Global Fish Production Data & Analysis

PRESENTER DR. RAGNAR TVETERAS | UNIVERSITY OF STAVANGER

GLOBAL OUTLOOK FOR AQUACULTURE LEADERSHIP
GUANGZHOU, CHINA | DAY 1
HEALTHY FISH | HEALTHY PEOPLE | HEALTHY PLANET
Dr. Ragnar Tveteras

• Professor Ragnar Tveteras is a business economist at the University of Stavanger’s Department for Industrial Economics, Risk Management and Planning in Norway.

• His research focuses primarily on aquaculture and seafood markets.

• As a writer and lecturer, he maintains relationships with authorities and private decision makers at the regional, national and international levels.

• Tveteras received the 2006 Scana research prize for his many publications and ability to communicate research findings beyond a narrow academic circle.
• **Prices:** NMFS, Norwegian Seafood Council, Kontali, Eurostat, FAO.

• **Production volumes:** FAO, Kontali, and many individuals and organizations who kindly responded to the GAA survey, sharing their time and knowledge.
Scope of Analysis

• Most focus on internationally traded species:
  • Typically imported to USA, Europe & Japan.

• Production forecasts for 2015 and 2016 for all chosen species:
  • But for some species only major producer countries/regions.

• Production forecast for 2017 for some species.
Finfish Species Included in Analysis

**Freshwater species:**
- Tilapia
- Catfish
  - Pangasius
  - Channel catfish, etc.
- Carps

**Diadromous species:**
- Salmon & Trout
  - Atlantic salmon
  - Coho salmon
  - Trout
  - Barramundi
  - Milkfish

**Marine species:**
- Seabass & Sea Bream
- Flatfishes
  - Olive Flounder
  - Atlantic Halibut
  - Turbot
- Cobia
- Atlantic cod
- Bluefin tuna
- Groupers
Freshwater Species
Global Tilapia Aquaculture Production

US import prices frozen fillet

Note: Prices are annual averages, except for 2015 (January-July average)
Tilapia

Countries production sorted by 2015 figures

Average of estimates from several sources.
Tilapia production estimates for China

Year | Average | Sergio Zimmermann | Anonymous3 | CAPPMA | Kevin Fitzsimmons | Anonymous2 | Anonymous1 | Liu Liping
--- | --- | --- | --- | --- | --- | --- | --- | ---
2014 | 1,665 | | | | | | | |
2015 | 1,710 | | | | | | | |
2016 | 1,724 | | | | | | | |
2017 | 1,776 | | | | | | | |
2018 | 1,712 | | | | | | | |

X 1000 MT
Pangasius

Production in selected countries

<table>
<thead>
<tr>
<th>Year</th>
<th>Malaysia</th>
<th>Indonesia</th>
<th>Bangladesh</th>
<th>India</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>1,169,000</td>
<td>383,846</td>
<td>100,000</td>
<td>475,000</td>
<td>100,000</td>
</tr>
<tr>
<td>2015</td>
<td>1,115,200</td>
<td>403,409</td>
<td>100,000</td>
<td>430,000</td>
<td>100,000</td>
</tr>
<tr>
<td>2016</td>
<td>1,188,680</td>
<td>422,182</td>
<td>100,000</td>
<td>447,500</td>
<td>100,000</td>
</tr>
<tr>
<td>2017</td>
<td>1,251,680</td>
<td>435,666</td>
<td>105,000</td>
<td>462,500</td>
<td>100,000</td>
</tr>
<tr>
<td>2018</td>
<td>1,334,680</td>
<td>640,000</td>
<td>110,000</td>
<td>640,000</td>
<td>110,000</td>
</tr>
</tbody>
</table>

