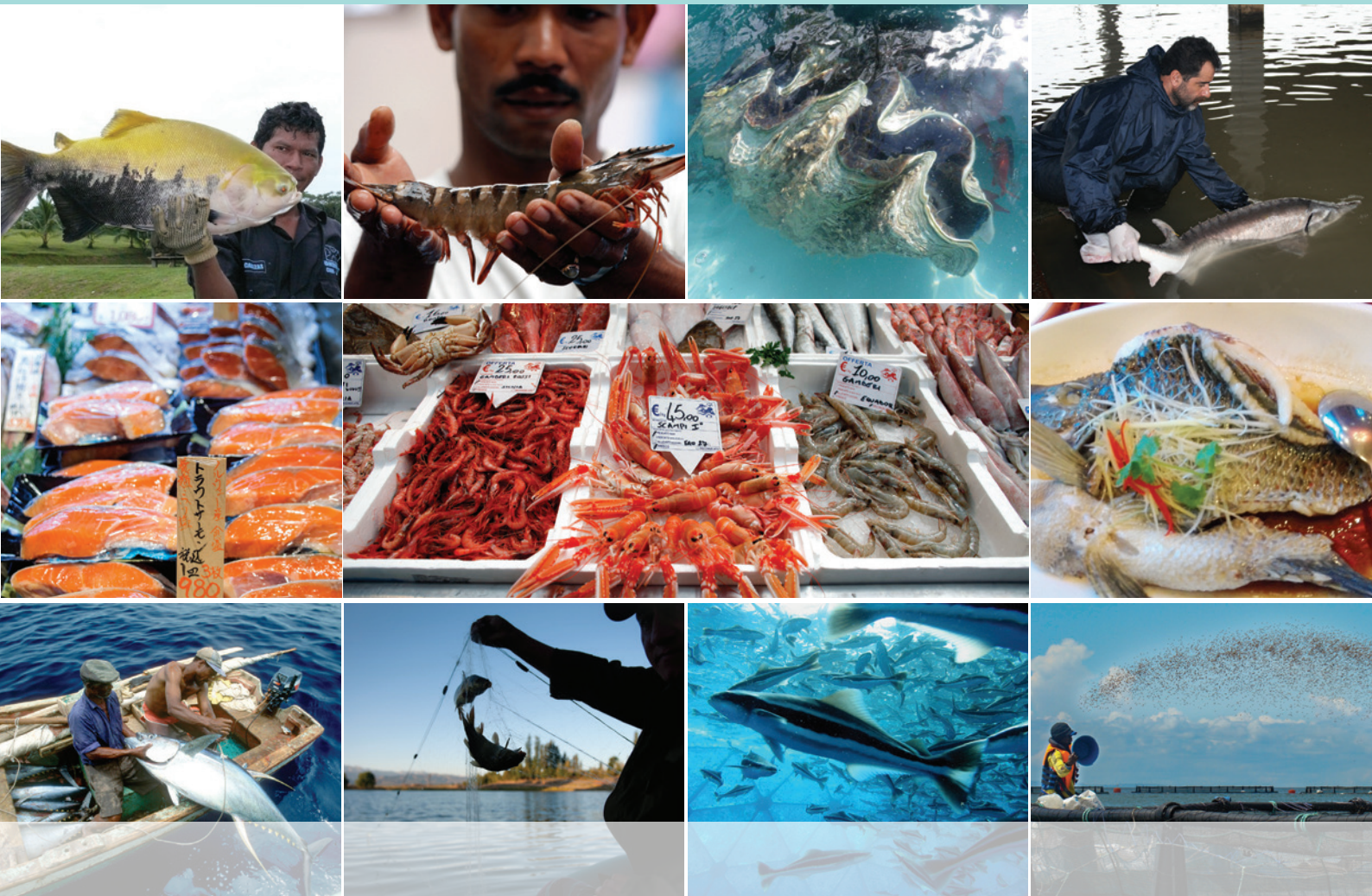




Short-term projection of global fish demand and supply gaps



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Short-term projection of global fish demand and supply gaps

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Preparation of this document

A short-term projection model is developed by the Food and Agriculture Organization of the United Nations (FAO) to assess and monitor potential fish demand and supply gaps with the aim of facilitating evidence-based decision-making at the national, regional and global levels. This paper presents the methodology and results of the model. The paper is intended to become a background document for the fish consumption module of the World Aquaculture Performance Indicators (WAPI). Audun Lem, Frank Asche, Malcolm Beveridge, Manuel Barange, Marttin Felix, Mimako Kobayashi, Nathanael Hishamunda, Pierre Charlebois, Rohana Subasinghe, Stefania Vannuccini, Tipparat Pongthanapanich, Trond Bjørndal, Xiaowei Zhou, Yaw Ansah and Ying Xiao are acknowledged for their valuable comments and suggestions provided in seminars or through the formal review of the paper. Danielle Rizcallah, Maria Giannini and Marianne Guyonnet are acknowledged for their assistance in editing and formatting, and Ettore Vecchione is acknowledged for layout and graphic design.

Abstract

A short-term projection model is developed to assess and monitor potential future fish demand and supply gaps at the country (nearly 200 countries or territories), regional (about 40 country groups), and global levels for nine species groups. Salient results at the global, regional and country levels are presented in the main text. Key results for all countries and all the nine species groups (including both standard and conservative projections) are documented in the appendix. The results indicate that: (i) if fish prices and consumer preferences remain the same, income growth would drive world per capita fish demand up from 20 kg/year in the mid-2010s to 25 kg/year in the early 2020s (or 23 kg/year under the conservative projection); (ii) the income-driven per capita fish demand hike, combined with population growth, would drive world fish demand up by 47 million tonnes (or 31 million tonnes under the conservative projection); (iii) the 19-million-tonne fish supply growth generated by the trend growth of world aquaculture production would cover only 40 percent of the projected demand growth (or 62 percent of the conservative projection), leaving a fish demand-supply gap of 28 million tonnes (or 16 million tonnes under the conservative projection) in the early 2020s; (iv) the demand-supply gap for shellfish (i.e. crustaceans and molluscs) would be bigger than that for finfish – they would account for, respectively, 55 percent and 45 percent of the 28-million-tonne fish demand-supply gap; (v) while world aquaculture production following its recent trend would grow 4.5 percent annually from the mid-2010s to the early 2020s, it would take a 9.9 percent annual growth (or 6.9 percent under the conservative projection) to fill the world fish demand-supply gap in the early 2020s; (vi) the trend aquaculture growth in only 17 countries (or 24 countries under the conservative projection) would be sufficient to cover the demand growth driven by population and income growth; excess demand is expected to occur in 170 countries (or 163 countries under the conservative projection); and (vii) should the world aquaculture production fall short of the required annual growth rate (i.e. 9.9 percent or 6.9 percent under the standard or conservative projection), and assuming world capture fisheries production would remain at the current level, the world fish price would have to increase to reduce fish demand in order to clear the market (i.e. no demand-supply gap). Results generated by the short-term projection model are useful for policymaking, development aids, business or investment planning, and other decision-making by various stakeholders in aquaculture and fisheries. They are a complement to and can potentially enhance the understanding of the results of more sophisticated forecasting models such as the OECD-FAO Fish Model and the World Bank-IFPRI-FAO Fish to 2030 model.

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Abbreviations and acronyms

F&D	Freshwater & diadromous
GDP	Gross domestic product
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
mt	million tonne
OECD	Organisation for Economic Co-operation and Development
PPP	purchasing power parity
SPC	Secretariat of the Pacific Community
SARNISSA	Sustainable Aquaculture Research Networks for Sub-Saharan Africa

1. Introduction

World fish¹ consumption increased from 121 million tonnes in 2008 to 140 million tonnes in 2013. Ninety percent of the growth was contributed by aquaculture. Looking into the future, growing and wealthier populations would continue to demand more fish, and aquaculture growth is expected to be the major force to satisfy the demand growth (OECD-FAO, 2011–2016; World Bank, 2013).

As opposed to most work that forecasts future fish demand and supply focusing on medium- or long-term projections at the global or regional level (Ye, 1999; Delgado *et al.*, 2003; OECD-FAO, 2011–2016; World Bank, 2013; Lem, Bjørndal and Lappo, 2014; Kobayashi *et al.*, 2015), this paper develops a short-term projection model to assess potential future fish demand-supply gaps at the country,² regional and global levels and estimates aquaculture growth needed to fill the gap.

The model includes: (i) a demand-side component that estimates the fish demand growth driven by population and income growth; (ii) a supply-side component that estimates the trend aquaculture growth; and (iii) a set of indicators that measure demand-supply gaps. The demand-side component contains an econometric model that estimates the income elasticity of fish demand based on the historical trends of nearly 200 countries.

The study covers the supply and demand of nine fish species groups. The results for five basic species groups³ (i.e. marine fish, freshwater & diadromous fish,⁴ crustaceans, shell molluscs and cephalopods) are estimated directly. These basic results are aggregated into results for four more aggregate species groups (i.e. molluscs,⁵ shellfish,⁶ finfish⁷ and fish⁸). Limited by space, the discussion in the paper is focused on fish as a whole and the five basic species groups. Yet key results for all the nine species groups are presented in the appendix.

The study examines fish supply and demand for nearly 200 countries or territories. The basic, country-level results are then aggregated into regional and global results. Limited by space, this paper only discusses regional- and global-level results and highlights

¹ Unless specified otherwise, in this document fish includes finfish, crustaceans and molluscs.

² Unless specified otherwise, in this document the term country includes non-sovereign territory.

³ At the time of this analysis, the FAO Food Balance Sheet for fish species provides data on apparent fish consumption at the level of species groups, including freshwater & diadromous fish, pelagic fish, demersal fish, marine fish nei, crustaceans, molluscs excluding cephalopods (a.k.a. shell molluscs), and cephalopods. The three marine fish species groups (i.e. pelagic fish, demersal fish and marine fish nei) are grouped by the authors into marine fish, which, together with the other four species groups (i.e. freshwater & diadromous fish, crustaceans, shell molluscs and cephalopods), are treated as the five basic species groups used in the analysis.

⁴ At the time of this analysis, the FAO Food Balance Sheet does not contain data on freshwater fish (carps, catfishes, tilapias, etc.) and diadromous fish (salmons, trouts, eels, etc.) as separate species groups.

⁵ Molluscs = shell molluscs + cephalopods.

⁶ Shellfish = crustaceans + molluscs.

⁷ Finfish = marine fish + freshwater & diadromous fish.

⁸ Fish = finfish + shellfish.

salient results at the country level. However, key results at the country, regional and global levels are presented in the appendix.

The study uses the situation in the mid-2010s as a baseline to project the demand-supply gaps in the early 2020s. The five-year horizon is selected to match the planning horizon for aquaculture and fisheries development in many countries. In principle, the methodology can be used for short-term projections of any horizon.

The results of the fish demand-supply gap analysis can be used to facilitate evidence-based policymaking and business decision-making at the country, regional and global levels. But understanding of the methodology and its merits and constraints are important to proper and flexible use of the results.

In section 2, the status and trends of fish consumption (including species composition) during the recent five years are examined. The results indicate that world fish consumption increased nearly 20 million tonnes from 2008 to 2013. About 40 percent of the world fish consumption growth is attributable to population growth, whereas the other 60 percent reflects the increase in per capita fish consumption.

In section 3, an econometric model is developed to estimate the impacts of income growth on per capita fish consumption. The resulting income elasticities are used to estimate income-driven per capita fish demand growth. The results, combined with the population projection provided by the United Nations, are used to project future fish demand in the early 2020s. Two scenarios are examined. The first scenario, the standard scenario, uses the medium-fertility-variant population projection and mean income elasticity coefficients to estimate future fish demand, whereas the second, the conservative scenario, uses the low-fertility-variant population projection and the lower bound of the 95 percent confidence interval of income elasticity coefficients for the estimation.

In section 4, future fish demand-supply gaps are estimated by comparing fish demand growth driven by population and income (estimated in section 3) to potential fish supply growth generated from the trend aquaculture growth. Aquaculture growth rates needed to satisfy the demand growth are estimated accordingly.

The last section – section 5 – summarizes the key results, examines the merits and constraints (as well as potential remedies) of the study, and discusses how its results can be used to facilitate evidence-based policymaking and sector management.

2. Status and trends of fish consumption

2.1 HISTORICAL TRENDS OF FISH CONSUMPTION

World fish consumption increased from 121 million tonnes in 2008 to 140 million tonnes in 2013,⁹ growing 2.9 percent annually and 19 million tonnes in total. About 40 percent of the 19-million-tonne growth is attributable to population growth from 6.7 billion to 7.1 billion (1.2 percent annual growth); the other 60 percent is due to the increase in per capita fish consumption from 18 kg to nearly 20 kg (1.7 percent annual growth).¹⁰

Table 1 summarizes the status and trends of fish consumption from 2008 to 2013 at the global and regional levels. Figure 1 illustrates countries' per capita fish consumption in 2013. Some salient results are presented below.

High fish consumption growth in developing regions versus stagnant fish consumption in developed regions¹¹

From 2008 to 2013, per capita fish consumption increased from 16 kg to 19 kg in developing regions and declined from 26 kg to 25 kg in developed regions. Per capita fish consumption growth (in terms of annual growth rate) in developed countries was mostly below the world average (Figure 2). Higher growth in per capita fish consumption, together with stronger population growth, has increased the share of developing regions in world fish consumption from 74 to 78 percent during the period.

Asia: high fish consumption growth

The share of Asia in world fish consumption increased from 67 percent in 2008 to 70 percent in 2013 because of its above-average growth in per capita fish consumption (Figure 3). Eastern Asia contributed most of the growth, primarily because of (mainland) China,¹² whose share in world fish consumption increased from 33 to 37 percent during the 2008–2013 period. Some Eastern Asian countries (China, Macao SAR, Japan, Democratic People's Republic of Korea and the Republic of Korea) had decreased per capita fish consumption during the same period. In 2013, per capita fish consumption in most South-eastern Asian countries (except Timor-Leste) was higher

⁹ Unless specified otherwise, fish consumption is measured by the apparent consumption of food fish (live weight equivalent) estimated in the FAO Food Balance Sheet for fish species (v. 2016.1.0), where the data are updated to year 2013.

¹⁰ The increase in total fish consumption could be broken up into three components. One is the pure population effect measured by the increase in total fish consumption under constant per capita fish consumption and growing population; another one is the pure per capita consumption effect measured by the increase in total fish consumption under constant population and growing per capita fish consumption; and the last one is the mixed effect that captures the interaction between the growing population and per capita consumption. The total fish consumption growth attributable to population growth is equal to the pure population effect plus half of the mixed effect, whereas that attributable to per capita consumption growth is equal to the pure per capita consumption effect plus half of the mixed effect.

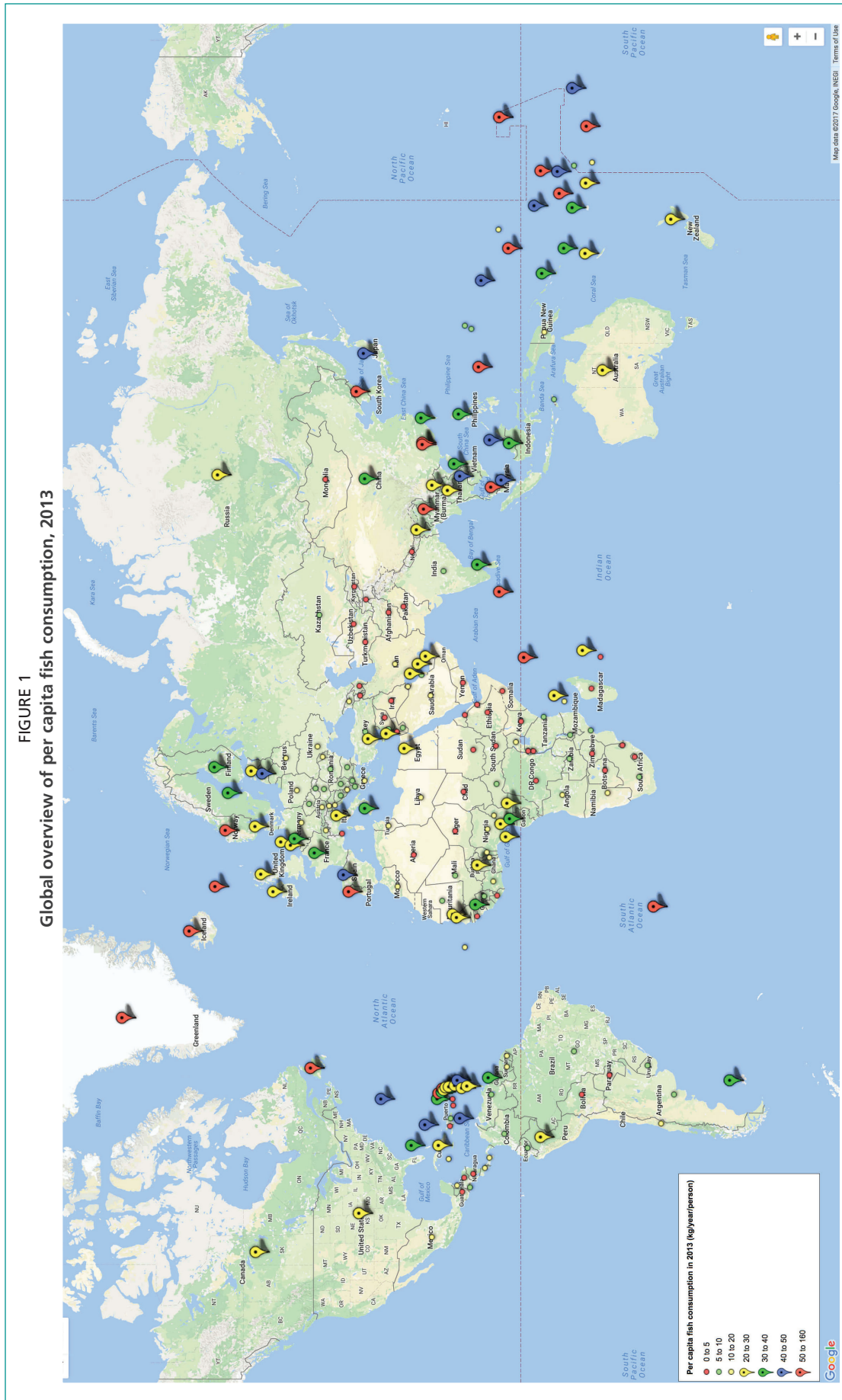
¹¹ According to the United Nations designation, developed regions include Europe, Northern America, Japan, Australia and New Zealand, whereas other countries are considered developing regions.

¹² In this document, China means mainland China.

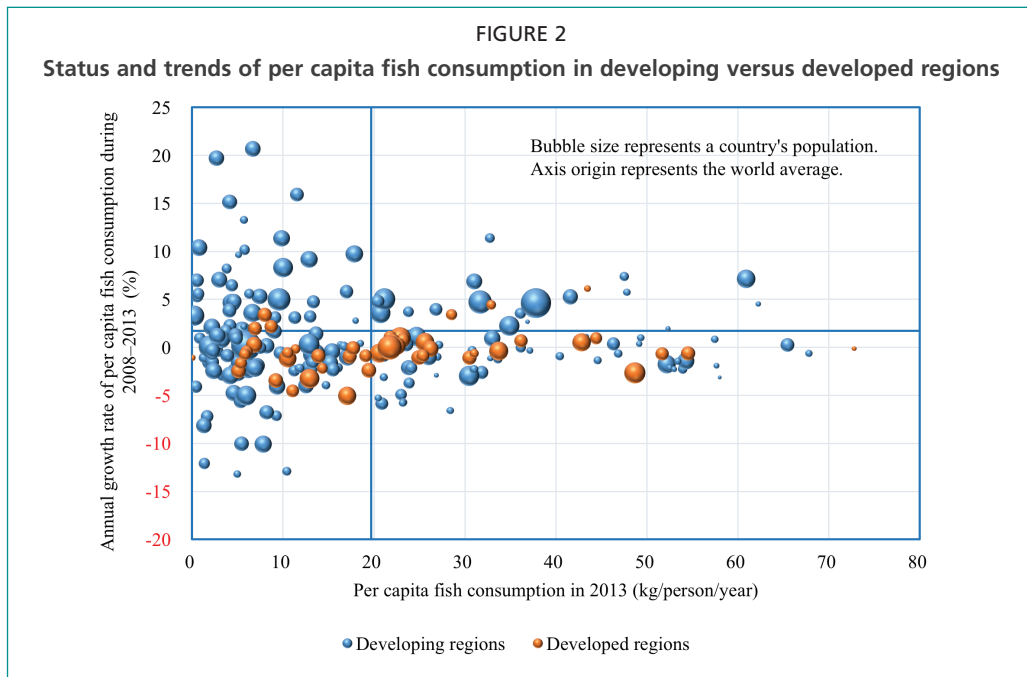
TABLE 1
Regional and global fish consumption – 2008 versus 2013

Country or region	Total fish consumption						Per capita fish consumption						Annual growth rate from 2008 to 2013 (%)		
	Quantity (mt)			% in world total			Quantity (kg)			Ratio to world average			Total	Per capita	Population
	2008	2013	+/-	2008	2013	+/-	2008	2013	+/-	2008	2013	+/-	2008	2013	+/-
World	121.37	140.16	18.79	100.00	100.00	0.00	18.09	19.68	1.59	1.00	1.00	0.00	2.92	1.70	1.17
Developed regions	31.57	30.84	-0.73	26.01	22.00	-4.01	25.81	24.78	-1.02	1.43	1.26	-0.17	-0.47	-0.81	0.34
Developing regions	89.80	109.32	19.52	73.99	78.00	4.01	16.36	18.59	2.23	0.90	0.94	0.04	4.01	2.59	1.35
Least developed countries	8.44	11.19	2.75	6.95	7.98	1.03	10.65	12.57	1.92	0.59	0.64	0.05	5.81	3.37	2.13
Small Island Developing States	1.00	0.99	-0.02	0.83	0.70	-0.12	16.20	14.97	-1.24	0.90	0.76	-0.14	-0.32	-1.58	1.14
Landlocked developing countries	1.33	1.69	0.37	1.09	1.21	0.12	3.43	3.88	0.46	0.19	0.20	0.01	5.00	2.55	2.38
Africa	9.21	10.97	1.77	7.59	7.83	0.24	9.32	9.82	0.50	0.51	0.50	-0.02	3.57	1.06	2.39
Northern Africa	2.18	2.86	0.69	1.79	2.04	0.25	10.63	13.41	2.78	0.59	0.68	0.09	5.64	4.76	0.98
Sub-Saharan Africa	7.10	8.15	1.04	5.85	5.81	-0.04	8.59	8.66	0.06	0.47	0.44	-0.04	2.78	0.15	2.51
Southern Africa	0.38	0.37	-0.02	0.32	0.26	-0.06	6.68	5.98	-0.71	0.37	0.30	-0.07	-0.98	-2.21	1.26
Eastern Africa	1.31	1.77	0.46	1.08	1.26	0.18	4.22	4.79	0.57	0.23	0.24	0.01	6.19	2.56	2.82
Western Africa	4.10	4.57	0.47	3.38	3.26	-0.12	14.08	13.68	-0.40	0.78	0.70	-0.08	2.20	-0.57	2.80
Middle Africa	1.24	1.40	0.17	1.02	1.00	-0.02	10.08	9.82	-0.26	0.56	0.50	-0.06	2.58	-0.52	3.11
Americas	12.97	13.80	0.83	10.68	9.84	-0.84	14.05	14.18	0.13	0.78	0.72	-0.06	1.25	0.18	1.05
Northern America	7.37	7.68	0.31	6.07	5.48	-0.59	21.81	21.80	-0.01	1.21	1.11	-0.10	0.84	-0.01	0.85
Latin America and the Caribbean	5.60	6.11	0.52	4.61	4.36	-0.25	9.58	9.85	0.28	0.53	0.50	-0.03	1.78	0.57	1.17
Central America	1.67	1.83	0.16	1.38	1.31	-0.07	10.69	10.90	0.21	0.59	0.55	-0.04	1.89	0.39	1.49
Caribbean	0.44	0.36	-0.08	0.36	0.26	-0.10	10.76	8.51	-2.25	0.59	0.43	-0.16	-3.71	-4.58	0.66
South America	3.49	3.92	0.43	2.88	2.80	-0.08	9.00	9.56	0.56	0.50	0.49	-0.01	2.34	1.21	1.09
Asia	81.86	98.19	16.33	67.45	70.06	2.61	20.21	22.95	2.74	1.12	1.17	0.05	3.71	2.57	1.07
Eastern Asia	51.33	61.76	10.44	42.29	44.07	1.78	32.91	38.65	5.74	1.82	1.96	0.14	3.77	3.27	0.49
South-eastern Asia	17.94	21.64	3.71	14.78	15.44	0.66	30.76	34.98	4.22	1.70	1.78	0.08	3.83	2.61	1.19
Western Asia	1.63	1.85	0.22	1.34	1.32	-0.03	7.36	7.47	0.10	0.41	0.38	-0.03	2.53	0.28	2.25
Central Asia	0.13	0.15	0.01	0.11	0.10	-0.01	2.20	2.23	0.03	0.12	0.11	-0.01	1.92	0.31	1.57
South Asia	10.83	12.79	1.96	8.93	9.13	0.20	6.58	7.25	0.67	0.36	0.37	0.00	3.38	1.95	1.39
Europe	16.44	16.25	-0.19	13.55	11.59	-1.95	22.44	22.05	-0.40	1.24	1.12	-0.12	-0.23	-0.36	0.13
Southern Europe	4.47	4.55	0.08	3.68	3.24	-0.44	29.37	29.76	0.39	1.62	1.51	-0.11	0.34	0.26	0.08
Northern Europe	2.50	2.54	0.04	2.06	1.81	-0.25	25.53	25.16	-0.36	1.41	1.28	-0.13	0.33	-0.28	0.61
Eastern Europe	5.19	5.04	-0.15	4.28	3.60	-0.68	17.58	17.17	-0.42	0.97	0.87	-0.10	-0.60	-0.48	-0.12
Western Europe	4.27	4.12	-0.15	3.52	2.94	-0.58	22.87	21.73	-1.14	1.26	1.10	-0.16	-0.73	-1.02	0.30
Oceania	0.90	0.94	0.05	0.74	0.67	-0.07	25.59	24.78	-0.82	1.41	1.26	-0.16	1.03	-0.65	1.67
Australia/New Zealand	0.68	0.72	0.04	0.56	0.52	-0.04	26.41	26.05	-0.36	1.46	1.32	-0.14	1.29	-0.28	1.57
Pacific islands	0.22	0.22	0.00	0.18	0.16	-0.02	23.18	21.24	-1.95	1.28	1.08	-0.20	0.22	-1.74	1.92

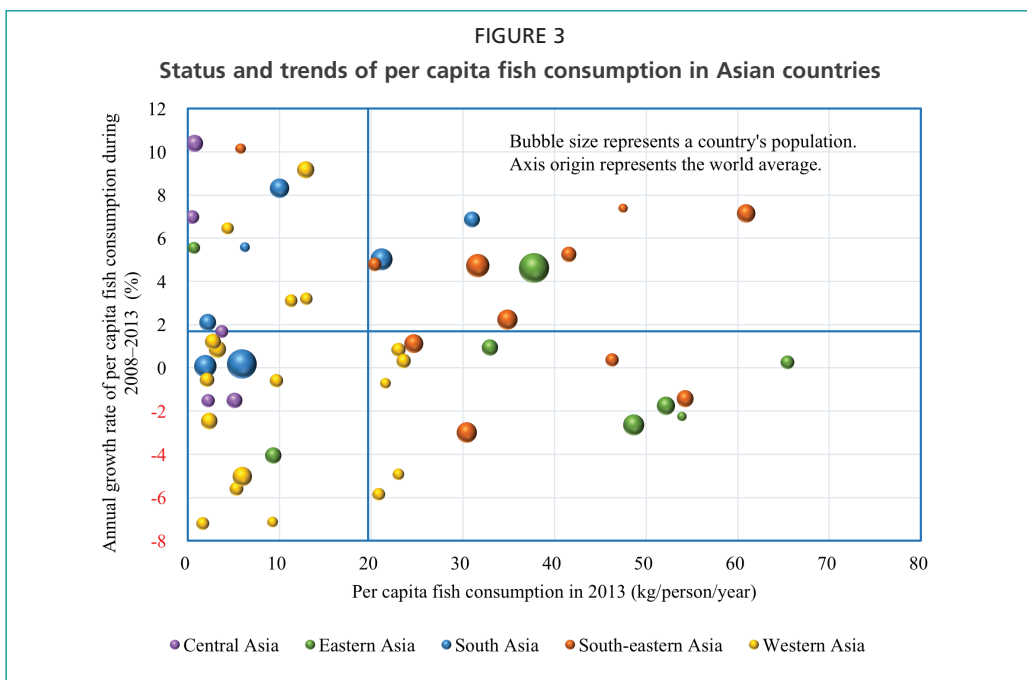
Source: authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).



Source: Authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0) and the United Nations World Population Prospects: The 2015 Revision (POP/DB/WPP/Rev.2015/POP/F01-1).
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Source: Authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).



Source: Authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).

than the world average, but some countries, such as Malaysia and the Philippines, had below-average per capita fish consumption growth during the 2008–2013 period. Many of the South Asian countries had below-average per capita fish consumption, yet above-average growth rates in fish consumption. Most countries in Central and Western Asia had below-average fish consumption levels and/or growth rates.

Africa: strong population growth yet weak growth in per capita fish consumption

The share of sub-Saharan Africa in world fish consumption declined slightly from 5.85 to 5.81 percent in spite of strong population growth in the region. This reflects the

stagnant growth of its already low per capita fish consumption from 8.6 kg to 8.7 kg (Figure 1). Eastern Africa had the lowest per capita fish consumption in the region, but it was the only sub-Saharan African subregion that increased its per capita fish consumption and share in world fish consumption (Table 1).

Northern Africa increased its share in world fish consumption from 1.8 to 2.0 percent during the 2008–2013 period, primarily because of Egypt, the only country in the subregion with both an above-average fish consumption level and growth rate (Figure 4).

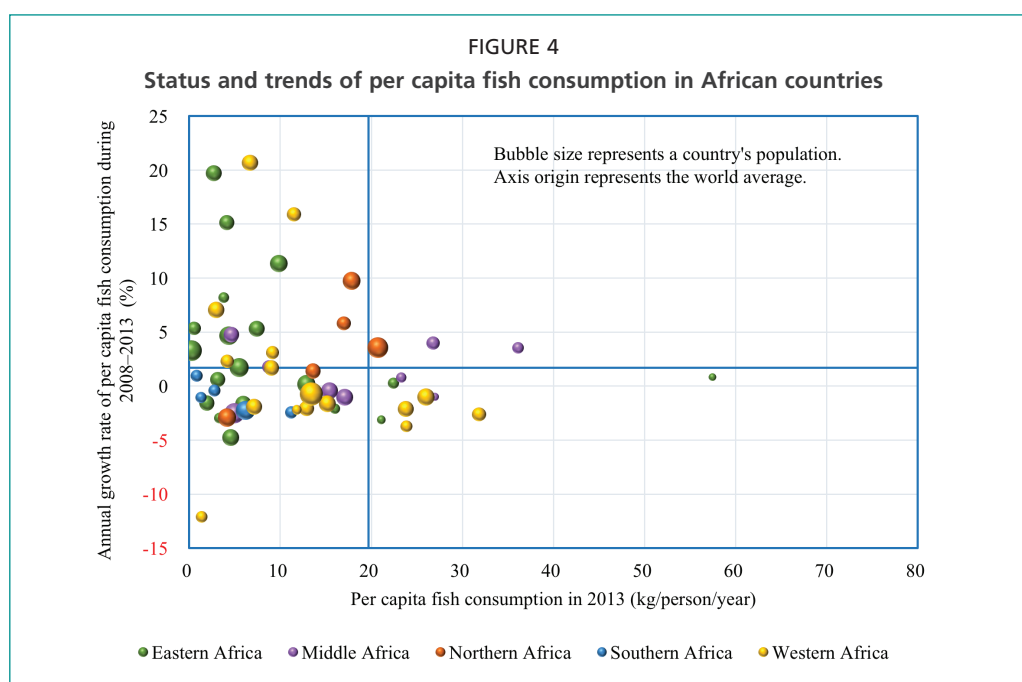
The Americas: stagnant per capita fish consumption

Per capita fish consumption in Latin America and the Caribbean is below the world average (Figure 5). Its growth from 2008 to 2013 was also below the world average; so was the population growth in the region. Thus, its share in world fish consumption declined from 4.6 to 4.4 percent during the 2008–2013 period. Per capita fish consumption in the Caribbean was high, yet its growth is low. Many Caribbean countries had below average or even negative growth in per capita fish consumption. Most countries in Central and South America had low per capita fish consumption as well as low per capita fish consumption growth.

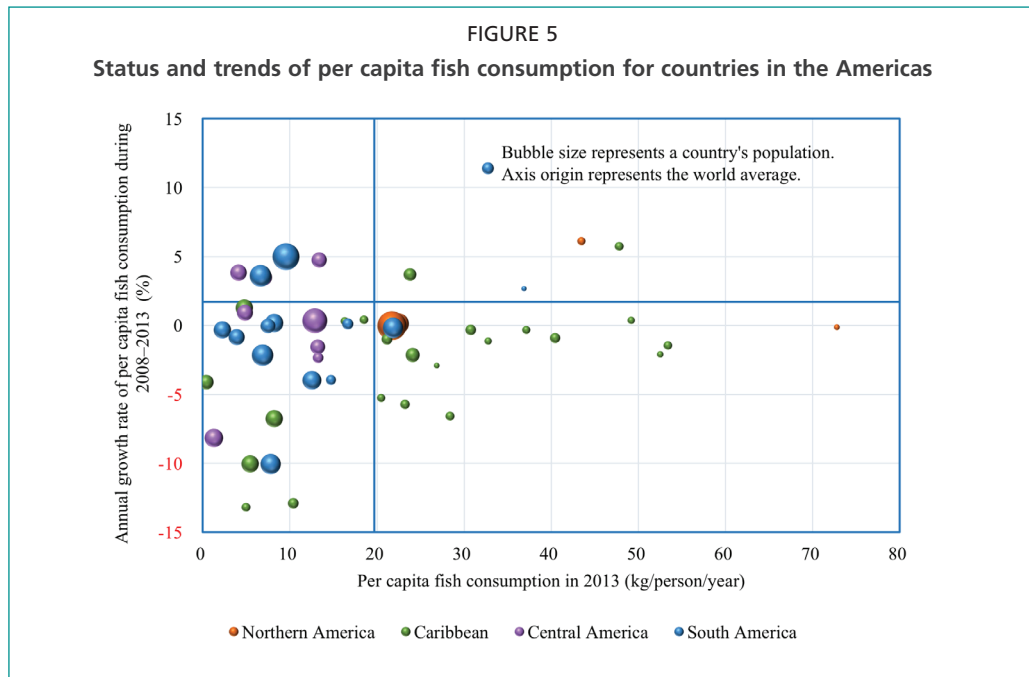
During the same period, Northern America reduced its share in world fish consumption from 6.1 to 5.5 percent because of stagnant per capita fish consumption growth in Canada and the United States of America. Most countries or territories (except Bermuda) in the region had an above-average fish consumption level, yet below-average consumption growth (Figure 5).

Europe: decreased share in world fish consumption

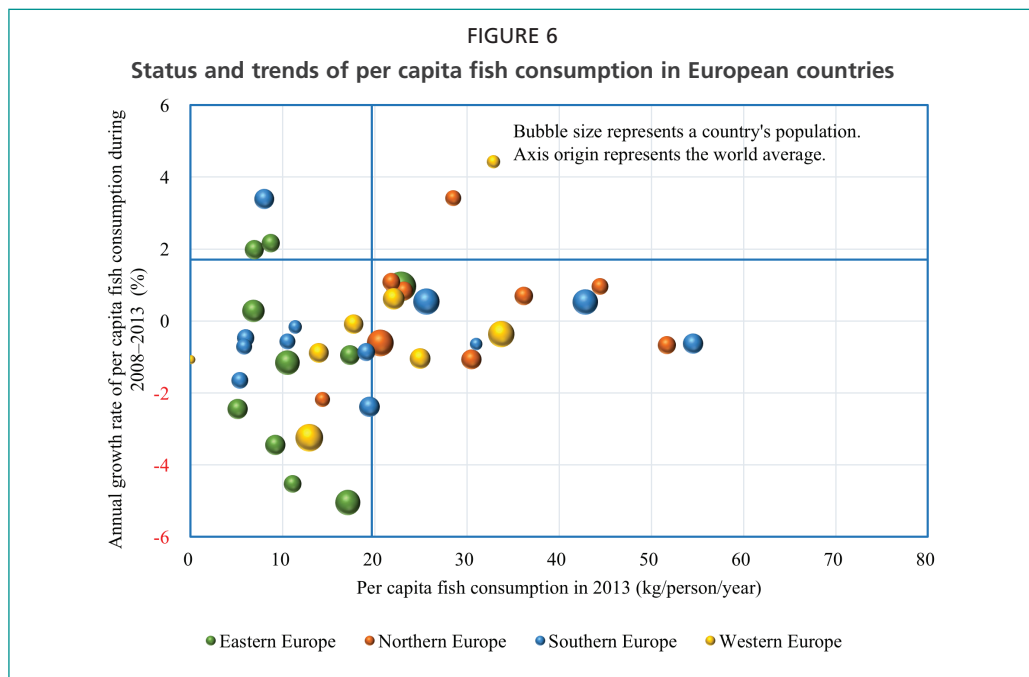
Europe reduced its share in world fish consumption from 14 to 12 percent during the 2008–2013 period (Figure 6). This reflects its negative growth in per capita fish consumption and stagnant population growth. Most subregions in Europe (except Southern Europe) had decreased per capita fish consumption during the period.



Source: Authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).



Source: Authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).

