Economic Implications and the Role of US Aquaculture in Future US Seafood Supply

GLOBAL TRENDS IN SEAFOOD DEMAND, SUPPLY, TRADE AND PRICES

by Stefania Vannuccini
Fishery Statistician (Commodities)
FAO Fisheries and Aquaculture Statistics and Information Service

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Outline

- Overview
- Production
- Utilization
- Consumption
- Trade
- Prices
- Outlook
Overview: last two decade

- Increase in global aquaculture production
- Rising demand for fish and fishery products
- Growth in world trade of fish and fishery products
- Global call for responsible management
World fishery production

million tonnes

Aquaculture
Capture

World fishery production

million tonnes

Aquaculture (marine waters)
Aquaculture (inland waters)
Capture (inland waters)
Capture (marine waters)
## World fishery production

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010 e</th>
<th>2011f</th>
<th>2011/2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production</strong></td>
<td>144.6</td>
<td>145.1</td>
<td>149.0</td>
<td>2.7%</td>
</tr>
<tr>
<td><strong>Capture</strong></td>
<td>88.9</td>
<td>87.0</td>
<td>88.5</td>
<td>1.8%</td>
</tr>
<tr>
<td><strong>Aquaculture</strong></td>
<td>55.7</td>
<td>58.1</td>
<td>60.4</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

*Note: e: estimation; f: forecast*
Capture fishery production by continent/region

million tonnes

- Oceania
- Central America and Caribbean
- Northern America
- Africa
- South America
- Europe
- Asia
2009 Capture: top producers

- China: 17%
- Peru: 8%
- USA: 5%
- Russian Federation: 4%
- Chile: 4%
- Indonesia: 6%
- Japan: 5%
- India: 5%
- Others: 47%
Capture fishery production by ISSCAAP division

- Miscellaneous aquatic animals
- Diadromous fishes
- Crustaceans
- Molluscs
- Freshwater fishes
- Marine fishes

million tonnes

Global trends in the status of marine stocks

Percentage of stocks assessed

- Green: Underexploited + Moderately exploited
- Blue: Fully exploited
- Red Triangle: Overexploited + Depleted + Recovering

Percentage of stocks assessed:
- 53% in 2008
- 32% in 2008
- 15% in 2008
Aquaculture production by continent/region

Oceania
Central America and Caribbean
Northern America
Africa
South America
Europe
Asia

million tonnes

2009 Aquaculture: top producers

- China: 62%
- Viet Nam: 5%
- India: 7%
- Thailand: 3%
- Indonesia: 3%
- Bangladesh: 2%
- Norway: 2%
- Chile: 1%
- Others: 15%
- India: 5%
- China: 7%
Aquaculture production by ISSCAAP division
2009 Aquaculture by species groups

- Freshwater fishes: 56%
- Bivalves: 22%
- Other molluscs: 3%
- Other crustaceans: 3%
- Miscellaneous aquatic animals: 1%
- Shrimps, prawns: 6%
- Squids, cuttlefishes, octopuses: 0.0%
- Other marine fishes: 3%
- Other pelagics: 0.4%
- Tunas, bonitos, billfishes: 0.0%
- Other diadromous: 2%
- Salmons, trouts, smelts: 4%
Annual growth rate

%12


Capture
Aquaculture
Annual growth rate
Aquaculture vs agriculture

- 2000-2009
- 1990-1999
- 1980-1989
- 1970-1979

Meat
Milk
Eggs
Cereals
Fruit
Vegetables
Aquaculture

%
Annual growth rate
Aquaculture vs meat

<table>
<thead>
<tr>
<th>Year Period</th>
<th>Aquaculture</th>
<th>Poultry Meat</th>
<th>Meat, Total</th>
<th>Sheep and Goat Meat</th>
<th>Beef and Buffalo Meat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-1979</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980-1989</td>
<td></td>
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<tr>
<td>1990-1999</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000-2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Utilization of fish production and per capita fish supply

Fish production (million tonnes)

Per capita fish supply (kg)

- Fish for human consumption
- Non-food uses
- Per capita food fish supply
Share of utilization of fish production

- Fish for human consumption
- Non-food uses

[Graph showing the share of fish production utilization from 1950 to 2010]
Utilization of fish production breakdown by quantity

- Non-food uses
- Curing
- Canning
- Freezing
- Marketing fresh

Million tonnes
Fish as food

- Important role in food security
- Source of proteins, minerals, micronutrients and essential fatty acids
- 118 million tonnes
- 17.2 kg/capita
- 47% from aquaculture
Per capita fish supply: contribution of capture and aquaculture
Per capita fish supply

Average per capita fish supply (in live weight equivalent)

- 0–2 kg/year
- 2–5 kg/year
- 5–10 kg/year
- 10–20 kg/year
- 20–30 kg/year
- > 60 kg/year
Per capita fish supply

