



Aquaculture II

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General Overview of Aquaculture

- Fish are the largest phylum of living vertebrates, with around 30,000 fish species out of approximately 50,000 vertebrate species (www.fishbase.com). Fish inhabit almost every aquatic environment on the planet, which present an enormous variation in temperature, salinity, oxygen, and other chemical and physical water properties. These environments have exerted evolutionary pressures that have resulted in the evolution of the enormous number of fishes and an immense variety of reproductive strategies.

- Fish exhibit various types of sex determination, from genetic to environmental control, sex differentiation from hermaphroditism to gonochorism, age of puberty, from a few months to many years, fecundity, from a few to millions of eggs, internal or external fertilization, a wide range of egg sizes, some that float and others that sink or stick to substrates, uncared eggs scattered into the environment to parental care of eggs to live “birth” (ovoviviparity). The existence of these diverse reproductive strategies has important implications for finfish culture and broodstock management.

Sea-Bass



World Fish Production

Dünya Su Ürünleri Üretimi

	AVCILIK (ton)			YETİŞTİRİCİLİK (ton)			TOPLAM (ton)
	<u>Deniz</u>	<u>İcsu</u>	<u>Toplam</u>	<u>Deniz</u>	<u>İcsu</u>	<u>Toplam</u>	
2010	77.828.396	11.271.565	89.099.961	22.310.734	36.790.052	59.100.786	148.200.747
2011	82.623.550	11.124.401	93.747.951	23.366.371	38.698.805	62.065.176	155.813.127
2012	79.719.854	11.630.320	91.350.174	24.707.343	41.948.313	66.655.656	158.005.830
2013	80.899.153	11.687.507	92.586.660	25.536.710	44.686.846	70.223.556	162.810.216
2014	81.564.094	11.895.922	93.460.016	26.727.687	47.104.420	73.832.107	167.292.123

Kaynak: FAO

Not: Üretim rakamlarına su bitkileri ve deniz memelileri dahil değildir.

- Aquaculture is a rapidly growing food production industry, accounting for over one-third of global fisheries production and is a lucrative industry in the domestic and international markets. The interest in marine and brackishwater aquaculture has dramatically increased with the recent failures in the capture fisheries. Fishery production supplied the world with about 154 million tonnes of fish in 2010 (FAO 2012). Of this, over 115 million tonnes was used as human food, providing an estimated apparent per capita supply of about 17 kg (live weight equivalent). Recently, Aquaculture production accounted for 46 % of total food fish supply, a slightly lower proportion than reported in 2008, because of major downward trend in aquaculture and capture fishery production.

2007

2008

2009

2010

2011

2012

*(Million tonnes)***PRODUCTION****Capture**

Inland	10.1	10.3	10.5	11.3	11.1	11.6
Marine	80.7	79.9	79.6	77.8	82.6	79.7
Total capture	90.8	90.1	90.1	89.1	93.7	91.3

Aquaculture

Inland	29.9	32.4	34.3	36.8	38.7	41.9
Marine	20.0	20.5	21.4	22.3	23.3	24.7
Total aquaculture	49.9	52.9	55.7	59.0	62.0	66.6