Pangasius production estimates for Vietnam

<table>
<thead>
<tr>
<th>Year</th>
<th>Average</th>
<th>Anonymous4</th>
<th>Anonymous3</th>
<th>Hồ văn Chiến</th>
<th>Anonymous2</th>
<th>Anonymous1</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>1,169,000</td>
<td>1,115,200</td>
<td>1,188,680</td>
<td>1,251,680</td>
<td>1,334,680</td>
<td>1,334,680</td>
</tr>
<tr>
<td>2015</td>
<td>1,115,200</td>
<td>1,115,200</td>
<td>1,188,680</td>
<td>1,251,680</td>
<td>1,334,680</td>
<td>1,334,680</td>
</tr>
<tr>
<td>2016</td>
<td>1,115,200</td>
<td>1,115,200</td>
<td>1,188,680</td>
<td>1,251,680</td>
<td>1,334,680</td>
<td>1,334,680</td>
</tr>
<tr>
<td>2017</td>
<td>1,251,680</td>
<td>1,251,680</td>
<td>1,251,680</td>
<td>1,251,680</td>
<td>1,251,680</td>
<td>1,251,680</td>
</tr>
<tr>
<td>2018</td>
<td>1,334,680</td>
<td>1,334,680</td>
<td>1,334,680</td>
<td>1,334,680</td>
<td>1,334,680</td>
<td>1,334,680</td>
</tr>
</tbody>
</table>
Pangasius
Production in Vietnam and US (blue) & EU (red) real import prices frozen fillet (USD/kg)

Prices: Norwegian Seafood Council, Eurostat and NMFS.
Total production of Catfish species

Incl. Pangasius

Production in metric tonnes

Sources: FAO, Kontali and miscellaneous.
### Total production of Catfish species

#### Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Production in metric tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>886,900</td>
</tr>
<tr>
<td>2004</td>
<td>1,059,902</td>
</tr>
<tr>
<td>2005</td>
<td>1,302,521</td>
</tr>
<tr>
<td>2006</td>
<td>1,578,010</td>
</tr>
<tr>
<td>2007</td>
<td>1,908,584</td>
</tr>
<tr>
<td>2008</td>
<td>2,276,220</td>
</tr>
<tr>
<td>2009</td>
<td>2,531,993</td>
</tr>
<tr>
<td>2010</td>
<td>2,834,305</td>
</tr>
<tr>
<td>2011</td>
<td>3,154,589</td>
</tr>
<tr>
<td>2012</td>
<td>3,451,392</td>
</tr>
<tr>
<td>2013</td>
<td>3,883,296</td>
</tr>
<tr>
<td>2014</td>
<td>4,155,103</td>
</tr>
<tr>
<td>2015</td>
<td>4,228,000</td>
</tr>
<tr>
<td>2016</td>
<td>4,370,000</td>
</tr>
<tr>
<td>2017</td>
<td>4,676,000</td>
</tr>
<tr>
<td>2018</td>
<td>4,885,000</td>
</tr>
</tbody>
</table>

Sources: FAO and miscellaneous. Prices: NMFS.
Carps in China
Production by major species

Major Carp species in GAA survey

Diadromous Species
Atlantic Salmon Production

Real EU27 import price fresh whole gutted and real US import price fresh fillet

Sources: FAO, Kontali, NSC/Eurostat (prices). Note: Prices until 2013 are annual averages. Price in 2015 is January-August average.
Atlantic Salmon
Production by country

Source: Kontali
Coho Salmon
Total Production and Real Export Price for Chilean Coho Frozen, Head off

Sources: FAO, Kontali.
Coho Salmon

Production by country

Source: Kontali
Large Rainbow Trout

Total Marine Production, real Chilean frozen export price (blue) and real EU fresh import price EUR/kg (red)

Sources: FAO, Kontali and miscellaneous, NSC. Note: Prices are annual averages except 2015 (January-August average).
Large Rainbow Trout

Production by country

Production in Metric Tonnes

- Chile
- Norway
- Finland
- Russia
- Faroe Island
- Australia
- Others

Source: Kontali
Small Rainbow Trout
Global Production and EU27 real import price frozen whole trout < 1.2 kg

Sources: FAO, Kontali, NSC. Note: Prices are annual averages except 2015 (January-August average).
Small Rainbow Trout