<table>
<thead>
<tr>
<th>Region</th>
<th>kg/capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>17.2</td>
</tr>
<tr>
<td>Africa</td>
<td>8.4</td>
</tr>
<tr>
<td>Asia</td>
<td>18.8</td>
</tr>
<tr>
<td>Europe</td>
<td>22.1</td>
</tr>
<tr>
<td>North America</td>
<td>24.0</td>
</tr>
<tr>
<td>Latin America</td>
<td>9.6</td>
</tr>
<tr>
<td>Oceania</td>
<td>25.5</td>
</tr>
<tr>
<td>Industrialized</td>
<td>28.7</td>
</tr>
<tr>
<td>Developed</td>
<td>24.3</td>
</tr>
<tr>
<td>Least Developed</td>
<td>10.3</td>
</tr>
<tr>
<td>Other developing</td>
<td>16.3</td>
</tr>
<tr>
<td>LIFDCs</td>
<td>9.1</td>
</tr>
</tbody>
</table>
### Per capita fish supply by groups of species

<table>
<thead>
<tr>
<th>Species</th>
<th>2007</th>
<th>1987</th>
<th>1967</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater and diadromous fish</td>
<td>5.6</td>
<td>3.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Pelagic fish</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Demersal fish</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Molluscs, excl. cephalopods</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Crustaceans</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Marine fish, other</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Cephalopods</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Aquatic animals, others</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

kg/capita
Nutritional standards

- Increase of the per capita food consumption
- Improvement of nutritional standards since 1970
- Change in global dietary patterns
- Increase in the average global calorie supply
- Growth of the quantity of proteins, in particular for emerging economies
Food consumption

• Rising living standards
• Population growth
• Rapid urbanization
• Increased trade
• Transformation in food distribution, transportation, marketing
• Improvement in food science, technology
• Value-added products
• More developed economies less reactive to income growth compared to low-income countries
Fish consumption in industrialized countries

- Diversification in the diets
- Health and diet conscious
- Value addition
- Ready-to-cook, ready-to-eat
- More fish in fresh form
Fish contribution to animal protein supply (2005-2007)
Share of production traded

million tonnes

Production

Exports

Trade by groups of species (value)

- Shrimps, prawns: 15%
- Salmons, trouts, smelts: 12%
- Cods, hakes, haddocks: 10%
- Tuna: 9%
- Other pelagics: 7%
- Other finfish: 27%
- Meals: 3%
- Oils: 2%
- Squids, cuttlefishes, octopuses: 4%
- Other crustaceans: 6%
- Other molluscs, aquatic invert: 5%
- Other pelagics: 7%
- Tuna: 9%
- Cod, hakes, haddocks: 10%
Fish exports

USD billion


Central America
Oceania
Africa
Northern America
South America
Asia
Europe
2009: Top exporters (value)

- China: 12%
- Norway: 8%
- Thailand: 7%
- USA: 5%
- Viet Nam: 4%
- Canada: 4%
- Chile: 3%
- Indonesia: 3%
- Peru: 2%
- Other: 52%
Net exports developing countries

USD billion

-5 0 5 10 15 20 25

Fish Coffee Rubber Bananas Cocoa Meat Tea Sugar Tobacco Rice

1987 1997 2007
2009: Top importers (value)

Other 48.4%
USA 14.1%
Japan 13.6%
China 5.7%
France 5.4%
Korea Rep 2.9%
Canada 2.1%
Russian Fed 2.1%
China, H.Kong 2.4%
UK 3.3%
Trends in trade

• 7% decline in 2009, followed by growth of 11% in 2010
• 2010 imports estimated ad USD 110 billion and exports at USD 105 billion
• Positive 2011
• Wide range of product types and participants
• Increased fishery trade within regions
• Growing imports among/from developing countries
Asia

Imports in USD million

3 560.7
5 351.7
888.2
15 300.8
1 515.0
Oceania

Imports in USD million

Intraregional trade
Europe

Imports in USD million

3,168.4
26,675.7
7,077.1
4,009.5
4,251.0
303.1
South America

Imports in USD million

Intraregional trade
North and Central America

Imports in USD million
US fish imports in 2010
Value

- Asia: 54%
- North America: 15%
- South America: 12%
- Europe: 9%
- Central America & Caribbean: 7%
- Oceania: 2%
- Africa: 1%
US fish imports in 2010

Value

- China: 14%
- Thailand: 13%
- Others: 34%
- Vietnam: 5%
- Indonesia: 6%
- Chile: 4%
- Ecuador: 5%
- Mexico: 2%
- Norway: 3%
- Canada: 13%
- India: 2%
US fish exports in 2010

Value

- Asia: 45%
- Europe: 26%
- North America: 24%
- Central America & Caribbean: 3%
- South America: 1%
- Oceania: 1%
- Africa: 0.4%
US fish exports in 2010
Value

- Canada: 25%
- China: 16%
- Japan: 16%
- Korea Rep: 6%
- UK: 2%
- Others: 19%
- Netherlands: 3%
- France: 4%
- Germany: 5%
- China, Hong Kong SAR: 2%
Fish Price Index (2005=100)

Data Source: Norwegian Seafood Export Council
Outlook supply

• Major increases will depend on aquaculture.
• Factors to influence future growth of aquaculture:
  – costs/availability of feed for selected species;
    access and availability of areas/water
  – environmental impacts
  – availability of technology and finance
  – effects on biodiversity
  – climate changes
  – governance
  – food safety and traceability issues
• Capture: importance of implement more cautious and effective fisheries management
Outlook demand

- Retail concentration in developed and developing which will affect demand
- Product development, technological innovation
- Continuous increase of trade
- Increased imports from developing countries
- Outsourcing of processing will continue
- Slow growth in per capita consumption