Aquaculture in Portugal: Challenges and Opportunities

Pedro Encarnação 2016
Overview of Portuguese Aquaculture

Market

- Portugal is the 3rd biggest per capita fish consumer in the world with 62 kg fish/person/year.
- Portuguese seafood demand is also remarkably diversified, with request for a high number of different species available in the market place.

Production

- Aquaculture production in Portugal is very fragmented, producing small amount of many species.
- Producing 3 species of bivalves and 7 species of fish
**Overview of Portuguese Aquaculture**

Portuguese Aquaculture is very diverse in all aspects.

<table>
<thead>
<tr>
<th>Species</th>
<th>Area of Culture</th>
<th>Type of Culture</th>
<th>Culture System</th>
<th>Type of Culture Bivalves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>Estuaries</td>
<td>Extensive</td>
<td>Cages</td>
<td>Longline</td>
</tr>
<tr>
<td>Bivalves</td>
<td>Marine Waters</td>
<td>Semi-Intensive</td>
<td>Ponds</td>
<td>Floating structures</td>
</tr>
<tr>
<td>Crustaceans</td>
<td>Inland Waters</td>
<td>Intensive</td>
<td>Tanks</td>
<td>Parks</td>
</tr>
<tr>
<td>Macro/Micro Algae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Overview of Portuguese Aquaculture Production

### Production 2014

<table>
<thead>
<tr>
<th>Species</th>
<th>Producción (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seabass</td>
<td>455</td>
</tr>
<tr>
<td>Seabream</td>
<td>1201</td>
</tr>
<tr>
<td>Trout</td>
<td>772</td>
</tr>
<tr>
<td>Sole</td>
<td>154</td>
</tr>
<tr>
<td>Turbot</td>
<td>2353</td>
</tr>
<tr>
<td>Clams</td>
<td>2372</td>
</tr>
<tr>
<td>Mussels</td>
<td>1547</td>
</tr>
<tr>
<td>Oysters</td>
<td>995</td>
</tr>
</tbody>
</table>

Source INE

- Portuguese aquaculture production is dominated by shellfish (clams, oyster, mussels) which reflects the good conditions of Portugal for production of these species.
- Fish production is dominated by intensive production of turbot using RAS system.
- Seabass and seabream production in earthen ponds is not competitive and serves a niche market.
Achieving high production and efficiency in Aquaculture requires the right approach

- Aquaculture is a capital intensive business that requires a careful selection of the species and location to invest on, to achieve high efficiency

- Portugal has opportunities but also important constraints:
  - Very good conditions for production of bivalves (inland and offshore).
  - Vast area for offshore operation (mainland and islands)
  - Possibility to produce high value species in RAS systems
  - Challenging conditions for offshore cage farming in mainland Portugal
  - Water temperature profile that is not optimal for the species produced (seabass, seabream, meagre, sole)

Although there are specific opportunities in Portugal, at the moment the industry needs to overcome major constrains
High potential for shellfish production

Potential
- Good environmental conditions to achieve high growth rates
- Vast area for longline and park production

Constrains
- Constant presence of toxic algae
- Logistics to work offshore
- Low internal market (oyster and mussels)
How to further develop shellfish production

Immediate needs

- Environmental modeling to predict occurrence of toxic algae blooms
- Develop internal market (oyster, mussels)
Inland Aquaculture using RAS or flow through

Potential

- Good temperature profile for turbot production
- Possibility to better control production cycle
- High productivity

Constrains

- High capital investment
- High operational costs
- Restricted to high value species
High Challenges for the fish production

Potential

• Big demand for seabass and seabream
• Possibility for offshore production
• Good conditions in Madeira Island

Constrains

• Water temperature at sea not optimal for growth of these species
• Rough seas limits offshore production
• Most production done in earthen ponds with limited capacity
The challenge of water temperature

- Water temperature is a major drive for fish growth (seabass, seabream optimal 22-25 ºC)

Madeira has enormous potential for offshore farming of temperate species (Seabream, tuna) Temp profile (17-23 C)
Offshore Challenges for the fish production

- Continental west cost is quite exposed to extreme waves
- South coast characterized by strong currents
- Madeira has excellent temp profile but some challenging conditions in waves and currents
Cage farming has the choice model

Key Points

- Most efficient aquaculture operations are based on cage farming (e.g. Salmon)
- Lower installation costs
- Higher productivity
- Better growth rates

Introduction of technology (automatic feeding, underwater cameras) to optimize production cycle and costs
Offshore as Future of Aquaculture?

Investing in Open Sea Farming:

- New trend in industry
- Fewer licence limitations
- Higher production
- Technology still in testing phase
- High investments (€60-80 M)

Development of **offshore aquaculture in Portugal** is highly dependent on **new technology** that can **adapt to our sea conditions**.
Synergy renewable energy and Aquaculture?

Synergies:
- Share logistics and infrastructure offshore
- Energy source to power aqua farms

Constrains:
- Different environment conditions necessary for each industry (aqua – calm)
Thank you