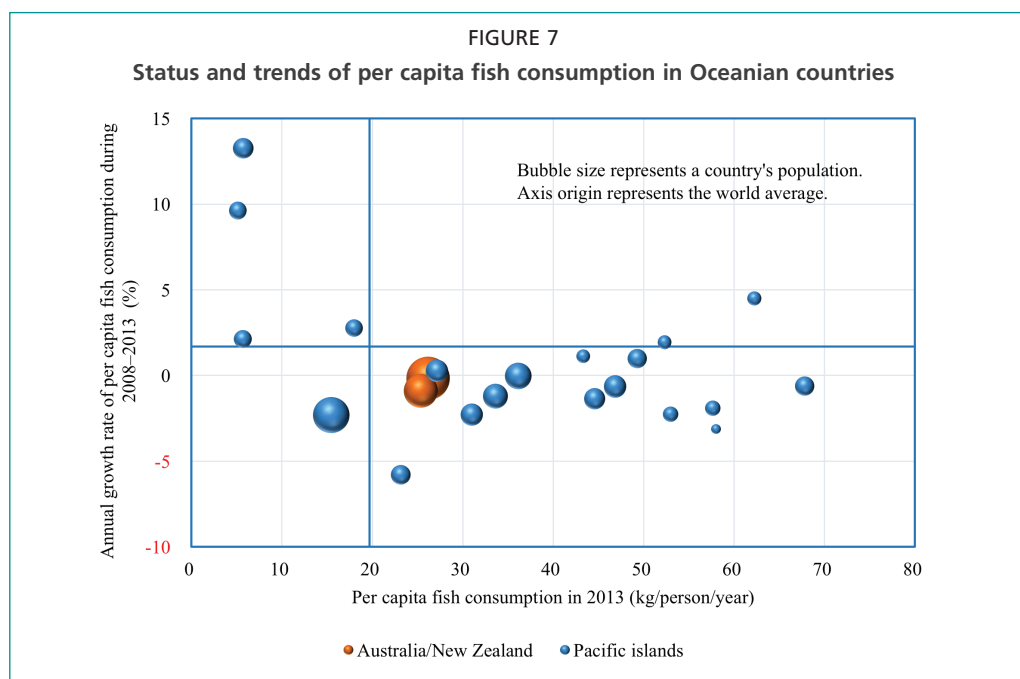


Source: Authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).

Eastern Europe, however, had negative population growth as well as negative growth in per capita fish consumption (Table 1).

Oceania: high yet decreased per capita fish consumption

Most Pacific Island countries or territories have above-average per capita fish consumption (Figure 7). But the subregion's per capita fish consumption declined from 23 kg in 2008 to 21 kg in 2013. Similar to other developed regions, Australia and New Zealand had reduced per capita fish consumption from 26.4 kg to 26.1 kg during the 2008–2013 period (Figure 7). Even with above-average population growth, the two subregions' shares in world fish consumption declined slightly during that period.



Source: Authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).

2.2 SPECIES COMPOSITION OF FISH CONSUMPTION

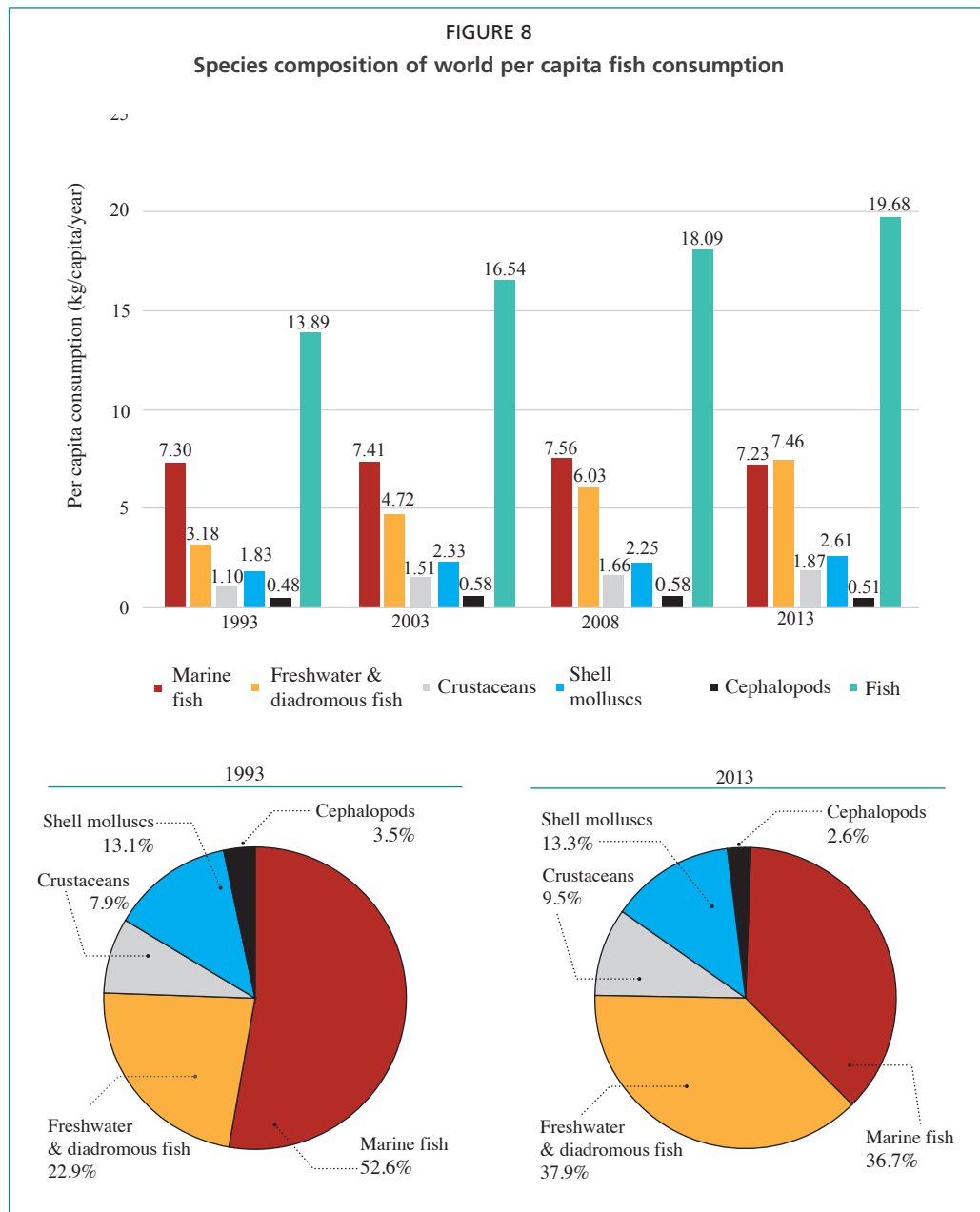
The growth of world per capita fish consumption from 18 kg in 2008 to 20 kg in 2013 was contributed by an increase in per capita consumption of freshwater & diadromous fish, crustaceans and shell molluscs, whereas that of marine fish and cephalopods declined (Figure 8). The species composition of fish consumption at the regional level is shown in Figure 9.

Marine fish used to be the largest species group in world fish consumption, but its share declined from 53 percent in 1993 to 37 percent in 2013, surpassed by freshwater & diadromous fish.¹³ However, the world average of 37 percent does not properly reflect the situation that marine fish is still the dominant species in most countries' fish consumption. Indeed, in 2013 marine fish accounted for more than half of fish consumption in more than 170 countries (Figure 10).

Freshwater & diadromous fish had the highest growth in world fish consumption, increasing from 3.2 kg in 1993 to 7.5 kg in 2013. Although freshwater & diadromous fish became the largest species group in world fish consumption in 2013, it is a dominant species group (i.e. more than half of fish consumption) in only 31 countries, primarily in Asia and Africa. In 136 countries, it is still a minor species group relative to marine fish, accounting for less than 25 percent of fish consumption (Figure 11).

Crustaceans accounted for nearly 10 percent of world fish consumption in 2013, increasing from 8 percent in 1993 (Figure 8). However, crustaceans accounted for more than 10 percent of fish consumption in only 47 countries; in 165 countries its share was less than 10 percent and in 126 countries less than 5 percent. Developed regions generally have higher consumption of crustaceans (generally considered a

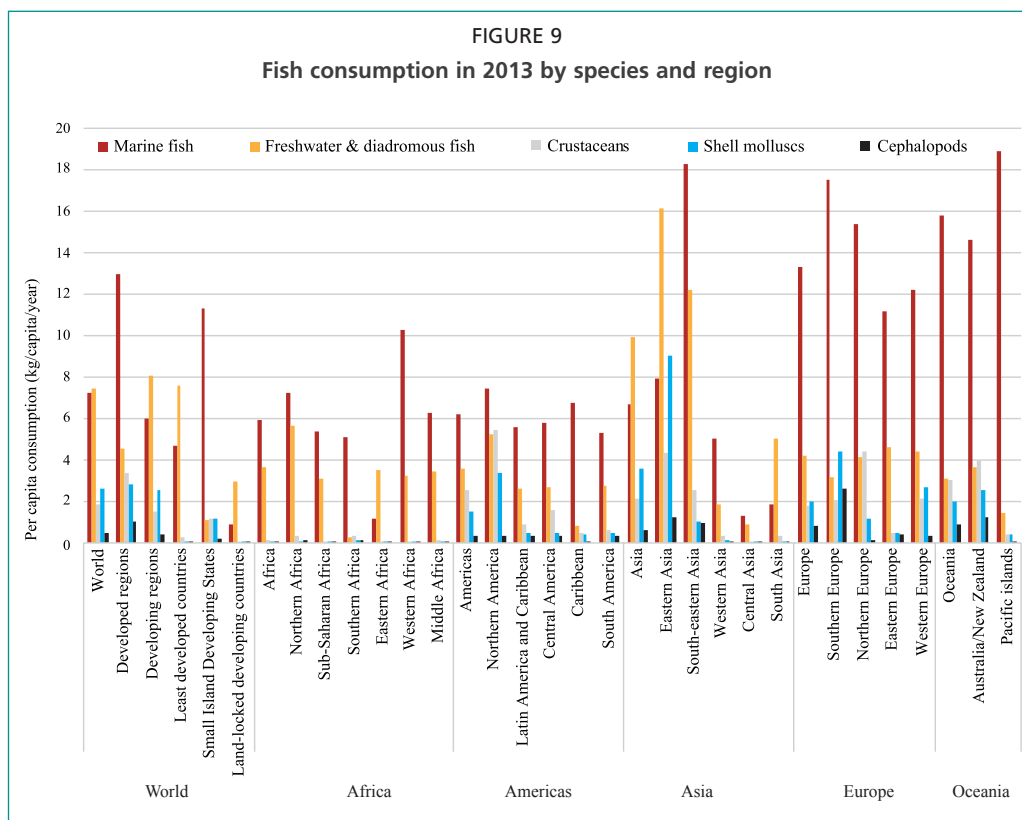
¹³ This reflects the situation that capture fisheries production, which is the primary source of marine fish, has been stagnant; on the other hand, the production of freshwater & diadromous fish has increased significantly thanks to the rapid growth in aquaculture production. However, it is worth noting that the increase in world consumption of freshwater & diadromous fish is contributed primarily by a few populous countries with strong growth in freshwater aquaculture (e.g. China and India).



Source: Authors' estimation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).

luxury seafood) than developing regions in terms of both the amount and the share in fish consumption. Countries in Eastern Asia, the Caribbean, Central America, Northern America, Western Europe and Northern Europe generally have a higher share of crustaceans in their fish consumption than countries in other regions. The share of crustaceans in fish consumption was less than 5 percent in nearly all countries on the African continent (Figure 12).

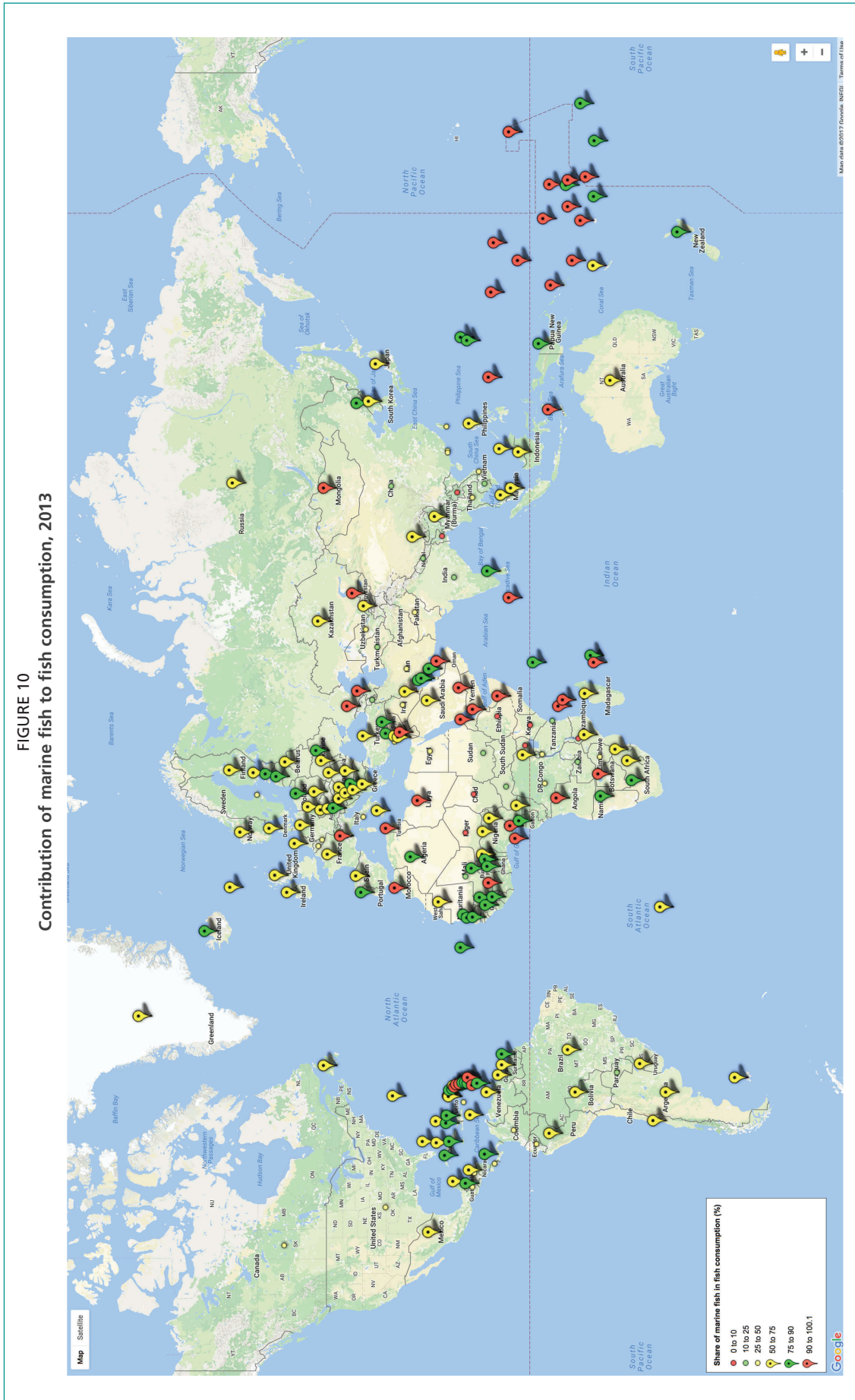
Shell molluscs accounted for 13 percent of world fish consumption in 2013; the share is nearly the same as in 1993 (Figure 8). The species group accounted for more than 10 percent of fish consumption in only 29 countries, whereas in 159 countries its share was less than 10 percent and in 132 countries less than 5 percent. Countries in Eastern Asia, the Caribbean, Northern America, Southern and Western Europe generally had a higher share of this species group compared with countries in other regions. No



Source: Authors' calculation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).

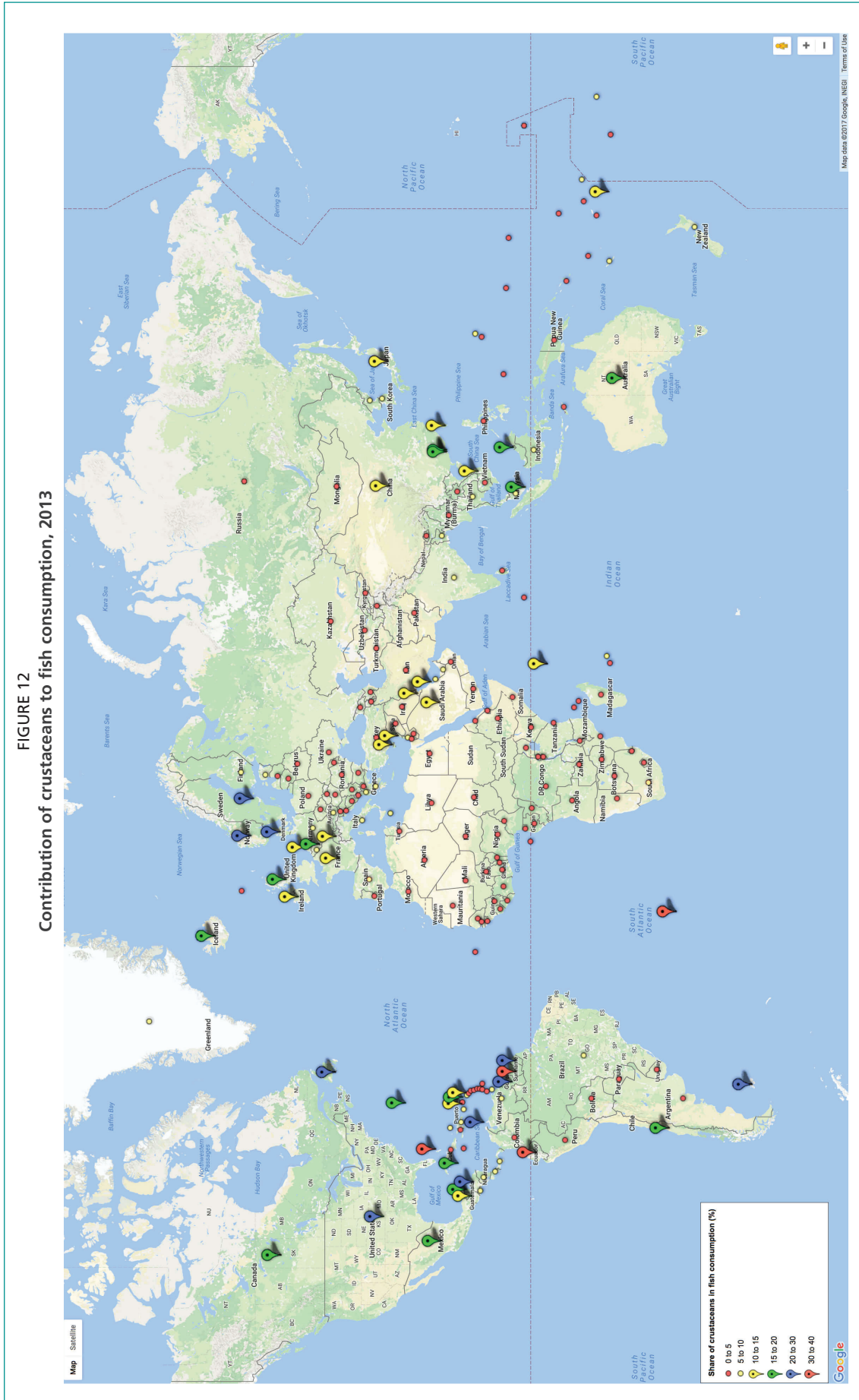
country on the African continent had higher than a 5 percent share of this species group (Figure 13).

Cephalopods accounted for 2.6 percent of world fish consumption in 2013; the share declined from 3.5 percent in 1993 (Figure 8). Indeed, world per capita cephalopod consumption declined from 0.58 kg in 2008 to 0.51 in 2013 (Figure 8). The species group accounted for more than 5 percent of fish consumption in only 18 countries; in 160 countries its share was less than 5 percent and in 104 countries less than 1 percent. Generally speaking, countries in Eastern Asia and Southern Europe had a higher share of this species group compared with countries in other regions (Figure 14).

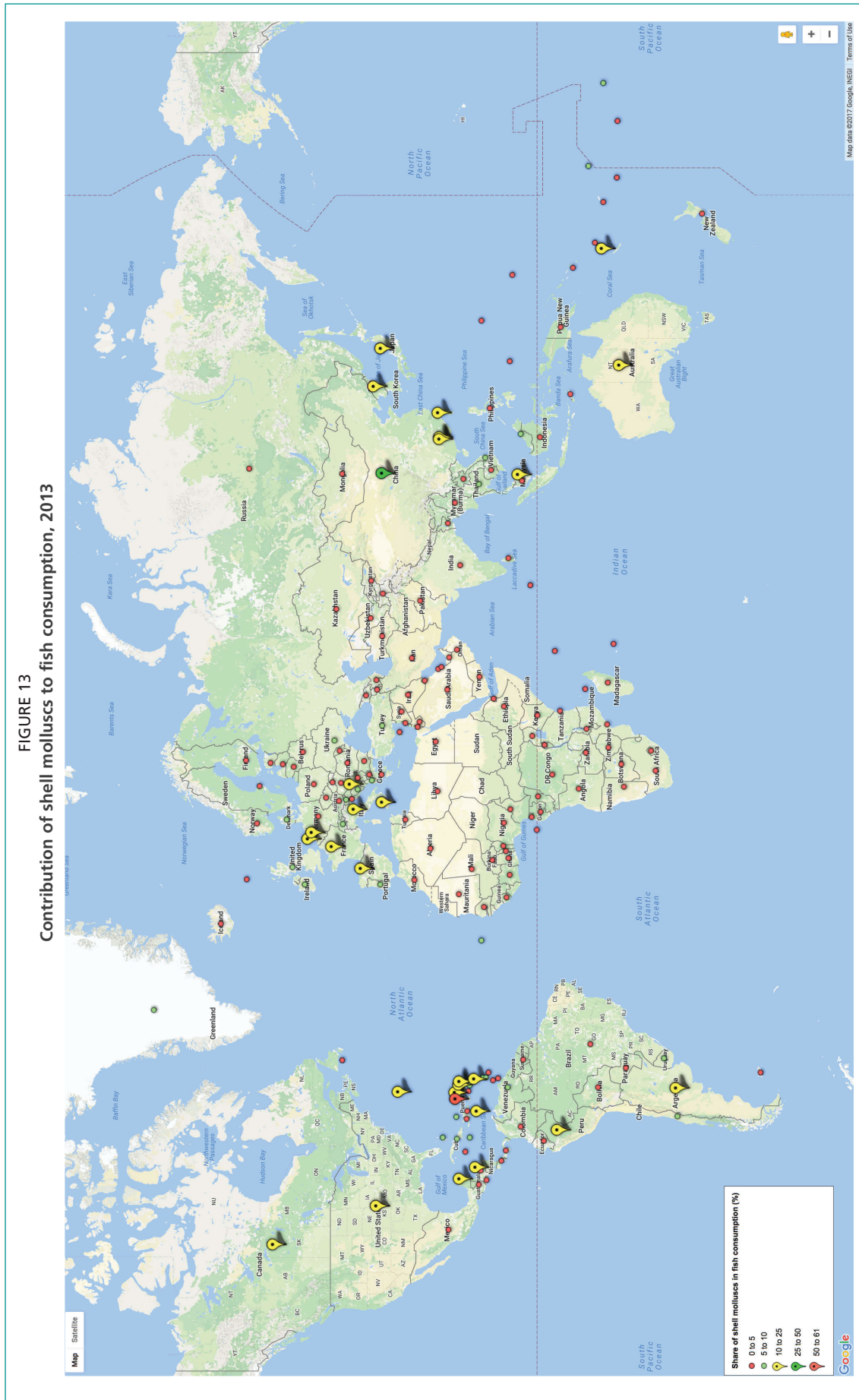


Source: Authors' calculation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).
Image source: @2017 Google.

FIGURE 12
Contribution of crustaceans to fish consumption, 2013



Source: Authors' calculation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).
Image source: ©2017 Google.



Source: Authors' calculation based on the FAO Food Balance Sheet for fish species (v. 2016.1.0).
Image source: ©2017 Google.

3. Estimating future fish demand

An econometric model is developed to estimate the income elasticity of fish demand, which measures the impact of income growth on per capita fish demand. The estimated income elasticity coefficients are then used to project per capita fish demand in the early 2020s at the country, regional and global levels. Finally, the projected per capita fish demand is combined with the United Nations population projection to estimate total fish demand in the early 2020s.

The basic results at the country level for the five basic species groups (i.e. marine fish, freshwater & diadromous fish, crustaceans, shell molluscs and cephalopods) are directly estimated; the results for the four more aggregated species groups (i.e. molluscs, shellfish, finfish and fish), or at the regional or global levels, are derived from the aggregation of the basic results.

3.1 ESTIMATING THE IMPACT OF INCOME ON PER CAPITA FISH DEMAND

The model

Equation (1) describes the model for estimating the impact of income growth on fish consumption.

$$\ln(C_{it}) = \alpha + \beta \ln(Y_{it}) + \gamma \ln(P_{it}) + u_i + e_{it} \quad (1)$$

It is a panel model, where i denotes country and t denotes time. The model is used to run five separate regressions, one for each of the five basic species groups. For example, in the regression for marine fish, the historical trends of per capita marine fish consumption in all countries are pooled together to estimate the impact of income growth on marine fish consumption.

The dependent variable C denotes per capita fish consumption, or more exactly, the per capita consumption of a fish species group. For narrative convenience, unless associated with a specific number indicating otherwise, the term “fish consumption (or demand)” generally means the consumption (or demand) of a fish species group, but not specifically the consumption (or demand) of fish as a whole.

The independent variables Y and P denote per capita income and fish price, respectively. For comparability across countries and over time, they are measured in real terms. Both the own price and the prices of substitute goods (e.g. alternative fish species and/or meats) were initially included in P , yet eventually dropped because their coefficients are not statistically significant. Therefore, the final model specification includes only the own price.

In a review of seafood demand studies, Asche, Bjørndal and Gordon (2007) reported that there are few studies showing that seafood and terrestrial meats are substitutes. Moreover, Tveterås *et al.* (2012) indicate that, while there are global markets for different main groups of fish species, there is little market integration between the main species groups. Another issue is limited data availability. For example, adding the meat price to the model for marine fish would reduce the number of countries included in the estimation from 187 to 109 and the number of observations from 1 109 to 646. The resulting loss of degree of freedom would cause collinearity problems that make some countries or subregions dropped from the estimation.

Coefficient β (i.e. the income elasticity of fish demand) is the key parameter to be estimated. It measures the impact of income growth on fish demand. More specifically, it measures what percentage a country's fish demand would change if its per capita income changes by 1 percent, given that other factors remain unchanged. Theoretically, the panel model in equation (1) can be used to estimate a distinct β for each country, but such a specification does not give statistically significant β for every country because of the limited amount and quality of data. Thus, we estimate a distinct β only for the top 20 countries with the largest fish consumption in 2013 and group other countries into 20 geographic subregions; countries in each subregion are assumed to have identical income elasticity. This assumption is technically necessary, and it is justifiable because countries in the same subregion generally tend to have similar dietary habits. Bangladesh, one of the top 20 countries, is grouped into South Asia in the estimations for shell molluscs and cephalopods because the estimated β for Bangladesh as a distinct country is not statistically significant for the two species groups.

Coefficient γ (i.e. the own price elasticity of fish demand) measures the impact of the price of a fish on its demand. The price elasticity is not the focus of the estimation because of the lack of worldwide data on domestic fish prices – there would be a more detailed discussion on this data limitation below. However, inclusion of the price variable is necessary to obtain more accurate estimations on β . Originally, a distinct γ is specified for each of the top 20 countries and the 20 subregions. Yet this specification is discarded, because the estimated coefficients are the correct signs and significant for a few countries or subregions, the correct signs yet insignificant for many countries or subregions, and the wrong signs and insignificant for a few countries or subregions. This may be caused by a varied quality of price data across countries. Thus, in the estimation for each of the five basic species groups, the final model specification assumes a uniform price elasticity γ across all countries in order to avoid an unwanted ad hoc effect on the estimation of income elasticity β , which is the targeted parameter in this study.

Coefficient α is the intercept. Parameter u is the random effect parameter that captures countries' idiosyncratic preference over fish consumption. Parameter e is an autoregressive AR (1) error term that captures general shocks.

Data

Population

Data on per capita consumption and per capita income in official databases are not used in this study because population data used to calculate them may not be consistent in different databases. Instead, population data from the United Nations World Population Prospects: the 2015 Revision (POP/DB/WPP/Rev.2015/POP/F01-1) is used to calculate per capita variables used in this study. When the United Nations World Population Prospects database does not contain data for a country or territory, population data provided by the FAO Food Balance Sheet for fish species (v. 2016.1.0) are used.

Consumption

A country's per capita fish consumption is calculated from the country's total fish consumption divided by its population. The data on countries' total fish consumption are obtained from the FAO Food Balance Sheet for fish species (v. 2016.1.0) published through FishStatJ; the data source for the population is explained above. Observations with per capita fish consumption less than 0.1 percent of the world average are treated as outliers and not used in the estimations. This has led to a loss of 0.1 percent of observations for marine fish, 2 percent for freshwater & diadromous fish, 6 percent for crustaceans, 10 percent for shell molluscs, and 7 percent for cephalopods.

Income

Gross domestic product (GDP) per capita is used as a proxy of per capita income. The GDP per capita adjusted for purchasing power parity (PPP) is used because it is more comparable across countries and over time. The data on GDP adjusted for PPP from the International Monetary Fund (IMF) World Economic Outlook database (April 2016)¹⁴ and the population data from the United Nations are used to calculate GDP per capita adjusted for PPP.

Price

Worldwide data on countries' domestic fish prices are not readily available. FAO provides worldwide data on a country's aquaculture production (both quantity and value),¹⁵ which can be used to calculate the price of domestic aquaculture production. FAO also provides worldwide data on the quantity and value of fish imports,¹⁶ which can be used to calculate the price of a country's fish imports. Since a country's domestic fish prices are determined by the prices of domestically produced fish as well as imported fish, a weighted average of these two prices (i.e. cultured fish price and imported fish price) is used to construct a proxy of domestic fish price.

The "ratio of aquaculture production relative to fish consumption" (denoted as w) is used as the weight for cultured fish price; w is set to unity if it is greater than one. The corresponding weight for imported fish price is $1 - w$. The rationale behind this weighting scheme is that, generally speaking, the greater a country's aquaculture production is compared to its fish consumption, the more its domestic fish price would be under the influence of its cultured fish price.

For countries that do not have a proxy domestic fish price under the weighting scheme, their imported fish prices are used as the proxy. If imported fish prices are also unavailable, the cultured fish prices are used.

The resulting prices over US\$20/kg, which are less than 1 percent of the data, are treated as outliers and not used in the estimations. Because per capita GDP adjusted for PPP is used, the price is adjusted for PPP by multiplying per capita GDP (PPP measure) and then dividing per capita GDP (current United States dollar measure).

Summary

Eventually, the estimation model covers a five-year period from 2008 to 2013 for nearly 200 countries for four basic species groups (marine fish, crustaceans, shell molluscs and cephalopods); the model for freshwater & diadromous covers a seven-year period from 2006 to 2013 (Table 2).

Although data are available from 1980 to 2013, only data in the most recent five years are used in estimations in order to capture the current situation. For the case of freshwater & diadromous fish, using the five-year period from 2008 to 2013 or a six-year period from 2007 to 2013 does not result in statistically significant coefficients for all countries and subregions; thus, the period is extended to 2006–2013, which leads to statistically significant income and price elasticity coefficients.

¹⁴ The dataset contains time series (1980–2021) data on the GDP for 190 countries.

¹⁵ Global Aquaculture Production Quantity (1950–2014) and Value (1984–2014) in the FAO Fishery and Aquaculture Statistics v. 2016.1.2 (published through FishStatJ).

¹⁶ Global Commodity Production and Trade Quantity and Value (1976–2013) in the FAO Fishery and Aquaculture Statistics v. 2016.1.2.

TABLE 2
Data used in estimations

Species group	Period	Number of countries	Number of observations
Marine fish	2008–2013	187	1 109
Freshwater & diadromous fish	2006–2013	188	1 426
Crustaceans	2008–2013	176	982
Shell molluscs	2008–2013	163	854
Cephalopods	2008–2013	154	803

Source: Author's estimation.

Income elasticity

The panel model in equation (1) is used to estimate the income elasticity of demand for the five basic fish species groups. The estimated income elasticities are presented in Figure 15A for the 20 subregions and Figure 15B for the top 20 countries.

More detailed results, including the 95 percent confidence interval of the income elasticity coefficients, are presented in Table 3; the results indicate that in all five estimations all coefficients are of the expected signs and statistically significant at 95 percent.

In general, the income elasticity coefficients for the two finfish species groups are lower than the three shellfish species groups, which are generally more luxurious goods, and the income elasticity of demand for freshwater & diadromous fish is the lowest. While the income elasticity coefficients are mostly between 0.5 and 0.6 for marine fish and below 0.5 for freshwater & diadromous fish, they are mostly greater than 1 for crustaceans, shell molluscs and cephalopods.

3.2 ESTIMATING PER CAPITA FISH DEMAND IN THE FUTURE

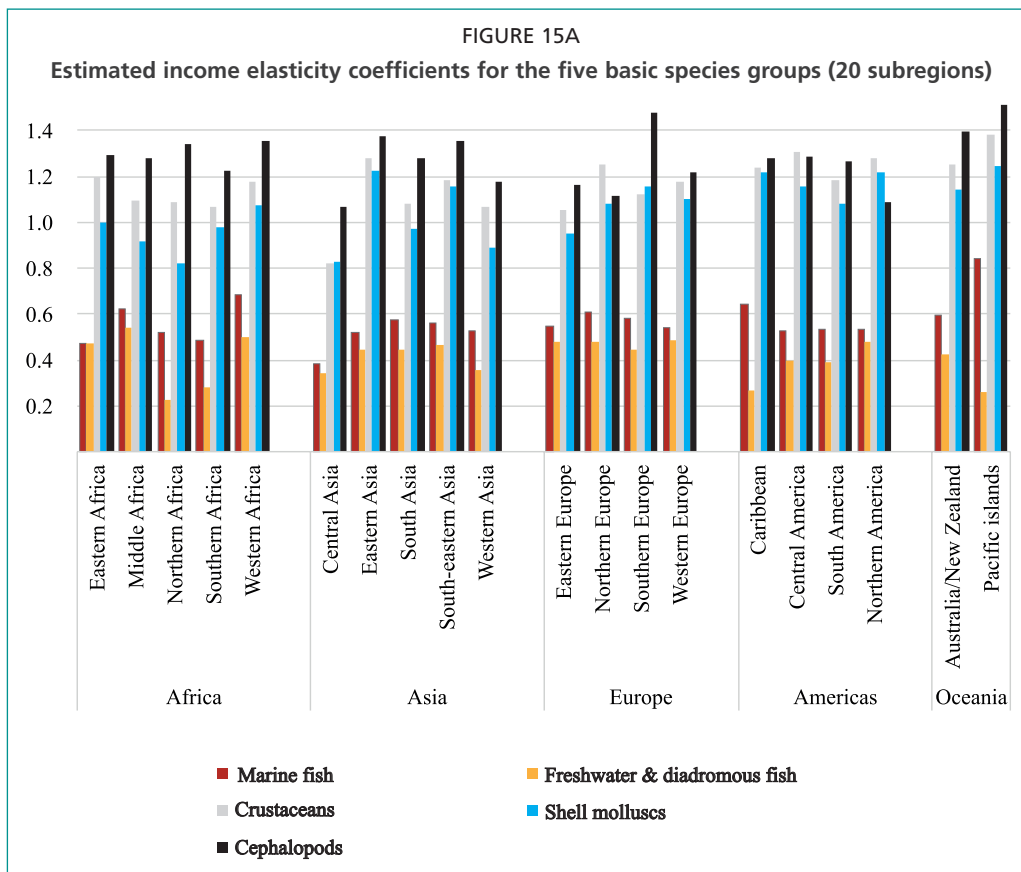
The per capita fish demand of a country in the future is estimated by equation (2).

$$C_{\text{future}} = C_{\text{benchmark}} \times (Y_{\text{future}} / Y_{\text{benchmark}})^{\beta} \quad (2)$$

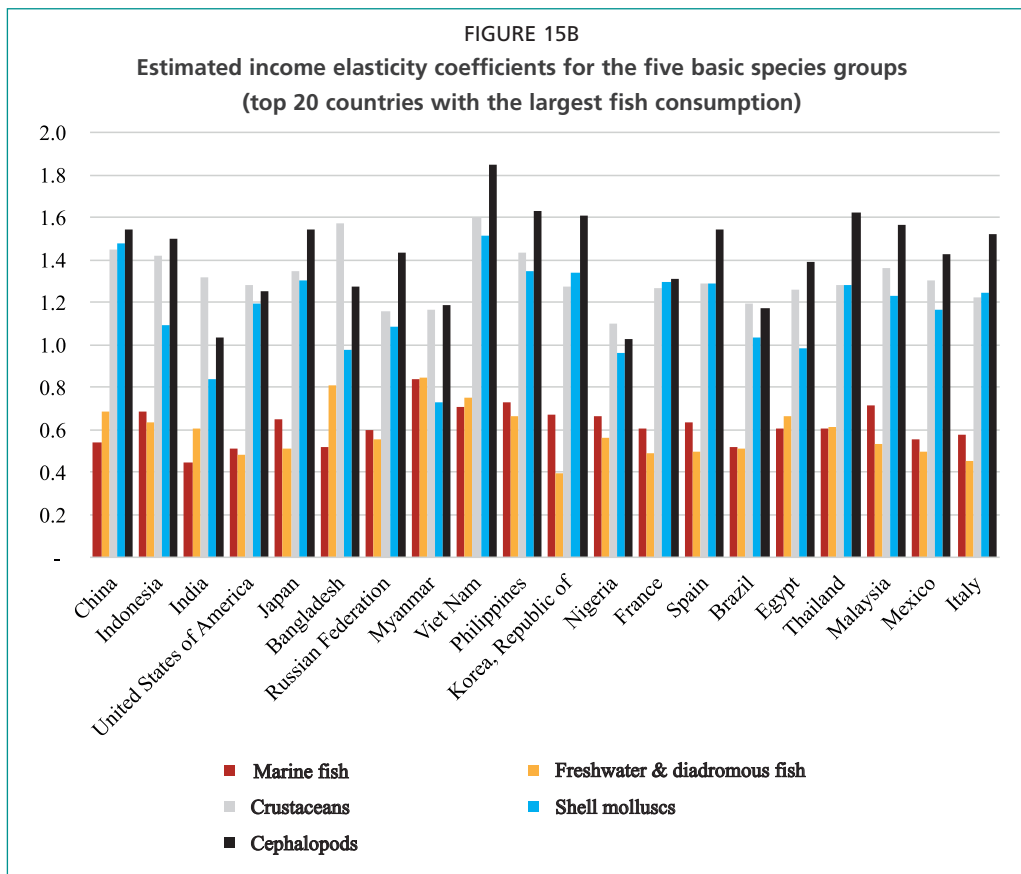
Intuitively, given per capita fish consumption in the benchmark year ($C_{\text{benchmark}}$), the expected income growth during the projection period ($Y_{\text{future}}/Y_{\text{benchmark}}$), and other factors that affect fish demand (fish price, consumer preference, etc.) remaining the status quo, per capita fish demand in the future is expected to be C_{future} .