Production by Country

Asian Seabass, Barramundi
Barramundi Production forecasts for selected countries

Marine Species
Seabass & Sea Bream
Mediterranean Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Sea Basses</th>
<th>Sea Breams</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>459,578</td>
<td>58,831</td>
</tr>
<tr>
<td>2000</td>
<td>578,111</td>
<td>73,232</td>
</tr>
<tr>
<td>2001</td>
<td>561,621</td>
<td>88,340</td>
</tr>
<tr>
<td>2002</td>
<td>610,933</td>
<td>88,922</td>
</tr>
<tr>
<td>2003</td>
<td>620,600</td>
<td>99,265</td>
</tr>
<tr>
<td>2004</td>
<td>68,769</td>
<td>113,200</td>
</tr>
<tr>
<td>2005</td>
<td>82,706</td>
<td>141,500</td>
</tr>
<tr>
<td>2006</td>
<td>113,200</td>
<td>160,700</td>
</tr>
<tr>
<td>2007</td>
<td>123,500</td>
<td>169,200</td>
</tr>
<tr>
<td>2008</td>
<td>120,700</td>
<td>170,300</td>
</tr>
<tr>
<td>2009</td>
<td>124,700</td>
<td>166,200</td>
</tr>
<tr>
<td>2010</td>
<td>127,700</td>
<td>161,100</td>
</tr>
<tr>
<td>2011</td>
<td>129,700</td>
<td>177,400</td>
</tr>
<tr>
<td>2012</td>
<td>142,800</td>
<td>173,300</td>
</tr>
<tr>
<td>2013</td>
<td>146,500</td>
<td>158,200</td>
</tr>
<tr>
<td>2014</td>
<td>151,400</td>
<td>154,700</td>
</tr>
<tr>
<td>2015</td>
<td>150,900</td>
<td>169,900</td>
</tr>
<tr>
<td>2016</td>
<td>146,700</td>
<td>160,100</td>
</tr>
<tr>
<td>2017</td>
<td>160,100</td>
<td>169,900</td>
</tr>
</tbody>
</table>

Source: Kontali
Seabass & Sea Bream
Mediterranean Production & Real Italian Import Price

Source: Kontali, NSC/Eurostat
Farmed Cobia
Estimates for China, Taiwan, Panama and Vietnam

Source: Various sources
Farmed Cobia
Estimates for China, Taiwan, Panama and Vietnam

Source: Various sources
Bluefin Tuna
Total Production and US real import price fresh

Sources: Production - Apostolos Tzoumas; import price- NMFS. Note: Prices are annual averages, except price in 2015 is January-August average.
Grouper production in countries surveyed by GAA

Grouper production in countries surveyed by GAA

Note: Data not available for China 2016-18. Assume production of 100,000 MT these years.
Summary Finfish
Aquaculture Production of Fish Species and 10-year growth rate
1990-2014

Source: FAO
Aquaculture Production of Fish Species and Seafood Price Indices

1990-2013

Source: FAO
Diadromous Species
Annual Percent Growth Rates

- Atlantic salmon: 9, 4, 5, -6
- Coho salmon: -26, -9, -8, -6
- Large Rainbow trout: -10, -6, 0
- Small trout: -2, 7, 3, 3
- Milkfish, selected countries: 6, 2, 4, -1
- Barramundi: -7, 5, 5, 21

Colors:
- 2014
- 2015
- 2016
- 2017
Freshwater Species

Annual Percent Growth Rates

Carp, selected countries
Tilapia
Catfishes, selected countries
Pangasius, Vietnam

-3 6 4.6
9 4 4.5
10 4 2 7.4
-2 7 5

-3 -2 -1 -2
Marine Species
Annual Percent Growth Rates

Sea bass & bream, Medit.
Grouper, selected countries
Bluefin tuna
Cobia, selected countries
Turbot, excl. China
Atlantic halibut
Atlantic cod

-5 -2
5 7 1 2
6 10 8
-10
4 6 4
8
-6
13 11
26
-5
-61
50
52
0.0
20.0
40.0
60.0
-20.0
-40.0
-60.0
-80.0

2014
2015
2016
2017
Production of Surveyed Species

Incl. Carp, 2003-2017

Production in Mill. metric tonnes

- 2003: 19.2
- 2004: 20.5
- 2005: 21.8
- 2006: 23.1
- 2007: 25.5
- 2008: 27.4
- 2009: 29.0
- 2010: 31.4
- 2011: 32.3
- 2012: 35.4
- 2013: 38.5
- 2014: 38.6
- 2015: 40.6
- 2016: 42.3
- 2017: 44.3
Production of Surveyed Species

