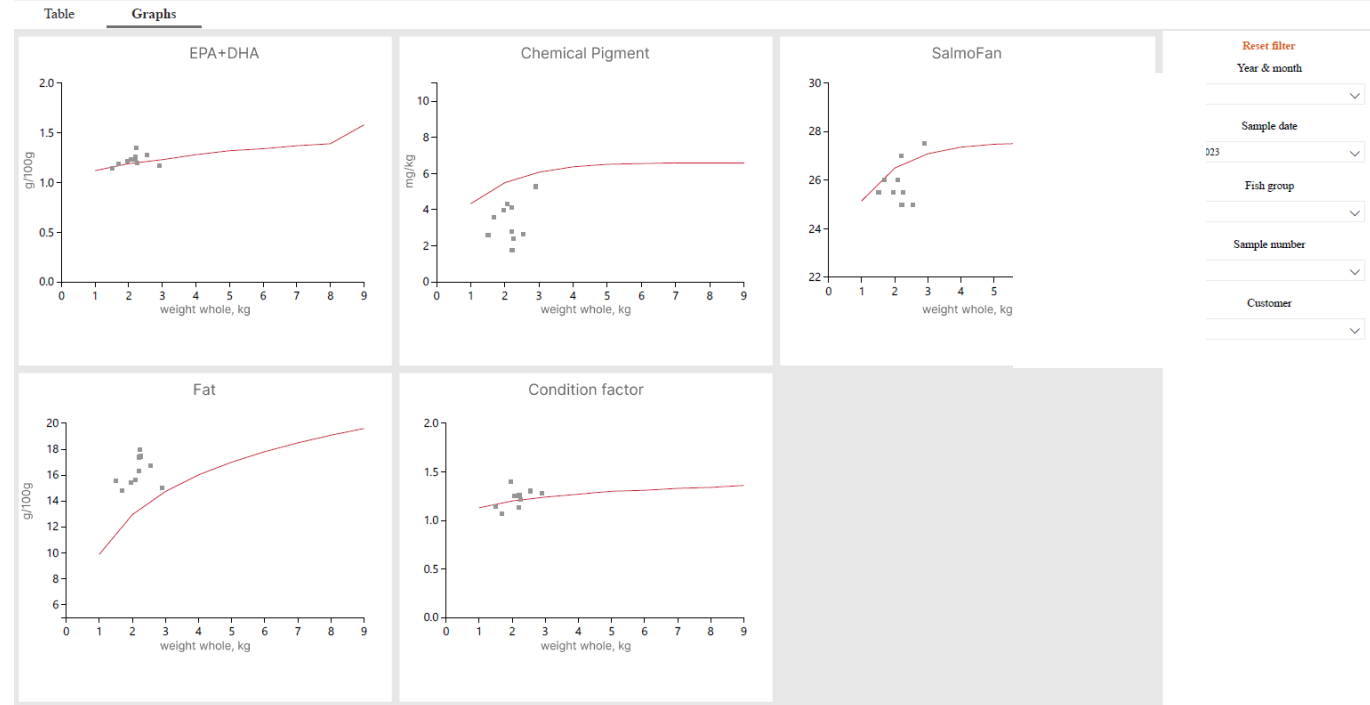


Keep the fish

# The challenges in Aquaculture Ensure fish quality in real-time



Fish quality **matís**



Produce quality fish

# The challenges in Aquaculture

## What to do with the rest.



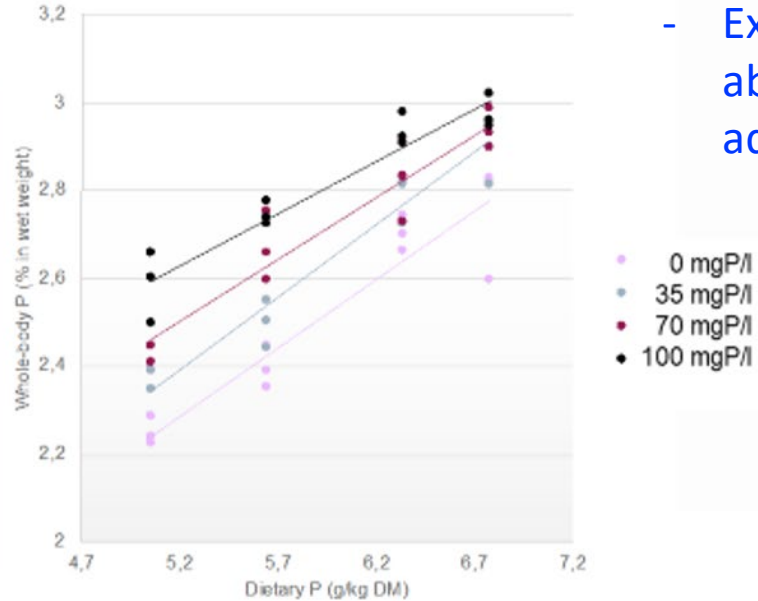
Handle the waste



# The challenges in Aquaculture

## What to do with the rest.

- Juvenile *Silurus glanis* were given diets with four different P-levels at four different P-wáter concentrations.
- Body mineralization increased with dietary P and with wáter P.
- At 100 mg/l wáter P, around 1kgP/MT feed could be saved.



- Excreted phosphorus can be re-absorbed from the water and save P-addition to the feed.

- Special binders can improve faecal stability and make it easier to remove solids from water.



Faeces collection



Faecal material

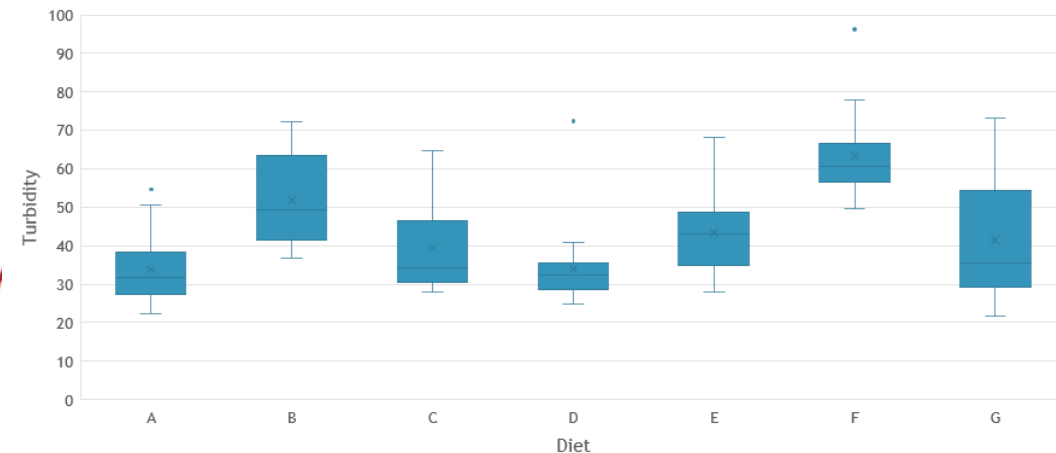


500 ml sample bottles



Turbidity measurement

Faeces stability



## **Intensive and more sustainable aquaculture practices. How it can work together?**

- Novel feed raw materials have to be developed.**
- New husbandry systems with low impact have to be realized.**
- Quality of fish needs to be monitored and maintained.**
- Excretions of fish need to be quantified, separated and valorised.**