TOTAL WORLD FISHERIES

140.7	143.1	145.8	148.1	155.7	158.0
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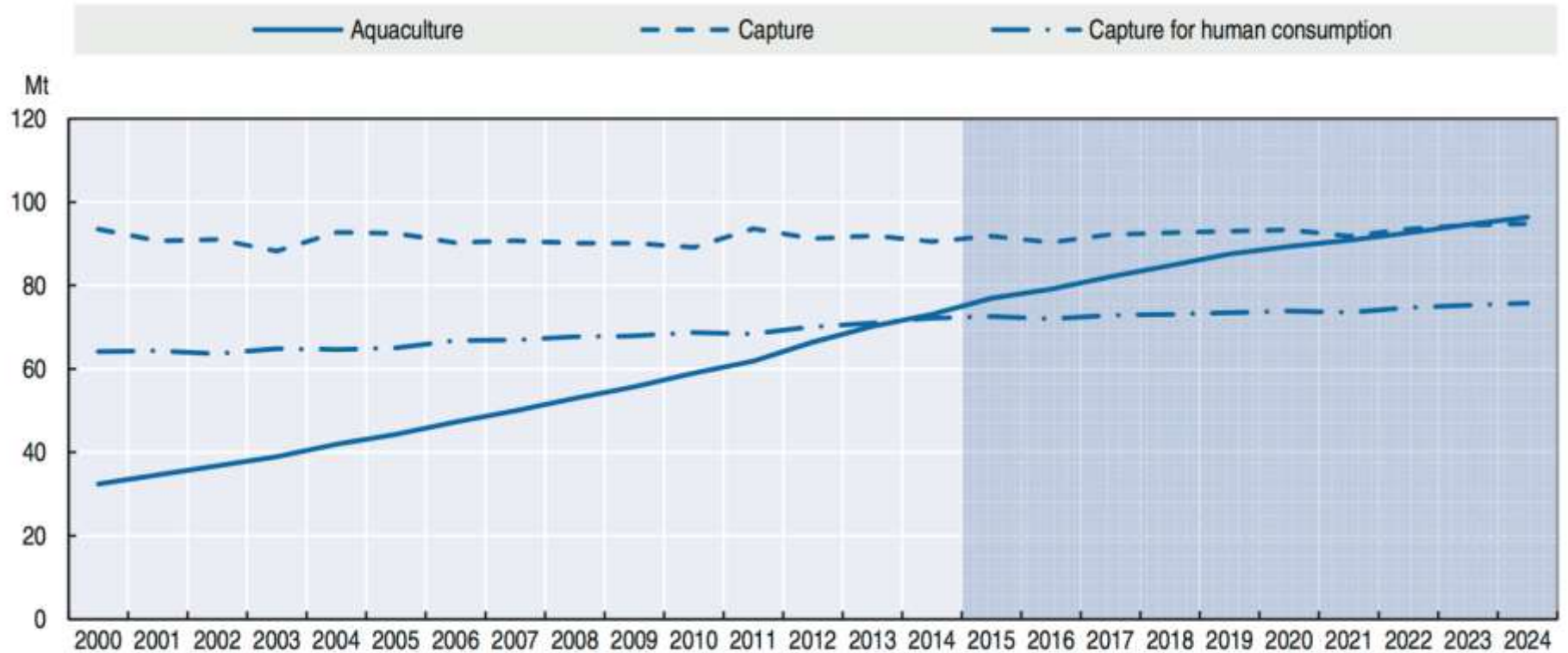
UTILIZATION¹

Human consumption	117.3	120.9	123.7	128.2	131.2	136.2
Non-food uses	23.4	22.2	22.1	19.9	24.5	21.7
Population (<i>billions</i>)	6.7	6.8	6.8	6.9	7.0	7.1
Per capita food fish supply (<i>kg</i>)	17.6	17.9	18.1	18.5	18.7	19.2

2012 Ranking	Country	Continent	2003	2011	2012	Variation	
						2003–2012	2011–2012
			<i>(Tonnes)</i>		<i>(Percentage)</i>		
1	China	Asia	12 212 188	13 536 409	13 869 604	13.6	2.4
2	Indonesia	Asia	4 275 115	5 332 862	5 420 247	27.0	1.7
3	United States of America	Americas	4 912 627	5 131 087	5 107 559	4.0	-0.5
4	Peru	Americas	6 053 120	8 211 716	4 807 923	-20.6	-41.5
5	Russian Federation	Asia/ Europe	3 090 798	4 005 737	4 068 850	31.6	1.6
6	Japan	Asia	4 626 904	3 741 222	3 611 384	-21.9	-3.5
7	India	Asia	2 954 796	3 250 099	3 402 405	15.1	4.7
8	Chile	Americas	3 612 048	3 063 467	2 572 881	-28.8	-16.0
9	Viet Nam	Asia	1 647 133	2 308 200	2 418 700	46.8	4.8
10	Myanmar	Asia	1 053 720	2 169 820	2 332 790	121.4	7.5
11	Norway	Europe	2 548 353	2 281 856	2 149 802	-15.6	-5.8
12	Philippines	Asia	2 033 325	2 171 327	2 127 046	4.6	-2.0
13	Republic of Korea	Asia	1 649 061	1 737 870	1 660 165	0.7	-4.5
14	Thailand	Asia	2 651 223	1 610 418	1 612 073	-39.2	0.1
15	Malaysia	Asia	1 283 256	1 373 105	1 472 239	14.7	7.2
16	Mexico	Americas	1 257 699	1 452 970	1 467 790	16.7	1.0
17	Iceland	Europe	1 986 314	1 138 274	1 449 452	-27.0	27.3
18	Morocco	Africa	916 988	949 881	1 158 474	26.3	22.0
Total 18 major countries			58 764 668	63 466 320	60 709 384	3.3	-4.3
World total			79 674 875	82 609 926	79 705 910	0.0	-3.5
Share 18 major countries (percentage)			73.8	76.8	76.2		