Incl. Carp, 2003-2017

Production in Mill. metric tonnes

% growth
Production of Surveyed Species


<table>
<thead>
<tr>
<th>Year</th>
<th>Production in Mill. metric tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>5.1</td>
</tr>
<tr>
<td>2004</td>
<td>5.6</td>
</tr>
<tr>
<td>2005</td>
<td>6.2</td>
</tr>
<tr>
<td>2006</td>
<td>6.9</td>
</tr>
<tr>
<td>2007</td>
<td>8.0</td>
</tr>
<tr>
<td>2008</td>
<td>9.0</td>
</tr>
<tr>
<td>2009</td>
<td>9.5</td>
</tr>
<tr>
<td>2010</td>
<td>10.3</td>
</tr>
<tr>
<td>2011</td>
<td>11.2</td>
</tr>
<tr>
<td>2012</td>
<td>12.8</td>
</tr>
<tr>
<td>2013</td>
<td>13.5</td>
</tr>
<tr>
<td>2014</td>
<td>14.3</td>
</tr>
<tr>
<td>2015</td>
<td>14.7</td>
</tr>
<tr>
<td>2016</td>
<td>14.9</td>
</tr>
<tr>
<td>2017</td>
<td>15.6</td>
</tr>
</tbody>
</table>
**Production of Surveyed Species**

*Excl. Carp, 2003-2017*

![Graph depicting production and growth percentages for surveyed species from 2003 to 2017. The graph shows the production in million metric tonnes with corresponding percentage growth. The data points are as follows:

- **2003:** 4.8%
- **2004:** 10.5%
- **2005:** 11.2%
- **2006:** 12.9%
- **2007:** 16.4%
- **2008:** 8.5%
- **2009:** 8.6%
- **2010:** 4.8%
- **2011:** 15.0%
- **2012:** 5.3%
- **2013:** 6.0%
- **2014:** 2.4%
- **2015:** 1.4%
- **2016:** 5.0%

The graph indicates a peak in production and growth in 2007 and 2012, followed by a decline in later years.*
Production of Surveyed Species
By species group 2003-2017

Source price index: FAO, Univ. of Stavanger, Norwegian Seafood Council
Production of Surveyed Species

Excl. Carp 2003-2017
Growth Rates by Species Groups - Incl. Carps

2004-2016 average growth rate (in parenthesis)

- Freshwater (6.5%)
- Diadromous (4.9%)
- Marine (6.7%)
Growth Rates by Species Groups - Excl. Carp
(2004-2016 average growth rate in parenthesis)
Production of Surveyed Whitefish Species


<table>
<thead>
<tr>
<th>Year</th>
<th>Production (Mill. metric tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>3.3</td>
</tr>
<tr>
<td>2004</td>
<td>3.7</td>
</tr>
<tr>
<td>2005</td>
<td>4.2</td>
</tr>
<tr>
<td>2006</td>
<td>4.8</td>
</tr>
<tr>
<td>2007</td>
<td>5.7</td>
</tr>
<tr>
<td>2008</td>
<td>6.6</td>
</tr>
<tr>
<td>2009</td>
<td>7.1</td>
</tr>
<tr>
<td>2010</td>
<td>7.9</td>
</tr>
<tr>
<td>2011</td>
<td>8.5</td>
</tr>
<tr>
<td>2012</td>
<td>9.7</td>
</tr>
<tr>
<td>2013</td>
<td>10.4</td>
</tr>
<tr>
<td>2014</td>
<td>11.1</td>
</tr>
<tr>
<td>2015</td>
<td>11.3</td>
</tr>
<tr>
<td>2016</td>
<td>11.7</td>
</tr>
<tr>
<td>2017</td>
<td>12.3</td>
</tr>
</tbody>
</table>
Production of Surveyed Whitefish Species

Production of Surveyed Whitefish Species and Price Index

Aquaculture & Whitefish

Excluding Carp, 2003-2017

Source prices: FAO, Norwegian Seafood Council
### Did they double in a decade?

**Percentage growth, 2006-2016**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Catfishes*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barramundi*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grouper*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tilapia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pangasius, Vietnam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milkfish*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cobia*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atlantic salmon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carp*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small trout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbot, excl. China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coho salmon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sea bass &amp; bream, Medit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bluefin tuna</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atlantic halibut</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Rainbow trout</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Selected countries
Did they double in a decade?

Percentage growth 2006-2016

- Marine: 40.6%
- Diadromous: 66.7%
- Freshwater ex. Carp: 158.4%
- Freshwater: 86.1%
- TOTAL EX. CARP: 116.4%
- TOTAL: 83.1%
Thank You!