The following report is a summary of the ‘The State of World Fisheries and Aquaculture 2016’: Contributing to food security and nutrition for all’ Food and Agriculture Organization of the United Nations (UN FAO), Rome. 200 pp - [http://www.fao.org/3/a-i5555e.pdf](http://www.fao.org/3/a-i5555e.pdf)

### Key Messages

- Fisheries and aquaculture remain important sources of food, nutrition, income and livelihoods for hundreds of millions of people around the world.
- World per capita fish supply has outpaced population growth in the past five decades and reached a new record high of 20 kg in 2014 (double the level of the 1960s), due to vigorous growth in aquaculture, and to a slight improvement in the state of certain fish stocks due to improved fisheries management.
- In the last two decades, dramatic growth in aquaculture production has boosted average consumption of fish and fishery products at the global level. The shift towards relatively greater consumption of farmed species compared with wild fish reached a milestone in 2014, when the farmed sector’s contribution to the supply of fish for human consumption surpassed that of wild caught fish for the first time.
- Aquaculture now provides half of all fish for human consumption.
- Fish continues to be one of the most-traded food commodities worldwide with more than half of fish exports by value originating in developing countries.
- Oceans and inland waters now, and more so in the future, have potential to contribute significantly to food security and adequate nutrition for a global population expected to reach 9.7 billion (bn) by 2050.

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1 SOFIA is published every 2 years to provide policy-makers, civil society and those whose livelihoods depend on the sector a comprehensive, objective and global view of capture fisheries and aquaculture ([http://www.fao.org/fishery/sofia/en](http://www.fao.org/fishery/sofia/en)).
Surging demand for fish and fishery products will mainly be met by growth in supply from farmed production, which is expected to reach 102 million tonnes (mt) by 2025.

For global fish availability to meet projected demand, it has been estimated that aquaculture production will need to more than double by mid-century to roughly 140 mt in 2050.

Global Aquaculture Production

- In terms of global production volume, farmed fish and aquatic plants combined surpassed that of capture fisheries in 2013.
- In terms of food supply, aquaculture provided more fish than capture fisheries for the first time in 2014.

**TOTAL** - World aquaculture production of fish and plants combined reached 101 mt in live weight in 2014, with an estimated total farm gate value of US$165.8 bn.

**FISH** - The trend in aquaculture food fish production continues to rise. In 2000 global production was 32.4 mt. In 2010, global production of farmed food fish was 59.9 mt up by 7.5% from 55.7 mt in 2009.
- In 2014, fish harvested from aquaculture amounted to 73.8 mt, with an estimated first-sale value of US$160.2 bn. This consisted of:
  - 49.8 mt of finfish (US$99.2 bn)
  - 16.1 mt of molluscs (US$19 bn)
  - 6.9 mt of crustaceans (US$36.2 bn)
  - 7.3 mt of other aquatic animals including frogs (US$3.7 bn)
- Almost all fish produced from aquaculture are destined for human consumption, although by-products may be used for non-food purposes.

**AQUATIC PLANTS** - In 2014 farmed aquatic plants contributed 27.3 mt (US$5.6 bn).
- Farmed fish constitutes 3/4s of total aquaculture production by volume, and farmed aquatic plants 1/4, but the latter’s share in total value is disproportionately low (<5%).

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3 The term “fish” here includes finfish, crustaceans, molluscs, frogs, turtles and other edible aquatic animals (such as sea cucumbers, sea urchins, sea squirts and jellyfish).
Main Groups of Species Produced and Culture Environment

- A total of 580 species and/or species groups are farmed globally. These species include:
  - 362 finfishes (including hybrids)
  - 104 molluscs
  - 62 crustaceans
  - 6 frogs and reptiles
  - 9 aquatic invertebrates
  - 37 aquatic plants

In the decade 2005–2014, fish culture production grew at 5.8% annually, down from the 7.2% achieved in the previous decade (1995–2004).

Aquaculture production occurs in freshwater, brackish and marine water.

In 2014 63.8% (47.1 mt) of fish farmed for human consumption came from inland aquaculture; 36.2% (26.7 mt) came from marine and coastal aquaculture.

