New Solutions in Global Aquaculture

Explore new technological solutions in global context and crossover opportunities between subsea and aquaculture
A brief overview of global Aquaculture

by/ Ragnar Nystøyl

«New solutions in global aquaculture»
Seminar; Cross-over project – «Oil & Gas meets aquaculture»

Aquanor, Trondheim
August - 2017
Perspective of the potential: Scaling up from Salmonids ???

The Salmon Industry in 2016:
- A USD 15 BN Industry at producer level
- Example NORWAY 2015:
  - First-sale value: USD 5-6 BN (50 % of WW)
  - Generating USD 2,3 BN in dir/indir value added for related industry (*Sintef Ocean, Aug 17):

*Technology and Service provider.

The quick conclusion: The potential must be huge!
Agenda / Aim of presentation

- A quick glance at the diversity in global aquaculture
- Huge differences: Geography, Production methods
- A diverse exposure to, and need for «Technology»
- For major commercial species;
- Major challenges and latest trends
# Global Aquaculture

## Where & What?

### Table: Aquaculture Production by Region and Category

<table>
<thead>
<tr>
<th>Region</th>
<th>Salmonids</th>
<th>Other Marine Fish</th>
<th>Other Freshwater Fish</th>
<th>Carps and Carp-like</th>
<th>Crustaceans</th>
<th>Molluscs</th>
<th>Aquatic Plants</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In million Tonnes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EUROPE</strong></td>
<td>1.6</td>
<td>0.3</td>
<td>0.3</td>
<td>0.0</td>
<td>0.2</td>
<td>-</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>AMERICAS</strong></td>
<td>0.9</td>
<td>0.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.8</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>ASIA</strong></td>
<td>0.0</td>
<td>0.2</td>
<td>0.9</td>
<td>0.2</td>
<td>4.2</td>
<td>3.9</td>
<td>5.8</td>
<td>29.5</td>
</tr>
<tr>
<td><strong>AFRICA</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.9</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>OCEANIA</strong></td>
<td>0.1</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>2.6</td>
<td>0.6</td>
<td>1.2</td>
<td>0.8</td>
<td>5.7</td>
<td>4.3</td>
<td>6.1</td>
<td>29.8</td>
</tr>
</tbody>
</table>

Source: Kontali estimates, based on FAO, GOAL, own research
It all depends on the perspective...

Source: Kontali estimates, based on FAO, GOAL, own research
It all depends on the perspective…

Aquaculture - Ranked by Volume

Source: Kontali estimates, based on FAO, GOAL, own research
It all depends on the perspective…
Ranked by Value…

Source: Kontali estimates, based on FAO, GOAL, own research
## Categorization
Production Methods vs. Environment/Regime