2012 Ranking	Scientific name	FAO English name	Variation				
			2003	2011	2012	2003–2012	2011–2012
			(Tonnes)			(Percentage)	
1	<i>Engraulis ringens</i>	Anchoveta (= Peruvian anchovy)	6 203 751	8 319 597	4 692 855	–24.4	–43.6
2	<i>Theragra chalcogramma</i>	Alaska pollock (= walleye pollock)	2 887 962	3 207 063	3 271 426	13.3	2.0
3	<i>Katsuwonus pelamis</i>	Skipjack tuna	2 184 592	2 644 767	2 795 339	28.0	5.7
4	<i>Sardinella</i> spp. ¹	Sardinellas nei	2 052 581	2 344 675	2 345 038	14.2	0.0
5	<i>Clupea harengus</i>	Atlantic herring	1 958 929	1 780 268	1 849 969	–5.6	3.9
6	<i>Scomber japonicus</i>	Chub mackerel	1 825 130	1 715 536	1 581 314	–13.4	–7.8
7	<i>Decapterus</i> spp. ¹	Scads nei	1 438 905	1 384 105	1 441 759	0.2	4.2
8	<i>Thunnus albacares</i>	Yellowfin tuna	1 498 652	1 239 232	1 352 204	–9.8	9.1
9	<i>Engraulis japonicus</i>	Japanese anchovy	1 899 570	1 325 758	1 296 383	–31.8	–2.2
10	<i>Trichiurus lepturus</i>	Largehead hairtail	1 249 408	1 258 389	1 235 373	–1.1	–1.8
11	<i>Gadus morhua</i>	Atlantic cod	849 015	1 051 545	1 114 382	31.3	6.0
12	<i>Sardina pilchardus</i>	European pilchard (= sardine)	1 052 003	1 037 161	1 019 392	–3.1	–1.7
13	<i>Mallotus villosus</i>	Capelin	1 143 971	853 449	1 006 533	–12.0	17.9
14	<i>Dosidicus gigas</i>	Jumbo flying squid	402 045	906 310	950 630	136.4	4.9
15	<i>Scomberomorus</i> spp. ¹	Seerfishes nei	702 010	918 495	914 591	30.3	–0.4
16	<i>Scomber scombrus</i>	Atlantic mackerel	689 606	945 452	910 697	32.1	–3.7
17	<i>Strangomera bentincki</i>	Araucanian herring	304 048	887 272	848 466	179.1	–4.4
18	<i>Acetes japonicus</i>	Akiami paste shrimp	542 974	550 297	588 761	8.4	7.0
19	<i>Brevoortia patronus</i>	Gulf menhaden	522 195	623 369	578 693	10.8	–7.2
20	<i>Nemipterus</i> spp. ¹	Threadfin breams nei	636 644	551 239	576 487	–9.4	4.6
21	<i>Engraulis encrasicolus</i>	European anchovy	620 200	607 118	489 297	–21.1	–19.4

Figure 3.6. **Aquaculture and capture fisheries**



Note: "Capture for human consumption refers" to the Capture production excluding ornamental fish, fish destined to the production of fishmeal, fish oil and other non-food uses. All aquaculture production is assumed to be destined to human consumption.

Source: OECD/FAO (2015), "OECD-FAO Agricultural Outlook", OECD Agriculture Statistics (database), <http://dx.doi.org/10.1787/agr-outl-data-en>.