Inland finfish aquaculture is the most common type of aquaculture operation in the world.

Earthen pond culture of finfish is by far the largest contributor from aquaculture to food security and nutrition in the developing world.

Feed is widely regarded as becoming a major constraint to aquaculture growth.

By volume, half of world aquaculture production in 2014, including seaweeds and microalgae (27%) and filter-feeding animal species (22.5%), was realized without feeding.

The culture of non-fed animal species in 2014 produced 22.7 mt, representing 30.8% of world production of all farmed fish species.

The most important non-fed animal species include: (i) two finfish species, silver carp and bighead carp, typically in inland aquaculture; (ii) bivalve molluscs (clams, oysters, mussels, etc.); and (iii) other filter feeding animals (such as sea squirts) in marine and coastal areas.
Global Distribution

- In 2014, 25 countries recorded aquaculture production in excess of 0.2 mt
- Collectively, they produced 96.3% of farmed fish and 99.3% of farmed aquatic plants in the world
  - The top 5 countries produced 82.8% of the world’s total aquaculture production
  - The top 10 countries produced 89.9% of the world’s total aquaculture production

Farmed Aquatic Plant Production 2014: Regional Production and Top 7 Producers

- Asia has accounted for about 89% of world aquaculture production of fish for human consumption in the past two decades
- Africa and the Americas have improved their respective shares in world total production, while those of Europe and Oceania have dropped slightly
- The species produced, and their relative importance in national total production, vary significantly among the top producers
- China remains by far the major producer although its share in world fish production from aquaculture has declined slightly from 65% to below 62% in the past two decades

Farmed Aquatic Animal Production 2014: Regional Production and Top 10 Producers
Farmed Fish Trade and Main Commodities

- Trade plays a major role in the fisheries and aquaculture sector as an employment creator, food supplier, income generator, and contributor to economic growth and development, and to food and nutrition security.
- Trade in fish and fishery products is becoming more complex, dynamic and highly segmented with greater diversification among species and product forms.
- Expansion in aquaculture production has contributed significantly to increased consumption and commercialization of species that were once primarily wild caught, with farmed products representing a growing share of international fish trade.
- Despite recent improvements in trade classifications, international trade statistics do not distinguish between wild and farmed origin of the products - exact breakdown between products of capture fisheries and aquaculture in international trade is open to interpretation.
- Estimates indicate that aquaculture products represent between 20-25% of traded quantities but 33-35% in value terms, indicating that an important segment of the industry is export oriented and a producer of relatively high-value products destined for international markets.
- If only fish products for direct human consumption are considered, the share increases to 26-28% of traded quantities and 35-37% in value.
- Measured as a share of world trade in value terms, salmon and trout are now the largest single commodity (16.6%); 15.3% for shrimps and prawns; 3% for bivalves.

### Production of Main Species Groups of Fish for Human Consumption from Inland, and Marine and Coastal Aquaculture in 2014

<table>
<thead>
<tr>
<th></th>
<th>INLAND AQUACULTURE</th>
<th>MARINE AND COASTAL AQUACULTURE</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td></td>
<td>(Tonnes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Africa</strong></td>
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<tr>
<td>Finfish</td>
<td>1,682,039</td>
<td>12,814</td>
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<td>Molluscs</td>
<td>–</td>
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<td>1</td>
<td>1</td>
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<tr>
<td><strong>Total Africa</strong></td>
<td>1,689,279</td>
<td>21,631</td>
<td>1,710,910</td>
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<td>539,989</td>
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<tr>
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<td>652,610</td>
<td>716,525</td>
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<td>2,211,059</td>
<td>3,351,614</td>
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<td>2,673,159</td>
<td>3,507,019</td>
<td>6,180,178</td>
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<td>370,538</td>
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<td>74</td>
<td>241</td>
<td>315</td>
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<tr>
<td>Other animals</td>
<td>29</td>
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<td>863</td>
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<td>2,930,127</td>
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<td>5,558</td>
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<td>Other animals</td>
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<td>1,354</td>
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<tr>
<td><strong>Total Oceania</strong></td>
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<td>184,602</td>
<td>189,183</td>
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<td><strong>World</strong></td>
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<tr>
<td>Finfish</td>
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<td>Molluscs</td>
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<td>15,835,450</td>
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<tr>
<td>Crustaceans</td>
<td>2,744,537</td>
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<td>6,915,073</td>
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<td>Other animals</td>
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<td>372,718</td>
<td>893,568</td>
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<td><strong>Total World</strong></td>
<td>47,102,391</td>
<td>26,681,334</td>
<td>73,783,725</td>
</tr>
</tbody>
</table>
Livelihoods and Consumption