<table>
<thead>
<tr>
<th>Production Environment</th>
<th>Feeding Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extensive</strong></td>
<td></td>
</tr>
<tr>
<td>Seaweed Culture (Ranching)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Bivalve/Mussel Cultures</td>
<td>n.a.</td>
</tr>
<tr>
<td>Feeding grounds, ranching or simple Pond culture</td>
<td>Minimal</td>
</tr>
<tr>
<td><strong>Semi-Intensive</strong></td>
<td></td>
</tr>
<tr>
<td>Integrated Ponds</td>
<td>Minimal</td>
</tr>
<tr>
<td>Simple Pen- &amp; Cage-cultures</td>
<td>Variable / Seldom Compound</td>
</tr>
<tr>
<td><strong>Intensive</strong></td>
<td></td>
</tr>
<tr>
<td>Ponds</td>
<td>Compound feed &amp; Non-compound</td>
</tr>
<tr>
<td>Freshwater, Brakkish and Inshore Pens &amp; Cages</td>
<td>Compound feed - Complexity vary</td>
</tr>
<tr>
<td>Marine &amp; Offshore Cages</td>
<td>Compound feed - Complex</td>
</tr>
<tr>
<td>Tanks, Raceways, RAS</td>
<td>Compound feed - Complex</td>
</tr>
<tr>
<td>Production Environment</td>
<td>Feeding Regime</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Extensive</td>
<td></td>
</tr>
<tr>
<td>Seaweed Culture (Ranching)</td>
<td>n.a.</td>
</tr>
<tr>
<td>Bivalve/Mussel Cultures</td>
<td>n.a.</td>
</tr>
<tr>
<td>Ranching or simple Pond culture</td>
<td>Minimal</td>
</tr>
<tr>
<td>Semi-Intensive</td>
<td></td>
</tr>
<tr>
<td>Integrated</td>
<td>Minimal</td>
</tr>
<tr>
<td>Ponds</td>
<td>Variable / Seldom Compound</td>
</tr>
<tr>
<td>Simple Pen- &amp; Cage-cultures</td>
<td>Variable / Seldom Compound</td>
</tr>
<tr>
<td>Intensive</td>
<td></td>
</tr>
<tr>
<td>Ponds</td>
<td>Compound feed &amp; Non-compound</td>
</tr>
<tr>
<td>FW, Brakkish and Inshore</td>
<td>Compound feed - Complexity vary</td>
</tr>
<tr>
<td>Marine &amp; Offshore Cages</td>
<td>Compound feed - Complex</td>
</tr>
<tr>
<td>Tanks, Raceways, RAS</td>
<td>Compound feed - Complex</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Target Markets? 30-35 % of Value ~ +/- 40 BN USD
Warmwater Shrimp Major Challenges?

- Diseases!
- Pond environment
  - Bacteria
  - Parasites
  - Effluents/Residues

-> Water Quality
Warmwater Shrimp

- Globally, fragmented production regions
- Truly global Market, with increasing demand
- Strong will to growth, but regular set-backs; primarily disease-related

Source: Kontali est., based on GOAL, industry sources + own research, Eurostat/US Census
Pangasius - Catfish

Major Challenges:

- Reputation / acceptance in markets
  -> also market access

- Real/perceived environmental and social effects of farming practices

- Cost vs. Price
Pangasius - Catfish

- Still struggling with market access and acceptance
- Low growth in global production
- Stagnating to declining international trade,
- Lowest price «position»

Source: Eurostat – US Census
Tilapia

Major Challenges?

- Diseases (*Latest*.. – *TiLV*)

- Current production methods -> exposure to weather, varying water quality

- Pond environment…..

- Access to area and fresh-water of right quality
Tilapia

- The most diverse specie, Geography - Production

- Steady growth, but declining?

- Major growth for domestic consumption in Asia, Africa and partly South America

- International trade – Shifting more to axis Asia -> Africa -> Price effect….

Source: Kontali est., based on GOAL, industry sources + own research, US Census / IHS
Bass & Bream

- Markets – Traditionally price-sensitive to volume change.

- Expanding geographical markets, and consumer segments -> A slow process

- Price effects of production / feed sales growth in 2015/2016

- Stagnating feed sales YTD 2017 -> Better balance?

Source: Kontali est., industry sources + own research & database
Salmonids

Major Challenges?

- Parasites (Sea-lice)
- Access to production capacity and production sites
- Escalating costs
Salmonids

- Record high prices 2016 and into 2017.

- On back of biggest supply decline seen in modern (Although only at 7 %)

- Improvement in productivity, mainly Chile, but also Europe + Strong will to grow persists

- A shift in production towards volume growth again!

Source: Kontali, Chilean customs, Nasdaq/SSB
Final Considerations

- There are huge needs and potential, for providing technological solutions to other than marine, cage-based aquaculture.

- But, needs are different – and not necessarily priority..

- Challenges:
  - Geographical and cultural spread & structures
  - Diversity in biology & production methods
  - Low financial capacity to R&D and investments
  - Local & In-expensive competition…
Thank you for the attention...

www.kontali.com