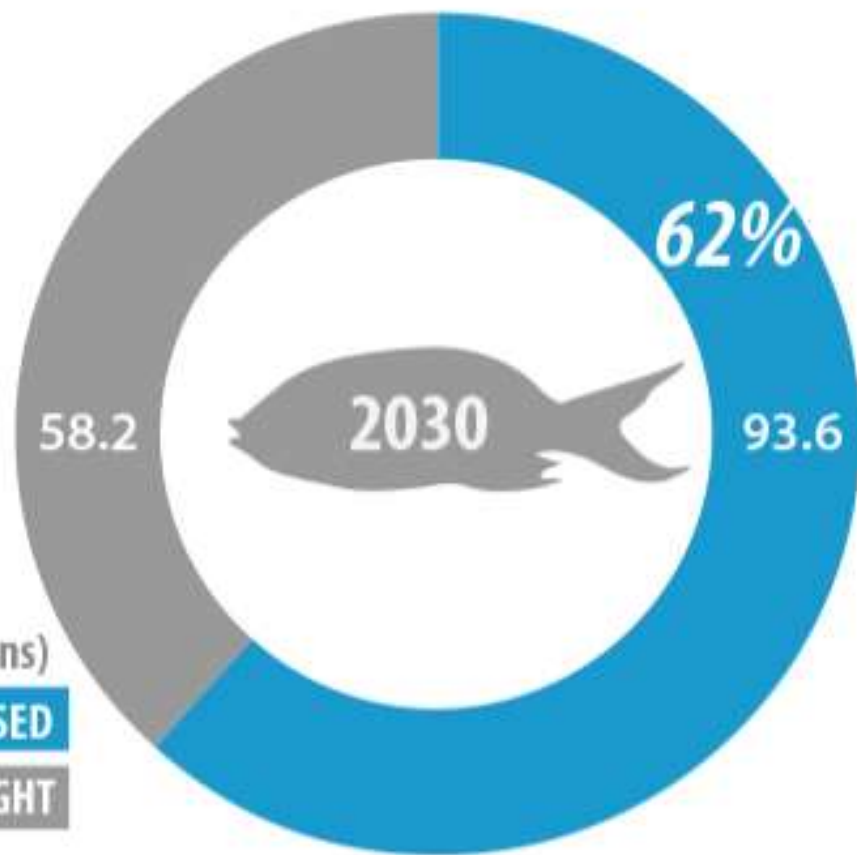
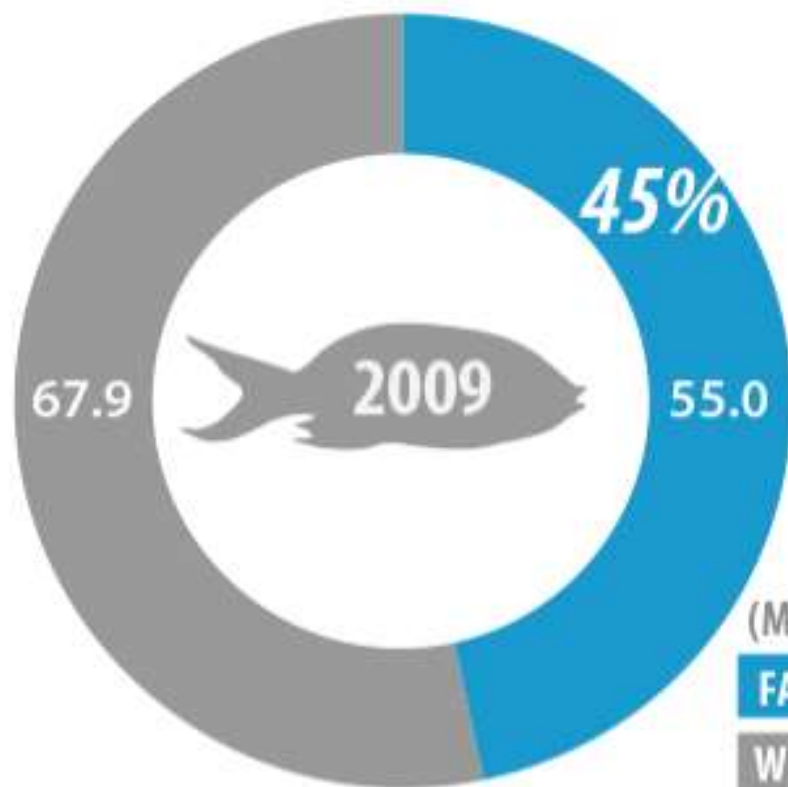
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GLOBAL SEAFOOD CONSUMPTION

