Why Farming of Marine Fish?

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Marine Farms Vietnam

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Marine Farms ASA
Mr. Massad has over 25 years experience in various commercial aquaculture operations in different countries around the world. Since 2008, Mr. Massad has been Managing Director for Marine Farms Vietnam - an international company and subsidiary of Marine Farms A/S Norway - dedicated to the production of cobia, with a total annual production of 1,500 tonnes. The company employs a workforce of over 100 and posts annual sales of US$ 6 million. Before, he was Business Manager for Armstrong-Keta Inc. in Juneau, Alaska (USA), a regional salmon enhancement hatchery based in Alaska.
Environmental Concerns

- Freshwater – limited resources.
- Seawater - higher availability of resources.
# Fish Prices (Value in USD/kg)

<table>
<thead>
<tr>
<th>Category</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater Fish</td>
<td>1.06 USD/kg</td>
</tr>
<tr>
<td>Diadromous Fish</td>
<td>3.26 USD/kg</td>
</tr>
<tr>
<td>Marine Fish</td>
<td>3.48 USD/kg</td>
</tr>
</tbody>
</table>
### Growth In Farmed Finfish (Mill. Tonnes)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater fish</td>
<td>14.6</td>
<td>18.6</td>
<td>23.0</td>
<td>25.8</td>
<td>8%</td>
</tr>
<tr>
<td>Diadromous fish</td>
<td>1.7</td>
<td>2.1</td>
<td>2.6</td>
<td>2.9</td>
<td>7%</td>
</tr>
<tr>
<td>Marine fish</td>
<td>0.6</td>
<td>0.9</td>
<td>1.2</td>
<td>1.6</td>
<td>17%</td>
</tr>
</tbody>
</table>

*Source: FAO*
A Conclusion

Marine fish offer:

– Less environmental concerns.
– Better prices.
– Better growth prospects.
Marine Fish Characteristics

- Carnivorous – high feed costs.
- Difficult intensive hatchery technique.
- High fecundity – many eggs per kilo, but small larvae.
- Good water quality.
- White flesh.
- Many species to choose from.
- Popular as food.
- Many well known and popular local species.
## Cold Water Farming Candidates

<table>
<thead>
<tr>
<th>Species</th>
<th>Tons Farmed</th>
<th>Price to Farmer (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halibut</td>
<td>2,000</td>
<td>12</td>
</tr>
<tr>
<td>Cod</td>
<td>20,000</td>
<td>4-5</td>
</tr>
<tr>
<td>Turbot</td>
<td>10,000</td>
<td>12+</td>
</tr>
<tr>
<td>Sole</td>
<td>1,000</td>
<td>12+</td>
</tr>
</tbody>
</table>
Temperate Water Species

**Europe**
- Mediterranean sea bass - 150,000 tons
- Mediterranean sea bream - 150,000 tons
- Corvina (meagre) - 5,000 tons?
- A number of other candidates – but similar eating quality

**Asia**
- Japanese sea bream
- Rockfish in Korea
- Flounder in Korea
- Yellowfin tuna
What Is The Next Area To Be Developed For Marine Fish?

The Tropics!!
Many Carnivorous Fish Farming Candidates in The Tropics

**Group A**
- Wrasses
- Groupers
- Tunas
- Rabbit fish (herbivorous)

**Group B**
- Snappers
- Pompano
- Barramundi / Asian sea bass
- Mahi-mahi
- Seriola sp. (yellowtail/kingfish)
- Cobia

Group A : difficult  
Group B : easier
Bottlenecks

• Broodfish and eggs.
• Larval rearing.
• Nutrition – develop plant protein ingredients.
• Diseases and parasites.
• Yield.
• Progress every year.
Semi Intensive
Low Investment, Family Unit
Intensive, High Capital Requirements
Open Ocean Cages, Very High Investment

Aquapod - Ocean Drifter (O.F.T./MIT)
Why Farming Cobia?

Cobia has all the traits you want in a farmed fish:

- Excellent eating qualities:
  - Grilled, baked, deep fried and as sashimi.
- White flesh.
- Large fillets.
- High in Omega-3.
- Do well in cages.
- Fast growth.
- Year round egg supplies can be developed.
- Efficient production.
Fast Growth

![Graph showing growth rates over time for different fish species: Cobia, Salmon, Seabass/bream, Cod.](image)
Omega-3 Content:
Salmon and Cobia have 1,000x more Omega-3 than Pangasius

Atlantic salmon
1.4
0.3

Cobia
1.4
0.3

Pangasius
0.002

gram Omega-3 / 150 gram product
+/- range
World Production of Farmed Cobia

- Estimated world production (tons) in 2007
  - China 20,000
  - Taiwan 4,000
  - Vietnam 2,000
  - Caribbean 1,000
  - Philippines 500
  - Thailand 500
  - Japan 500
- Total 28,500 tons
Cobia Cuisine

Pan Fried Cobia  Cobia Carbonnata  Cobia Sashimi
Vietnam - Sales

- Infrastructure and cages, nets, etc. for 2000 tons.
- Processing – contract production.
- Marketing:
  - Frozen to Nordic Group, Boston.
  - Fresh to Taiwan and Japan.
  - Fresh to other Asian markets.
  - Frozen to Europe.
- Plan to sell 1500 tons this year.
Production Cost for Marine Fish

Feed about 50% of cost

<table>
<thead>
<tr>
<th>Feed Cost</th>
<th>FCR</th>
<th>Feed Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.40</td>
<td>1.5</td>
<td>2.10</td>
<td>4.20</td>
</tr>
<tr>
<td>1.20</td>
<td>1.2</td>
<td>1.44</td>
<td>2.88</td>
</tr>
</tbody>
</table>

Range of cost (USD) for marine fish farmed in cages. Cost round, ex cage.
Development Cost and Market Price (FOB Norwegian border) and World Supply Atlantic Salmon, 1987-2008E

Average export price fob Norwegian border, fresh gutted Atlantic salmon

Harvest quantity
Atlantic salmon World wide
Estimate for 2008

Average cost/ kg fresh gutted
Atlantic salmon, (fob Norwegian border)

Adjusted according to consumer index basis 2008 = 100
Source: The Norwegian Seafood Export Council / Konta
For marine fish we will see the same developments:

• Better feed – R&D.
• Better fish (genetics).
• Lower costs.
• Higher volume.

Cobia (and tuna) will be winners!