The projection horizon is five years, from the mid-2010s to the early 2020s. Per capita fish consumption in 2013, the latest data on fish consumption available at the time of this analysis, is used to represent the benchmark per capita fish consumption ($C_{\text{benchmark}}$) in the mid-2010s. This essentially assumes that the mid-2010 per capita fish consumption in each country is at the level of its consumption in 2013.¹⁷ The average per capita GDP (PPP adjusted) in 2015 and 2016 is used to represent the benchmark income ($Y_{\text{benchmark}}$) in the mid-2010s, whereas the average expected income in 2020 and 2021 is used to represent the future income ($Y_{\text{benchmark}}$) in the early 2020s. The parameter β is estimated by the model in equation (1), which is assumed to be constant during the projection period.

¹⁷ Even though each country's per capita fish consumption in the mid-2010s is assumed to be at the level in 2013, the per capita consumption of a subregion, region or the entire world in the mid-2010s, which is a weighted average of per capita consumption in relevant individual countries (with their population being the respective weights), may be different from that in 2013 because the population of countries is different in the mid-2010s than in 2013.



Source: Author's estimation.



Source: Author's estimation.

TABLE 3
Estimated income elasticity coefficients

Subregions and top 20 countries	Marine fish			Freshwater & diadromous fish			Crustaceans			Shell molluscs			Cephalopods		
	Mean coefficient	95% confidence level	Mean coefficient	95% confidence level	Mean coefficient	95% confidence level	Mean coefficient	95% confidence level	Mean coefficient	95% confidence level	Mean coefficient	95% confidence level	Mean coefficient	95% confidence level	
Eastern Africa	0.4698	0.3011	0.6385	0.4744	0.2652	0.6836	1.1956	0.9290	1.4621	0.9981	0.6973	1.2989	1.2940	0.9683	1.6196
Middle Africa	0.6254	0.4616	0.7892	0.5432	0.3418	0.7446	1.0934	0.8389	1.3479	0.9132	0.6370	1.1894	1.2795	0.9806	1.5783
Northern Africa	0.5165	0.3602	0.6727	0.2222	0.0264	0.4181	1.0878	0.8409	1.3348	0.8212	0.5488	1.0936	1.3372	1.0393	1.6351
Southern Africa	0.4844	0.3148	0.6540	0.2792	0.0754	0.4829	1.0639	0.8085	1.3194	0.9763	0.6870	1.2656	1.2271	0.9155	1.5386
Western Africa	0.6849	0.5107	0.8590	0.5013	0.2845	0.7180	1.1734	0.8955	1.4514	1.0764	0.7594	1.3934	1.3556	1.0059	1.7054
Central Asia	0.3828	0.2105	0.5551	0.3399	0.1312	0.5485	0.8236	0.5604	1.0867	0.8269	0.5328	1.1210	1.0680	0.7506	1.3854
Eastern Asia	0.5229	0.3738	0.6721	0.4451	0.2652	0.6249	1.2787	1.0555	1.5018	1.2255	0.9807	1.4703	1.3764	1.1103	1.6426
South Asia	0.5744	0.4084	0.7404	0.4463	0.2447	0.6479	1.0780	0.8244	1.3317	0.9741	0.6745	1.2736	1.2768	0.9581	1.5955
South-eastern Asia	0.5582	0.4018	0.7147	0.4662	0.2782	0.6542	1.1802	0.9442	1.4161	1.1555	0.8949	1.4161	1.3523	1.0687	1.6358
Western Asia	0.5294	0.3991	0.6598	0.3529	0.1919	0.5139	1.0654	0.8569	1.2739	0.8923	0.6581	1.1265	1.1769	0.9199	1.4338
Eastern Europe	0.5459	0.4022	0.6897	0.4755	0.3000	0.6510	1.0562	0.8320	1.2803	0.9491	0.6990	1.1993	1.1632	0.8893	1.4370
Northern Europe	0.6062	0.4759	0.7366	0.4763	0.3163	0.6362	1.2537	1.0489	1.4585	1.0826	0.8537	1.3115	1.1122	0.8608	1.3635
Southern Europe	0.5797	0.4382	0.7211	0.4438	0.2714	0.6161	1.1208	0.8999	1.3417	1.1528	0.9065	1.3992	1.4763	1.2061	1.7465
Western Europe	0.5391	0.4027	0.6755	0.4839	0.3197	0.6481	1.1787	0.9713	1.3862	1.1006	0.8711	1.3300	1.2179	0.9671	1.4687
Caribbean	0.6418	0.5007	0.7828	0.2647	0.0919	0.4376	1.2400	1.0173	1.4627	1.2155	0.9630	1.4679	1.2760	0.9993	1.5528
Central America	0.5254	0.3653	0.6855	0.3952	0.2009	0.5896	1.3046	1.0584	1.5508	1.1537	0.8245	1.4275	1.2871	0.9878	1.5863
South America	0.5309	0.3863	0.6755	0.3905	0.2126	0.5684	1.1819	0.9542	1.4097	1.0792	0.8729	1.3339	1.2684	0.9895	1.5473
Northern America	0.5352	0.3099	0.7606	0.4763	0.2206	0.7320	1.2796	0.9792	1.5800	1.2178	0.9028	1.5328	1.0859	0.7504	1.4214
Australia/New Zealand	0.5927	0.4125	0.7730	0.4219	0.2125	0.6312	1.2488	0.9957	1.5019	1.1448	0.8730	1.4166	1.3966	1.1034	1.6897
Pacific Islands	0.8416	0.6757	1.0075	0.2624	0.0578	0.4671	1.3815	1.1198	1.6433	1.2442	0.9500	1.5385	1.5088	1.1890	1.8286
China	0.5381	0.2816	0.7946	0.6886	0.3936	0.9836	1.4467	1.1017	1.7918	1.4798	1.1172	1.8425	1.5424	1.1556	1.9291
Indonesia	0.6857	0.4232	0.9481	0.6385	0.3387	0.9383	1.4218	1.0707	1.7730	1.0960	0.7275	1.4646	1.4983	1.1059	1.8908
India	0.4460	0.1637	0.7283	0.6068	0.2836	0.9299	1.3169	0.9385	1.6954	0.8380	0.4402	1.2357	1.0359	0.6057	1.4660
United States of America	0.5081	0.2865	0.7297	0.4833	0.2322	0.7343	1.2814	0.9862	1.5765	1.1952	0.8859	1.5046	1.2496	0.9201	1.5791
Japan	0.6501	0.4211	0.8792	0.5119	0.2522	0.7717	1.3474	1.0421	1.6527	1.3045	0.9846	1.6244	1.5441	1.2032	1.8849
Bangladesh*	0.5199	0.2198	0.8200	0.8120	0.4684	1.1555	1.5740	1.1714	1.9765	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Russian Federation	0.5994	0.3625	0.8362	0.5542	0.2844	0.8239	1.1553	0.8390	1.4716	1.0829	0.7511	1.4148	1.4317	1.0784	1.7850
Myanmar	0.8358	0.5474	1.1242	0.8481	0.5183	1.1780	1.1670	0.7806	1.5534	0.7260	0.3042	1.1478	1.1849	0.7528	1.6169
Viet Nam	0.7063	0.4236	0.9891	0.7498	0.4268	1.0728	1.6018	1.2235	1.9800	1.5163	1.1190	1.9137	1.8449	1.4220	2.2678
Philippines	0.7311	0.4562	1.0060	0.6626	0.3486	0.9766	1.4354	1.0673	1.8035	1.3462	0.9604	1.7320	1.6299	1.2183	2.0414
Korea, Republic of	0.6702	0.4389	0.9015	0.3920	0.1288	0.6551	1.2730	0.9645	1.5815	1.3383	1.0150	1.6616	1.6097	1.2651	1.9543
Nigeria	0.6644	0.3851	0.9436	0.5657	0.2467	0.8847	1.1016	0.7283	1.4748	0.9629	0.5711	1.3547	1.0253	0.6079	1.4428
France	0.6040	0.3769	0.8311	0.4878	0.2303	0.7452	1.2666	0.9641	1.5691	1.2948	0.9778	1.6119	1.3132	0.9753	1.6510
Spain	0.6364	0.4057	0.8670	0.4942	0.2330	0.7555	1.2872	0.9801	1.5944	1.2885	0.9668	1.6103	1.5409	1.1979	1.8838
Brazil	0.5218	0.2722	0.7714	0.5086	0.2245	0.7926	1.1973	0.8644	1.5302	1.0318	0.6828	1.3808	1.1733	0.8013	1.5453
Egypt	0.6028	0.3434	0.8622	0.6649	0.3706	0.9592	1.2600	0.9146	1.6053	0.9854	0.6232	1.3476	1.3908	1.0055	1.7760
Thailand	0.6089	0.3584	0.8594	0.6165	0.3311	0.9019	1.2779	0.9433	1.6125	1.2799	0.9293	1.6305	1.6207	1.2469	1.9945
Malaysia	0.7152	0.4759	0.9544	0.5356	0.2632	0.8080	1.3630	1.0436	1.6824	1.2312	0.8965	1.5659	1.5670	1.2102	1.9238
Mexico	0.5529	0.3052	0.8006	0.4936	0.2125	0.7748	1.3004	0.9702	1.6306	1.1670	0.8205	1.5134	1.4292	1.0603	1.7980
Italy	0.5771	0.3481	0.8062	0.4548	0.1956	0.7140	1.2259	0.9210	1.5307	1.2478	0.9284	1.5672	1.5217	1.1813	1.8621

Source: Author's estimation. *For shell molluscs or cephalopods, no distinct income elasticity coefficient is estimated for Bangladesh; the country is grouped into South Asia.

Individual countries' per capita demand for the five basic species groups (i.e. marine fish, freshwater & diadromous fish, crustaceans, shell molluscs and cephalopods) is estimated by equation (2). The basic results are then aggregated into per capita fish demand in regions and the world. The results for the five basic species groups at the national, regional and global levels are further aggregated into per capita demand for the four more aggregate species groups (i.e. molluscs, shellfish, finfish and fish).

Expected growth in per capita income from the mid-2010s to the early 2020s

The GDP per capita (PPP adjusted) is used to measure per capita income. The projection of GDP per capita is calculated from the IMF World Economic Outlook projections on GDP divided by the United Nations projections on population. Nearly all countries are expected to have positive income growth during the period from the mid-2010s to the early 2020s. Countries with relatively high income growth (annual growth of 5 percent or above) are concentrated in Asia, Eastern Africa, Western Africa and Eastern Europe (Figure 16).

Expected growth in per capita fish demand from the mid-2010s to the early 2020s

Given no changes in other factors that affect fish demand, such as fish price and consumer preference, income growth would tend to increase world per capita fish demand by 5.2 kg, from 19.5 kg¹⁸ in the mid-2010s to 24.7 kg in the early 2020s; finfish and shellfish account for 53 and 47 percent of the growth, respectively (Figure 17).

Per capita fish demand is expected to increase at all regional and subregional levels for all the five basic species groups (Figure 18). Eastern Asia and South-eastern Asia would have the greatest demand increases because of their relatively high fish consumption and fast income growth.

Per capita fish demand is expected to decline in only a few countries (Ecuador, Equatorial Guinea, Timor-Leste and Venezuela, Bolivarian Republic of) because of their negative expected income growth (Figure 19).¹⁹ In the majority of the countries, the increase in per capita fish demand is less than 5 kg. In many countries, the increase is less than 1 kg. Countries with relatively high growth in per capita fish demand (higher than 5 kg) are concentrated in Eastern, South and South-eastern Asia, including Bangladesh, Brunei Darussalam, Cambodia, China and China, Hong Kong SAR, Indonesia, Japan, the Republic of Korea, Malaysia, Maldives, Myanmar, the Philippines, Sri Lanka, Taiwan Province of China, Thailand and Viet Nam. A number of small island developing states – including Fiji, Kiribati, Palau, Samoa, Singapore and Tuvalu in the Pacific; Antigua and Barbuda, Saint Kitts and Nevis, and Barbados in the Caribbean Sea; and Seychelles in the Indian Ocean – would also have relatively high growth in per capita fish demand. Other countries with relatively high growth in per capita demand include Iceland, Latvia, Lithuania, Malta, Norway, Portugal and Spain in Europe; Ghana, Gabon, Senegal and Sierra Leone in Africa; and Guyana in South America (Figure 19).

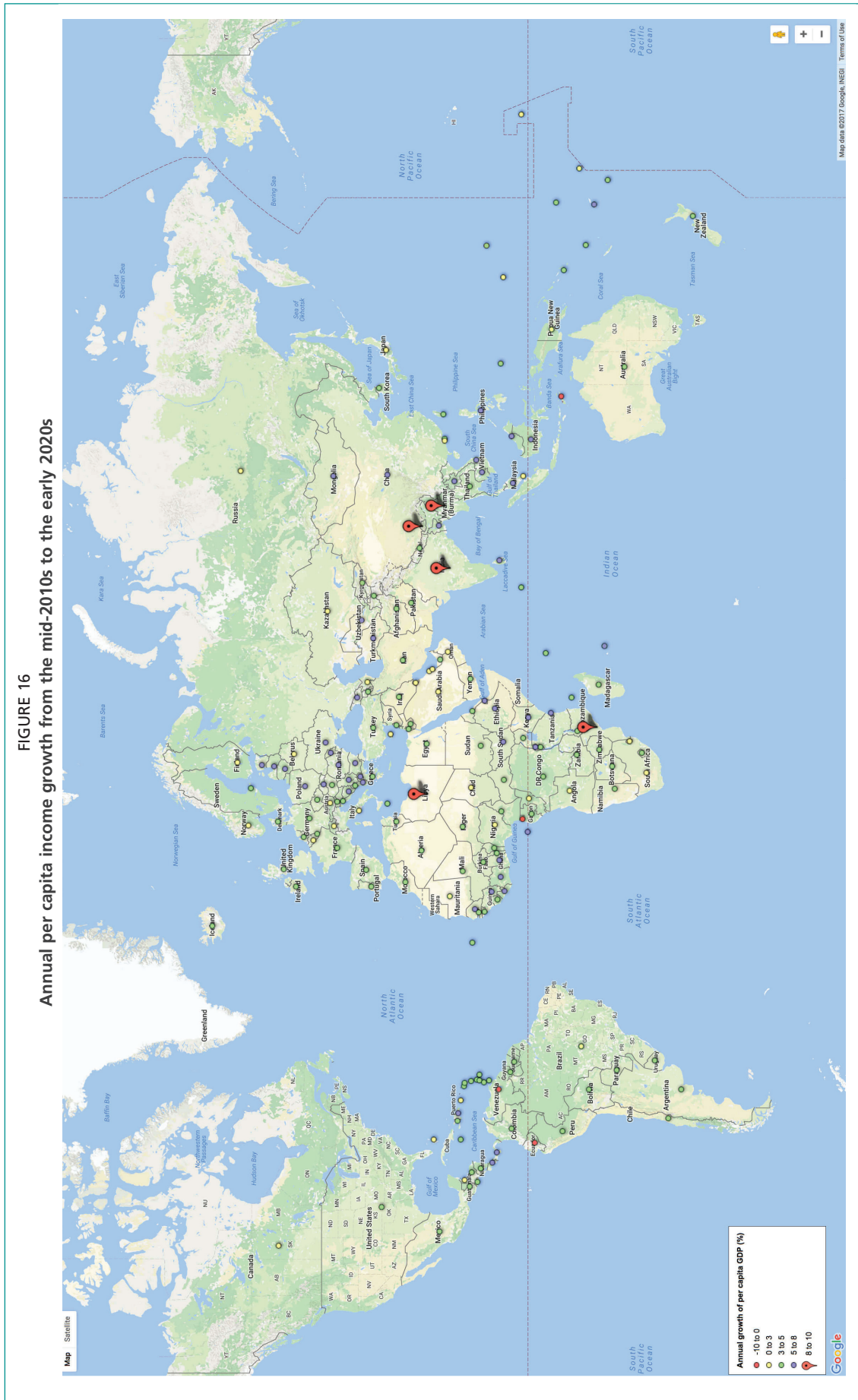
3.3 ESTIMATING FUTURE FISH DEMAND

Estimated per capita fish demand in the future, combined with the population projection provided by the United Nations, is used to estimate countries' future demands for the five basic species groups (marine fish, freshwater & diadromous fish,

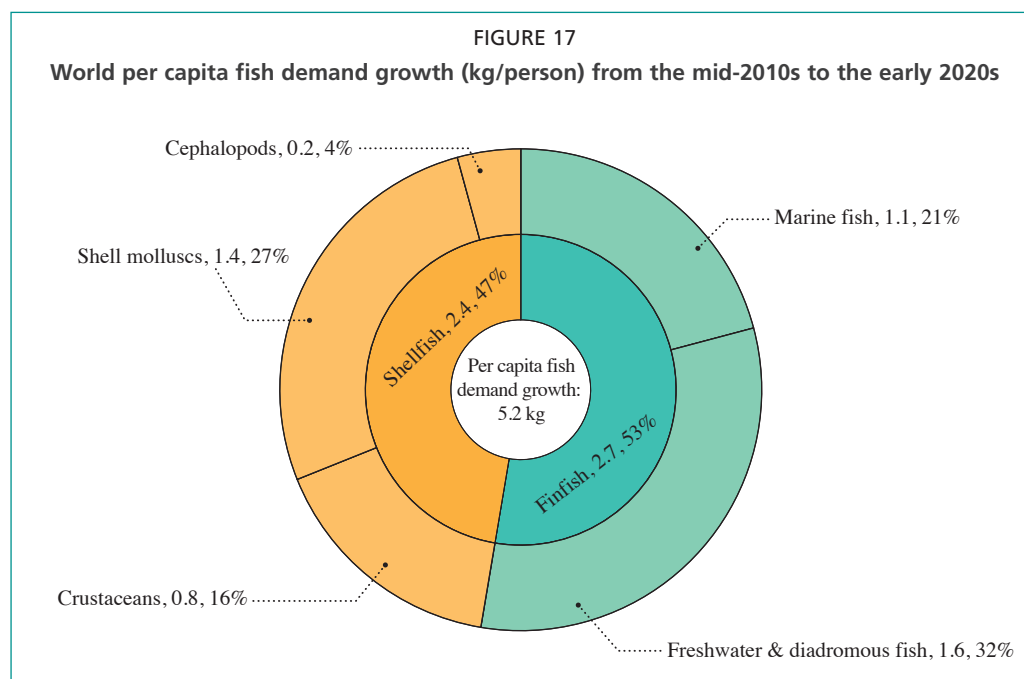
¹⁸ The world average figure here, which is calculated based on countries' benchmark population (the average of the population in 2015 and 2016), is slightly different from the one presented in previous sections (19.7 kg), which is calculated based on their population in 2013; see the explanation in footnote 17.

¹⁹ It should be noted that per capita income is measured by per capita GDP adjusted for PPP.

FIGURE 16
Annual per capita income growth from the mid-2010s to the early 2020s



Source: Authors' estimation.
Image source: ©2017 Google.



Source: Author's estimation.

crustaceans, shell molluscs, and cephalopods) at the country level. The basic results are aggregated into more aggregate species groups (molluscs, shellfish, finfish and fish) and/or at the regional or global levels.

Population growth

World population is expected to increase from 7.3 billion in the mid-2010s to 7.7 billion in the early 2020s (Figure 20).²⁰ The situation of individual countries is presented in Figure 21. Most of the world population growth (96 percent) in the near future will come from developing regions. Asia, Africa, and Latin America and the Caribbean would account for 50 percent, 38 percent and 8 percent of the growth, respectively. In Asia, South Asia accounts for more than half of the population growth in the region. Europe accounts for less than a half percent of the world population growth. Indeed, the population in Eastern and Southern Europe is expected to decline (Figure 20), as in Japan and a few Caribbean countries (Figure 21). Northern America accounts for 3 percent of world population growth during the period.

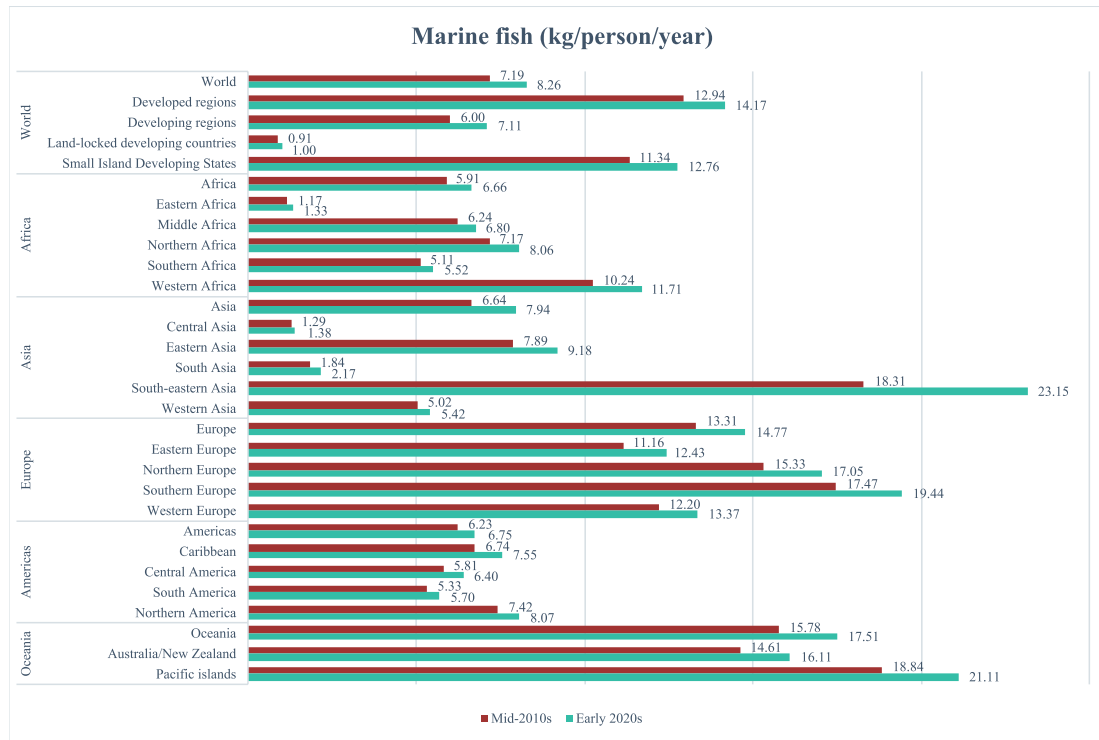
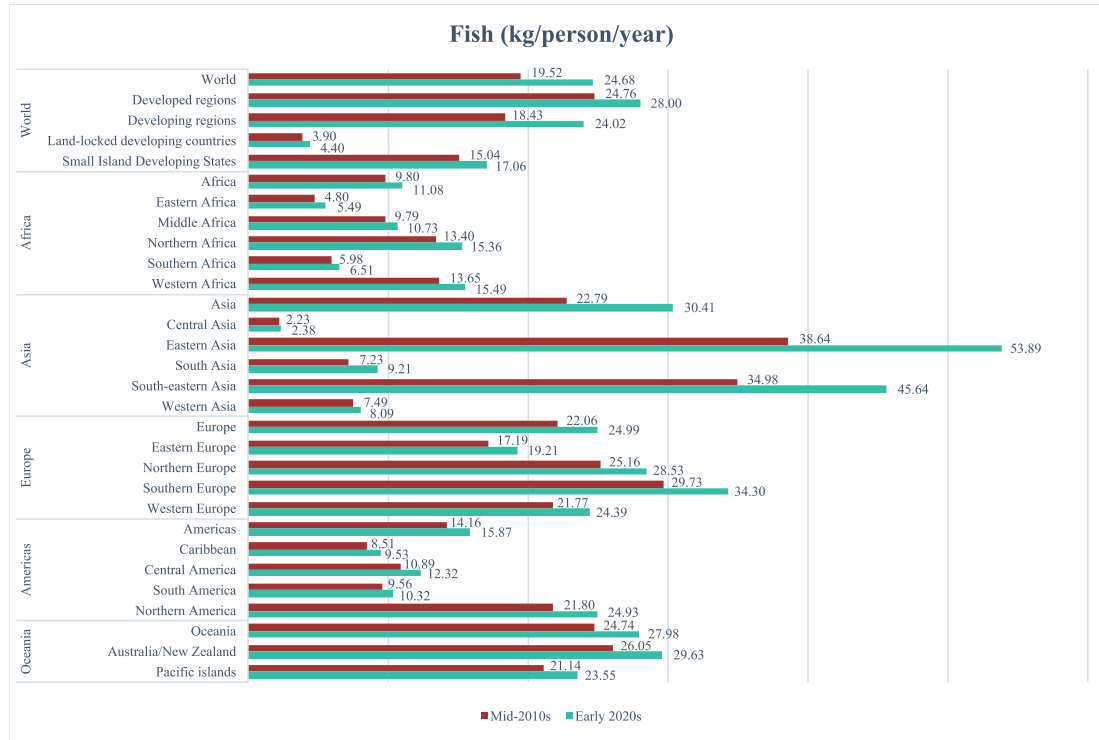
Countries with relatively large population growth include Bangladesh, China, India, Indonesia, Iraq, Pakistan and the Philippines in Asia; the Democratic Republic of the Congo, Egypt, Ethiopia, Kenya, Nigeria, the Sudan, Uganda and the United Republic of Tanzania in Africa; and Brazil, Mexico and the United States of America in the Americas.

Projection of future fish demand

The estimated future per capita fish demand discussed in section 3.2 and the United Nations population project just discussed are combined to estimate countries' future demand for the five basic species groups. The basic results are aggregated into

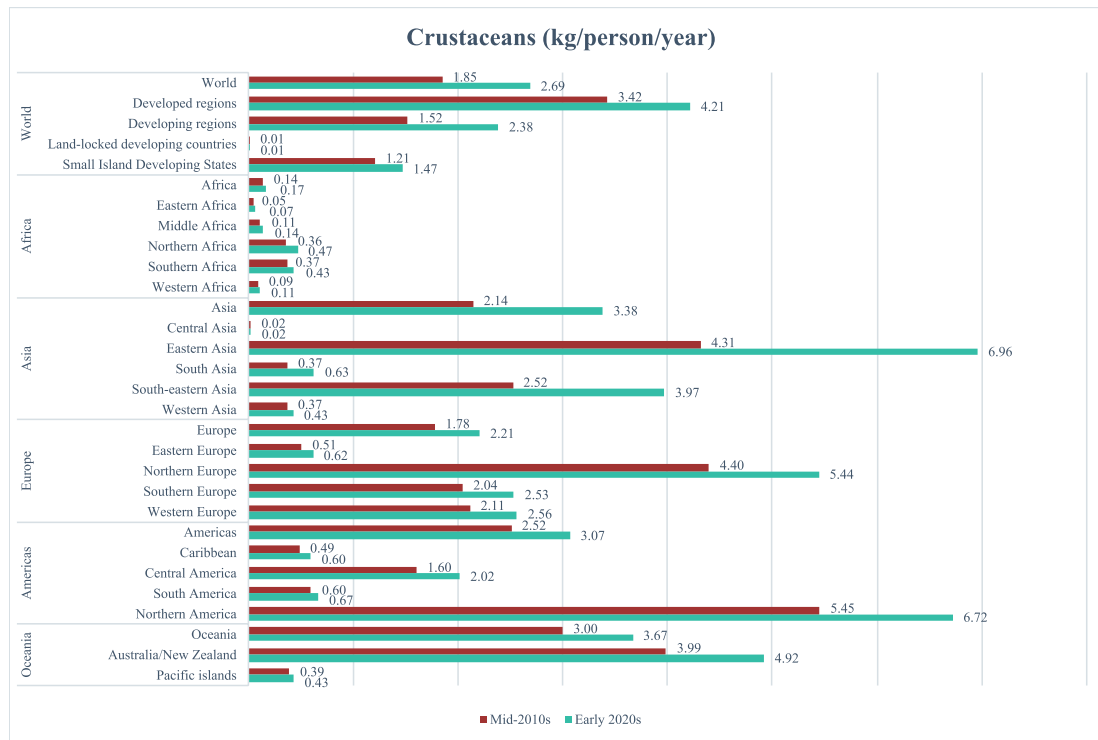
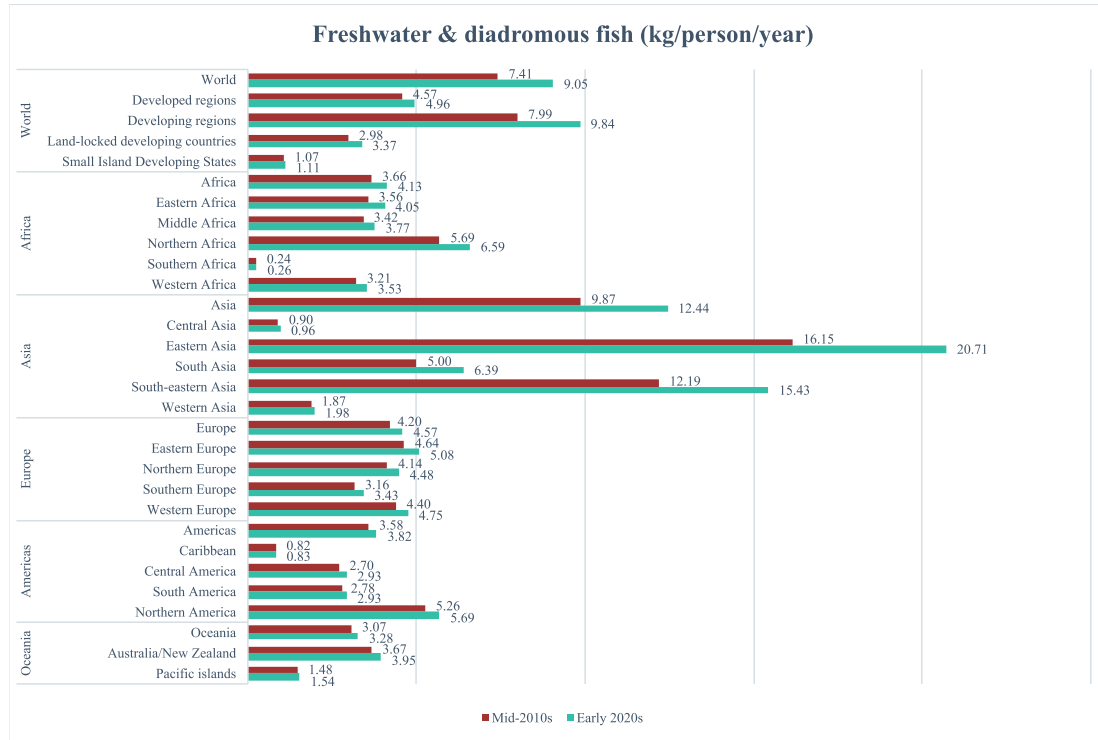
²⁰ Unless specified otherwise, United Nations population projections used in this paper are the medium-fertility-variant projections.

FIGURE 18
Per capita fish demand at the regional and global levels – mid-2010s versus the early 2020s



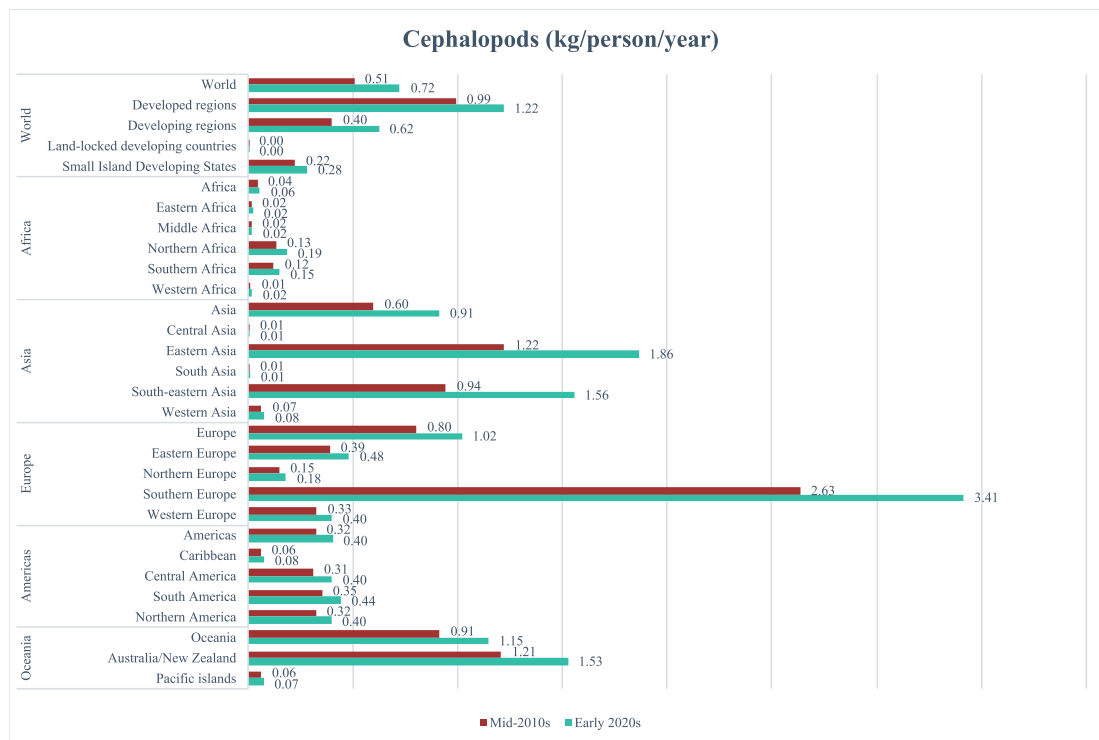
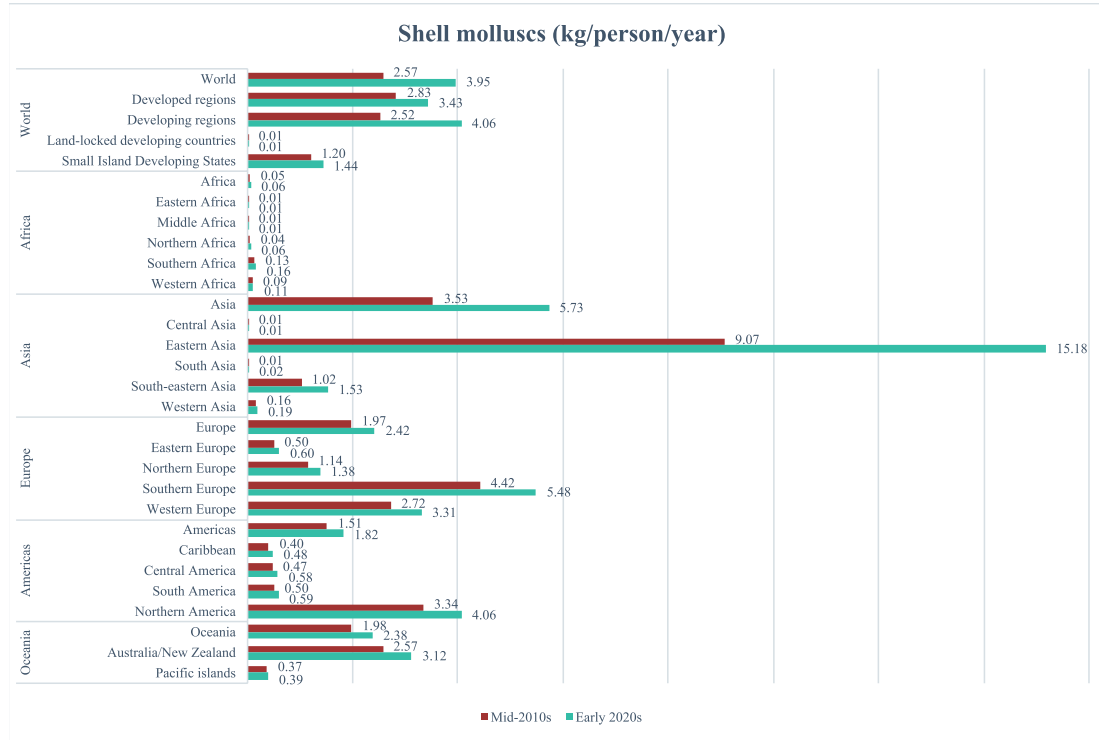
Source: Authors' estimation.

FIGURE 18 (CONT'D)
Per capita fish demand at the regional and global levels – mid-2010s versus the early 2020s



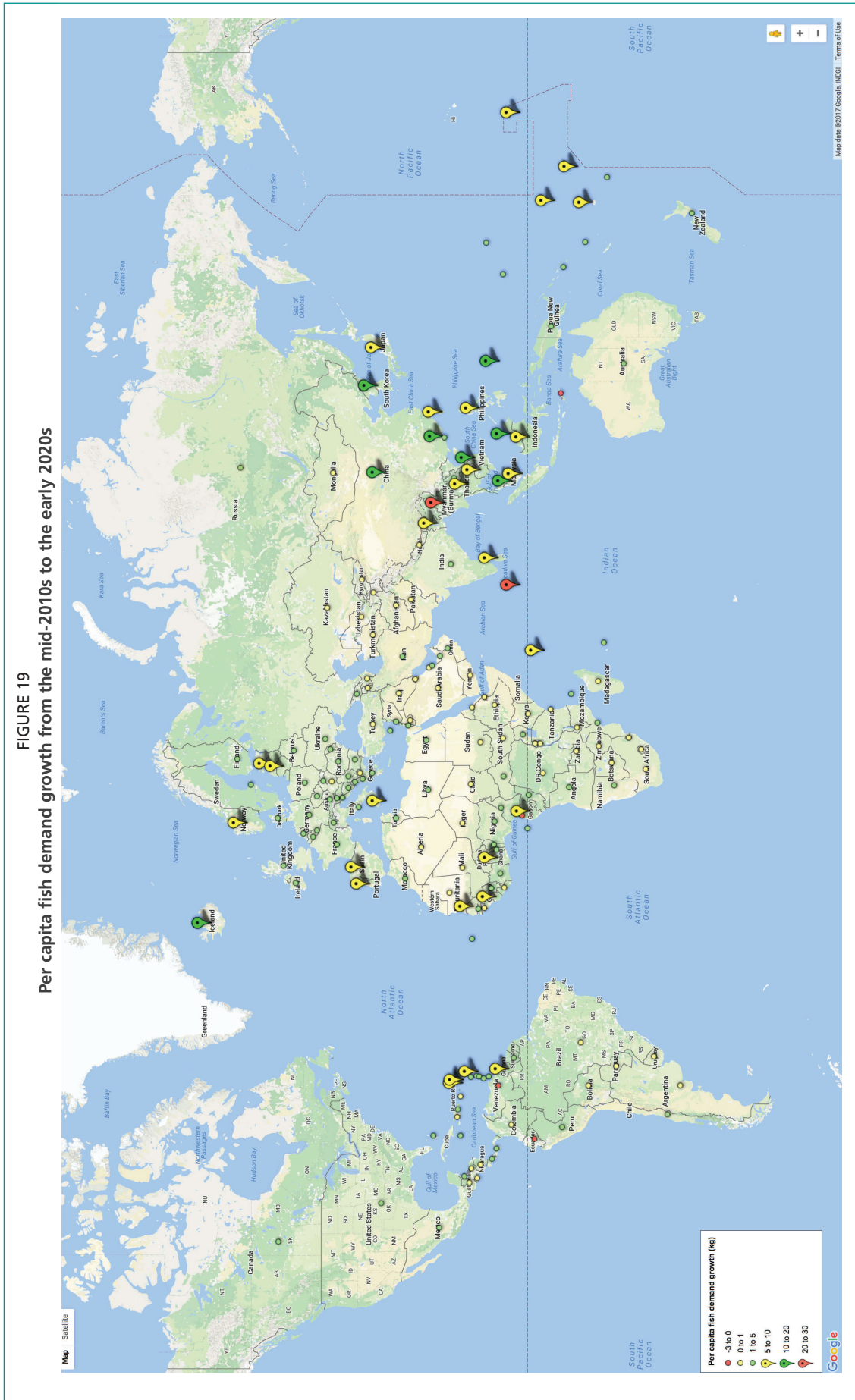
Source: Authors' estimation.