- Fisheries and aquaculture provided a source of income and livelihoods and income for an estimated 56.6 million people engaged in the primary sector of fish production in 2014, of whom an estimated 18 million (33% of all people employed in the sector) were engaging in fish farming.

- Of this 18 million fish farmers, the highest concentrated is primarily in Asia (94% of all aquaculture engagement), followed by Latin America and the Caribbean (1.9% of the total or 3.5 million people) and Africa (1.4% of the total or 2.6 million people).

- The significant growth in fisheries and aquaculture production in the past 50 years, especially in the last two decades, has enhanced the world’s capacity to consume diversified and nutritious food.

- Aquaculture development has outpaced population growth, resulting in increased per capita aquaculture production in the past three decades in most regions.

- Asia as a whole has pushed far ahead of other continents in raising per capita farmed fish production for human consumption.

- The shift towards relatively greater consumption of farmed species compared with wild fish reached a milestone in 2014, when the farmed sector’s contribution to the supply of fish for human consumption surpassed that of wild caught fish for the first time. This represents an impressive rise as the share of fish from aquaculture in total supply was 7% in 1974, 26% in 1994 and 39% in 2004.
Fishmeal and Fish Oil in Aquaculture Feeds

- A significant, but declining, proportion of world fisheries production is processed into fishmeal (FM) and fish oil (FO), thereby contributing indirectly to human consumption when they are used as feed in aquaculture and livestock raising.
- FM is the crude flour obtained after milling and drying fish or fish parts, while FO is usually a clear brown/yellow liquid obtained through the pressing of the cooked fish.
- Owing to the growing demand for FM and FO, in particular from the aquaculture industry, and coupled with high prices, a growing share of fishmeal is being produced from fish by-products, which previously were often discarded.
- Non-official estimates of the contribution of by-products to the total volume of FM and fish oil produced indicate it is about 25-35%.
- There has been much research focused on finding replacements for FM and FO in aquaculture feeds. The amount of FM and FO used in compound feeds for aquaculture has shown a clear downward trend, with their being more selectively used as strategic ingredients at lower levels and for specific stages of production, particularly hatchery, broodstock and finishing diets.

Outlook

- It is expected that future growth in fish production and related fish consumption will mainly originate from aquaculture.
- However, many factors might affect prospects of the aquaculture sector. These include:
  - Land and water and associated conflicts
  - Feed, seed supply and genetic resources
  - Environmental integrity and disease problems
  - Development and adoption of new and improved farming technologies
  - Market, trade and food safety
  - Climate change
  - Investment capital impediments
  - Problems that can originate from unguided and unmonitored aquaculture practices.
- Aquaculture is also expected to continue to grow through:
  - Intensification
  - Species diversification
  - Expansion into new milieus (including moving farther into offshore marine waters)
  - Through the introduction of innovative, more-resource efficient farming technologies.
- Well-advised policies and strategies backed by strong research programmes will be of paramount importance in overcoming production constraints.
Faced with one of the world's greatest challenges – how to feed more than 9 billion people by 2050 in a context of climate change, economic and financial uncertainty, and growing competition for natural resources – the international community made unprecedented commitments in September 2015 when UN Member States adopted the 2030 Agenda for Sustainable Development.

The 2030 Agenda also sets aims for the contribution and conduct of fisheries and aquaculture towards food security and nutrition in the use of natural resources so as to ensure sustainable development in economic, social and environmental terms

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