NOW

vs

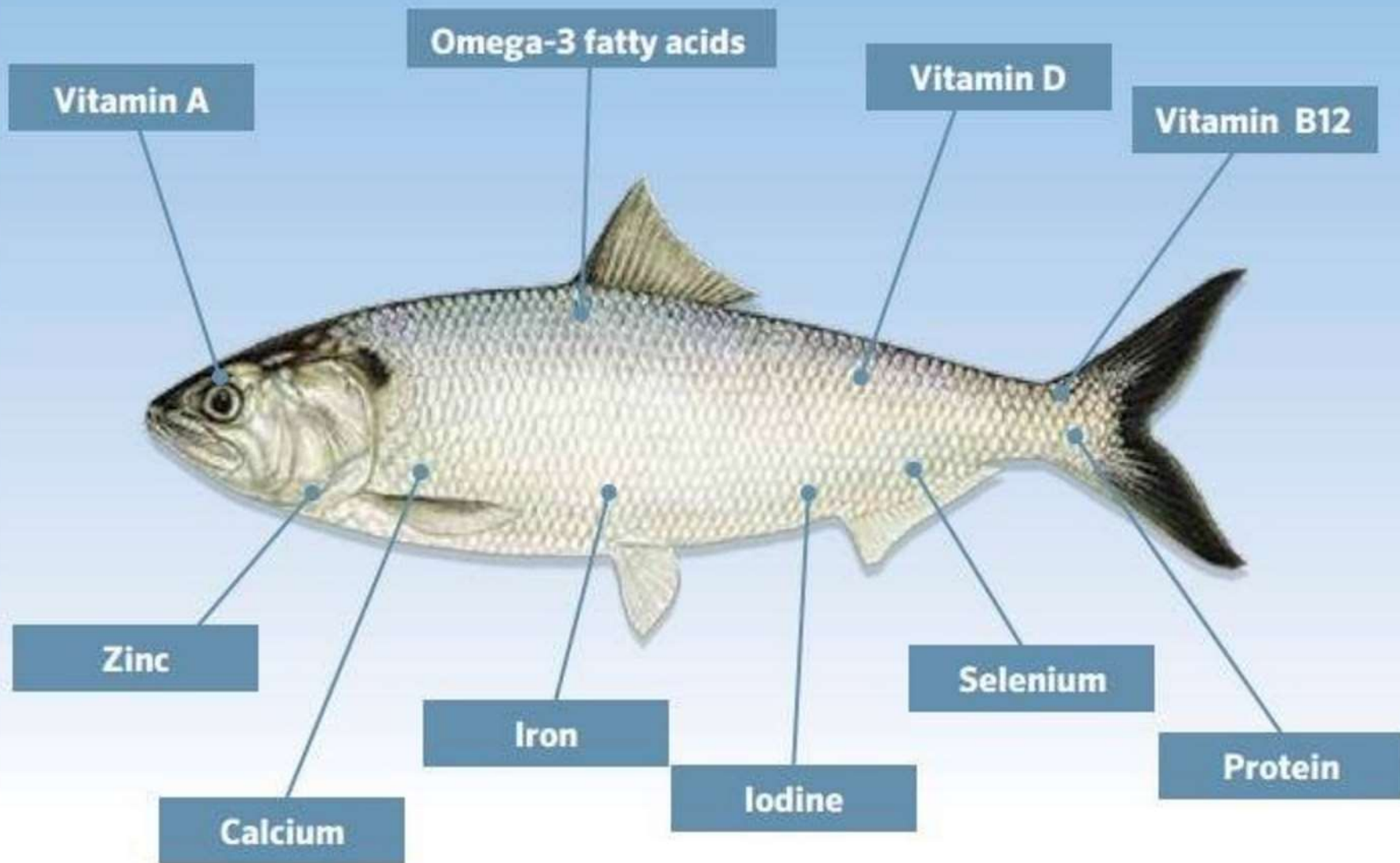
FUTURE



Sources: FAOSTAT (2014) // *Fish to 2030* (2013)

#Fish2030

Fish: Nature's superfood



Why Invest in the Transition to Sustainable Fisheries?



3 billion people

rely on fish as their primary source of protein

Fisheries contribute **\$274 billion** a year to global GDP

75% of global fisheries are underperforming

Fisheries could be worth an **extra \$50 billion** every year if managed sustainably

260 million people

globally are employed directly or indirectly in fishing; 97% of these are in developing countries

The value of the Pacific Halibut fishery has

increased by 222%

since the introduction of sustainable management measures

The global fish harvest could be

40% higher

if under sustainable management