FIGURE 18 (CONT'D)
Per capita fish demand at the regional and global levels – mid-2010s versus the early 2020s

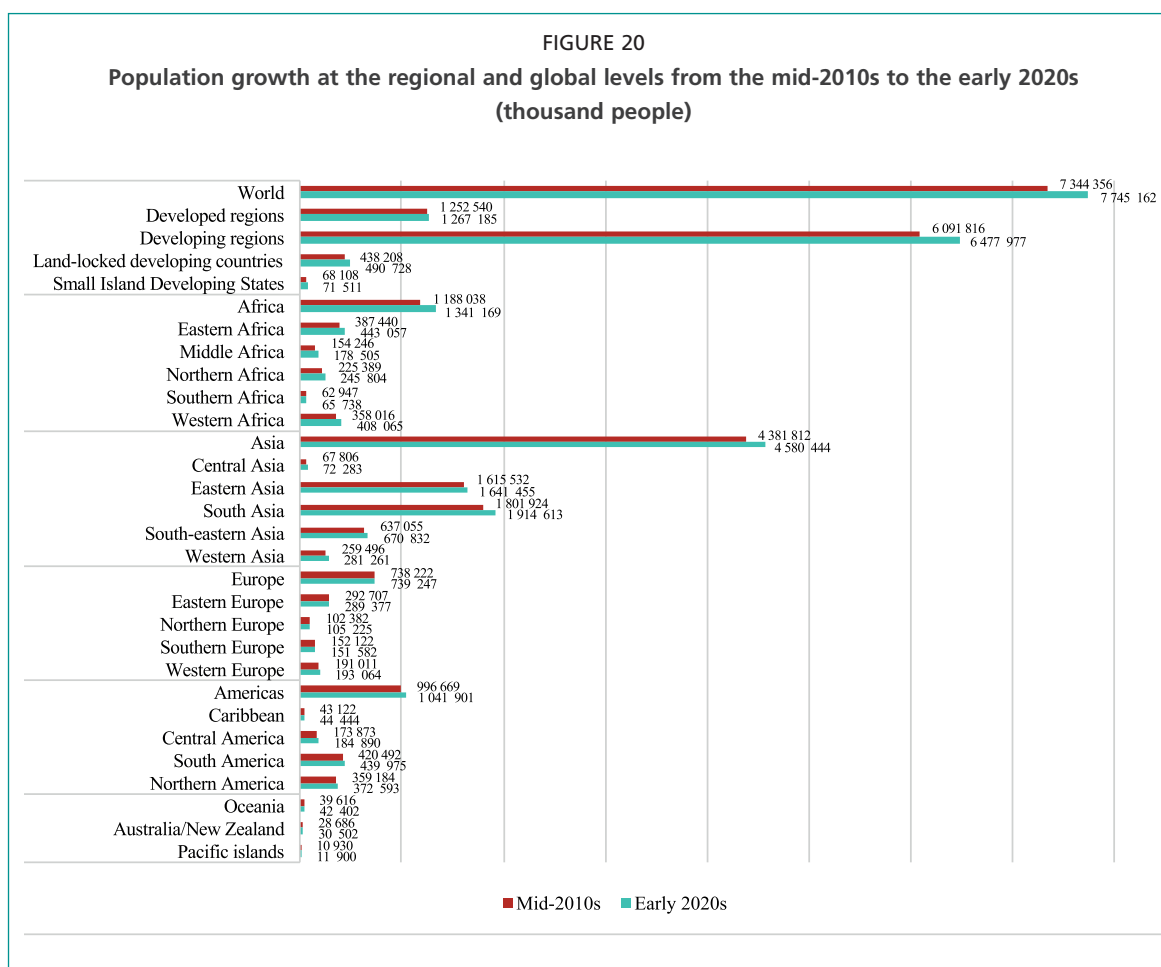


Source: Authors' estimation.

FIGURE 19
Per capita fish demand growth from the mid-2010s to the early 2020s



Source: Authors' estimation.
Image source: @2017 Google.



Source: Author's estimation based on the United Nations World Population Prospects: The 2015 Revision (POP/DB/WPP/Rev.2015/POP/F01-1).

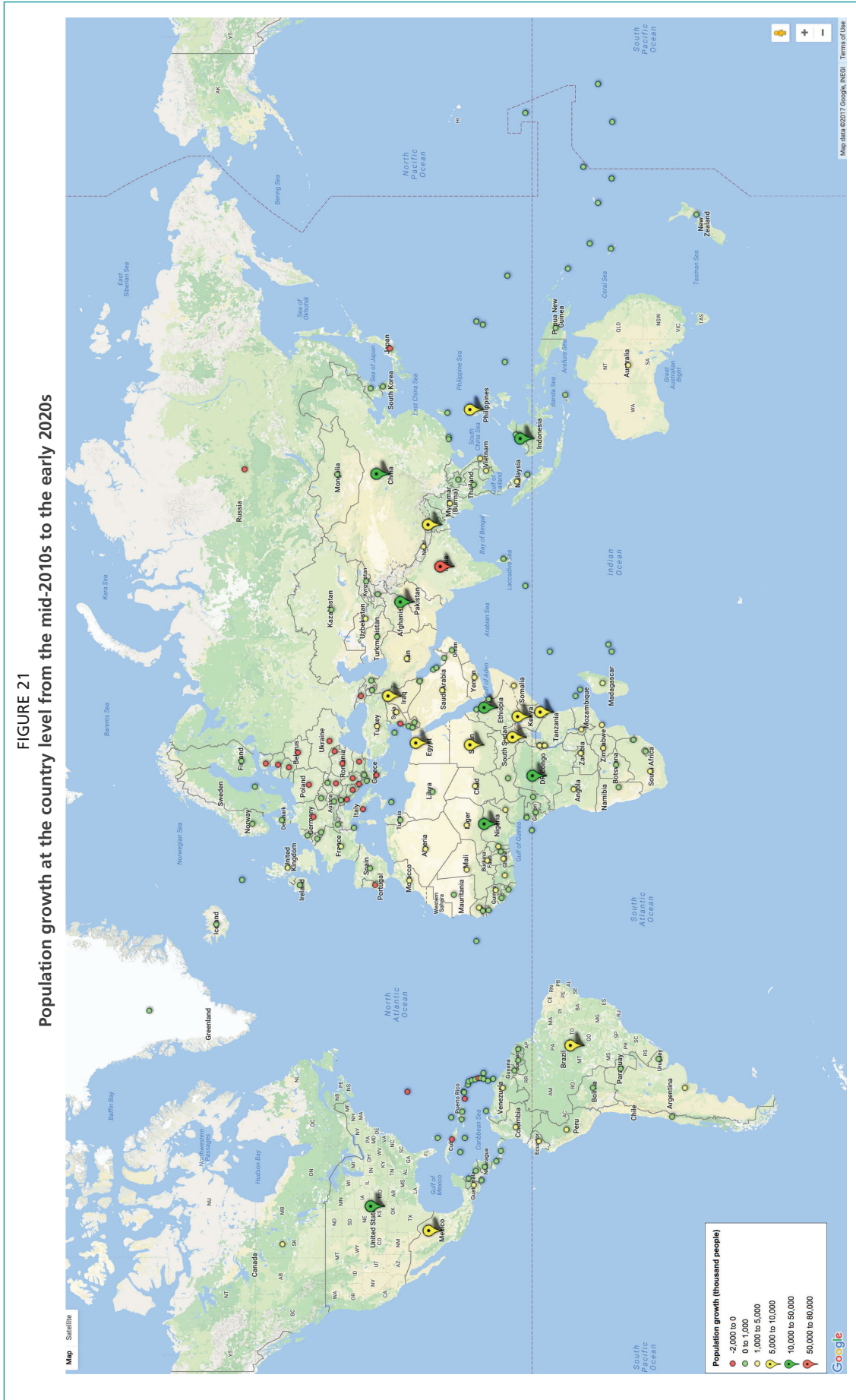
regional and global projections²¹ for the five basic species groups as well as the four aggregated groups.

The results indicate that given constant fish prices and consumer preference, income and population growth is expected to increase world fish demand by 47 million tonnes in the early 2020s compared with the mid-2010s. Most of the growth is due to come from Asia, particularly China, which would account for over half of the growth (Figure 22). South-eastern Asia and South Asia would account for 18 and 10 percent of the growth, respectively. The share of Africa is 7 percent, whereas that of Latin America and the Caribbean is 2 percent. The share of Europe, Northern America, and Oceania are 5 percent, 3 percent and less than 0.5 percent, respectively.

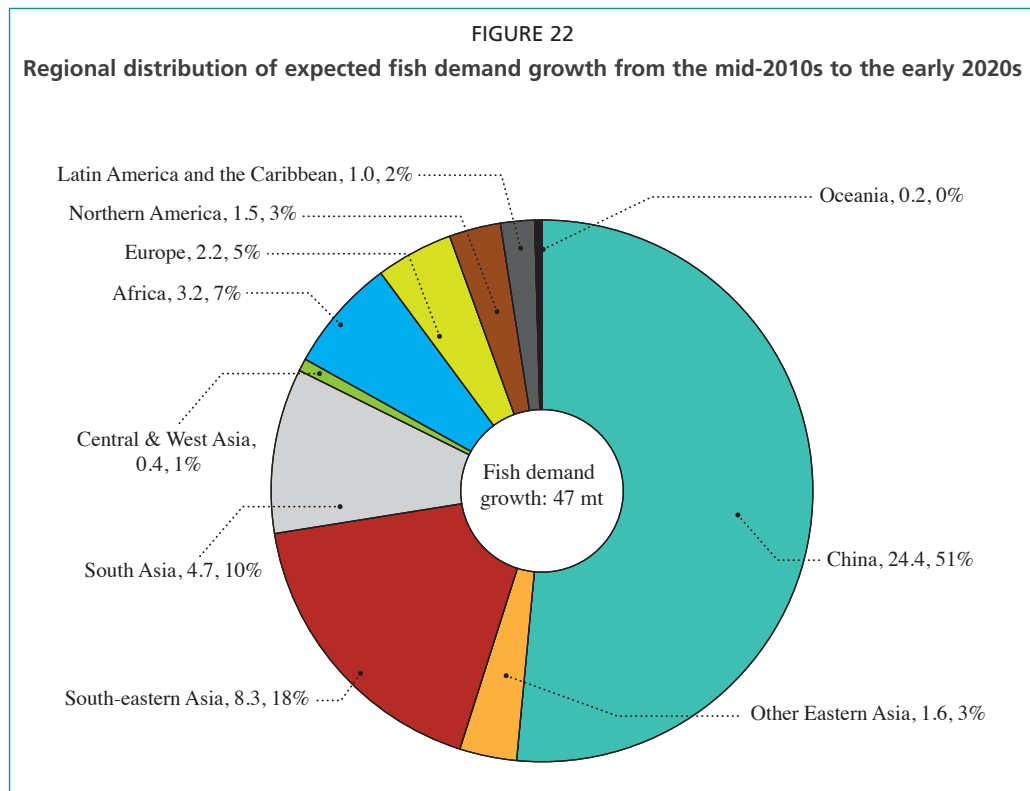
The 47 million tonnes fish demand growth is composed of 57 percent finfish (24 and 33 percent for marine fish, and freshwater & diadromous fish, respectively) and 43 percent shellfish (15, 24 and 4 percent for crustaceans, shell molluscs and

²¹ For a country with data on its per capita fish consumption in the baseline year but no data on its expected future per capita GDP, its future per capita fish demand cannot be estimated from equation (2); hence, its future fish demand would not be estimated. However, since the country is included in the aggregation of country-level results into regional or global fish demand in the baseline year, it should also be included in the regional or global aggregation for future fish demand. To facilitate this, the country's future fish demand is estimated by multiplying its per capita fish consumption in the baseline year by its expected population in the future; or if there is no data on the country's expected future population, its fish consumption in the baseline year would be used to represent its future fish demand.

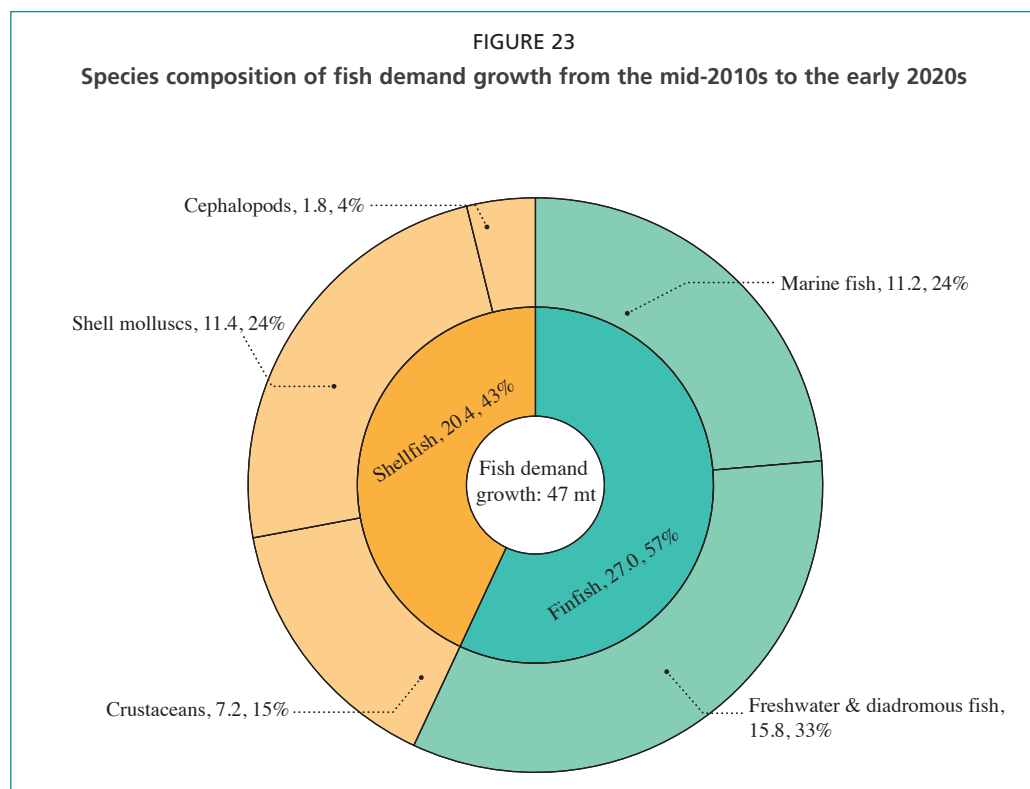
FIGURE 21
Population growth at the country level from the mid-2010s to the early 2020s



Source: Authors' estimation based on the United Nations World Population Prospects: The 2015 Revision (POP/DB/WPP/Rev.2015/POP/F01-1).
Image source: ©2017 Google.



Source: Author's estimation.
Note: mt = million tonnes.

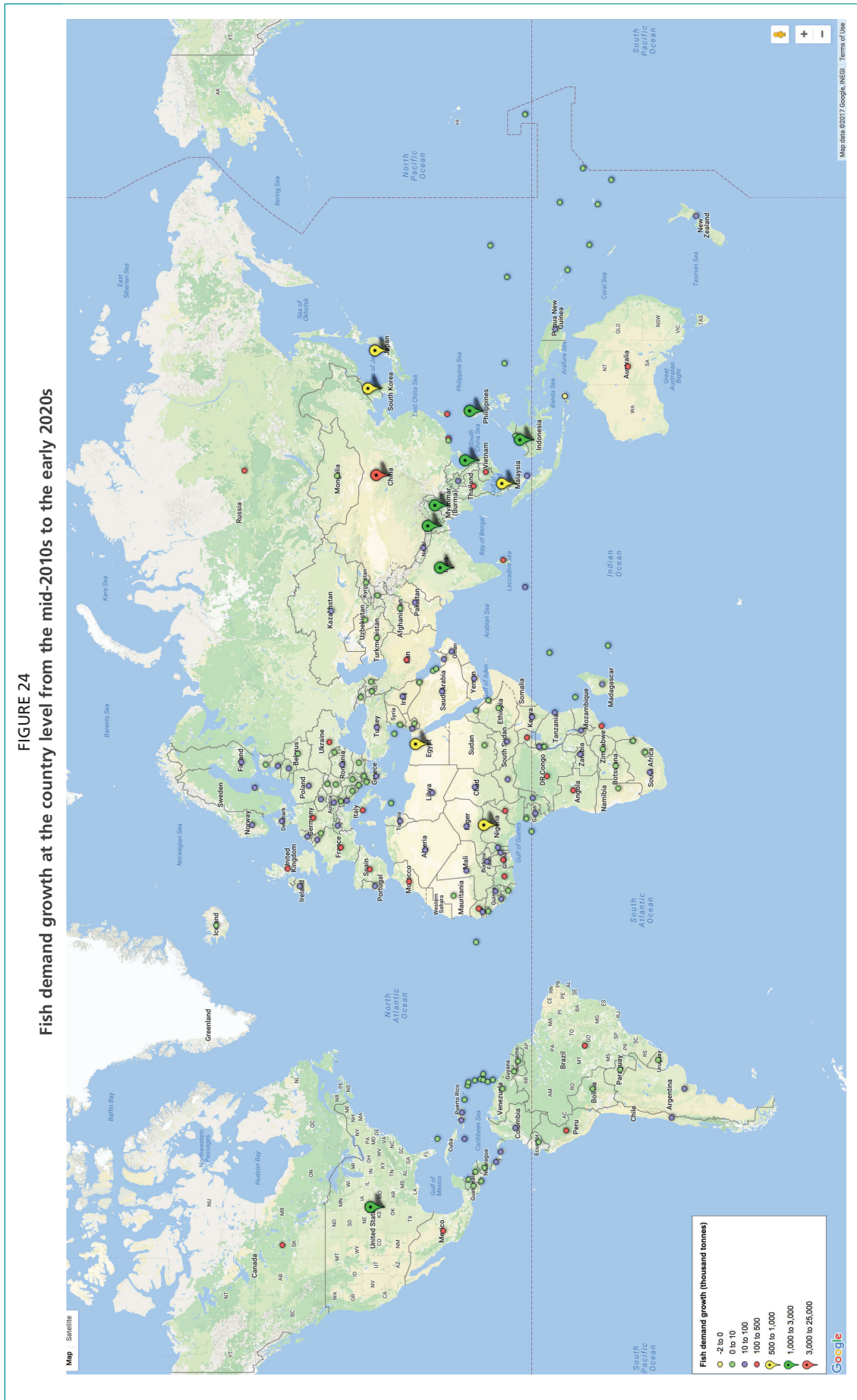


Source: Author's estimation.
Note: mt = million tonnes.

cephalopods, respectively) (Figure 23). As indicated in Figure 8, shellfish accounted for only a quarter of world fish consumption in the mid-2010s. Yet it would account for nearly half of the world fish demand growth from the mid-2010s to early 2020s because of the higher income elasticity for shellfish species than for finfish species.

In the majority of the countries, fish demand growth during the period from the mid-2010s to the early 2020s would be less than 100 000 tonnes. In many countries, the growth would be less than 10 000 tonnes. Countries with fish demand growth during the period between 1 million and 3 million tonnes include India, Indonesia, Myanmar, Viet Nam, Bangladesh and the Philippines in Asia and the United States of America. Countries with growth between 500 000 to 1 million tonnes include the Republic of Korea, Japan and Malaysia in Asia and Nigeria and Egypt in Africa (Figure 24).

FIGURE 24
Fish demand growth at the country level from the mid-2010s to the early 2020s



Source: Authors' estimation.
Image source: @2017 Google.

4. Estimating future fish demand-supply gaps

The analysis in the previous section shows that if fish prices and consumer preference remain the same, the larger and wealthier world populations would demand 47 million tonnes more fish in the early 2020s compared with the mid-2010s. The analysis in this section will examine whether the trend aquaculture growth (i.e. aquaculture production in each country growing according to its recent trend) can generate enough fish supply to satisfy the demand growth. Potential fish demand-supply gaps as well as aquaculture growth needed to cover the gaps are measured for five basic species groups and the four aggregate species groups at the national, regional and global levels.

World capture fisheries production has been flat since the 1990s and is expected to remain that way because of resources and regulations constraints. Thus, the impact of capture fisheries on fish supply is not considered in the analysis here, which essentially assumes that capture fisheries production in the early 2020s would be at the same level as the mid-2010s.

4.1 SHORT-TERM PROJECTION OF AQUACULTURE PRODUCTION

Price and productivity are two primary factors driving the growth of aquaculture production (Kumar and Engle, 2016). The lack of data on the prices of inputs (feed, seed, labour, etc.) makes it difficult to estimate a farmed fish production function for each country. Thus, trend analysis is used as a simplified way to project a country's potential aquaculture production in the future.

A country's aquaculture production from 2015 to 2021 is projected by its recent five-year (i.e. 2009–2014²²) linear trend. The average production projection in 2015 and 2016 is used to represent the benchmark aquaculture production for the mid-2010s, whereas the projection in 2020 and 2021 represents the expected future production for the early 2020s.

For some cases of a downward trend leading to an unreasonably low or even a negative production projection, the average production during 2012–2014 or during 1980–2014, whichever is smaller, is used as the lower bound of the production projection.

The projection of aquaculture production is first conducted for the five basic species groups at the country level; the results are then aggregated into regional and global results and/or for the four aggregate species groups.

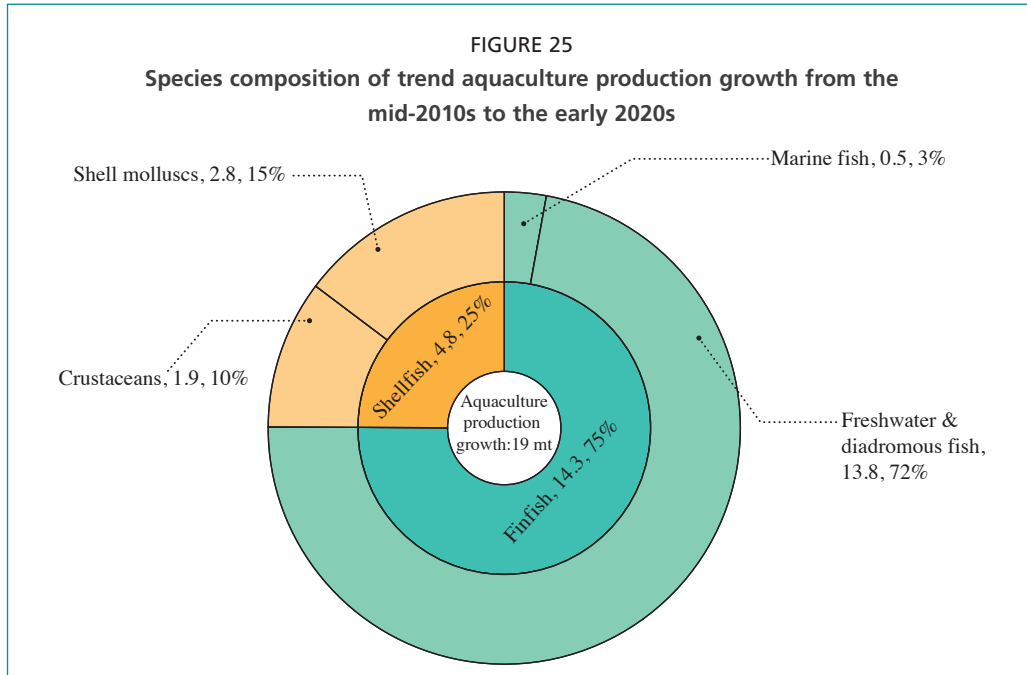
The results indicate that if aquaculture production²³ in every country follows its recent trend, world aquaculture production would increase by 19 million tonnes in the early 2020s compared with the mid-2010s; three-quarters of the growth would be in finfish species and one-quarter in shellfish species (Figure 25). Freshwater & diadromous fish

²² At the time of this analysis, 2014 is the latest year for FAO data on global aquaculture production; see the data source in footnote 15.

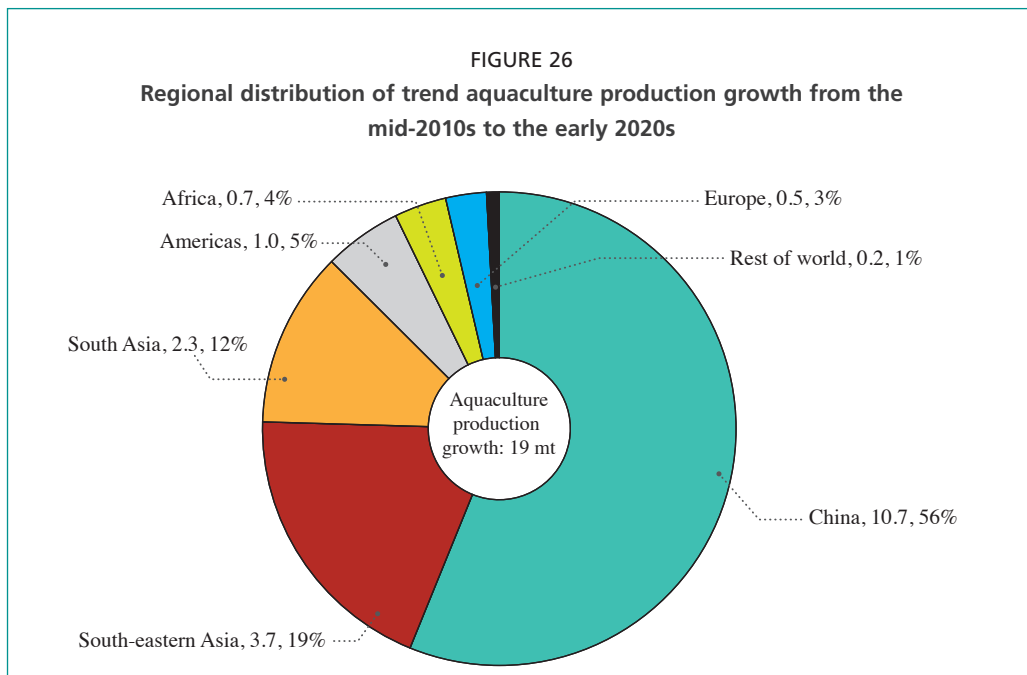
²³ In this paper aquaculture production means farmed fish production, including finfish and shellfish species but not aquatic animals or aquatic plants.

would account for 72 percent of the growth; the share of marine fish would be only 3 percent. The share of crustaceans and shell molluscs would be 10 and 15 percent, respectively, and the share of cephalopods would be zero because at the time of this analysis there is no substantial cephalopod aquaculture (Figure 25).

China, which accounts for 61 percent of world aquaculture production in the mid-2010s, would account for 56 percent of the 19-million-tonne growth. South-eastern and South Asia also have a significant contribution (19 and 12 percent, respectively). The share of the Americas, Africa and Europe is 5, 4 and 3 percent, respectively (Figure 26).



Source: Authors' estimation.
Note: mt = million tonnes.



Source: Author's estimation.
Note: mt = million tonnes.

Besides China, other countries that have a relatively large trend growth in aquaculture production (more than 100 000 tonnes) include Bangladesh, India, Indonesia, Iran, Myanmar and Viet Nam in Asia; Brazil, Chile and Ecuador in the Americas; Egypt and Nigeria in Africa; and Norway in Europe. The trend growth in most of the other countries is less than 10 000 tonnes. In some countries, the trend growth is negative, such as Canada, Greece, Malaysia, the Republic of Korea and Thailand (Figure 27).

4.2 DEMAND-SUPPLY GAPS IN THE EARLY 2020s

A country's fish demand-supply gap in the early 2020s is measured by its fish demand growth (driven by population and income growth) minus its trend growth in aquaculture production. A positive demand-supply gap indicates excess demand, i.e. the extra fish supply generated by the trend aquaculture growth is insufficient to cover the extra fish demand due to population and income growth, whereas a negative gap indicates excess supply.

Alternatively, a demand-supply gap can also be measured by the ratio between the supply growth and the demand growth. A ratio greater than one indicates excess supply, and a ratio smaller than one indicates excess demand and measures the percentage of the demand growth that can be covered by the supply growth.

A country or region's fish demand-supply gap can be narrowed through changes in production (i.e. increased domestic fish production through aquaculture or capture fisheries), trade (i.e. increased fish imports or reduced fish exports), and/or fish prices (i.e. fish demand reduced by higher fish prices). For the entire world, only production and price variations could affect the fish demand-supply gap, whereas the trade balance of the entire world would always be at zero.

Demand-supply gaps for fish as a whole

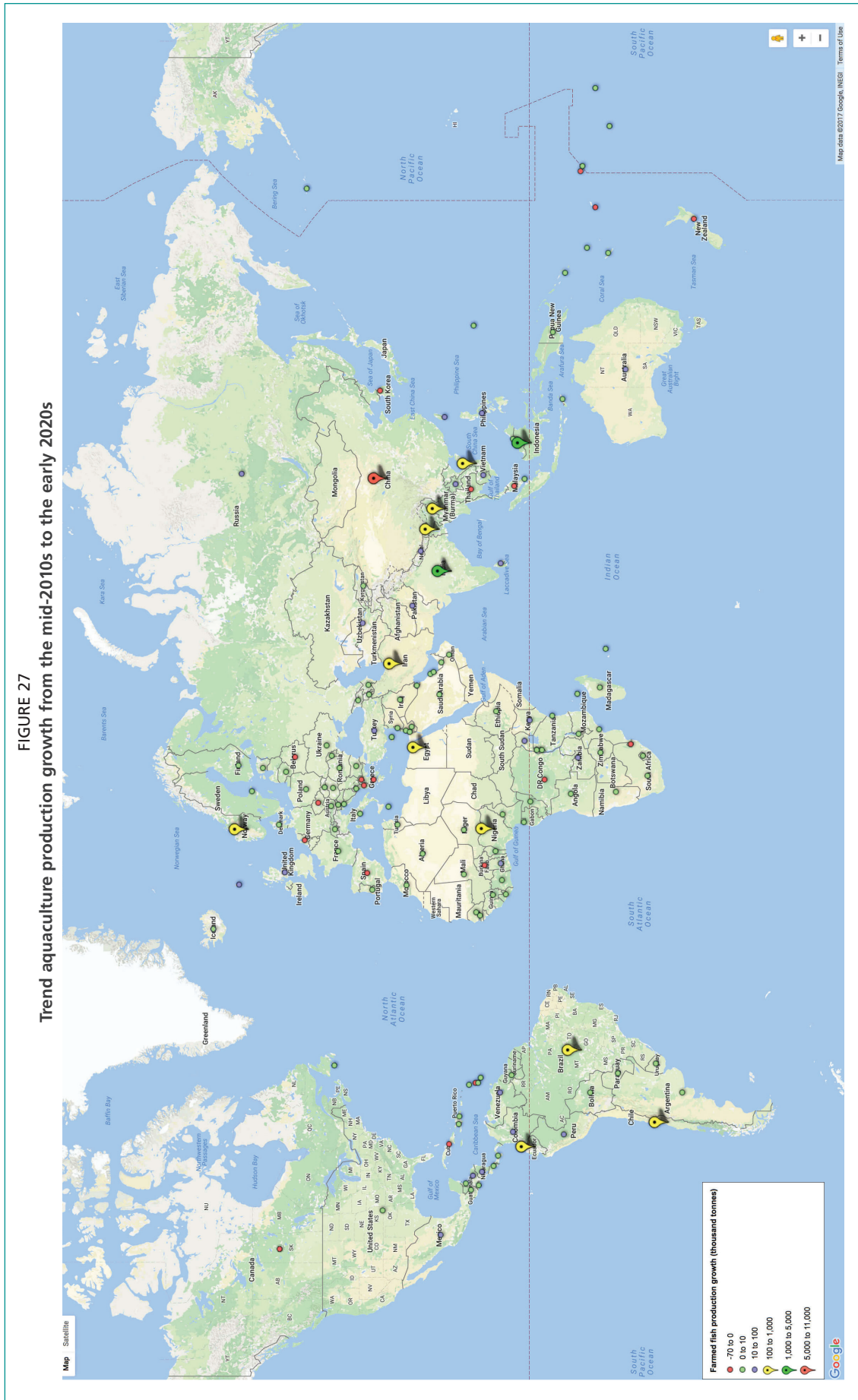
The 19 million tonnes of extra world fish supply generated by the trend aquaculture growth would only be able to cover 40 percent of the 47 million tonnes of extra fish demand driven by population and income growth, leading to a 28-million-tonne demand-supply gap in the early 2020s. Shellfish would account for 55 percent of the gap (18, 30 and 7 percent for crustaceans, shell molluscs and cephalopods, respectively); the share for finfish would be 45 percent (38 and 7 percent for marine fish, and freshwater & diadromous fish, respectively) (Figure 28).

China would account for nearly half of the 28-million-tonne demand-supply gap. South-eastern Asia, South Asia and Africa would also have significant gaps (Figure 29). South America and Northern Europe are the only two subregions that have negative gaps, indicating excess fish supply (Table A in the appendix).

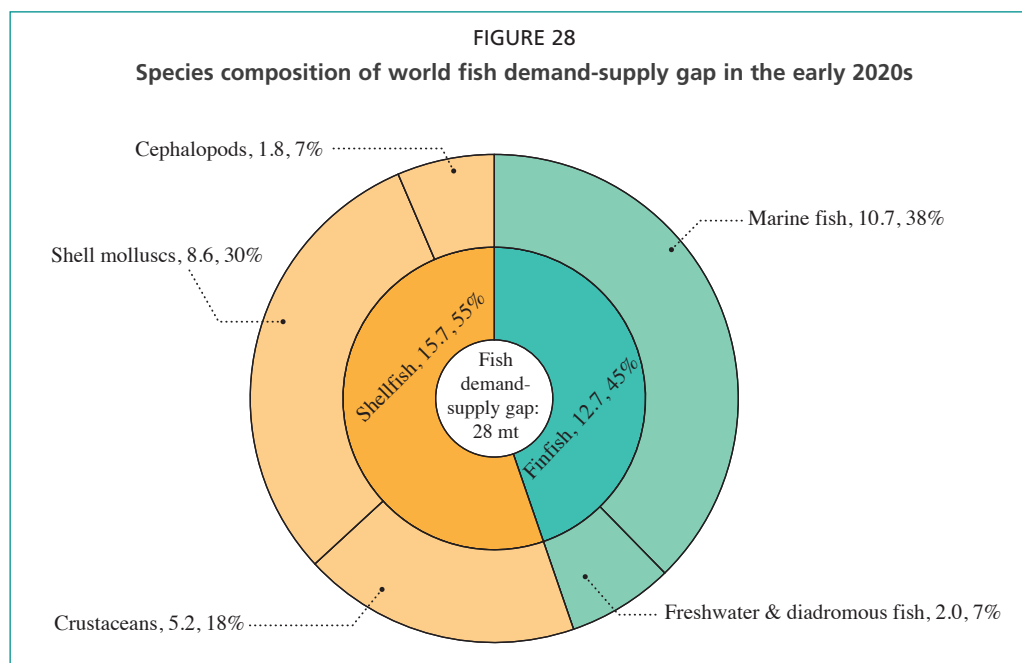
The trend aquaculture growth in 170 countries would not be able to generate enough fish to satisfy their fish demand growth (i.e. positive demand-supply gap); surplus (i.e. a negative demand-supply gap) is expected to occur in only 17 countries (Figure 30). The trend aquaculture growth in nearly 120 countries would cover less than 5 percent of their expected fish demand growth (Table A in the appendix).

In the majority of the countries, the fish demand-supply gap would be less than 100 000 tonnes. In many countries, the gap would be less than 10 000 tonnes. Countries with relatively large fish demand-supply gaps (greater than 500 000 tonnes) in the early 2020s include, in descending order of their demand-supply gaps, China, India, Myanmar, the United States of America, the Philippines, Viet Nam, the Republic of Korea, Japan, Bangladesh and Malaysia (Figure 30).

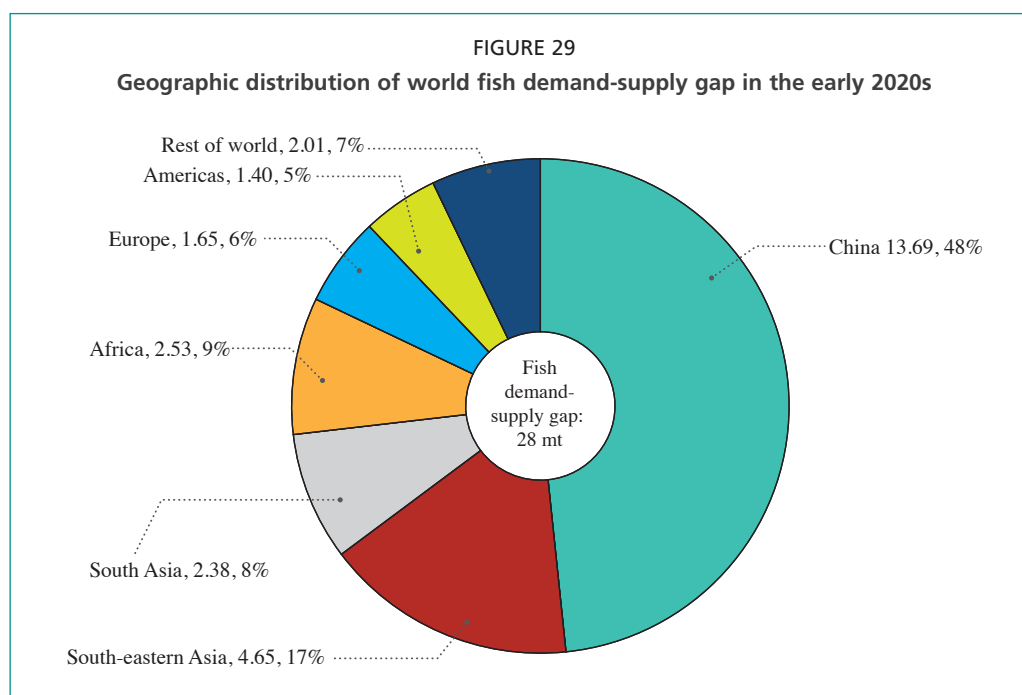
FIGURE 27
Trend aquaculture production growth from the mid-2010s to the early 2020s



Source: Authors' estimation.
Image source: @2017 Google.

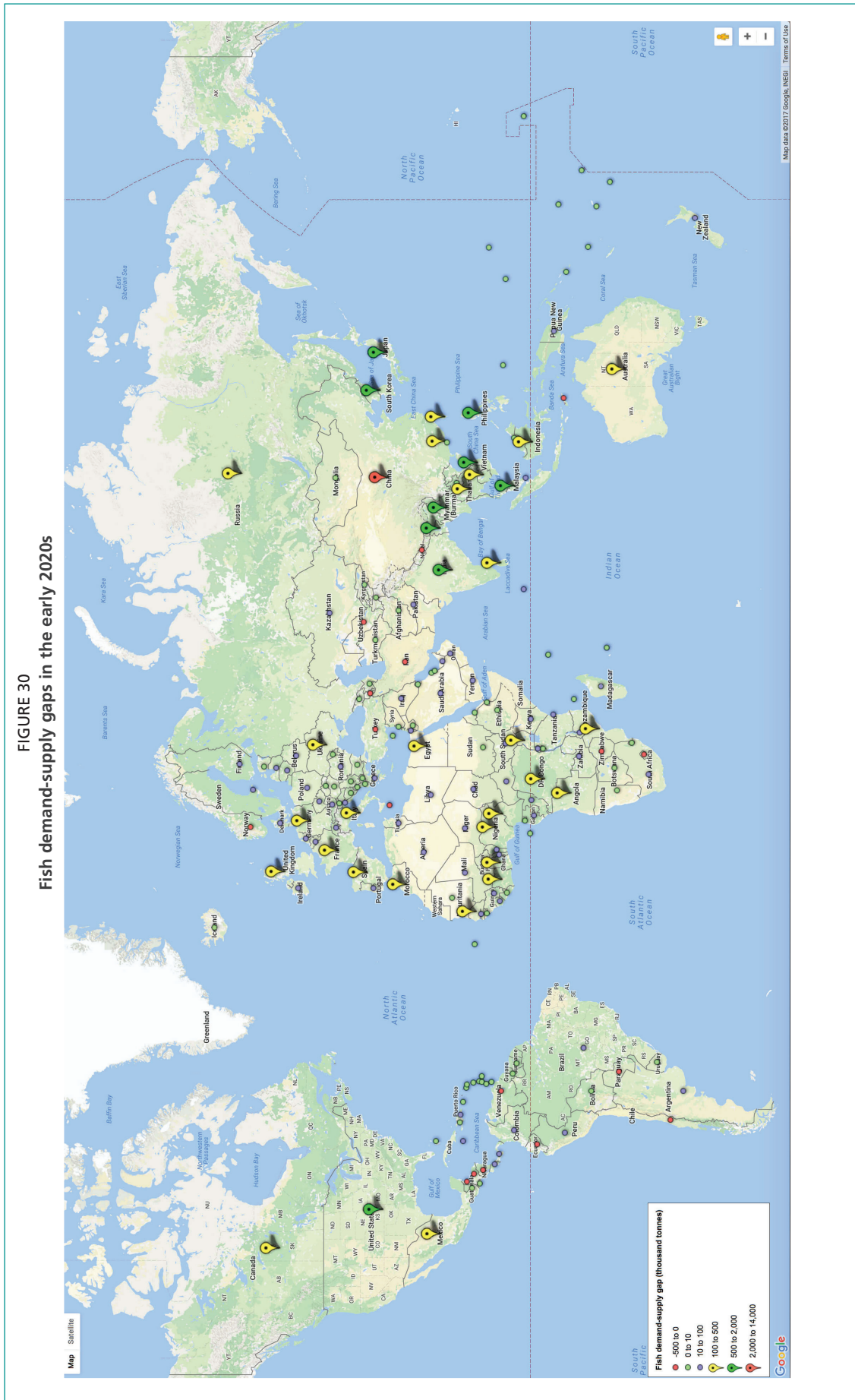


Source: Authors' estimation.
Note: mt = million tonnes.



Source: Author's estimation.
Note: mt = million tonnes.

World aquaculture production is set to grow 4.5 percent annually from the mid-2010s to the early 2020s if aquaculture in every country follows its recent trend. This trend growth rate would not generate enough fish to satisfy the demand growth driven by income and population growth. Indeed, world aquaculture production would need to grow 9.9 percent per year during the period in order to generate enough fish to satisfy the expected demand growth. While the trend aquaculture growth would exceed 10 percent per year in less than 20 countries, aquaculture growth in over 130 countries needs to exceed 10 percent in order to generate enough fish to satisfy the demand growth (Table A in the appendix).



Source: Authors' estimation.
Image source: ©2017 Google.

Demand-supply gaps for marine fish

The trend growth in world marine finfish aquaculture would generate 550 000 tonnes of extra marine fish in the early 2020s compared with the mid-2010s. The supply growth would cover less than 5 percent of the 11.2 million tonnes extra demand for marine fish driven by income and population growth, leaving a 10.7-million-tonne demand-supply gap.

The trend growth in marine finfish aquaculture in 181 countries (including those with no marine finfish aquaculture at the time of this analysis) would be unable to generate enough marine fish to satisfy their demand growth; surplus is expected to occur in only four countries (i.e. Cyprus, Malta, Taiwan Province of China and Timor-Leste²⁴) (Table A). Countries with a relatively large marine fish demand-supply gap (greater than 100 000 tonnes) include, in descending order within the respective regions, Indonesia, China, Myanmar, the Philippines, India, Malaysia, Viet Nam, the Republic of Korea, Japan, Thailand and Sri Lanka in Asia; Nigeria, Egypt, Ghana, Côte d'Ivoire, Senegal and Morocco in Africa; the United States of America and Mexico in the Americas; and the Russian Federation, Spain, France and the United Kingdom of Great Britain and Northern Ireland in Europe (Figure 31).

The trend growth in marine finfish aquaculture in only 23 countries would cover more than 1 percent of their expected marine fish demand growth. World marine finfish aquaculture production would need to grow over 40 percent annually from the mid-2010s to the early 2020s in order to satisfy the demand growth. The needed growth rate is much higher than the trend growth rate (less than 4 percent) (Table A in the appendix).

Demand-supply gaps for freshwater & diadromous fish

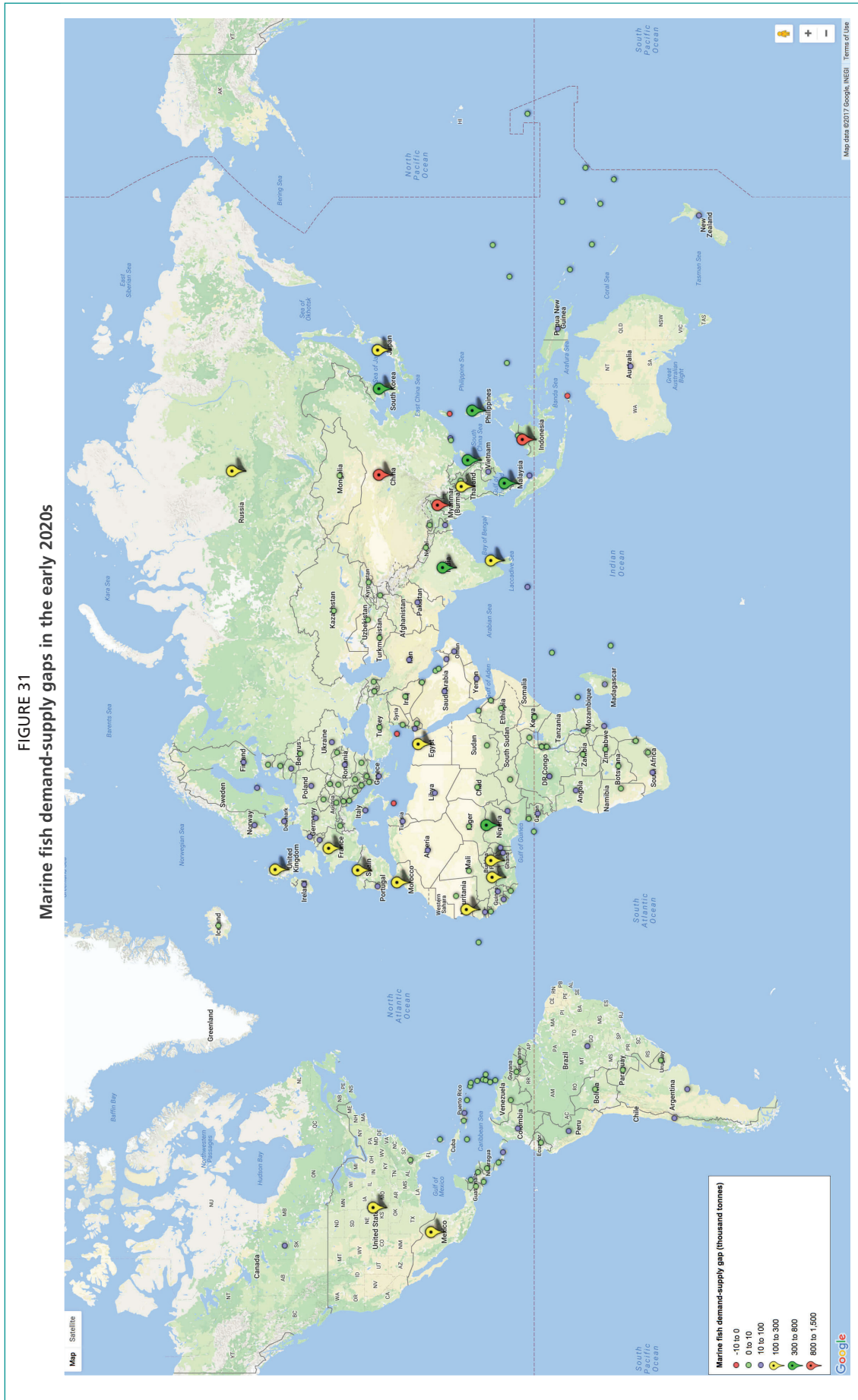
The world trend growth in freshwater & diadromous finfish aquaculture would generate 13.8 million tonnes of supply growth, which can cover 87 percent of the 15.8 million tonnes of demand growth driven by income and population growth, leaving a 2-million-tonne demand-supply gap.

The trend growth in freshwater & diadromous finfish aquaculture in 150 countries would not be sufficient to satisfy their demand growth; surplus is expected to occur in 34 countries (Figure 32). Countries with relatively large freshwater & diadromous fish demand-supply gaps (greater than 100 000 tonnes) include, in descending order within the respective regions, China, India, Myanmar, Bangladesh, the Philippines and Thailand in Asia; the United States of America in the Americas; and Uganda in Africa.

The trend growth in freshwater & diadromous finfish aquaculture in only 67 countries would cover more than 25 percent of their expected freshwater & diadromous fish demand growth (49 countries more than 50 percent). The world trend growth in freshwater & diadromous finfish aquaculture production is 4.9 percent per year from the mid-2010s to the early 2020s, slightly lower than the 5.5 percent growth needed to satisfy the expected demand growth. Unlike marine fish for which the demand-supply gap is positive for all subregions, the freshwater & diadromous fish demand-supply gap is negative (indicating excess supply) in Northern Africa, Central Asia, South-eastern Asia, Northern Europe, Central America and South America (Table A in the appendix).

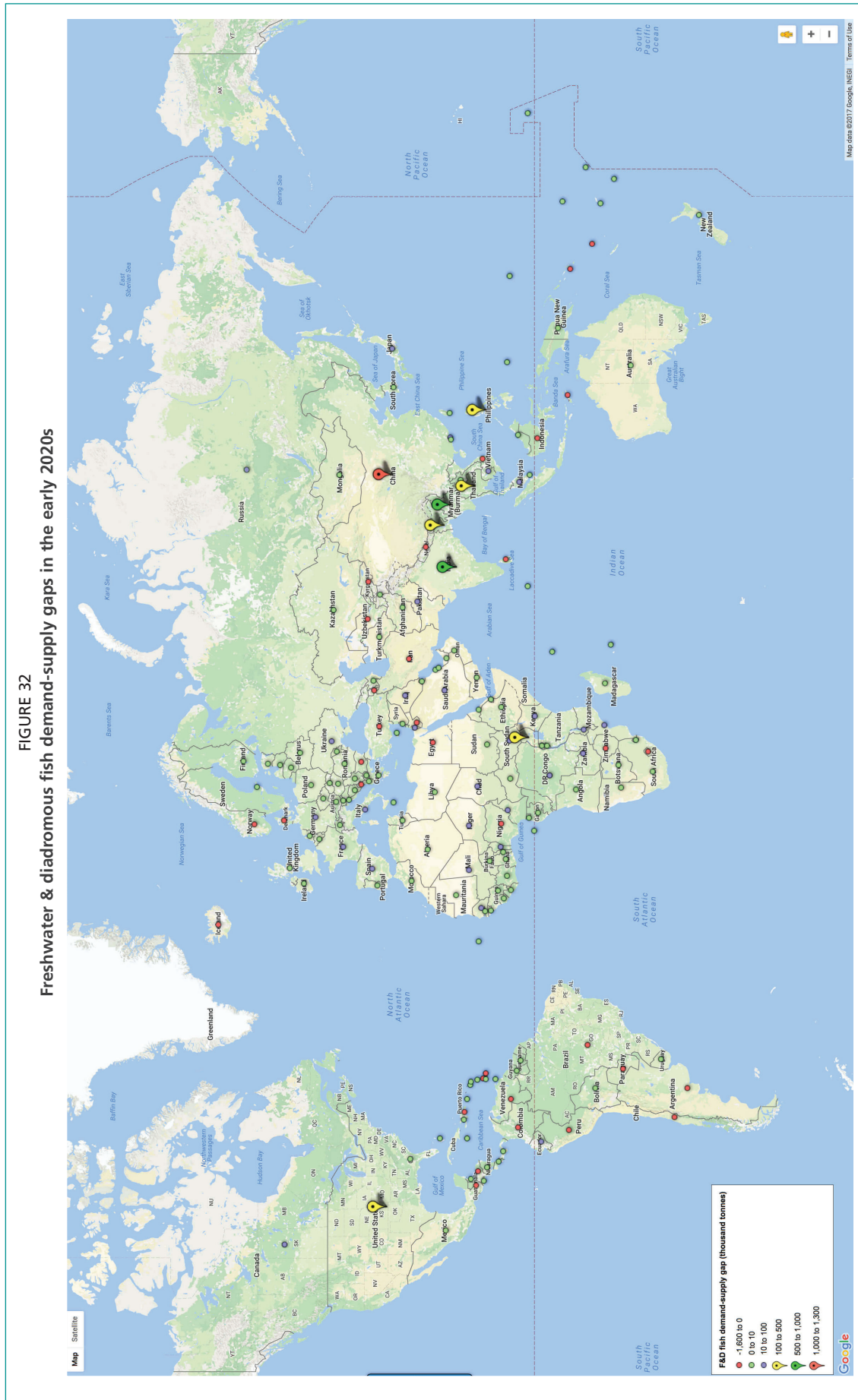
²⁴ The trend growth in marine finfish aquaculture in Timor-Leste from the mid-2010s to the early 2020s is expected to be zero (Table A), but the expected growth in the country's demand for marine fish is negative because of its negative expected growth in per capita GDP (PPP adjusted) (Figure 19).

FIGURE 31
Marine fish demand-supply gaps in the early 2020s



Source: Authors' estimation.
Image source: @2017 Google.

FIGURE 32
Freshwater & diadromous fish demand-supply gaps in the early 2020s



Source: Authors' estimation.
Image source: ©2017 Google.

Demand-supply gaps for crustaceans

The world trend growth in crustacean aquaculture production would generate 1.95 million tonnes of supply growth, which can cover 27 percent of the 7.16 million tonnes of demand growth driven by income and population growth, leaving a 5.2-million-tonne demand-supply gap.

The trend growth in crustacean aquaculture production in 171 countries would not be sufficient to satisfy their demand growth; a surplus is expected to occur in 11 countries. China alone accounts for nearly two-thirds of the world crustacean demand-supply gap. Other countries with relatively large crustacean demand-supply gaps (more than 10 000 tonnes) include, in descending order within the respective regions, Viet Nam, Indonesia, Japan, Bangladesh, Malaysia, India, the Philippines, the Republic of Korea, Thailand, Taiwan Province of China, China, Hong Kong SAR, and Singapore in Asia; the United States of America, Mexico, Canada, Brazil and Chile in the Americas; and the United Kingdom of Great Britain and Northern Ireland, France, Spain, Italy, Sweden, the Russian Federation, Norway and Germany in Europe; and Australia in Oceania (Figure 33).

The trend growth in crustacean aquaculture production in only 27 countries would cover more than 5 percent of their expected crustacean demand growth. World crustacean aquaculture production would need to grow 14.5 percent annually from the mid-2010s to the early 2020s in order to satisfy the demand growth. The needed growth rate is much higher than the 4.8 percent trend growth. South America is the only subregion whose trend growth in crustacean aquaculture production would be enough to cover the demand growth (Table A in the appendix).

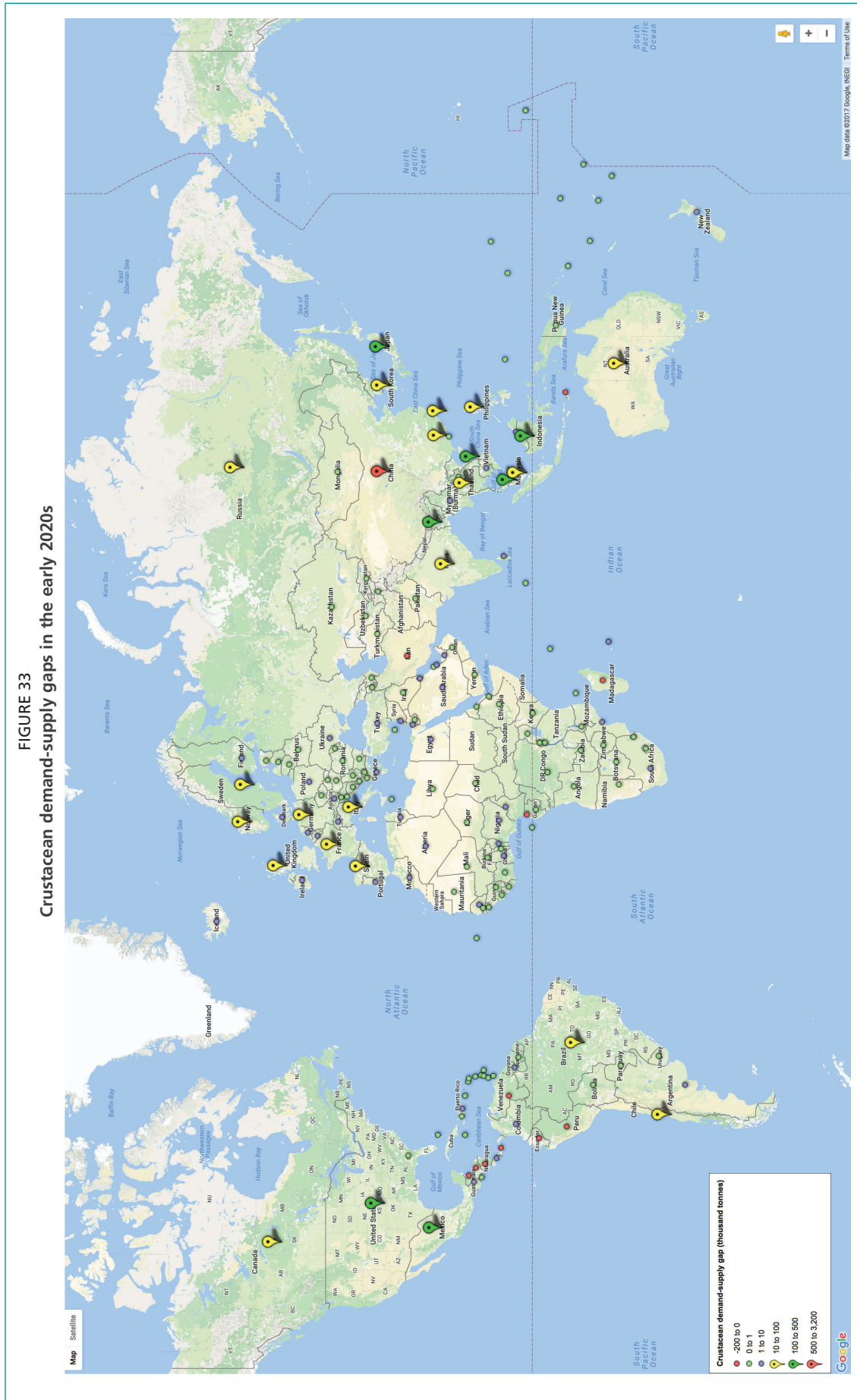
Demand-supply gaps for shell molluscs

The world trend growth in shell molluscs aquaculture production would generate 2.8 million tonnes of supply growth, which would be able to cover only 25 percent of the 11.4 million tonnes of demand growth driven by income and population growth, leaving an 8.6-million-tonne demand-supply gap.

The trend growth in shell molluscs aquaculture production in 157 countries would not be sufficient to satisfy their demand growth; surplus is expected to occur in eight countries. China alone accounts for nearly 90 percent of the world shell molluscs demand-supply gap. Other countries with relatively large shell molluscs demand-supply gaps (more than 10 000 tonnes) include, in descending order within the respective region, the Republic of Korea, Japan, Viet Nam, the Philippines, Thailand, Taiwan Province of China, China, Hong Kong SAR, Indonesia, Malaysia, Singapore and India in Asia; the United States of America, Canada and Mexico in the Americas; France, Spain, Italy, the United Kingdom of Great Britain and Northern Ireland, Ukraine and the Russian Federation in Europe; and Australia in Oceania. The demand-supply gap is less than 10 000 tonnes for the majority of the countries and negative in a few countries (Figure 34).

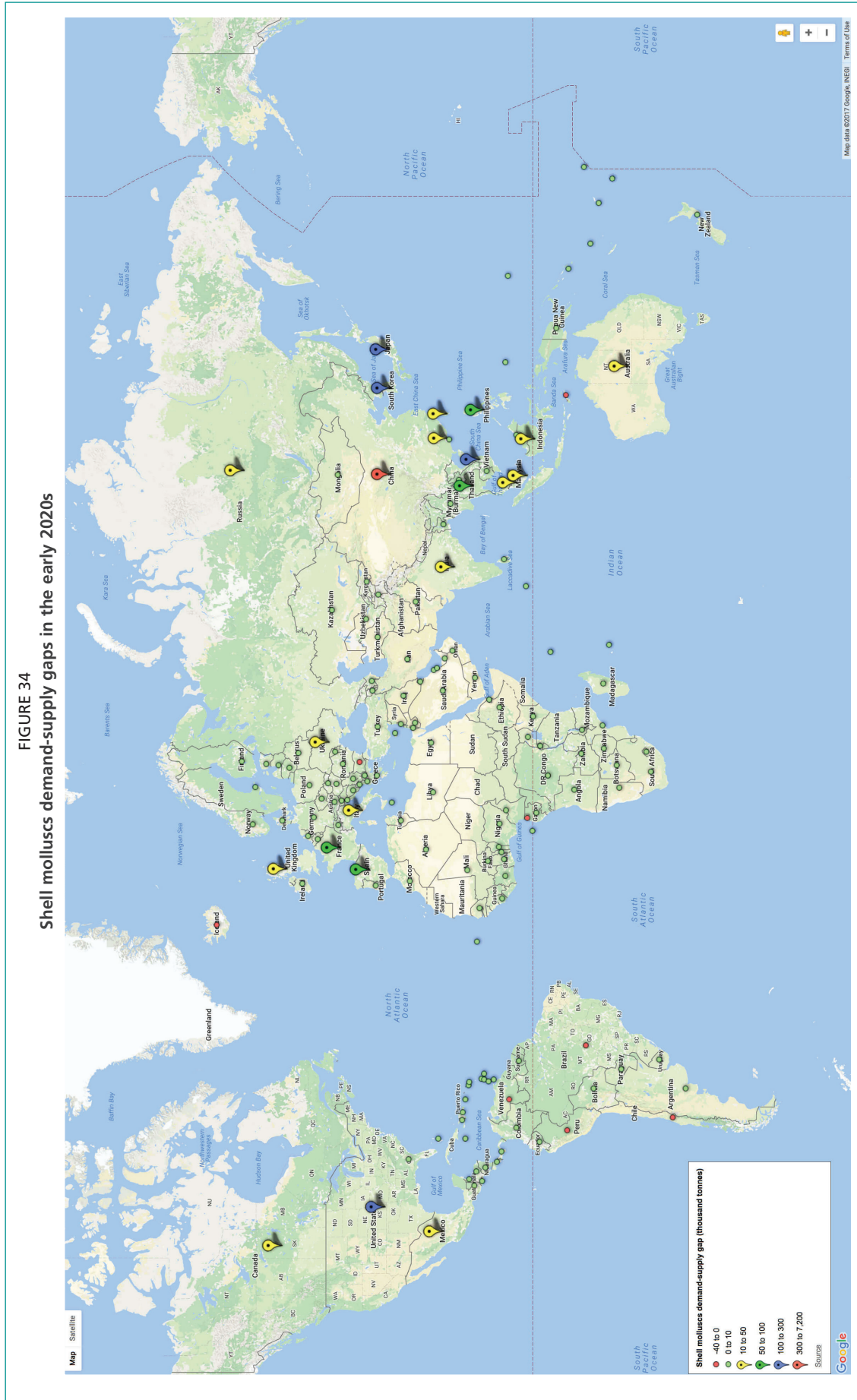
The trend growth in shell molluscs aquaculture production in only 24 countries would cover more than 5 percent of their expected shell molluscs demand growth. The world shell molluscs aquaculture production would need to grow 10.9 percent annually from the mid-2010s to the early 2020s in order to satisfy the demand growth. The needed growth rate is much higher than the 3.1 percent trend growth. South America is the only subregion whose trend growth in shell molluscs aquaculture production would be enough to cover the demand growth (Table A in the appendix).

FIGURE 33
Crustacean demand-supply gaps in the early 2020s



Source: Authors' estimation.
Image source: ©2017 Google.

FIGURE 34
Shell molluscs demand-supply gaps in the early 2020s



Demand-supply gaps for cephalopods

Income and population growth is expected to drive the world demand for cephalopods up by 1.8 million tonnes in the early 2020s compared with the mid-2010s. Yet with no substantial cephalopod aquaculture production at the time of this analysis, the trend growth in cephalopod aquaculture production would generate no extra supply, leaving a demand-supply gap of 1.8 million tonnes.

Cephalopod accounted for a tiny share (less than 3 percent) of world fish consumption in the mid-2010s (Figure 8). The consumption of cephalopods in many countries is either very low or virtually non-existent. Thus, the cephalopod demand-supply gap in the early 2020s would be greater than 10 000 tonnes in only 18 countries. China alone would account for over 40 percent of the 1.8-million-tonne world demand-supply gap in cephalopods. Other countries with relatively large cephalopod demand-supply gaps include, in the descending order within the respective regions, Viet Nam, the Republic of Korea, Japan, Thailand, the Philippines, Indonesia, Malaysia and Taiwan Province of China in Asia; the United States of America, Argentina, Mexico and Peru in the Americas; Spain, Italy, the Russian Federation and Greece in Europe; and Australia in Oceania (Figure 35).

4.3 MORE CONSERVATIVE PROJECTION OF DEMAND GROWTH

The standard projection of the demand growth in the above analysis is based on mean income elasticity coefficients and the medium-fertility-variant population projection. This section examines a more conservative projection based on the lower bound of the 95 percent confidence interval of the estimated income elasticity coefficients (Table 3) and the low-fertility-variant population projection provided by the United Nations.

Detailed comparisons of the standard and conservative projections at the country, regional and global levels for all the nine species groups are presented in the appendix (Table A). Some important patterns are presented below.

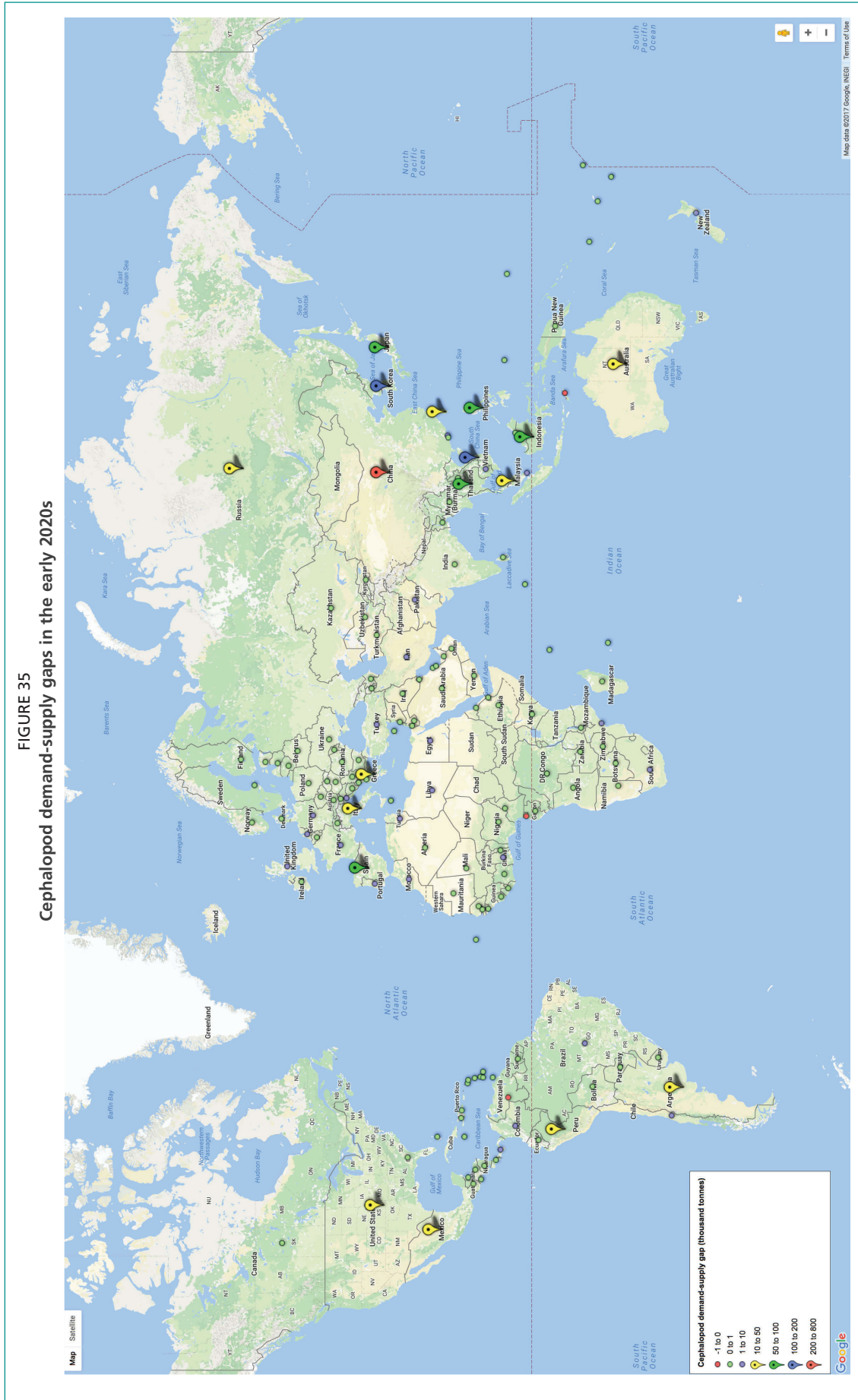
Fish as a whole

The lower-fertility-variant projection of the world population in the early 2020s would be 1 percent lower than the medium-fertility-variant projection. The conservative estimation of world per capita fish demand under the lower bound income elasticity would be 8 percent less than the standard one (22.8 kg/year and 24.7 kg/year, respectively). Thus, the conservative projection of world fish demand would be nearly 10 percent and 17 million tonnes lower than the standard one (Table 4).

The trend growth in world aquaculture production would still be insufficient to fully cover the conservative demand growth (covering only 62 percent). Yet the gap (12 million tonnes) is much less than the standard projection (28 million tonnes), and the needed growth rate is also lower (6.9 percent versus 9.9 percent) (Table 4).

The conservative projection of China's fish demand-supply gap in the early 2020s would be 5 million tonnes. This would still be the world's largest, yet much smaller than the gap under the standard projection (14 million tonnes). Indonesia's trend aquaculture growth would be nearly 180 000 tonnes less than the demand growth under the standard projection, yet over 800 000 tonnes more than that under the conservative one. Brazil, Bangladesh and Egypt are also among the seven countries that would have a positive demand-supply gap under the standard projection and negative gap under the conservative one (Table A in the appendix).

FIGURE 35
Cephalopod demand-supply gaps in the early 2020s



Source: Authors' estimation.
Image source: @2017 Google.

Marine fish

The conservative projection of world marine fish demand in the early 2020s would be 60 million tonnes, which is 4 million tonnes less than the standard projection. The demand growth under the conservative projection would still be greater than the trend growth in world marine fish aquaculture production, leaving a 6.7-million-tonne demand-supply gap, which would need 31 percent annual growth of world marine aquaculture production to fill (Table 4). Turkey is the only country that would have excess demand under the standard projection, yet excess supply under the conservative one (Table A in the appendix).

Freshwater & diadromous fish

While the trend growth in world freshwater & diadromous fish aquaculture would be 2 million tonnes short of the demand growth under the standard projection, it would nevertheless be 5 million tonnes greater under the conservative projection (Table 4). Similarly, China would have 2.3 million tonnes of excess demand under the standard projection, yet 1.2 million tonnes of excess supply under the conservative one. Trend growth in freshwater & diadromous fish aquaculture in 34 countries would be sufficient to cover their demand growth under the standard projection; the number is increased to 50 under the conservative projection (Table A in the appendix).

Shellfish species groups

For all three basic shellfish species groups (crustaceans, shell molluscs and cephalopods), world trend aquaculture growth would still not be enough to cover the demand growth under the conservative projection (Table 4). One major exception at the national level is India, which would have 88 000 tonnes of excess demand for crustaceans under the standard projection and 27 000 tonnes of excess supply under the conservative one (Table A in the appendix).

TABLE 4
Demand-supply gaps: standard versus conservative projections

Species	Per capita demand (kg/year)		Total demand (million tonnes)		Demand-supply gap (million tonnes)		Ratio of supply growth to demand growth (%)		Annual aquaculture growth rate needed (%)		Trend aquaculture growth rate (%)
	Standard ¹	Conservative ²	Standard ¹	Conservative ²	Standard ¹	Conservative ²	Standard ¹	Conservative ²	Standard ¹	Conservative ²	
Fish	24.68	22.76	190.44	173.87	28.32	11.82	40.29	61.79	9.91	6.87	4.45
Finfish	17.31	16.08	134.55	123.65	12.67	1.82	53.11	88.76	8.42	5.36	4.81
Marine fish	8.26	7.82	64.00	59.97	10.67	6.67	4.87	7.58	40.28	30.94	3.99
F&D fish	9.05	8.25	70.55	63.68	1.99	- 4.85	87.38	154.18	5.48	3.25	4.85
Shellfish	7.37	6.69	55.89	50.22	15.65	10.00	23.33	32.26	12.97	9.96	3.64
Crustaceans	2.69	2.46	20.59	18.67	5.22	3.30	27.19	37.09	14.46	11.29	4.77
Molluscs	4.68	4.23	35.30	31.54	10.44	6.70	21.24	29.59	12.29	9.35	3.13
Shell molluscs	3.95	3.56	29.88	26.61	8.61	5.36	24.63	34.43	10.89	8.22	3.13
Cephalopods	0.72	0.67	5.42	4.93	1.82	1.34			1 393.75	1 303.86	

Source: Authors' estimation.

Notes: Cells with zero or no value are left blank. ¹Standard projections are based on mean income elasticity coefficients and medium-fertility-variant population projections. ²Conservative projections are based on the lower bound of the 95 percent interval of income elasticity coefficients and low-fertility-variant population projections.

5. Discussion

A short-term projection model is developed to assess and monitor potential future fish demand and supply at the country, regional and global levels for nine species groups at different aggregate levels. The results indicate that:

- Given that fish prices and consumer preference remain the same, income growth would drive world per capita fish demand up from 20 kg/year in the mid-2010s to 25 kg/year in the early 2020s (or 23 kg/year under the conservative projection).
- The income-driven per capita fish demand hike, combined with population growth, would drive world fish demand up by 47 million tonnes (or 31 million tonnes under the conservative projection).
- The 19-million-tonne fish supply growth generated by the trend growth of world aquaculture production would cover only 40 percent of the projected demand growth (or 60 percent of the conservative projection), leaving a fish demand-supply gap of 28 million tonnes (or 16 million tonnes under the conservative projection) in the early 2020s.
- The demand-supply gap for shellfish would be larger than that for finfish – they would account for 55 and 45 percent, respectively, of the 28-million-tonne fish demand-supply gap.
- While world aquaculture production following its recent trend would grow 4.5 percent annually from the mid-2010s to the early 2020s, it would take 9.9 percent annual growth (or 6.9 percent under the conservative projection) to fill the world fish demand-supply gap in the early 2020s.
- The trend aquaculture growth in only 17 countries (or 24 countries under the conservative projection) would be sufficient to cover the demand growth driven by population and income growth; excess demand is expected to occur in 170 countries (or 163 countries under the conservative projection).
- Should world aquaculture fall short of the required annual growth rate (i.e. 9.9 percent under the standard projection or 6.9 percent under the conservative one), and should world capture fisheries production remain the status quo, the world fish price would tend to increase to reduce fish demand to the extent that world fish demand and supply are balanced (i.e. no demand-supply gap).

Detailed results of the demand-supply gap analysis at the country, regional and global levels for the nine species are presented in the appendix (Table A).

The results of the demand-supply gap analysis are useful to decision-makers in both the public and private sectors. Knowledge and understanding of potential future fish demand as well as demand-supply gaps could facilitate the establishment of evidence-based regulations, policies and development strategies and plans, help development agencies or donors set targets and allocate resources, assist fish farmers in business planning, and guide investors in investment planning. But clear understanding of the results, including their merits and constraints, is essential to properly and flexibly using them to facilitate evidence-based decision-making.

Not consumption forecasting, but demand projection

First and foremost, it should be noted that similar to Ye (1999), the study here is not to forecast fish consumption in the future but to project potential fish demand under

certain conditions. The study does not predict that world per capita fish consumption will most likely reach 25 kg/year in the early 2020s. Rather, it means that “given that fish prices and consumer preferences remain the same”, income growth could drive world per capita fish demand up to that level.

Since it appears that the trend aquaculture growth could cover only 40 percent of the projected world fish demand growth while capture fisheries production is expected to have little growth, the resulting excess demand would tend to drive up fish prices, which would reduce the demand growth. Therefore, per capita fish consumption (as realized fish demand) in the early 2020s would likely be less than 25 kg/year if global aquaculture follows its recent trend. However, the 25 kg/year per capita fish consumption could be sustained if productivity gains, increases in the utilization of aquaculture resources, policy interventions and other factors can accelerate world aquaculture growth from the 4.5 percent trend growth to 9.9 percent a year.

Complement to other projection models

Three major projection models on fish supply and demand – IFPRI Fish to 2020 (Delgado *et al.*, 2003), the OECD-FAO Fish Model (OECD-FAO, 2011–2016; Lem, Bjørndal and Lappo, 2014) and the World Bank-IFPRI-FAO Fish to 2030 (World Bank, 2013; Kobayashi *et al.*, 2015) – use sophisticated models to predict likely scenarios of fish production, trade, consumption and price in the medium or long term. There are no demand-supply gaps in these models where fish price as an endogenous variable would balance fish demand and supply.

The short-term projection model in this study does not try to balance fish demand and supply. It treats fish price as an exogenous variable to estimate fish demand growth driven by population and income growth and compares the demand growth to trend aquaculture growth to assess potential demand-supply gaps.

Examining demand and supply separately is a common practice in projection exercises. The “Fish to 2020” (Delgado *et al.*, 2003) uses two chapters to examine the historical trends of fish supply and demand (chapters 2 and 3, respectively) before examining the projections to 2020 in chapter 4. Lem, Bjørndal and Lappo (2014) also spend much effort to examine food (especially fish) demand and supply trends and the factors affecting them before using the OECD-FAO Fish Model to examine different projection scenarios.

The analysis here also examines fish demand and supply separately, yet moves a step further to project future fish demand and supply separately under certain conditions (i.e. fish price and consumer preference remaining unchanged for the demand-side analysis and trend aquaculture growth for the supply-side analysis). This approach not only allows more detailed assessment and monitoring of future fish demand – this point would be discussed later – but also could help enhance understanding of the results of more complex models.

For example, in the OECD-FAO Agricultural Outlook 2012–2021 (OECD-FAO, 2012), the OECD-FAO Fish Model projects that per capita fish consumption in Africa would decline in 2021 compared with the 2009–2011 average due to “population growing faster than supply”. This interpretation from a supply-side perspective does not explain why people in Africa with a higher per capita income would consume less fish. A separate examination of fish demand and supply as well as potential demand-supply gaps would help to understand the outcomes after demand and supply are balanced by price adjustments.

It should be noted that the results of the demand analysis in this study may not be directly comparable to the results of demand analysis in other models because of the differences in model set-up or parameters used.

Self-estimated income elasticity coefficients

The lack of fish demand elasticities once prevented fish from being included in a global food projection system (Rosegrant, Sombilla and Perez, 1995). Most models on fish projection, including the three models mentioned above, “borrow” elasticity parameters from the literature. Many fish demand elasticities in the literature are provided by fish demand analyses that do not (at least not directly) aim at projecting future fish demand (Asche and Bjørndal, 1999; Asche, Bjørndal and Gordon, 2007; Dey 2000). Estimated demand elasticity coefficients tend to vary because of different methodologies or data used. For example, the income elasticities estimated by Muhammad *et al.* (2013) based on data in 2005 are quite different than those estimated by Seale, Regmi and Bernstein (2003) based on data in 1996, even though the two studies use the same methodology. The income elasticities of fish demand for 144 countries estimated by Muhammad *et al.* (2013) are widely used in various projection models, but the study provides only elasticity coefficients for fish as a whole.

While demand analysis based on household data uses various consumption models to estimate demand elasticity parameters,²⁵ a few studies (e.g. Ye, 1999) use country-level data to estimate fish demand elasticities through single-equation linear regressions of per capita fish consumption on income and price variables. As such regressions usually entail substantial time-series data in order to discern statistically significant patterns, countries with insufficient data have to be aggregated into country groups for estimation. Aggregating countries into groups, albeit a common practice in forecasting future fish demand, tends to result in a vast amount of information loss and hence should always be considered as the last resort.

Even for a country with enough data, single-equation regressions do not always give sensible results because of poor data quality or because the country’s own historical consumption pattern does not provide adequate information for extrapolating its future fish demand. Ad hoc adjustments on model specification (e.g. adding a trend variable) are sometimes used to avoid insensible projections (Ye, 1999), but doing so would undermine the uniformity of the estimation model.

Similar to Ye (1999), the study here estimates countries’ income elasticities based on their historical consumption, income and price trends. However, instead of using single-equation regressions to estimate individual countries’ income elasticity separately, a panel model is used in the study here to pool all countries’ historical trends together to conduct a single estimation for each of the five basic species groups. Extrapolations under this model would thus be based not only on comparing individual countries’ own fish consumption and income patterns over time, but also on comparing the patterns across countries. As such, even countries with just a few data points can be included in the analysis as a distinctive country rather than being an unidentifiable part of a country group. Another merit of the panel model is to improve the reliability of extrapolation by pooling individual countries’ data together and hence providing a wide income range from countries at different income levels (Hsiao, 2007).

²⁵ Common methods used in fish demand analysis include single equation (reduced-form) demand function estimation, the Rotterdam System, the Almost Ideal Demand System, the multistage budgeting framework, among others (Asche, Bjørndal and Gordon, 2007; Dey *et al.*, 2008; Seale, Regmi and Bernstein, 2003).

The panel model helps self-generate income elasticities of demand for the five disaggregate species groups based on up to nearly 190 countries' recent trends of fish consumption, fish prices and incomes (Table 2). While there is still room for improvement in model specification and other aspects, the panel model approach represents a potentially better way to obtain demand elasticities than borrowing from the literature, both in terms of availability and quality.

It is important to note that the income elasticity coefficients estimated in this study (Table 3) are specific for short-term projections from the mid-2010s to the early 2020s. It may not be appropriate to borrow them for other projections, especially not for longer-term projections.

Global perspective with country focus

Most projection work on fish demand and supply, including IFPRI Fish to 2020, OECD-FAO Fish Model and World Bank-IFPRI-FAO Fish to 2030, are regional or globally oriented in the sense that: (i) only a limited number of countries are modelled explicitly while others are grouped into regions; and (ii) only regional and global results as well as the results for a few countries are reported.

While many regional and global results are presented in previous sections, the ultimate goal of this study is to facilitate evidence-based decision-making at the country level. Data availability allows 187 countries or territories to be included in the projection model. All of them enter the model as a distinct country or territory; the regional and global results are aggregated from country results. The key results of all the 187 countries are presented in the appendix (Table A).

Similarly, the model analyses the five basic species groups, which are the most disaggregate consumption data available at the time of the analysis. The basic results are then aggregated into more aggregated species groups.

Areas to improve

Data used in the projection model include FAO data on fish consumption, aquaculture production and fish trade, IMF data on per capita GDP, and United Nations data on population. Improvement of the timeliness and quality of these official statistics would increase the accuracy of the projection.

While data on population and per capita GDP are available for the baseline period (the 2015 and 2016 average), fish consumption in 2013 (the latest year with global fish consumption data available at the time of this analysis) has to be used to represent the baseline per capita fish consumption. Improvement in the timeliness of fish consumption data would help solve this inconsistency.

There is an ongoing effort to separate freshwater fish and diadromous fish into two separate species groups in FAO's fish consumption data. This would help increase the accuracy of the fish demand-supply gap analysis and provide more detailed information.

Fish price, which is a key variable in the demand analysis, is constructed from the prices of farmed fish and imported fish, with that of captured fish not accounted for because of the lack of data. The price proxies constructed as such are helpful to improve the accuracy of estimated income elasticity coefficients. However, even though the estimated price elasticity coefficients are of the expected sign and statistically significant at 95 percent for all the five basic species groups, they cannot be used to estimate the

impact of a change in fish price on fish demand because of the unsure quality of the price proxies. As discussed in section 3.1, the quality problem also affects the model specification. Data on the price of capture fisheries production would help improve the construct of the price variable. Price indices at the country level would also help.

The panel model uses a parsimonious specification. The prices of substitute goods are not included, partly because of limited data availability and quality. With improvement of data availability and quality, the model specification could be improved.

Understand the results properly and use them flexibly

The results presented in the appendix (Table A) may not all be accurate or sensible because of imperfect data or methodology. Yet the results that seem implausible should not be dismissed hastily, but should be understood properly, improved accordingly, and used flexibly.

For example, China's 14 million tonnes of excess demand in the early 2020s may appear overestimated to some observers who have experience of market gluts and harsh competition in China's low-value, freshwater finfish industry (e.g. tilapia). However, a deeper look would reveal that over 80 percent of the 14 million tonnes of excess demand is in shellfish, whereas freshwater & diadromous fish accounts for only 10 percent. Indeed, under the conservative projection, China would have 2.3 million tonnes of excess supply in freshwater & diadromous fish.

Users may modify the demand projection in equation (2) with more accurate data or parameters or introduce new driving factors (e.g. changes in consumer preference). They may modify the supply projection by specifying a different trend horizon, considering nonlinear trends, or factoring into policy and other factors (e.g. aquaculture production growth in Chile and Norway tends to be limited by stringent regulations). A user-friendly tool can be developed to facilitate such flexibility.

The world fish demand-supply gap can be used to measure the potential for aquaculture growth at the global level since aquaculture is expected to be the main, if not the only, source of fish supply growth. Yet, besides domestic aquaculture, fish supply in a country can come from imports. Also, capture fisheries could be a substantial source of fish supply growth in a specific country although it is not expected so at the global level. Similarly, the domestic market may not be the only source of demand for a country's aquaculture production, not even as a main source for countries with an export-oriented aquaculture sector.

Therefore, it should be noted that the demand-supply gap analysis here is only a standardized assessment that may not be suitable for all cases. A positive fish demand-supply gap should not be viewed, *a priori*, as a problem to solve but could imply an opportunity to exploit. For example, a large demand-supply gap in a country with little comparative advantage in fish production may not be an issue to be solved by domestic policy, but could represent a potential market opportunity for producers in other countries. Users may use the information in the tables in the appendix to conduct tailor-made assessments according to individual specific conditions and needs.

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Appendix

NOTES FOR TABLE A

1. Production and consumption are measured in live weight equivalent. Cells containing zero or no value are left blank. Projections at the country level for the five basic species groups (i.e. marine fish, freshwater & diadromous fish, crustaceans, shell molluscs and cephalopods) are directly estimated, whereas those at the subregional, regional or global level and/or for the four more aggregate species groups (i.e. fish, finfish, shellfish and molluscs) are derived from aggregation of the basic results.
2. The baseline situation in the mid-2010s is measured by the two-year average of 2015 and 2016. Each country's aquaculture production in 2015 or 2016 is projected from the five-year trend of its production during 2009–2014. Each country's per capita consumption in 2015 or 2016 is assumed to be at the level of 2013. Being a weighted average of per capita consumption in relevant individual countries (with their population being the respective weights), the per capita consumption of a subregional, regional or the entire world in 2015 or 2016 may be different from that in 2013 because countries' population are different in 2015 or 2016 from 2013. The baseline total consumption presented here is for standard projection scenarios; that for conservative projection scenarios is a little different because of the use of low-fertility-variant population projection in 2016 (see note 4 and 5 below).
3. The projected situation in the early 2020s is measured by the two-year average of 2020 and 2021.
4. Standard projections are based on mean income elasticity coefficients and medium-fertility-variant population projections.
5. Conservative projections are based on the lower bound of the 95 percent interval of income elasticity coefficients and low-fertility-variant population projections.
6. The indicator is not applicable if the extra supply is negative. The indicator is set to 100 percent if the extra demand is negative whereas the extra supply is positive.

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s			Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)			
	Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth (000 tonnes)	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁵	Conservative ⁵	Standard ⁶	Conservative ⁶	Standard ⁶	Conservative ⁶
Fish	78 515.70	19.52	143 015.82	97 624.86	24.68	190 444.14	19 109.17	4.45	47 428.32	28 319.15	11 818.03	40.29	61.79	9.91	6.87	
Finfish	54 209.81	14.60	107 541.02	68 556.89	17.31	134 554.72	14 347.07	4.81	27 013.70	16 163.87	1 816.80	53.11	88.76	8.42	5.36	
Marine fish	2 531.24	7.19	52 781.98	3 078.17	8.26	64 001.67	546.93	3.99	11 219.70	7 213.33	6 666.40	4.87	7.58	40.28	30.94	
F&D fish	51 678.57	7.41	54 759.05	65 478.72	9.05	70 553.05	13 800.15	4.85	15 794.00	8 950.54	1 993.85	87.38	154.18	5.48	3.25	
Shellfish	24 305.89	4.92	35 474.79	29 067.97	7.37	55 889.43	4 762.08	3.64	20 414.64	14 763.33	15 652.55	10 001.24	23.33	32.26	12.97	9.96
Crustaceans	7 425.82	1.85	13 431.66	9 373.20	2.69	20 594.17	1 947.38	4.77	7 162.52	5 250.06	5 215.13	3 302.68	27.19	37.09	14.46	11.29
Molluscs	16 880.07	3.08	22 043.14	19 694.77	4.68	35 295.26	2 814.70	3.13	13 252.12	9 513.27	10 437.42	6 698.57	21.24	29.59	12.29	9.35
Shell molluscs	16 880.06	2.57	18 448.53	19 694.76	3.95	29 876.13	2 814.70	3.13	11 427.60	8 175.54	8 612.90	5 360.84	24.63	34.43	10.89	8.22
Cephalopods	0.00	0.51	3 594.60	0.00	0.72	5 419.12	2 814.70	3.13	11 427.60	8 175.54	8 612.90	5 360.84	24.63	34.43	10.89	8.22
Fish	4 479.48	24.76	31 016.55	5 013.30	28.00	35 475.25	533.82	2.28	4 458.70	3 031.43	3 924.88	2 497.61	11.97	17.61	14.82	10.89
Finfish	3 152.27	17.52	21 941.73	3 678.81	19.13	24 240.48	526.53	3.14	2 298.74	1 380.23	1 772.21	853.70	22.91	38.15	11.58	7.53
Marine fish	416.12	12.94	16 213.21	411.22	14.17	17 954.71	-4.90	-0.24	1 741.51	1 090.36	1 746.41	1 095.26	38.98	29.34	36.98	29.34
F&D fish	2 736.15	4.57	5 728.53	3 267.59	4.96	6 285.76	531.44	3.61	557.24	289.87	25.80	-241.56	95.37	183.33	3.78	2.03
Shellfish	1 327.21	7.25	9 074.82	1 334.49	8.87	11 234.77	7.29	0.11	1 159.96	1 651.20	1 643.91	0.34	0.44	21.31	17.55	
Crustaceans	66.01	3.42	4 288.30	74.19	4.21	5 340.40	8.19	2.37	1 052.10	821.46	1 043.92	813.27	0.78	1.00	76.11	68.16
Molluscs	1 261.20	3.82	4 786.52	1 260.30	4.65	5 894.37	-0.90	-0.01	1 107.85	829.74	1 108.76	830.65	1.00	13.44	13.44	10.64
Shell molluscs	1 261.20	3.82	4 786.52	1 260.30	4.65	5 894.37	-0.90	-0.01	1 107.85	829.74	1 108.76	830.65	1.00	13.44	13.44	10.64
Cephalopods	0.00	0.99	1 241.76	0.00	1.22	1 544.89	805.63	-0.01	804.73	599.27	600.18	300.47	10.37	8.09	10.37	8.09
Fish	74 036.22	18.43	111 999.26	92 611.56	24.02	154 968.90	18 575.33	4.58	42 969.63	27 895.76	24 394.30	43.23	66.59	9.59	6.60	
Finfish	51 057.54	13.99	85 599.30	64 878.08	16.95	110 314.24	13 820.54	4.91	24 714.94	14 783.64	10 894.41	55.92	93.49	8.22	5.22	
Marine fish	2 115.12	6.00	36 568.77	2 666.95	7.11	66 046.96	551.83	4.75	9 478.19	6 122.97	8 926.36	5 571.14	5.82	9.01	40.53	31.25
F&D fish	48 942.42	7.99	49 030.52	62 211.13	9.84	64 267.28	13 268.71	4.91	15 236.76	8 660.66	1 968.05	87.08	153.21	5.57	3.31	
Shellfish	22 978.68	4.44	26 399.98	27 733.48	7.07	63 244 654.65	4 754.80	3.83	18 254.68	13 112.13	13 499.88	8 357.33	26.05	36.26	12.40	9.45
Crustaceans	7 359.82	1.52	9 143.36	9 299.01	2.38	15 253.77	1 939.20	4.79	6 110.41	4 428.60	4 171.22	2 489.41	31.74	43.79	12.85	9.88
Molluscs	15 618.87	2.92	17 256.62	18 434.47	4.68	29 400.88	2 815.60	3.37	12 144.27	8 683.53	9 328.66	5 867.92	23.18	32.42	12.19	9.24
Shell molluscs	15 618.87	2.52	14 903.77	18 434.47	4.06	25 526.65	2 815.60	3.37	10 622.87	7 576.27	7 807.27	4 760.67	26.51	37.16	10.94	8.23
Cephalopods	0.40	2.42	3 524.84	0.62	0.56	3 874.23	1 521.39	1 107.26	1 521.39	1 107.26	1 521.39	1 107.26	1 107.26	10.94	8.23	
Fish	3 783.35	12.37	11 686.70	5 050.25	15.38	16 283.40	1 266.90	5.95	4 596.70	3 039.65	3 329.80	1 772.75	27.56	41.68	17.24	12.52
Finfish	3 568.17	12.06	11 427.34	4 793.10	14.88	15 818.61	1 224.93	6.08	4 391.27	2 890.32	3 166.35	27.89	42.38	17.41	12.60	
Marine fish	95.22	4.60	4 232.36	128.05	5.65	5 832.42	32.83	6.10	1 600.06	1 128.81	1 567.23	1 095.98	2.05	2.91	77.87	66.65
F&D fish	3 472.95	7.46	7 194.98	4 665.05	9.23	8 36 986.19	1 192.10	6.08	2 791.22	1 761.51	1 599.12	569.41	42.71	67.67	12.52	8.55
Shellfish	215.18	0.31	259.36	257.16	0.50	464.79	41.98	3.63	205.43	149.33	163.45	107.36	20.43	28.11	14.34	11.12
Crustaceans	211.02	0.26	219.79	250.86	0.42	37 401.60	39.84	3.52	181.81	131.26	141.96	91.42	21.91	30.35	13.23	10.16
Molluscs	4.16	0.05	39.57	6.30	0.08	63.19	2.14	8.64	23.62	18.07	21.88	15.93	9.04	11.82	46.19	39.82
Shell molluscs	4.16	0.03	25.36	6.30	0.05	39.49	2.14	8.64	23.62	18.07	21.88	15.93	9.04	11.82	46.19	39.82
Cephalopods	0.02	0.02	14.21	0.03	0.03	23.70	21.51	9.49	7.32	7.32	9.49	7.32	19.86	34.47	29.09	

Developed regions

Developing regions

Least developed countries

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s			Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)					
	Species group	Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁵	Conservative ⁵	Standard ⁶	Conservative ⁶			
		Standard ⁴	Conservative ⁴	Standard ⁴												Conservative ⁴	Annual aquaculture growth rate (%)	Standard ⁴
Small Island Developing States	Fish	49.11	15.04	1 018.10	55.91	17.06	1 211.63	6.80	2.63	193.53	154.23	186.73	147.43	3.51	4.41	37.64	32.87	
	Finfish	32.26	12.41	844.24	34.98	13.87	990.89	2.72	1.63	146.66	116.05	143.93	113.32	1.86	2.35	40.87	35.68	
	Marine fish	2.63	11.34	772.47	3.38	12.76	912.73	0.75	5.17	140.26	111.94	139.51	111.19	0.54	0.67	122.36	112.75	
	F&D fish	29.63	1.07	71.77	31.60	1.11	78.16	1.97	6.40	6.40	4.10	4.43	2.13	30.80	48.02	3.99	2.63	
	Shellfish	16.85	2.63	173.87	20.93	3.19	220.74	4.08	4.43	46.87	38.19	42.79	34.11	8.69	10.67	30.47	26.71	
	Crustaceans	14.82	1.21	82.21	18.89	1.47	105.00	4.07	4.97	22.79	18.76	18.72	14.70	17.85	21.68	20.47	17.77	
	Molluscs	2.03	1.43	91.66	2.04	1.72	115.74	0.01	0.07	24.08	19.42	24.07	19.42	0.03	0.04	66.68	60.26	
	Shell molluscs	2.03	1.20	77.03	2.04	1.44	96.51	0.01	0.07	19.47	15.72	19.47	15.71	0.04	0.05	60.34	54.30	
	Cephalopods	0.22	14.62	14.62	0.28	0.27	19.23	18.32	4.61	3.70	4.61	3.70	4.61	3.70	0.91	1.15	92.70	84.12
	Fish	404.85	3.90	1 806.32	547.45	4.40	2 281.56	142.60	6.22	475.23	363.85	332.64	221.26	30.01	39.19	16.80	13.68	
Finfish	404.80	3.88	1 799.26	547.38	4.38	2 272.19	142.59	6.22	472.93	362.06	330.34	219.48	30.15	39.38	16.74	13.63		
Marine fish	0.00	0.91	397.37	0.01	1.00	492.31	0.01	16.34	94.94	74.48	94.93	74.48	0.01	0.01	621.83	587.63		
F&D fish	404.79	2.98	1 401.89	547.37	3.37	1 779.88	142.58	6.22	377.99	287.58	235.41	145.00	37.72	49.58	14.10	11.33		
Shellfish	0.06	0.02	7.06	0.07	0.02	9.37	8.85	0.01	4.27	2.30	2.29	1.78	0.56	0.72	111.85	101.71		
Crustaceans	0.06	0.01	4.37	0.07	0.01	5.79	5.48	0.01	4.27	1.41	1.11	1.40	1.10	0.91	92.70	84.12		
Molluscs	0.01	2.69	2.69	0.01	0.01	3.58	3.37	0.89	0.68	0.68	0.89	0.68	0.68	0.68	0.68	0.68	0.68	
Shell molluscs	0.01	2.12	2.12	0.01	0.01	2.83	2.66	0.71	0.54	0.54	0.71	0.54	0.54	0.54	0.54	0.54	0.54	
Cephalopods	0.00	0.57	0.57	0.00	0.00	0.75	0.71	0.18	0.13	0.13	0.18	0.13	0.13	0.13	0.13	0.13	0.13	
Fish	1 949.03	9.80	11 666.51	2 630.28	11.08	14 882.73	681.25	6.18	3 216.22	2 465.99	2 534.97	1 784.75	21.18	27.63	21.52	17.77		
Finfish	1 930.48	9.57	11 416.48	2 601.86	10.79	14 528.68	671.37	6.15	3 112.21	2 385.59	2 440.83	1 714.22	21.57	28.14	21.17	17.46		
Marine fish	144.27	5.91	7 019.54	114.01	6.66	8 928.54	8 516.74	-30.26	-4.60	1 909.00	1 500.92	1 939.26	1 531.19	58.31	79.31	70.08	62.71	
F&D fish	1 786.21	3.66	4 396.94	2 487.85	4.13	5 600.14	701.64	6.85	1 203.21	884.67	501.57	183.04	58.31	79.31	10.85	8.38		
Shellfish	18.55	0.23	250.03	28.42	0.29	354.05	330.29	9.87	104.01	80.40	94.14	70.52	9.49	12.28	45.89	39.77		
Crustaceans	14.77	0.14	158.27	23.78	0.17	223.57	209.35	9.00	9.99	65.29	51.16	56.29	42.16	13.79	17.60	40.22	34.88	
Molluscs	3.77	0.09	91.76	4.64	0.11	130.48	120.95	0.87	4.23	38.72	29.24	37.85	28.37	2.24	2.97	62.30	54.30	
Shell molluscs	3.77	0.05	48.07	4.64	0.06	66.15	61.49	0.87	4.23	18.08	13.44	17.21	12.58	4.81	6.46	42.08	35.47	
Cephalopods	0.04	43.69	43.69	0.05	0.06	64.33	59.45	20.65	20.65	15.79	20.65	15.79	20.65	15.79	20.65	15.79	20.65	
Fish	1 308.67	13.40	2 997.27	1 717.20	15.36	3 742.67	408.53	5.58	745.40	522.92	336.87	114.39	54.81	78.13	9.44	6.95		
Finfish	1 299.76	12.86	2 897.88	1 700.98	14.65	3 600.85	3 386.73	401.22	5.53	702.97	490.55	301.75	89.33	57.08	81.79	9.03	6.61	
Marine fish	143.18	7.17	1 615.46	112.37	8.06	1 982.05	1 878.14	-30.80	-4.73	366.59	263.63	397.39	294.43	128.43	28.91	23.23		
F&D fish	1 156.59	5.69	1 282.42	1 588.61	6.59	1 618.81	1 508.59	432.03	6.55	336.38	226.92	-95.64	-205.11	190.39	5.24	3.65		
Shellfish	8.91	0.54	99.39	16.22	0.71	141.82	131.70	7.31	12.73	42.43	32.37	35.12	25.06	17.23	22.58	41.95	35.89	
Crustaceans	8.46	0.36	66.20	15.70	0.47	93.59	87.24	7.24	13.17	27.38	21.07	20.14	13.83	26.45	34.38	28.42		
Molluscs	0.45	0.18	33.18	0.52	0.24	48.23	44.46	0.07	2.75	15.05	11.30	14.98	11.23	0.44	0.58	102.94	92.00	
Shell molluscs	0.45	0.04	8.28	0.52	0.06	11.15	10.28	0.07	2.75	2.87	2.00	2.81	1.94	2.28	3.27	49.14	40.38	
Cephalopods	0.13	24.90	24.90	0.17	0.19	37.08	34.18	12.18	12.18	9.29	12.18	9.29	12.18	9.29	12.18	9.29	12.18	

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
		Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵		
Sub-Saharan Africa	Fish	642.34	8.66	8 707.27	915.06	9.78	11 184.82	272.72	7.33	2 477.55	1 948.03	2 204.83	1 675.32	11.01	14.00	37.17	32.17
	Finfish	632.70	8.49	8 556.62	902.86	9.57	10 972.59	270.15	7.37	2 415.97	1 900.01	2 145.82	1 629.86	11.18	14.22	36.96	31.97
	Marine fish	1.09	5.39	5 409.36	1.64	6.09	6 952.98	0.54	8.38	1 543.62	1 238.29	1 543.08	1 237.75	0.04	0.04	326.52	308.14
	R&D fish	631.61	3.10	3 147.26	631.61	3.48	4 019.61	269.61	7.37	872.35	661.71	602.74	392.10	30.91	40.74	18.95	15.41
	Shellfish	9.64	0.16	150.65	12.20	0.20	212.23	2.56	4.83	61.58	48.03	59.02	45.46	4.16	5.34	49.18	43.01
	Crustaceans	6.32	0.10	92.07	8.08	0.12	129.98	1.76	5.04	37.91	30.09	36.15	28.33	4.64	5.85	47.59	41.95
	Molluscs	3.32	0.07	58.58	4.13	0.09	82.25	0.80	4.43	23.67	17.94	22.87	17.14	3.39	4.48	52.04	44.95
	Shell molluscs	3.32	0.05	39.79	4.13	0.06	55.00	0.80	4.43	15.20	11.44	14.40	10.64	5.28	7.02	41.01	34.75
	Cephalopods	0.02	18.79	0.02	0.03	0.03	27.25	8.47	6.50	8.47	6.50	8.47	6.50				
	Fish	6.23	5.98	375.84	8.02	6.51	427.21	1.79	5.17	51.37	36.40	49.58	34.61	3.48	4.91	56.00	46.89
Southern Africa	Finfish	3.23	5.36	337.10	4.45	5.77	379.62	1.22	6.61	42.52	29.60	41.30	28.38	2.87	4.12	69.88	58.98
	Marine fish	0.13	5.11	321.87	0.23	5.52	362.73	0.10	11.74	40.86	28.69	40.77	28.60	0.24	0.34	215.75	194.27
	R&D fish	3.10	0.24	15.23	4.23	0.26	16.88	1.12	6.37	1.65	0.91	0.53	-0.21	67.94	123.57	8.92	5.27
	Shellfish	3.00	0.63	38.74	3.57	0.74	47.59	0.57	3.53	8.85	6.80	8.28	6.23	6.41	8.35	31.61	26.70
	Crustaceans	0.00	0.37	23.17	0.00	0.43	28.29	27.15	5.12	3.99	3.99	5.12	3.99			308.54	288.78
	Molluscs	3.00	0.26	15.57	3.56	0.31	18.37	0.57	3.53	3.73	2.80	3.16	2.24	15.21	20.25	17.56	14.12
	Shell molluscs	3.00	0.13	8.22	3.56	0.16	9.99	0.57	3.53	1.77	1.30	1.20	0.73	32.07	43.79	9.73	7.45
	Cephalopods	0.12	7.36	0.12	0.15	0.14	9.32	8.86	1.96	1.51	1.51	1.96	1.51				
	Fish	211.06	4.80	1 901.11	290.52	5.49	2 485.24	79.46	6.60	584.13	442.64	504.67	363.19	13.60	17.95	30.38	25.37
	Eastern Africa	Finfish	204.75	4.73	1 874.62	282.45	5.39	2 441.46	77.70	6.65	566.84	429.27	489.14	351.57	13.71	18.10	30.39
Marine fish		0.96	1.17	452.64	1.41	1.33	591.38	0.45	7.89	138.74	105.56	138.29	105.11	0.32	0.42	170.55	156.27
R&D fish		203.78	3.56	1 421.98	281.04	4.05	1 850.08	77.25	6.64	428.10	323.71	350.85	246.46	18.05	23.86	25.40	20.95
Shellfish		6.31	0.07	26.50	8.07	0.10	43.79	1.76	5.04	17.29	13.37	15.53	11.61	10.18	13.16	30.18	25.54
Crustaceans		6.31	0.05	18.52	8.07	0.07	31.00	1.76	5.04	12.48	9.78	10.72	8.02	14.10	18.00	24.39	20.58
Molluscs		0.00	0.02	7.98	0.00	0.03	12.79	11.57	4.81	3.60	3.60	4.81	3.60			337.60	312.91
Shell molluscs		0.00	0.01	2.81	0.00	0.01	4.11	3.78	1.30	0.96	0.96	1.30	0.96			236.81	217.50
Cephalopods		0.02	5.16	0.02	0.02	0.02	8.68	7.80	3.51	2.63	2.63	3.51	2.63				
Fish		418.56	13.65	4 883.13	609.67	15.49	6 313.73	191.11	7.81	1 430.59	1 124.14	1 239.49	933.03	13.36	17.00	34.60	29.81
Western Africa		Finfish	418.24	13.46	4 818.01	609.11	15.24	6 220.92	190.87	7.81	1 402.91	1 102.72	1 212.04	911.85	13.61	17.31	34.21
	Marine fish	10.24	3 667.58	10.24	11.25	4 778.73	4 551.98	1 111.15	886.25	1 111.15	886.25	1 111.15	886.25				
	R&D fish	418.24	3.21	1 150.43	609.11	3.53	1 442.19	190.87	7.81	291.76	216.47	100.89	25.60	65.42	88.17	11.16	8.70
	Shellfish	0.32	0.19	65.13	0.56	0.24	92.81	0.24	11.56	27.68	21.42	27.45	21.19	0.85	1.10	143.98	131.94
	Crustaceans	0.09	33.22	0.09	0.11	46.79	43.96	13.57	10.76	13.57	10.76	13.57	10.76				
	Molluscs	0.32	0.10	31.91	0.56	0.13	46.02	0.24	11.56	14.11	10.66	13.87	10.42	1.67	2.21	113.68	102.33
	Shell molluscs	0.32	0.09	27.84	0.56	0.11	39.71	0.24	11.56	11.87	8.95	11.63	8.72	1.99	2.63	106.59	95.61
	Cephalopods	0.01	4.07	0.01	0.02	0.02	6.31	5.77	2.24	1.71	1.71	2.24	1.71				

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)					
	Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Standard ⁴	Conservative ⁵	Per capita demand (kg)	Standard ⁴	Conservative ⁵	Total demand (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand minus extra supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
Middle Africa	Fish	4.50	9.79	1 509.15	4.86	10.45	1 913.88	1 848.27	0.36	1.56	404.73	339.89	404.36	339.53	0.09	0.11	146.44	138.08		
	Finfish	4.50	9.65	1 488.87	4.86	10.30	1 885.84	1 821.56	0.36	1.56	396.97	333.45	396.61	333.09	0.09	0.11	145.50	137.18		
	Marine fish		6.24	961.99		6.66	1 213.66	1 178.29			251.67	216.80	251.67	216.80						
	F&D fish	4.50	3.42	526.88	4.86	3.77	672.18	643.27	0.36	1.56	145.30	116.65	144.94	116.29	0.25	0.31	101.57	93.19		
	Shellfish		0.14	20.28		0.16	28.04	26.71			7.76	6.44	7.76	6.44						
	Crustaceans		0.11	17.17		0.13	23.90	22.71			6.73	5.56	6.73	5.56						
	Molluscs		0.02	3.11		0.03	4.14	3.99			1.03	0.88	1.03	0.88						
	Shell molluscs		0.01	0.92		0.01	1.19	1.14			0.27	0.23	0.27	0.23						
	Cephalopods		0.02	2.20		0.02	2.95	2.85			0.75	0.65	0.75	0.65						
	Fish	3 627.07	14.16	14 110.82	4 643.12	15.35	16 531.15	15 821.18	1 016.05	5.06	2 420.33	1 717.83	1 404.28	701.78	41.98	59.15	10.77	8.06		
Finfish	2 248.36	9.80	9 771.67	2 959.28	10.57	11 016.95	10 572.75	710.92	5.65	1 245.28	806.34	534.37	95.42	57.09	88.17	9.22	6.32			
Marine fish	16.95	6.23	6 208.90	27.53	6.75	7 033.21	6 765.37	10.58	10.18	824.31	559.83	813.73	549.26	1.28	1.89	118.35	102.48			
F&D fish	2 231.41	3.58	3 562.77	2 931.75	3.82	3 983.74	3 807.38	700.34	5.61	420.97	246.50	-279.37	-453.84	166.36	284.11	3.52	2.12			
Shellfish	1 378.70	4.36	4 339.15	1 683.84	5.30	5 514.20	5 248.43	305.13	4.08	1 175.05	911.50	869.92	606.36	25.97	33.48	13.12	10.68			
Crustaceans	788.73	2.52	2 509.99	1 002.82	3.07	3 196.45	3 047.52	214.09	4.92	686.46	538.81	472.36	324.71	31.19	39.73	13.34	10.97			
Molluscs	589.98	1.84	1 829.16	681.02	2.23	2 117.75	2 000.92	91.04	2.91	488.59	372.69	397.55	281.65	18.63	24.43	12.82	10.29			
Shell molluscs	589.98	1.51	1 508.11	681.02	1.82	1 75	1 804.02	91.04	2.91	390.51	296.67	299.47	205.63	23.31	30.69	10.69	8.49			
Cephalopods		0.32	321.05		0.40	39	419.13	396.90			98.08	76.02	98.08	76.02						
Fish	578.71	21.80	7 829.78	575.58	24.93	9 290.39	8 860.72	-3.13	-0.11	1 460.62	1 034.74	1 463.75	1 037.87	41.98	59.15	28.65	22.76			
Finfish	317.35	12.68	4 554.31	302.53	13.75	5 124.17	4 898.69	-14.81	-0.95	569.87	346.59	584.68	361.40	0.30	0.48	22.83	15.91			
Marine fish	2.81	7.42	2 666.59	3.83	8.07	7 800	7 879.98	1.02	6.40	339.11	214.69	338.09	213.67	0.30	0.48	161.31	138.71			
F&D fish	314.54	5.26	1 887.72	298.71	5.69	4 27	2 018.70	-15.83	-1.03	230.76	131.90	246.59	147.74			11.63	7.26			
Shellfish	261.36	9.12	3 275.47	273.04	11.18	10 73	4 166.22	3 962.03	11.68	0.88	890.75	688.15	879.06	676.47	1.31	1.70	34.54	29.44		
Crustaceans	60.48	5.45	1 958.17	69.49	6.72	6 46	2 503.98	2 384.47	9.01	2.81	545.81	427.24	536.80	418.24	1.65	2.11	58.57	51.81		
Molluscs	200.87	3.67	1 317.30	203.55	4.46	4 27	1 662.24	1 577.57	2.68	0.27	344.94	260.91	342.26	258.23	0.78	1.03	22.13	18.11		
Shell molluscs	200.87	3.34	1 200.99	203.55	4.06	3 89	1 514.19	1 437.52	2.68	0.27	313.21	237.11	310.53	234.43	0.85	1.13	20.68	16.87		
Cephalopods		0.32	116.31		0.40	38	148.04	140.05			31.73	23.80	31.73	23.80						
Fish	3 048.36	9.86	6 281.04	4 067.54	10.82	7 240.76	6 960.47	1 019.18	5.94	959.72	683.09	-59.47	-336.09	106.20	149.20	5.63	4.13			
Finfish	1 931.02	8.18	5 217.36	2 656.75	8.80	5 892.77	5 674.06	725.73	6.59	675.41	459.74	-50.32	-265.99	107.45	157.86	6.18	4.36			
Marine fish	14.14	5.56	3 542.31	23.70	6.02	5 87	4 027.51	3 885.39	9.56	10.88	485.20	345.14	475.65	335.59	1.97	2.77	103.97	90.98		
F&D fish	1 916.87	2.63	1 675.05	2 633.05	2.79	2 70	1 865.27	1 788.67	716.17	6.55	190.21	114.60	-525.96	-601.58	376.51	1.91	1.17			
Shellfish	1 117.34	1.67	1 063.68	1 410.80	2.02	1 95	1 347.98	1 286.40	293.45	4.77	284.30	223.35	-9.15	-70.10	103.22	131.39	4.64	3.71		
Crustaceans	728.24	0.87	551.82	933.33	1.00	692.47	663.05	205.09	5.09	140.65	111.56	-64.44	-93.53	145.82	183.83	3.59	2.89			
Molluscs	389.10	0.80	511.86	477.47	0.98	0.94	655.51	623.35	88.36	4.18	143.65	111.78	55.29	61.51	79.05	6.49	5.18			
Shell molluscs	389.10	0.48	307.12	477.47	0.58	384.42	366.50	88.36	4.18	77.30	59.56	-11.06	-28.80	114.31	148.36	3.69	2.89			
Cephalopods		0.32	204.74		0.41	271.09	256.85			66.35	52.22	66.35	52.22							

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)		
	Species group	Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)		Trend aquaculture growth	Extra demand generated by income and population growth (000 tonnes)		Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)		Standard ⁵	Conservative ⁵	Standard ⁶	Conservative ⁶
		Aquaculture production (000 tonnes)	Standard ⁴	Conservative ⁴		Standard ⁴	Conservative ⁴		Annual growth rate (%)	Standard ⁴		Conservative ⁴	Standard ⁴				
Central America	Fish	387.30	10.89	1 893.29	12.32	2 277.30	2 158.07	125.83	5.79	384.01	265.92	140.09	32.77	47.32	14.77	11.02	
	Finfish	159.55	8.51	1 479.11	9.33	1 724.47	1 637.08	83.79	8.81	245.36	158.87	161.57	75.08	34.15	20.47	14.82	
	Marine fish	13.30	5.81	1 010.19	6.40	1 182.99	1 125.45	9.42	11.30	172.81	115.87	163.39	106.45	5.45	8.13	69.50	57.56
	F&D fish	146.25	2.70	468.92	2.93	2.80	541.47	511.63	74.37	8.57	72.55	43.00	-1.81	102.50	172.97	8.39	5.29
	Shellfish	227.75	2.38	414.18	2.99	2.85	552.84	520.99	42.04	3.45	138.65	107.05	96.62	30.32	39.27	9.98	8.01
	Crustaceans	214.86	1.60	278.95	2.02	1.92	372.56	351.79	33.54	2.94	93.61	73.01	60.07	35.83	45.94	7.50	6.03
	Molluscs	12.89	0.78	135.24	0.98	0.93	180.28	169.20	8.49	10.65	45.04	34.04	36.55	25.55	18.86	35.06	29.49
	Shell molluscs	12.89	0.47	81.17	0.58	0.55	106.36	99.91	8.49	10.65	25.19	18.79	16.70	10.30	33.72	24.19	19.70
	Cephalopods	0.31	0.31	54.07	0.40	0.38	73.92	69.28	19.85	15.24	19.85	15.24	19.85	15.24	45.20	24.19	19.70
	Fish	29.50	8.51	366.81	9.53	9.33	423.23	410.09	1.01	0.68	56.41	43.47	55.40	42.46	1.80	23.83	19.86
Finfish	23.43	7.56	325.95	8.38	8.21	372.30	361.17	-0.04	-0.04	46.35	35.40	46.39	35.44	24.39	20.21	20.21	
Marine fish	0.40	6.74	290.63	0.41	7.55	7.40	335.70	325.39	0.01	0.52	45.07	34.91	45.06	34.90	0.02	0.03	
F&D fish	23.04	0.82	35.32	22.98	0.83	0.82	36.59	35.78	-0.05	-0.05	1.28	0.48	1.33	0.54	1.09	0.42	
Shellfish	6.07	0.95	40.87	7.13	1.11	50.93	48.92	1.06	3.26	10.06	8.08	9.01	7.02	10.50	21.58	18.43	
Crustaceans	4.50	0.49	20.97	5.55	0.60	26.46	23.46	1.05	4.30	5.49	4.50	4.44	3.45	19.19	17.29	14.87	
Molluscs	1.57	0.46	19.90	1.58	0.55	24.47	23.46	0.00	0.03	4.57	3.58	4.57	3.57	0.06	31.34	26.78	
Shell molluscs	1.57	0.40	17.35	1.58	0.48	21.17	20.34	0.00	0.03	3.82	2.99	3.82	2.99	0.07	27.97	23.77	
Cephalopods	0.06	0.06	2.55	0.08	0.07	3.30	3.13	0.12	0.75	0.58	0.58	0.75	0.58	0.09	27.97	23.77	
Fish	2 631.56	9.56	4 020.94	10.32	10.09	4 540.23	4 392.30	892.34	6.01	519.29	373.69	-373.05	-518.65	171.84	3.67	2.69	
Finfish	1 748.04	8.12	3 412.31	8.63	8.45	3 796.01	3 673.81	641.98	6.46	383.70	265.48	-258.28	-376.50	167.31	241.82	2.87	
Marine fish	0.44	5.33	2 241.49	5.70	5.59	2 508.81	2 434.56	0.12	5.06	267.32	194.36	267.20	194.24	0.05	0.06	259.86	
F&D fish	1 747.59	2.78	1 170.82	2.93	2.85	1 287.20	1 241.26	641.86	6.46	116.38	71.12	-525.48	-570.74	551.51	902.50	1.30	
Shellfish	883.52	1.45	608.63	1.69	1.65	744.21	716.49	250.36	5.12	135.59	108.21	-114.77	-142.14	184.65	231.35	2.34	
Crustaceans	508.88	0.60	251.90	0.67	0.66	293.45	285.80	170.49	5.95	41.55	34.05	-128.95	-136.44	410.37	500.76	1.58	
Molluscs	374.64	0.85	356.72	1.03	0.99	450.76	430.69	79.87	3.94	94.04	74.17	14.17	-5.70	84.93	107.68	3.68	
Shell molluscs	374.64	0.50	208.60	0.59	0.57	256.89	246.26	79.87	3.94	48.29	37.77	-31.58	-42.09	165.40	2.45	1.94	
Cephalopods	0.35	0.35	148.12	0.44	0.42	193.88	184.43	45.75	36.40	45.75	36.40	45.75	36.40	211.45	2.45	1.94	
Fish	69 662.19	22.79	99 974.34	30.41	27.57	139 376.70	125 039.50	16 874.01	4.43	39 402.36	25 120.66	22 528.35	8 246.66	42.82	67.17	9.38	
Finfish	47 467.90	16.51	72 680.69	20.39	18.59	93 831.26	84 668.18	12 422.64	4.76	21 150.58	12 028.22	8 727.94	-394.42	58.73	103.28	4.62	
Marine fish	2 187.04	6.64	29 104.56	7.94	7.38	36 380.27	33 448.32	572.54	4.76	7 275.71	4 359.76	6 703.17	3 787.23	7.87	13.13	34.04	
F&D fish	45 280.86	9.87	43 576.13	12.44	11.21	57 450.99	51 219.86	11 850.10	4.76	13 874.86	7 668.46	2 024.76	-4 181.64	85.41	154.53	5.49	
Shellfish	22 194.29	6.28	27 293.66	10.02	8.98	45 455.44	40 371.31	4 451.37	3.72	18 251.78	13 092.44	13 800.41	8 641.07	24.39	34.00	9.72	
Crustaceans	6 616.62	2.14	9 331.53	3.38	3.04	15 388.89	13 705.72	1 725.01	4.74	6 057.36	4 379.28	4 332.36	2 654.27	28.48	39.39	10.69	
Molluscs	15 577.68	4.13	17 962.13	6.64	5.93	30 156.54	26 665.60	2 726.37	3.28	12 194.42	8 713.16	9 468.05	5 986.79	22.36	31.29	9.29	
Shell molluscs	15 577.68	3.53	15 360.64	5.73	5.10	26 021.41	22 951.25	2 726.37	3.28	10 660.77	7 598.93	7 934.40	4 872.56	25.57	35.88	8.27	
Cephalopods	0.60	0.60	2 601.49	0.91	0.83	4 135.14	3 714.35	1 533.65	1 114.23	1 533.65	1 114.23	1 533.65	1 114.23	35.88	10.99	8.27	

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)				
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth (000 tonnes)	Annual growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁵	Conservative ⁵	Standard ⁶	Conservative ⁶	Standard ⁶	Conservative ⁶	
																			Standard ⁴
Eastern Asia	Fish	49 348.28	38.64	62 413.45	60 106.24	48.75	88 454.00	10 757.95	4.02	26 040.55	16 849.97	15 282.60	6 092.02	41.31	63.85	8.84	6.05		
	Finfish	29 924.65	24.03	38 824.45	36 985.27	29.89	49 069.12	7 060.62	4.33	10 244.68	5 535.87	3 184.05	-1 524.75	68.92	127.54	6.07	3.45		
	Marine fish	1 688.09	7.89	12 739.98	2 126.95	9.18	8 559 33 992.29	438.86	4.73	2 336.31	1 229.83	1 897.45	790.96	18.78	35.68	18.98	11.57		
	F&D fish	28 236.56	16.15	26 084.47	34 858.32	20.71	18.69 33 992.84	30 376.30	6 621.76	4.30	7 908.36	4 306.05	2 286.61	-2 315.71	83.73	153.78	5.06	2.88	
	Shellfish	19 423.63	14.60	23 589.00	23 120.96	24.00	21.47 39 384.87	34 890.50	3 697.33	3.55	15 795.87	11 314.10	12 098.54	7 616.77	23.41	32.68	12.64	9.61	
	Crustaceans	4 311.93	4.31	6 969.51	5 333.93	6.96	6.26 11 420.75	10 181.66	1 022.00	4.35	4 451.23	3 215.84	3 429.23	2 193.84	22.96	31.78	15.24	11.79	
	Molluscs	15 111.70	10.29	16 619.49	17 787.03	17.04	15.20 27 964.13	24 708.84	2 675.33	3.31	11 344.64	8 098.26	8 669.31	5 422.93	23.58	33.04	11.85	8.96	
	Shell molluscs	15 111.70	9.07	14 648.78	17 787.03	15.18	13.51 24 911.86	21 958.54	2 675.33	3.31	10 263.07	7 317.66	7 587.74	4 642.33	26.07	36.56	10.92	8.22	
	Cephalopods	1.22	1.970.70	1.86	1.70	3 052.27	2 750.30	1 081.57	780.60	1 081.57	780.60	1 081.57	780.60	1 081.57	780.60	1 081.57	780.60	1 081.57	780.60
	Fish	11 902.85	34.98	22 284.89	15 592.19	45.64	41.68	30 620.00	3 689.33	5.55	8 335.10	5 386.15	4 645.77	1 696.82	44.26	68.50	11.20	7.75	
South-eastern Asia	Finfish	9 801.69	30.49	19 426.88	13 064.44	38.59	35.30 25 886.26	23 428.63	3 262.75	5.92	6 459.37	4 013.13	3 196.62	750.38	50.51	81.30	10.65	7.10	
	Marine fish	176.36	18.31	11 663.42	221.88	23.15	21.33 15 532.16	14 152.89	45.52	4.70	3 868.74	2 496.23	3 823.21	2 450.71	1.18	1.82	87.11	72.23	
	F&D fish	9 625.34	12.19	7 763.47	12 842.56	15.43	13.98 10 354.10	9 275.74	3 217.23	5.94	2 590.64	1 516.90	-626.59	-1 700.33	124.19	212.09	4.88	2.97	
	Shellfish	2 101.16	4.49	2 858.01	2 527.74	7.06	6.37 4 733.74	4 229.36	426.58	3.77	1 875.73	1 373.03	1 449.15	946.45	22.74	31.07	13.61	10.58	
	Crustaceans	1 646.79	2.52	1 606.34	2 019.18	3.97	3.59 2 663.32	2 385.36	372.39	4.16	1 056.99	779.97	684.59	407.57	35.23	47.74	10.42	8.06	
	Molluscs	454.38	1.96	1 251.67	508.56	3.09	2.78 2 070.42	1 844.00	54.19	2.28	818.74	593.06	764.56	538.87	6.62	9.14	22.88	18.18	
	Shell molluscs	454.38	1.02	649.83	508.56	1.53	1.38 1 027.23	917.25	54.19	2.28	377.40	267.80	323.21	213.61	14.36	20.23	12.85	9.71	
	Cephalopods	0.94	601.84	0.94	1.56	1.40	1 043.19	926.75	441.35	325.26	441.35	325.26	441.35	325.26	441.35	325.26	441.35	325.26	
	Fish	363.42	7.49	1 942.55	473.47	8.09	7.93	2 275.44	110.05	5.43	332.89	265.21	222.84	155.16	33.06	41.50	13.89	11.58	
	Finfish	356.03	6.89	1 788.58	465.62	7.40	7.26 2 081.72	2 020.39	109.59	5.51	293.13	232.76	183.55	123.17	37.38	47.08	12.76	10.58	
Marine fish	144.23	5.02	1 302.95	191.69	5.42	5.32 1 525.02	1 482.32	47.46	5.85	222.06	180.05	174.60	132.59	21.37	26.36	20.49	17.59		
F&D fish	211.80	1.87	485.63	273.93	1.98	1.93 556.70	538.07	62.13	5.28	71.07	52.70	8.95	-9.42	87.41	117.88	5.96	4.54		
Shellfish	7.39	0.60	153.96	7.85	0.69	0.67 193.72	186.33	0.47	1.23	39.76	32.46	39.29	31.99	1.17	1.44	44.88	40.08		
Crustaceans	6.61	0.37	96.08	7.07	0.43	0.42 120.16	116.41	0.47	1.37	24.08	20.39	23.62	19.92	1.93	2.29	35.96	32.51		
Molluscs	0.78	0.23	57.89	0.78	0.27	0.25 73.56	69.92	0.47	15.67	12.07	15.67	12.07	15.67	12.07	15.67	12.07	15.67		
Shell molluscs	0.78	0.16	41.00	0.78	0.19	0.18 51.73	49.07	0.47	10.73	8.09	10.73	8.09	10.73	8.09	10.73	8.09	10.73		
Cephalopods	0.07	16.89	0.07	0.08	0.07	21.83	20.86	4.94	3.98	4.94	3.98	4.94	3.98	4.94	3.98	4.94	3.98		
Fish	32.15	2.23	150.95	53.31	2.38	2.30	172.21	21.16	10.64	21.26	13.36	0.11	-7.80	99.50	158.38	10.68	7.20		
Finfish	32.15	2.19	148.46	53.31	2.34	2.26 169.19	161.34	21.16	10.64	20.73	12.97	-0.43	-8.18	102.06	163.09	10.46	7.01		
Marine fish	1.29	0.90	87.65	53.31	0.96	0.92 69.44	65.61	21.16	10.64	8.63	4.83	-12.52	-16.32	245.08	437.80	4.87	2.84		
F&D fish	32.15	0.90	60.81	53.31	0.96	0.92 69.44	65.61	21.16	10.64	8.63	4.83	-12.52	-16.32	245.08	437.80	4.87	2.84		
Shellfish	0.04	0.04	2.49	0.04	0.04	3.02	2.87	0.53	0.39	0.53	0.39	0.53	0.39	0.53	0.39	0.53	0.39		
Crustaceans	0.02	1.46	0.02	0.02	0.02	1.76	1.68	0.30	0.22	0.30	0.22	0.30	0.22	0.30	0.22	0.30	0.22		
Molluscs	0.02	1.03	0.02	0.02	0.02	1.26	1.19	0.17	0.23	0.17	0.23	0.17	0.23	0.17	0.23	0.17	0.23		
Shell molluscs	0.01	0.68	0.01	0.01	0.01	0.83	0.78	0.14	0.10	0.14	0.10	0.14	0.10	0.14	0.10	0.14	0.10		
Cephalopods	0.01	0.35	0.01	0.01	0.01	0.43	0.41	0.09	0.06	0.09	0.06	0.09	0.06	0.09	0.06	0.09	0.06		

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)				
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Standard ⁴	Conservative ⁵	Total demand (000 tonnes)	Standard ⁴	Conservative ⁵	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Extra demand minus extra supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
South Asia	Fish	8 015.49	7.23	13 182.50	10 311.00	9.21	17 855.05	15 780.44	2 295.52	5.17	4 672.55	2 605.96	2 377.03	310.45	49.13	88.09	9.62	5.79	
	Finfish	7 353.37	6.84	12 492.31	9 321.90	8.56	16 624.98	14 718.19	1 968.53	4.86	4 132.67	2 233.50	2 164.14	264.97	47.63	88.14	9.33	5.45	
	Marine fish	1 783.36	1.84	3 310.56	2 195.05	2.17	4 147.06	3 754.04	40.68	4.19	836.50	445.51	795.82	404.83	4.86	9.13	41.59	28.46	
	F&D fish	7 175.01	5.00	9 181.75	9 102.85	6.39	5.68	12 477.91	10 964.15	1 927.84	4.87	3 296.16	1 787.99	1 368.32	-139.85	58.49	107.82	7.85	4.55
	Shellfish	662.12	0.39	690.19	989.10	0.65	0.57	1 230.08	1 062.24	326.99	8.36	539.88	372.46	212.90	45.47	60.57	87.79	12.67	9.34
	Crustaceans	651.30	0.37	658.14	981.44	0.63	0.55	1 182.90	1 020.61	330.14	8.55	524.76	362.86	194.61	32.72	62.91	90.98	12.55	9.26
	Molluscs	10.82	0.02	32.05	7.66	0.03	0.02	47.18	41.63	-3.15	-6.66	15.13	9.60	18.28	12.76		19.12	13.55	
	Shell molluscs	10.82	0.01	20.34	7.66	0.02	0.01	29.76	25.61	-3.15	-6.66	9.42	5.28	12.57	8.43		13.34	8.27	
	Cephalopods	0.01	0.01	11.71	0.00	0.01	0.01	17.42	16.03	5.71	4.33		5.71	4.33					
	Fish	3 089.35	22.06	16 286.29	3 620.84	24.99	24.22	18 470.11	17 738.39	531.49	3.23	2 183.83	1 459.92	1 652.34	928.43	24.34	36.41	11.29	8.05
Finfish	2 486.95	17.51	12 925.83	3 016.41	19.34	18.78	14 296.58	13 758.12	529.47	3.94	1 370.75	838.54	841.28	309.07	38.63	63.14	9.18	5.98	
Marine fish	1 745.4	13.31	9 823.94	1 693.33	14.77	14.36	10 917.06	10 518.49	-5.20	-0.60	1 093.12	699.30	1 098.33	704.50		48.67	38.01		
F&D fish	2 312.41	4.20	3 101.90	2 847.08	4.57	4.42	3 379.52	3 239.62	534.67	4.25	2 773.63	139.24	-257.04	-395.43	192.59	383.99	2.29	1.18	
Shellfish	602.41	4.55	3 360.45	604.43	5.65	5.43	4 173.53	3 980.28	2.06	0.07	813.08	621.38	811.06	619.36	0.25	0.33	18.63	15.23	
Crustaceans	0.34	1.78	1 313.26	0.40	2.21	2.13	1 630.08	1 563.28	0.06	3.57	316.82	250.64	316.76	250.57	0.02	0.03	293.72	275.72	
Molluscs	602.07	2.77	2 047.20	604.03	3.44	3.30	2 543.45	2 417.00	1.96	0.06	496.26	370.75	494.30	368.79	0.39	0.53	12.78	10.07	
Shell molluscs	602.07	1.97	1 454.09	604.02	2.42	2.32	1 790.27	1 702.32	1.96	0.06	336.18	248.90	334.22	246.94	0.58	0.79	9.28	7.17	
Cephalopods	0.00	0.80	593.11	0.00	1.02	0.98	753.19	714.68	-1.48	-0.05	677.69	445.94	679.17	447.43		16.97	12.26		
Fish	569.82	29.73	4 522.26	568.34	34.30	33.04	5 199.95	4 966.16	-1.48	-0.05	677.69	445.94	679.17	447.43		16.97	12.26		
Finfish	235.25	20.63	3 138.41	229.50	22.87	22.11	3 466.79	3 323.31	-5.74	-0.49	328.38	186.33	334.12	192.07		19.10	12.38		
Marine fish	160.36	17.47	2 658.07	154.40	19.44	18.81	2 946.30	2 827.46	-5.96	-0.76	288.23	170.60	294.19	176.56		22.84	15.59		
F&D fish	74.89	3.16	480.34	75.11	3.43	3.30	520.49	495.85	0.22	0.06	40.15	15.73	39.93	15.51	0.54	8.96	3.89		
Shellfish	334.57	9.10	1 383.85	338.83	11.43	10.93	1 733.16	1 642.85	4.26	0.25	349.31	259.62	345.04	255.35	1.22	1.64	15.37	12.17	
Crustaceans	0.24	2.04	310.91	0.28	2.53	2.43	384.23	365.03	0.04	3.47	73.33	54.26	73.28	54.22	0.06	0.08	214.36	196.05	
Molluscs	334.33	7.05	1 072.95	338.55	8.90	8.50	1 348.93	1 277.82	4.22	0.25	275.98	205.36	271.76	201.14	1.53	2.05	12.79	10.05	
Shell molluscs	334.33	4.42	672.16	338.55	5.48	5.24	831.38	787.71	4.22	0.25	159.23	115.86	155.01	111.64	2.65	3.64	8.10	6.13	
Cephalopods	0.00	2.63	400.79	0.00	3.41	3.26	517.55	490.11			116.76	89.50	116.76	89.50					
Fish	1 911.26	25.16	2 576.02	2 382.91	28.53	27.92	3 002.51	2 911.15	471.65	4.51	426.49	336.39	-45.16	-135.26	110.59	140.21	4.11	3.30	
Finfish	1 863.79	19.47	1 993.38	2 341.75	21.53	21.10	2 265.19	2 198.80	477.96	4.67	271.80	207.39	-206.16	-270.57	175.85	230.47	2.76	2.13	
Marine fish	7.23	15.33	1 569.71	7.24	17.05	16.72	1 793.84	1 743.96	0.00	0.01	224.14	175.03	224.13	175.03	0.00	0.00	99.98	90.66	
F&D fish	1 856.55	4.14	423.67	2 334.51	4.48	4.37	471.34	455.83	477.96	4.69	47.67	32.36	-430.29	-445.60	1 002.71	1 477.04	0.51	0.35	
Shellfish	47.47	5.69	582.63	41.16	7.01	6.82	737.32	711.36	-6.31	-2.81	154.69	129.00	161.00	135.32		33.61	30.03		
Crustaceans	0.00	4.40	450.11	0.00	5.44	5.31	572.79	553.55			122.68	103.66	122.68	103.66		842.84	811.60		
Molluscs	47.47	1.30	132.53	41.16	1.56	1.51	164.53	157.81	-6.31	-2.81	32.00	25.34	38.32	31.65		10.86	8.93		
Shell molluscs	47.47	1.14	117.21	41.16	1.38	1.34	145.44	139.56	-6.31	-2.81	28.23	22.41	34.55	28.72		9.78	8.04		
Cephalopods	0.15	0.15	15.32	0.18	0.18	0.18	19.09	18.25			3.77	2.93	3.77	2.93					

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)				
	Species group	Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Annual growth rate (%)	Extra food fish supply (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Ratio of extra supply to extra demand ⁶ (%)	Standard ⁴	Conservative ⁵	
		318.15	17.19	5 030.93															377.82
Eastern Europe	Finfish	312.03	15.79	4 622.92	367.63	16.94	5 067.23	4 854.53	55.60	3.33	444.31	234.05	388.71	178.46	12.51	23.75	19.37	11.84	
	Marine fish	1.10	11.16	3 266.11	1.74	12.43	3 596.22	3 450.89	0.65	9.71	330.11	186.50	329.46	185.85	0.20	0.35	213.33	179.66	
	F&D fish	310.94	4.64	1 356.81	365.89	5.08	1 471.00	1 403.64	54.95	3.31	114.20	47.55	59.25	- 7.40	48.12	115.55	6.46	2.89	
	Shellfish	6.12	1.39	408.01	10.19	1.70	1 633.49	466.89	4.07	10.74	84.56	59.10	80.49	55.02	4.82	6.89	71.45	60.51	
	Crustaceans	0.06	0.51	148.52	0.08	0.62	0.59	178.19	169.45	0.02	6.27	29.68	21.01	29.66	20.99	0.07	0.09	251.53	228.12
	Molluscs	6.07	0.89	259.49	10.12	1.09	1.04	314.38	297.44	4.05	10.78	54.89	38.09	50.83	34.03	7.38	10.64	58.64	48.73
	Shell molluscs	6.07	0.50	145.18	10.12	0.60	0.58	174.99	164.85	4.05	10.78	29.81	19.74	25.76	15.69	13.60	20.53	42.68	33.59
	Cephalopods		0.39	114.31		0.48	0.46	139.39	132.60			18.34	25.08	25.08	18.34				
	Fish	290.12	21.77	4 157.07	291.77	24.39	4 707.86	4 539.66	1.65	0.11	550.78	384.43	549.13	382.78	0.30	0.43		23.72	18.38
	Finfish	75.88	16.60	3 171.12	77.53	18.12	3 497.38	3 380.48	1.65	0.43	326.26	210.77	324.61	209.11	0.51	0.78	39.59	30.45	
Marine fish	5.84	12.20	2 330.05	5.95	13.37	13.04	2 580.70	2 496.18	0.11	0.37	250.65	167.17	250.54	167.06	0.04	0.07	113.04	96.91	
F&D fish	70.04	4.40	841.07	71.58	4.75	4.62	916.69	884.30	1.54	0.44	75.61	43.60	74.07	42.06	2.04	3.54	15.77	10.16	
Shellfish	214.24	5.16	985.95	214.24	6.27	6.06	1 210.48	1 159.18			224.52	173.67	224.52	173.67			15.42	12.61	
Crustaceans	0.04	2.11	403.72	0.04	2.56	2.48	494.86	475.25			91.14	71.70	91.14	71.70			372.89	350.75	
Molluscs	214.20	3.05	582.23	214.20	3.71	3.57	715.61	683.93			133.39	101.96	133.39	101.96			10.17	8.10	
Shell molluscs	214.20	2.72	519.55	214.20	3.31	3.19	638.46	610.21			118.91	90.89	118.91	90.89			9.23	7.33	
Cephalopods		0.33	62.68		0.40	0.39	77.15	73.72			14.47	11.07	14.47	11.07					
Fish	188.05	24.74	977.87	194.42	27.98	1 183.46	1 140.11	6.37	0.67	205.59	162.79	199.23	156.43	3.10	3.91		15.92	13.28	
Finfish	76.11	18.85	746.37	88.80	20.79	20.27	881.24	851.12	12.69	3.13	134.88	105.18	122.19	92.49	9.40	12.06	22.62	18.96	
Marine fish	8.45	15.78	625.05	7.73	17.51	17.10	742.60	718.20	- 0.71	- 1.75	117.55	93.52	118.27	94.23			71.69	64.57	
F&D fish	67.67	3.07	121.32	81.06	3.28	3.17	138.65	132.91	13.40	3.68	17.33	11.66	3.93	- 1.74	77.33	114.94	4.66	3.23	
Shellfish	111.94	5.89	231.50	105.62	7.19	6.94	302.22	289.00	- 6.32	- 1.16	70.71	57.62	77.03	63.94			10.29	8.66	
Crustaceans	5.37	3.00	118.60	4.59	3.67	3.55	155.18	148.72	- 0.79	- 3.11	36.58	30.18	37.37	30.97			50.84	45.92	
Molluscs	106.57	2.90	112.90	101.04	3.52	3.39	147.03	140.28	- 5.53	- 1.06	34.13	27.44	39.67	32.97			5.71	4.69	
Shell molluscs	106.57	1.98	77.63	101.04	2.38	2.29	99.70	95.18	- 5.53	- 1.06	22.07	17.60	27.61	23.13			3.84	3.10	
Cephalopods		0.91	35.27		1.15	1.10	47.33	45.09			12.06	9.84	12.06	9.84					
Fish	183.44	26.01	747.21	188.90	29.63	28.74	903.63	868.39	5.46	0.59	156.42	121.56	150.95	116.10	3.49	4.49		13.13	10.70
Finfish	73.31	18.28	524.46	85.19	20.06	19.51	611.81	589.48	11.88	3.05	87.35	65.28	75.46	53.40	13.60	18.20	16.99	13.58	
Marine fish	8.43	14.61	419.17	7.71	16.11	15.69	491.39	474.09	- 0.72	- 1.77	72.22	55.13	72.94	55.86			57.09	49.78	
F&D fish	64.88	3.67	105.29	77.48	3.95	3.82	120.42	115.38	12.60	3.61	15.13	10.14	2.53	- 2.46	83.31	124.25	4.28	2.95	
Shellfish	110.13	7.77	222.75	103.71	9.57	9.23	291.82	278.92	- 6.42	- 1.19	69.07	56.29	75.49	62.70			10.23	8.61	
Crustaceans	3.59	3.99	114.36	2.71	4.92	4.76	150.07	143.77	- 0.88	- 5.49	35.70	29.46	36.59	30.34			61.39	55.90	
Molluscs	106.54	3.78	108.38	101.00	4.65	4.47	141.75	135.15	- 5.54	- 1.06	33.37	26.82	38.90	32.36			5.60	4.59	
Shell molluscs	106.54	2.57	73.73	101.00	3.12	3.01	95.22	90.82	- 5.54	- 1.06	21.49	17.13	27.03	22.67			3.74	3.03	
Cephalopods		1.21	34.66		1.53	1.47	46.53	44.33			11.88	9.69	11.88	9.69					

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)			
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Standard ⁴	Conservative ⁵	Per capita demand (kg)	Total demand (000 tonnes)	Standard ⁴	Conservative ⁵	Extra food fish supply (000 tonnes)	Annual aquaculture growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
Pacific islands	Fish	4.62	21.14	230.66	5.52	23.55	23.10	279.83	271.72	0.90	3.64	49.18	41.23	48.27	40.33	1.84	2.19	58.27
	Finfish	2.80	20.31	221.90	3.60	22.65	22.22	269.44	261.64	0.80	5.17	47.53	39.90	46.73	39.10	1.69	2.01	72.44
	Marine fish	0.01	18.84	205.88	0.02	21.11	20.72	251.21	244.11	0.01	9.19	45.33	38.38	45.33	38.38	0.02	0.02	400.81
	R&D fish	2.79	1.48	16.03	3.58	1.54	1.50	18.22	17.53	0.79	5.15	2.20	1.51	1.40	0.72	36.17	52.52	12.33
	Shellfish	1.82	0.82	8.75	1.92	0.90	0.88	10.40	10.08	0.10	1.09	1.64	1.33	1.54	1.23	6.16	7.61	13.77
	Crustaceans	1.79	0.39	4.24	1.88	0.43	0.42	5.12	4.95	0.10	1.06	0.88	0.72	0.78	0.62	11.04	13.45	8.32
	Molluscs	0.03	0.43	4.51	0.03	0.47	0.46	5.28	5.12	0.00	2.82	0.77	0.61	0.76	0.61	0.59	0.73	92.54
	Shell molluscs	0.03	0.37	3.90	0.03	0.39	0.38	4.48	4.36	0.00	2.82	0.59	0.47	0.58	0.46	0.77	0.97	82.82
	Cephalopods	0.06	0.06	0.62	0.07	0.07	0.07	0.80	0.76	0.18	0.18	0.15	0.15	0.18	0.15			75.10
	Fish	1.05	0.07	2.20	1.05	0.07	0.07	2.63	2.54	0.43	0.43	0.43	0.34	0.43	0.34			7.13
Finfish	1.05	0.07	2.20	1.05	0.07	0.07	2.63	2.54	0.43	0.43	0.43	0.34	0.43	0.34			7.13	
Marine fish	1.05	0.07	2.20	1.05	0.07	0.07	2.63	2.54	0.43	0.43	0.43	0.34	0.43	0.34			7.13	
R&D fish																		
Shellfish																		
Crustaceans																		
Molluscs																		
Shell molluscs																		
Cephalopods																		
Albania	Fish	2.17	5.36	15.55	2.13	6.52	6.26	19.16	18.18	-0.04	-0.37	3.60	2.64	3.64	2.68			21.65
	Finfish	1.12	4.24	12.28	1.19	4.93	4.75	14.48	13.81	0.07	1.22	2.19	1.54	2.12	1.47	3.19	4.55	24.30
	Marine fish	0.68	3.40	9.86	0.79	3.99	3.85	11.71	11.19	0.11	3.02	1.85	1.34	1.74	1.23	5.93	8.20	29.90
	R&D fish	0.43	0.83	2.42	0.39	0.94	0.90	2.77	2.62	-0.04	-1.91	0.35	0.20	0.39	0.24			12.56
	Shellfish	1.05	1.13	3.27	0.94	1.59	1.50	4.68	4.37	-0.11	-2.19	1.41	1.10	1.52	1.21			18.55
	Crustaceans	0.01	0.35	1.03	0.01	0.48	0.46	1.42	1.33	0.39	0.39	0.30	0.30	0.39	0.30			118.17
	Molluscs	1.04	0.77	2.24	0.93	1.11	1.04	3.26	3.04	-0.11	-2.21	1.02	0.80	1.13	0.91			14.64
	Shell molluscs	1.04	0.37	1.06	0.93	0.50	0.47	1.47	1.38	-0.11	-2.21	0.41	0.32	0.52	0.43			6.90
	Cephalopods	0.41	0.41	1.18	0.61	0.57	0.57	1.79	1.66	0.61	0.61	0.61	0.48	0.61	0.48			5.43
	Fish	2.57	4.16	166.41	2.99	4.51	4.40	195.14	188.68	0.42	3.07	28.74	22.38	28.32	21.96	1.46	1.88	64.83
Finfish	2.55	3.99	159.55	2.95	4.30	4.21	186.25	180.17	0.40	2.97	26.70	20.71	26.30	20.31	1.50	1.94	62.92	
Marine fish	0.92	3.45	138.11	1.65	3.74	3.67	162.21	157.11	0.73	12.38	24.10	19.09	23.37	18.35	3.03	3.83	93.48	
R&D fish	1.62	0.54	21.44	1.29	0.55	0.54	24.04	23.06	-0.33	-4.44	2.60	1.63	2.93	1.96			21.03	
Shellfish	0.02	0.17	6.86	0.04	0.21	0.20	8.89	8.52	0.02	11.91	2.04	1.66	2.02	1.65	0.92	1.13	141.84	
Crustaceans	0.00	0.12	4.77	0.00	0.14	0.14	6.14	5.89	1.12	1.36	1.12	1.12	1.36	1.12			320.61	
Molluscs	0.02	0.05	2.09	0.04	0.06	0.06	2.76	2.63	0.02	12.33	0.67	0.55	0.65	0.53	2.80	3.45	96.33	
Shell molluscs	0.02	0.01	0.30	0.04	0.01	0.01	0.37	0.36	0.02	12.33	0.07	0.05	0.05	0.03	26.72	35.52	31.62	
Cephalopods	0.04	0.04	1.78	0.06	0.05	0.05	2.39	2.28	0.60	0.60	0.60	0.49	0.60	0.49			26.34	

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²				Projected situation in the early 2020s ³				Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)	
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Extra food fish supply (000 tonnes)	Annual aquaculture growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
		Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵		
Angola	Fish	0.33	17.07	434.00	0.36	18.22	17.97	541.12	529.04	1.90	107.11	95.26	107.08	95.23	0.03	0.03	218.74	211.38	
	Finfish	0.33	16.96	431.30	0.36	18.10	17.86	537.54	525.57	1.90	106.24	94.50	106.21	94.47	0.03	0.03	218.23	210.88	
	Marine fish		15.85	402.89		16.92	16.69	502.42	491.40		99.53	88.71	99.53	88.71					
	R&D fish	0.33	1.12	28.40	0.36	1.18	1.16	35.12	34.18	1.90	6.71	5.79	6.68	5.76	0.48	0.56	84.81	79.67	
	Shellfish		0.11	2.71		0.12	0.12	3.58	3.47		0.87	0.76	0.87	0.76					
	Crustaceans		0.01	0.36		0.02	0.02	0.47	0.46		0.11	0.10	0.11	0.10					
	Molluscs		0.09	2.35		0.10	0.10	3.11	3.01		0.76	0.66	0.76	0.66					
	Shell molluscs		0.02	0.60		0.03	0.03	0.77	0.75		0.17	0.15	0.17	0.15					
	Cephalopods		0.07	1.75		0.08	0.08	2.34	2.26		0.59	0.51	0.59	0.51					
	Fish	53.36	4.94	61.71	60.25	5.96	5.75												
Antigua and Barbuda	Finfish	36.45	3.37	40.74	39.94	3.93	3.81												
	Marine fish	35.71	3.30	39.97	39.20	3.86	3.74												
	R&D fish	0.74	0.07	0.77	0.75	0.07	0.07												
	Shellfish	16.91	1.56	20.97	20.31	2.02	1.94												
	Crustaceans	6.26	0.58	7.78	7.56	0.75	0.72												
	Molluscs	10.66	0.99	13.20	12.75	1.27	1.22												
	Shell molluscs	10.36	0.96	12.82	12.39	1.24	1.18												
	Cephalopods	0.30	0.03	0.38	0.36	0.04	0.03												
	Fish	4.48	6.87	299.76	6.23	7.82	7.62	357.64	344.88	1.76	6.84	5.788	45.28	56.12	43.53	3.03	3.88	69.33	61.86
	Finfish	4.43	4.25	185.38	6.19	4.63	4.54	211.71	205.34	1.76	6.90	26.33	20.06	24.58	18.31	6.67	8.75	47.34	40.77
Marine fish	4.04	4.04	176.31		4.41	4.32	201.58	195.57		6.90	25.27	19.36	25.27	19.36					
R&D fish	4.43	0.21	9.07	6.19	0.22	0.22	10.14	9.77	1.76	6.90	1.06	0.70	-0.69	-1.06	164.97	251.89	4.40	2.96	
Shellfish	0.05	2.62	114.38	0.05	3.19	3.08	145.92	139.54		31.54	25.22	31.54	25.22			266.17	250.18		
Crustaceans	0.31	13.63		0.38	0.37	17.34	16.68		3.71	3.07	27.83	22.16	27.83	22.16			257.13	241.24	
Molluscs	0.05	2.31	100.75	0.05	2.81	2.71	128.59	122.86		9.18	7.23	9.18	7.23			186.30	173.01		
Shell molluscs	0.05	0.84	36.57	0.05	1.00	0.97	45.76	43.78		18.65	14.93	18.65	14.93						
Cephalopods	1.47	64.18		1.81	1.75	82.83	79.07		18.65	14.93	18.65	14.93							
Fish	16.00	4.36	13.18	25.39	4.80	4.64	14.57	13.92	9.39	9.68	1.40	0.76	-8.00	-8.63	673.09	1 239.72	1.69	0.93	
Finfish	15.96	4.34	13.10	25.34	4.77	4.61	14.48	13.84	9.38	9.68	1.37	0.74	-8.00	-8.64	682.34	1 264.76	1.67	0.91	
Marine fish	1.07	3.24		1.22	1.18	3.70	3.56		0.45	0.32	0.45	0.32							
R&D fish	15.96	3.26	9.86	25.34	3.55	3.42	10.78	10.28	9.38	9.68	0.92	0.42	-8.46	-8.96	1 019.38	2 214.31	1.13	0.53	
Shellfish	0.04	0.02	0.07	0.05	0.03	0.03	0.09	0.09	0.01	6.41	0.02	0.02	0.01	0.00	61.84	80.29	9.71	7.77	
Crustaceans	0.04	0.02	0.06	0.05	0.02	0.02	0.07	0.07	0.01	6.41	0.02	0.01	0.00	0.00	76.10	97.47	8.14	6.56	
Molluscs	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00					
Shell molluscs	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00					
Cephalopods	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00					

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)			
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
		80.54	26.18	631.88	90.71	29.85	768.59	10.17	2.41	136.72	106.68	126.55	96.51	7.44	9.53	21.95	18.38	
Australia	Finfish	62.27	17.74	428.29	75.89	19.47	501.39	13.62	4.03	73.10	54.80	59.48	41.18	18.63	24.85	16.80	13.46	
	Marine fish	8.43	13.61	328.65	7.71	15.04	387.29	-0.72	-1.77	58.64	45.07	59.36	45.79			51.40	44.71	
	F&D fish	53.84	4.13	99.64	68.18	4.43	114.10	14.34	4.84	14.46	9.73	0.12	-4.61	99.18	147.43	4.87	3.38	
	Shellfish	18.27	8.43	203.58	14.82	10.38	267.20	-3.45	-4.10	63.62	51.88	67.07	55.33			34.99	30.88	
	Crustaceans	3.59	4.29	103.58	2.71	5.29	136.27	-0.88	-5.49	32.69	27.01	33.58	27.89			58.84	53.52	
	Molluscs	14.68	4.14	100.00	12.11	5.08	130.93	-2.57	-3.77	30.93	24.87	33.49	27.44			25.45	21.93	
	Shell molluscs	14.68	2.93	70.71	12.11	3.55	91.42	-2.57	-3.77	20.71	16.52	23.28	19.09			19.24	16.28	
	Cephalopods		1.21	29.29		1.53	39.51			10.21	8.35	10.21	8.35					
	Fish	3.93	13.90	118.91	5.32	15.10	148.84	1.38	6.21	11.97	8.59	10.58	7.20	11.55	16.10	32.23	26.06	
	Finfish	3.93	12.17	104.12	5.32	13.07	113.30	1.38	6.21	9.18	6.33	7.80	4.95	15.06	21.84	27.23	21.14	
Marine fish	8.10	69.29		8.72	8.59	75.59			6.30	4.51	6.30	4.51						
F&D fish	3.93	4.07	34.83	5.32	4.35	37.71	1.38	6.21	2.88	1.82	1.50	0.44	48.03	76.00	11.61	7.90		
Shellfish	1.73	14.79		2.03	1.98	17.58			2.79	2.26	2.79	2.26						
Crustaceans	1.04	8.92		1.23	1.20	10.63			1.71	1.41	1.71	1.41						
Molluscs	0.69	5.86		0.80	0.78	6.94			1.08	0.85	1.08	0.85						
Shell molluscs	0.51	4.32		0.59	0.57	5.10			0.77	0.61	0.77	0.61						
Cephalopods	0.18	1.54		0.21	0.21	1.84			0.30	0.24	0.30	0.24						
Fish	0.34	2.11	20.74	0.34	2.25	23.09	0.01	0.32	2.36	1.86	2.35	1.85	0.23	0.29	51.65	45.57		
Finfish	0.34	2.07	20.35	0.34	2.20	22.63	0.01	0.32	2.29	1.80	2.28	1.79	0.24	0.30	50.83	44.76		
Marine fish	0.00	1.92	18.79	0.01	2.04	20.93	0.01	16.34	2.14	1.70	2.14	1.70	0.26	0.32	238.35	223.13		
F&D fish	0.33	0.16	1.56	0.33	0.17	1.70			0.14	0.10	0.14	0.10			7.42	5.28		
Shellfish	0.04	0.39		0.04	0.04	0.46			0.07	0.06	0.07	0.06						
Crustaceans	0.04	0.37		0.04	0.04	0.44			0.07	0.06	0.07	0.06						
Molluscs	0.00	0.01		0.00	0.00	0.02			0.00	0.00	0.00	0.00						
Shell molluscs	0.00	0.01		0.00	0.00	0.02			0.00	0.00	0.00	0.00						
Cephalopods	0.00	0.00		0.00	0.00	0.00			0.00	0.00	0.00	0.00						
Fish	30.76	12.01		34.36	33.82	14.16	13.78	1.79	2.14	1.79	2.14	1.79						
Finfish	18.41	7.19		19.93	19.66	8.21	8.01	1.02	0.83	1.02	0.83	1.02						
Marine fish	17.59	6.87		19.07	18.83	7.86	7.67	0.99	0.81	0.99	0.81	0.99						
F&D fish	0.83	0.32		0.86	0.84	0.35	0.34	0.03	0.02	0.03	0.02	0.03						
Shellfish	12.35	4.82		14.43	14.16	5.95	5.77	1.12	0.95	1.12	0.95	1.12						
Crustaceans	9.62	3.76		11.25	11.05	4.63	4.50	0.88	0.75	0.88	0.75	0.88						
Molluscs	2.73	1.07		3.18	3.11	1.31	1.27	0.25	0.20	0.25	0.20	0.25						
Shell molluscs	2.55	1.00		2.98	2.91	1.23	1.19	0.23	0.19	0.23	0.19	0.23						
Cephalopods	0.17	0.07		0.21	0.20	0.08	0.08	0.02	0.01	0.02	0.01	0.02						

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		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Annual food fish supply (000 tonnes)	Annual aquaculture growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
Bahrain	Fish	0.01	9.26	12.84	0.01	9.93	14.85	0.00	8.51	2.01	1.70	2.01	1.70	0.14	0.17	223.87	213.10
	Finfish	0.01	7.83	10.86	0.01	8.32	12.44	0.00	8.51	1.58	1.33	1.58	1.32	0.18	0.22	208.57	198.07
	Marine fish	0.01	7.45	10.34	0.01	7.93	11.85	0.00	8.51	1.51	1.28	1.51	1.27	0.19	0.22	206.01	195.80
	F&D fish	0.38	0.38	0.52	0.39	0.39	0.59	0.57	0.06	0.05	0.05	0.06	0.05				
	Shellfish	1.42	1.98	1.98	1.58	2.41	2.35	0.37	0.43	0.37	0.43	0.37	0.43				
	Crustaceans	1.22	1.70	1.70	1.38	2.07	2.02	0.37	0.32	0.37	0.32	0.37	0.32				
	Molluscs	0.20	0.28	0.28	0.23	0.22	0.34	0.33	0.06	0.05	0.05	0.06	0.05				
	Shell molluscs	0.09	0.13	0.13	0.10	0.10	0.15	0.15	0.03	0.02	0.02	0.03	0.02				
	Cephalopods	0.11	0.15	0.15	0.13	0.12	0.19	0.18	0.04	0.04	0.03	0.04	0.03				
	Fish	2 295.44	21.15	3 425.25	3 198.21	28.63	4 906.41	902.77	6.86	1 481.15	877.20	578.38	-25.56	60.95	102.91	10.47	6.69
Finfish	2 139.80	20.07	3 250.30	2 999.24	26.71	4 577.68	4 016.03	859.43	6.99	1 327.38	767.84	467.95	64.75	111.93	10.13	6.32	
Marine fish	94.22	2.06	332.87	126.46	2.48	425.83	378.01	32.24	6.06	92.95	45.35	60.71	34.69	71.10	14.71	8.18	
F&D fish	2 045.58	18.01	2 917.42	2 872.77	24.23	4 151.85	3 638.02	827.19	7.03	1 234.43	722.49	407.24	67.01	114.49	9.90	6.24	
Shellfish	155.64	1.08	174.96	198.98	1.92	328.73	284.20	43.34	5.04	153.77	109.36	110.43	28.18	39.63	14.73	11.23	
Crustaceans	155.64	1.08	174.71	198.98	1.92	328.35	283.87	43.34	5.04	153.64	109.27	110.30	28.21	39.66	14.72	11.22	
Molluscs	0.00	0.24	0.24	0.00	0.00	0.37	0.33	0.00	0.00	0.13	0.09	0.13	0.08	0.08			
Shell molluscs	0.00	0.22	0.22	0.00	0.00	0.33	0.29	0.00	0.00	0.11	0.08	0.11	0.08	0.08			
Cephalopods	0.00	0.03	0.03	0.00	0.00	0.05	0.04	0.00	0.00	0.02	0.01	0.02	0.01	0.01			
Fish	0.02	40.42	11.50	0.04	45.73	13.17	12.76	0.02	11.81	1.67	1.26	1.65	1.24	1.11	1.48	132.68	120.00
Finfish	0.02	37.68	10.72	0.04	42.29	12.18	11.81	0.02	12.00	1.46	1.09	1.44	1.07	1.27	1.71	127.52	114.74
Marine fish	36.93	10.51	10.51	41.51	40.67	11.95	11.59	0.02	12.00	1.45	1.08	1.45	1.08	1.3994	443.74	9.09	3.22
F&D fish	0.02	0.75	0.21	0.04	0.79	0.23	0.22	0.02	12.00	0.01	0.00	-0.01	0.01	139.94	443.74	9.09	3.22
Shellfish	0.00	2.75	0.78	0.00	3.44	3.33	0.99	0.95	0.21	0.21	0.17	0.21	0.17	0.17	234.80	220.39	
Crustaceans	0.00	1.85	0.53	0.00	2.32	0.67	0.64	0.64	0.14	0.11	0.11	0.14	0.11	0.11	209.40	196.92	
Molluscs	0.90	0.26	0.26	1.13	1.08	0.32	0.31	0.07	0.07	0.05	0.05	0.07	0.05	0.05			
Shell molluscs	0.57	0.16	0.16	0.72	0.69	0.21	0.20	0.20	0.04	0.03	0.03	0.04	0.03	0.03			
Cephalopods	0.33	0.09	0.09	0.41	0.39	0.12	0.11	0.03	0.03	0.02	0.02	0.03	0.02	0.02			
Fish	10.77	17.30	164.15	10.05	18.58	173.68	169.08	-0.73	-1.39	9.53	5.03	10.26	5.75	13.52	7.96		
Finfish	10.77	16.91	160.45	10.05	18.13	173.68	169.46	-0.73	-1.39	9.01	4.65	9.74	5.38	12.93	7.44		
Marine fish	12.24	116.13	116.13	12.96	122.97	119.91	119.91	6.84	6.84	3.84	3.84	6.84	3.84				
F&D fish	10.77	4.67	44.31	10.05	4.97	46.49	45.10	-0.73	-1.39	2.17	0.81	2.90	1.54				
Shellfish	0.39	3.71	3.71	0.45	0.44	4.23	4.08	0.38	0.38	0.38	0.38	0.52	0.38				
Crustaceans	0.18	1.72	1.72	0.21	0.20	1.94	1.88	0.17	0.17	0.17	0.17	0.23	0.17				
Molluscs	0.21	1.99	1.99	0.24	0.24	2.28	2.20	0.21	0.21	0.21	0.21	0.29	0.21				
Shell molluscs	0.01	0.09	0.09	0.01	0.01	0.10	0.10	0.01	0.01	0.01	0.01	0.01	0.01				
Cephalopods	0.20	1.90	1.90	0.23	0.23	2.18	2.10	0.28	0.28	0.28	0.20	0.28	0.20				

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth (000 tonnes)	Annual aquaculture growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁵	Conservative ⁵	Standard ⁶	Conservative ⁶	Standard ⁴	Conservative ⁴
Bolivia (Plurinational State of)	Fish	1.47	2.25	24.28	2.02	2.46	28.67	0.55	6.62	4.39	3.35	3.83	2.80	12.63	16.53	31.91	26.87	
	Finfish	1.47	2.23	24.13	2.02	2.45	28.46	0.55	6.62	4.33	3.31	3.78	2.76	12.79	16.75	31.67	26.65	
	Marine fish		1.43	15.46	2.02	1.58	18.41		6.62	2.95	2.34	2.95	2.34					
	F&D fish	1.47	0.80	8.67	2.02	0.86	10.05	0.55	6.62	1.38	0.97	0.83	0.42	40.09	57.15	14.21	10.69	
	Shellfish		0.01	0.16	0.02	0.02	0.21	0.05	0.04	0.04	0.05	0.05	0.04					
	Crustaceans		0.00	0.05	0.01	0.01	0.07	0.01	0.02	0.02	0.01	0.02	0.01					
	Molluscs		0.01	0.11	0.01	0.01	0.14	0.03	0.03	0.03	0.03	0.03	0.03					
	Shell molluscs		0.01	0.09	0.01	0.01	0.11	0.01	0.11	0.03	0.02	0.02	0.03	0.02				
	Cephalopods		0.00	0.02	0.00	0.00	0.03	0.00	0.01	0.01	0.01	0.01	0.01	0.01				
	Fish	3.32	5.97	22.73	3.32	7.09	26.61	3.88	5.31	189.00	118.96	13.14	-56.90	93.05	147.84	5.67	12.00	
Finfish	3.27	5.39	20.51	3.27	6.27	23.51	3.00	6.02	23.51	22.37	1.87	3.00	1.87	13.90	9.45			
Marine fish	0.13	3.36	12.79	0.13	3.97	14.88	0.13	3.82	14.88	14.21	1.42	2.08	1.42	76.64	64.51			
F&D fish	3.14	2.03	7.72	3.14	2.30	8.64	0.92	6.64	8.16	8.16	0.45	0.92	0.45	5.25	2.69			
Shellfish	0.05	0.58	2.22	0.05	0.83	3.10	0.88	3.10	2.88	2.88	0.66	0.88	0.66	81.18	71.84			
Crustaceans		0.02	0.07	0.03	0.03	0.10	0.03	0.10	0.09	0.09	0.02	0.03	0.02					
Molluscs	0.05	0.56	2.15	0.05	0.80	3.00	0.75	3.00	2.79	2.79	0.64	0.85	0.64	80.16	70.87			
Shell molluscs	0.05	0.45	1.72	0.05	0.63	2.36	0.59	2.36	2.19	2.19	0.47	0.64	0.47	70.57	61.58			
Cephalopods		0.11	0.43	0.17	0.17	0.64	0.64	0.64	0.60	0.60	0.21	0.21	0.17					
Fish	2.78	6.34	22.73	3.10	2.99	7.67	1.33	5.31	189.00	118.96	13.14	-56.90	93.05	147.84	5.67	12.00		
Finfish	2.70	6.17	22.73	3.00	2.90	7.44	1.27	2.90	7.44	7.10	0.94	1.27	0.94	13.90	9.45			
Marine fish	2.53	5.77	22.73	2.81	2.72	6.98	0.66	6.98	6.66	6.66	1.21	1.21	0.90	76.64	64.51			
F&D fish	0.18	0.40	8.67	0.19	0.18	0.46	0.44	0.06	0.04	0.04	0.06	0.06	0.04	5.25	2.69			
Shellfish	0.07	0.17	2.22	0.09	0.09	0.23	0.22	0.06	0.05	0.05	0.06	0.06	0.05	81.18	71.84			
Crustaceans	0.07	0.16	2.22	0.09	0.09	0.22	0.21	0.06	0.05	0.05	0.06	0.06	0.05					
Molluscs	0.00	0.01	0.16	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00					
Shell molluscs	0.00	0.01	0.16	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00					
Cephalopods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
Fish	595.17	9.55	1 993.28	771.03	10.07	9.85	2 182.28	175.86	5.31	189.00	118.96	13.14	-56.90	93.05	147.84	5.67	12.00	
Finfish	502.38	8.81	1 839.36	670.81	9.25	9.05	2 004.30	168.44	5.95	164.94	100.79	-3.49	-67.65	102.12	167.12	5.84	3.72	
Marine fish	4.90	1 022.05	15.46	5.14	5.04	1 114.32	1 079.83	92.26	58.37	58.37	92.26	58.37						
F&D fish	502.38	3.92	817.30	670.81	4.11	4.01	889.98	168.44	5.95	72.68	42.42	-95.75	-126.02	231.74	397.07	2.74	1.63	
Shellfish	92.79	0.74	153.93	100.22	0.82	0.80	177.98	7.42	1.55	24.06	18.17	16.63	10.74	30.86	40.87	4.72	3.64	
Crustaceans	67.12	0.50	103.63	65.78	0.56	0.54	120.33	-1.34	-0.40	16.70	12.85	18.04	14.19					
Molluscs	25.67	0.24	50.30	34.43	0.27	0.26	57.65	8.76	6.05	5.31	5.31	-1.41	-3.45	119.14	164.92	5.17	3.83	
Shell molluscs	25.67	0.20	40.78	34.43	0.22	0.21	46.63	8.76	6.05	5.85	4.20	-2.92	-4.56	149.88	208.48	4.19	3.08	
Cephalopods		0.05	9.51		0.05	0.05	11.02	1.51	1.51	1.11	1.11	1.51	1.11					

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Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Annual growth rate (%)	Extra food fish supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
		123.36	34.13	535.91	184.24	40.18	629.68	60.88	8.35	144.29	94.24	83.41	33.36	42.19	64.60	16.76	12.02
Cabo Verde	Fish	11.82	6.19		13.98	13.48	7.78	7.40	1.58	1.21	1.21	1.58	1.21	1.58	1.21		
	Finfish	10.61	5.56		12.41	12.00	6.90	6.59	1.34	1.03	1.03	1.34	1.03	1.34	1.03		
	Marine fish	10.57	5.54		12.36	11.95	6.87	6.56	1.34	1.03	1.03	1.34	1.03	1.34	1.03		
	F&D fish	0.04	0.02		0.05	0.04	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Shellfish	1.21	0.63		1.48	1.48	0.88	0.81	0.24	0.18	0.24	0.18	0.24	0.18	0.24		
	Crustaceans	0.33	0.18		0.44	0.41	0.24	0.23	0.07	0.05	0.07	0.05	0.07	0.05	0.07		
	Molluscs	0.87	0.46		1.14	1.07	0.63	0.59	0.18	0.13	0.18	0.13	0.18	0.13	0.18		
	Shell molluscs	0.62	0.32		0.79	0.74	0.44	0.41	0.12	0.08	0.12	0.08	0.12	0.08	0.12		
	Cephalopods	0.25	0.13		0.35	0.32	0.19	0.18	0.06	0.04	0.06	0.04	0.06	0.04	0.06		
	Fish	128.15	41.58	652.90	191.32	49.83	843.41	781.55	63.17	8.35	190.51	129.24	127.34	66.07	33.16	48.88	19.98
Cambodia	Finfish	123.94	39.73	623.89	185.09	47.00	44.26	795.53	737.82	61.15	8.35	171.64	114.48	110.49	53.34	35.63	53.41
	Marine fish	0.58	5.60	87.97	0.85	6.81	115.32	108.13	0.27	7.80	27.35	20.24	27.08	19.97	0.97	1.31	116.84
	F&D fish	123.36	34.13	535.91	184.24	40.18	629.68	629.68	60.88	8.35	144.29	94.24	83.41	33.36	42.19	64.60	16.76
	Shellfish	4.20	1.85	29.01	6.22	2.83	2.62	47.88	43.73	2.02	8.17	18.88	14.75	16.85	12.73	10.71	13.71
	Crustaceans	0.37	0.89	13.91	0.49	1.34	1.25	22.67	20.84	0.12	5.94	8.76	6.94	8.64	6.82	1.39	1.76
	Molluscs	3.84	0.96	15.10	5.74	1.49	1.37	25.21	22.90	1.90	8.38	10.11	7.81	8.21	5.91	18.79	24.33
	Shell molluscs	3.84	0.51	8.05	5.74	0.77	0.71	13.01	11.85	1.90	8.38	4.96	3.80	3.06	1.90	38.32	49.97
	Cephalopods	0.45	7.05		0.72	0.66	12.20	11.05	0.36	6.45	101.43	82.77	101.07	82.41	0.36	0.44	152.78
	Fish	0.99	15.39	363.66	1.36	17.46	465.09	446.24	0.36	6.45	95.22	77.67	94.86	77.31	0.38	0.47	149.63
	Cameroon	Finfish	0.99	14.74	348.34	1.36	16.65	16.14	443.57	425.83	0.36	6.45	95.22	77.67	94.86	77.31	0.38
Marine fish		10.81	255.55		12.27	11.92	326.84	314.49	0.36	6.45	23.93	18.60	23.57	18.24	1.52	1.96	90.54
F&D fish		0.99	3.93	92.79	1.36	4.38	4.22	116.72	111.34	0.36	6.45	23.93	18.60	23.57	18.24	1.52	1.96
Shellfish		0.65	15.31		0.81	0.77	21.52	20.40	0.36	6.45	23.93	18.60	23.57	18.24	1.52	1.96	
Crustaceans		0.64	15.24		0.80	0.77	21.42	20.31	0.36	6.45	23.93	18.60	23.57	18.24	1.52	1.96	
Molluscs		0.00	0.08		0.00	0.00	0.11	0.10	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Shell molluscs		0.00	0.07		0.00	0.00	0.09	0.09	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Cephalopods		0.00	0.01		0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fish		154.12	22.49	812.16	143.65	25.15	949.49	910.34	-10.47	-1.40	137.34	98.58	147.81	109.06	109.06	13.59	10.40
Canada		Finfish	111.11	14.54	525.18	95.28	15.65	15.17	590.85	567.39	-15.83	-3.03	65.67	42.47	81.51	58.30	9.73
	Marine fish	9.47	341.92		10.22	9.92	385.81	371.14	43.88	29.39	43.88	29.39	43.88	29.39	43.88	29.39	43.88
	F&D fish	111.11	5.07	183.26	95.28	5.43	205.04	196.24	-15.83	-3.03	65.67	42.47	81.51	58.30	9.73	6.69	
	Shellfish	43.01	7.95	286.98	48.37	9.17	358.64	342.95	5.36	2.38	71.66	56.12	66.30	50.76	7.48	9.55	21.67
	Crustaceans	4.48	161.83		5.38	5.20	203.05	194.41	41.22	32.65	41.22	32.65	41.22	32.65	41.22	32.65	41.22
	Molluscs	43.01	3.47	125.15	48.37	4.12	3.97	155.59	148.55	5.36	2.38	30.45	23.46	25.08	18.10	17.61	22.85
	Shell molluscs	43.01	3.40	122.95	48.37	4.05	3.90	152.91	146.00	5.36	2.38	29.96	23.11	24.60	17.75	17.89	23.20
	Cephalopods	0.06	2.20		0.07	0.07	2.68	2.55	0.48	0.35	0.48	0.35	0.48	0.35	0.48	0.35	0.48

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Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s			Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)			
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁵	Conservative ⁵	Standard ⁶	Conservative ⁶	
Central African Republic	Fish	0.14	8.74	43.27	0.14	9.57	54.61	51.75	11.34	8.50		11.34	8.50	141.43	128.07		
	Finfish	0.14	8.74	43.27	0.14	9.57	54.61	51.75	11.34	8.50		11.34	8.50	141.43	128.07		
	Marine fish		1.28	6.33		1.44	8.13	7.77	1.80	1.44		1.80	1.44				
	F&D fish	0.14	7.46	36.93	0.14	8.13	46.48	43.97	9.55	7.06		9.55	7.06	133.35	119.90		
	Shellfish																
	Crustaceans																
	Molluscs																
	Shell molluscs																
	Cephalopods																
		Fish	0.00	4.62	65.92	0.00	4.95	82.67	80.09	16.75	14.20		16.75	14.20	461.56	443.33	
Finfish	0.00	4.62	65.91	0.00	4.95	82.66	80.08	16.75	14.20		16.75	14.20	461.55	443.32			
Marine fish		0.06	0.91		0.07	1.15	1.12	0.24	0.21		0.24	0.21					
F&D fish	0.00	4.56	65.00	0.00	4.89	81.51	78.96	16.51	13.99		16.51	13.99	459.91	441.67			
Shellfish		0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00					
Crustaceans		0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00					
Molluscs																	
Shell molluscs																	
Cephalopods																	
Chad	Fish	1 329.63	12.52	225.91	1 790.08	14.39	272.32	262.21	460.45	6.13	46.42	36.43	- 414.03	992.00	1 264.05	0.69	0.54
	Finfish	1 048.83	7.67	138.41	1 466.26	8.41	159.11	154.03	417.43	6.93	20.71	15.71	- 396.72	2 015.68	2 657.84	0.39	0.30
	Marine fish	0.18	7.05	127.18	0.18	7.74	146.50	141.91	19.32	14.80		19.32	14.80				
	F&D fish	1 048.65	0.62	11.22	1 466.08	0.67	12.61	12.13	417.43	6.93	1.39	0.91	- 416.04	30 045.29	45 947.21	0.03	0.02
	Shellfish	280.80	4.85	87.50	323.81	5.98	113.21	108.17	43.02	2.89	25.71	20.72	- 17.31	167.34	207.61	1.77	1.43
	Crustaceans		2.04	36.83		2.51	47.57	45.66		10.74		8.85					
	Molluscs	280.80	2.81	50.67	323.81	3.47	65.63	62.51	43.02	2.89	14.96	11.87	- 28.06	287.50	362.42	1.04	0.83
	Shell molluscs	280.80	1.06	19.17	323.81	1.29	24.32	23.21	43.02	2.89	5.15	4.04	- 37.87	835.31	1 064.01	0.36	0.29
	Cephalopods		1.75	31.50		2.18	21.0	39.31		9.81		7.83					
		Fish	47 856.28	37.78	52 111.72	58 586.84	54.49	76 536.14	67 829.42	10 730.56	4.13	24 424.42	15 746.29	13 693.86	5 015.72	43.93	68.15
Finfish	29 325.34	23.49	32 395.77	36 363.56	29.90	41 995.69	37 545.62	7 038.22	4.40	9 599.92	5 167.62	2 561.70	- 1 870.60	73.32	136.20	5.83	3.30
Marine fish	1 330.56	5.30	7 302.90	1 757.41	6.45	9 066.95	8 189.86	426.85	5.72	1 764.05	890.96	1 337.21	464.12	24.20	47.91	18.39	10.80
F&D fish	27 994.78	18.19	25 092.87	34 606.16	23.44	32 928.73	29 355.76	6 611.38	4.33	7 835.57	4 276.66	1 224.49	- 2 334.71	84.37	154.59	5.06	2.88
Shellfish	18 530.94	14.30	19 715.95	22 232.28	24.59	34 540.46	30 283.80	3 693.34	3.70	14 824.51	10 578.66	11 132.16	6 886.32	24.91	34.90	12.47	9.45
Crustaceans	4 281.23	4.12	5 686.56	5 294.47	7.02	9 864.64	8 691.83	1 013.23	4.34	4 178.09	3 008.39	3 164.85	1 995.16	24.25	33.68	14.59	11.23
Molluscs	14 249.71	10.17	14 029.40	16 928.82	17.57	24 675.82	21 591.97	2 679.11	3.51	10 646.42	7 570.27	7 967.32	4 891.16	25.16	35.39	11.81	8.90
Shell molluscs	14 249.71	9.46	13 048.33	16 928.82	16.31	22 912.95	20 061.57	2 679.11	3.51	9 864.62	7 020.40	7 185.52	4 341.29	27.16	38.16	11.09	8.34
Cephalopods		0.71	981.07		1.26	1 10	1 762.87	1 530.40		781.80	549.87	781.80	549.87				

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²				Projected situation in the early 2020s ³				Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Annual growth rate (%)	Extra food fish supply (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand minus extra supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
		0.16	26.79	125.38	0.24	28.30	150.88	0.09	9.11	0.09	25.50	22.34	25.41	22.25	0.34	0.39	176.85	169.67		
Congo	Finfish	0.16	26.79	125.38	0.24	28.30	150.88	0.09	9.11	25.50	22.34	25.41	22.25	0.34	0.39	176.85	169.67			
	Marine fish	0.16	26.53	124.20	0.24	28.02	149.39	0.09	9.11	25.19	22.07	25.10	21.99	0.34	0.39	176.18	169.03			
	R&D fish	0.16	8.28	38.76	0.24	8.70	46.38	0.09	9.11	7.62	6.51	7.54	6.43	1.13	1.32	118.08	111.48			
	Shellfish	0.25	1.18		0.28	0.27	1.45		0.31	0.27	0.31	0.27	0.31	0.27						
	Crustaceans	0.22	1.01		0.24	0.24	1.28		0.26	0.23	0.26	0.23	0.26	0.23						
	Molluscs	0.04	0.17		0.04	0.04	0.21		0.04	0.04	0.04	0.04	0.04	0.04						
	Shell molluscs	0.02	0.09		0.02	0.02	0.11		0.02	0.02	0.02	0.02	0.02	0.02						
	Cephalopods	0.02	0.08		0.02	0.02	0.11		0.02	0.02	0.02	0.02	0.02	0.02						
	Fish	2.82	4.95	388.85	2.69	5.60	512.40	-0.13	-0.93	123.55	100.88	123.68	101.01	8.36	6.76	8.28	6.01			
	Finfish	2.82	4.95	388.59	2.69	5.59	512.02	-0.13	-0.93	123.43	100.78	123.56	100.91	8.79	7.13	7.00	4.82			
Marine fish	1.74	136.33		1.98	1.92	181.68		1.92	181.68	174.59		45.35	38.33							
R&D fish	2.82	3.21	252.26	2.69	3.61	330.34	-0.13	-0.93	78.08	62.46	78.21	62.59	5.42	4.59	25.96	20.72				
Shellfish	0.00	0.26		0.00	0.00	0.38		0.00	0.12	0.10	0.10	0.12	0.10							
Crustaceans	0.00	0.20		0.00	0.00	0.29		0.00	0.09	0.08	0.09	0.08	0.09							
Molluscs	0.00	0.06		0.00	0.00	0.09		0.00	0.03	0.02	0.03	0.02	0.03							
Shell molluscs	0.00	0.06		0.00	0.00	0.08		0.00	0.02	0.02	0.02	0.02	0.02							
Cephalopods	0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00							
Fish	27.33	13.35	64.52	28.24	15.37	77.88	0.90	0.65	13.36	9.27	12.46	8.36	6.76	9.75	8.28	6.01				
Finfish	24.63	11.72	56.64	25.75	13.14	66.55	1.12	0.89	9.91	6.54	8.79	5.42	11.30	17.13	7.00	4.82				
Marine fish	2.41	5.54	26.77	4.58	6.32	31.99	2.17	13.73	5.22	3.76	3.05	1.59	41.59	57.72	25.96	20.72				
R&D fish	22.22	6.18	29.87	21.17	6.82	34.55	-1.05	-0.97	4.69	2.77	5.74	3.83	3.83		3.90	2.38				
Shellfish	2.71	1.63	7.88	2.49	2.24	11.33	-0.22	-1.65	3.45	2.73	3.66	2.94	2.94		17.85	14.95				
Crustaceans	2.68	0.92	4.46	2.44	1.28	6.47	-0.24	-1.83	2.01	1.63	2.25	1.87	1.87		11.86	9.98				
Molluscs	0.03	0.71	3.42	0.05	0.96	4.86	0.02	11.46	1.43	1.09	1.41	1.08	1.37	1.79	121.68	110.33				
Shell molluscs	0.03	0.41	1.97	0.05	0.54	2.75	0.02	11.46	0.78	0.60	0.76	0.58	2.51	3.29	97.04	87.08				
Cephalopods	0.30	1.46		0.42	0.39	2.11		0.65	0.50	0.60	0.65	0.50								
Fish	12.47	19.07	80.70	13.43	22.22	92.31	0.96	1.50	11.60	8.01	10.64	7.05	8.28	11.99	14.06	10.43				
Finfish	11.40	15.90	67.32	12.36	17.99	74.73	0.96	1.63	7.41	4.76	6.45	3.80	12.97	20.19	10.53	7.22				
Marine fish	7.65	14.51	61.40	8.61	16.45	68.33	0.96	2.40	6.93	4.55	5.97	3.59	13.86	21.10	13.77	9.79				
R&D fish	3.76	1.40	5.92	3.76	1.54	6.12		0.48	0.20	0.48	0.20	0.48	0.20		2.42	1.07				
Shellfish	1.07	3.16	13.39	1.07	4.23	17.58		4.20	3.25	4.20	3.25	4.20	3.25		37.63	32.30				
Crustaceans	0.52	2.20		0.66	0.64	2.75		0.55	0.42	0.55	0.42	0.55	0.42							
Molluscs	1.07	2.64	11.19	1.07	3.57	14.83		3.64	2.83	3.64	2.83	3.64	2.83		34.60	29.60				
Shell molluscs	1.07	0.76	3.22	1.07	0.98	4.06		0.84	0.62	0.84	0.62	0.84	0.62		12.31	9.66				
Cephalopods	1.88	7.97		2.59	2.47	10.77		2.80	2.21	2.80	2.21	2.80	2.21							

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²				Projected situation in the early 2020s ³				Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)			
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Annual growth rate (%)	Extra food fish supply (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand minus extra supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
		0.01	20.46	1.49	0.01	23.32	22.74	1.74	1.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.82	100.64
Djibouti	Fish	3.79	3.39	3.39	4.48	4.24	4.27	3.99	0.88	0.61	0.61	0.88	0.61	0.88	0.61	0.88	0.61			
	Finfish	3.72	3.32	3.32	4.38	4.14	4.17	3.90	0.85	0.58	0.58	0.85	0.58	0.85	0.58	0.85	0.58			
	Marine fish	3.71	3.31	3.31	4.37	4.13	4.16	3.89	0.85	0.58	0.58	0.85	0.58	0.85	0.58	0.85	0.58			
	F&D fish	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
	Shellfish	0.07	0.06	0.06	0.10	0.09	0.10	0.09	0.04	0.03	0.03	0.04	0.03	0.04	0.03	0.04	0.03			
	Crustaceans	0.04	0.03	0.03	0.06	0.05	0.05	0.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02			
	Molluscs	0.03	0.03	0.03	0.05	0.04	0.04	0.04	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.01			
	Shell molluscs	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
	Cephalopods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
	Fish	0.01	20.46	1.49	0.01	23.32	22.74	1.74	1.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.82	100.64
Dominica	Finfish	0.01	20.17	1.47	0.01	22.95	22.38	1.71	1.66	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	117.30	106.71
	Marine fish	20.04	1.46	1.46	22.82	22.25	1.70	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.61	1.17
	F&D fish	0.01	0.12	0.01	0.13	0.13	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	50.13	44.91
	Shellfish	0.00	0.29	0.02	0.36	0.36	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	48.83	43.75
	Crustaceans	0.00	0.28	0.02	0.36	0.34	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		
	Molluscs	0.01	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Shell molluscs																			
	Cephalopods	0.01	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Fish	2.21	8.18	86.67	3.36	9.85	9.51	109.91	104.95	1.15	8.72	23.24	18.33	16.33	17.15	4.94	6.26	6.26	63.01	56.17
	Dominican Republic	Finfish	1.96	7.19	76.08	8.20	8.46	8.20	94.47	90.45	1.15	9.66	18.39	14.42	17.25	13.27	6.24	7.96	59.73	52.94
Marine fish		0.34	6.84	72.39	8.09	7.84	90.31	86.51	1.15	11.34	17.91	14.16	14.16	17.91	14.16	14.16	17.91	121.40	111.45	
F&D fish		1.61	0.35	3.69	2.76	0.37	0.36	4.17	3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shellfish		0.25	1.00	10.58	1.31	1.38	15.43	14.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crustaceans		0.25	0.60	6.35	0.25	0.83	0.79	9.27	8.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Molluscs		0.40	4.23	4.23	0.55	0.52	6.16	5.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shell molluscs		0.30	3.17	3.17	0.41	0.39	4.60	4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cephalopods		0.10	1.06	1.06	0.14	0.13	1.56	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fish		411.06	8.20	133.38	553.39	7.90	8.02	137.94	136.49	142.33	6.13	4.56	5.18	5.18	-137.77	3 121.17	2 748.01	2 748.01	0.22	0.25
Ecuador		Finfish	24.58	5.20	84.57	14.60	5.07	88.56	88.59	-9.98	-9.89	3.99	4.07	13.97	14.05	13.97	14.05	13.97	3.05	3.11
	Marine fish	3.70	60.25	60.25	3.61	3.65	62.96	62.98	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	2.72	1.02	1.03	
	F&D fish	1.50	24.33	24.33	1.48	1.48	25.60	25.61	-9.98	-9.89	1.28	1.30	11.26	11.28	11.26	11.28	11.26	1.02	1.03	
	Shellfish	386.48	3.00	48.81	538.79	2.83	2.89	49.38	49.89	152.31	6.87	0.57	1.11	-151.74	-151.20	26 772.94	13 691.34	0.03	0.06	
	Crustaceans	386.48	2.93	47.65	538.79	2.76	2.82	48.20	48.71	152.31	6.87	0.55	1.08	-151.76	-151.23	27 578.69	14 076.54	0.03	0.06	
	Molluscs	0.07	1.16	1.16	0.07	0.07	1.18	1.19	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Shell molluscs	0.05	0.86	0.86	0.05	0.05	0.87	0.88	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Cephalopods	0.02	0.30	0.30	0.02	0.02	0.30	0.31	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.01

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Country or country group	Species group	Baseline situation in the mid-2010s ²				Projected situation in the early 2020s ³				Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)		Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)		Trend aquaculture growth	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
		0.83	14.33	18.78		1.09	17.01	21.99	21.07	0.25	5.42	3.21	2.30	2.96	2.05	7.85	10.95	37.11	30.30	
Estonia	Finfish	0.83	14.33	18.78	1.09	17.01	21.99	21.07	0.25	5.42	3.21	2.30	2.96	2.05	7.85	10.95	37.11	30.30		
	Marine fish	0.83	12.46	16.34	1.09	14.47	18.71	17.97	0.25	5.42	2.37	1.64	2.12	1.39	10.62	15.35	30.90	24.30		
	F&D fish	0.83	9.94	13.03	1.09	11.28	15.02	14.45	0.25	5.42	1.99	1.43	1.99	1.43	0.00	0.00	0.00	0.00	0.00	
	Shellfish	0.00	1.86	2.44	0.00	2.54	2.42	3.28	0.25	5.42	0.38	0.21	0.13	-0.04	66.20	119.45	7.80	4.61		
	Crustaceans	0.00	1.20	1.57	0.00	1.65	1.58	2.14	2.03	0.25	0.84	0.66	0.84	0.66	0.00	0.00	404.45	380.73		
	Molluscs	0.00	0.67	0.87	0.00	0.88	0.84	1.14	1.07	0.27	0.27	0.20	0.27	0.20	0.00	0.00	366.78	347.31		
	Shell molluscs	0.28	0.37	0.37	0.35	0.37	0.35	0.48	0.45	0.11	0.08	0.11	0.08	0.11	0.08	0.00	0.00	0.00	0.00	
	Cephalopods	0.00	0.29	0.51	0.51	0.48	0.66	0.62	0.16	0.12	0.12	0.12	0.16	0.12	0.00	0.00	0.00	0.00		
	Fish	0.08	0.24	24.56	0.14	0.28	0.27	32.12	29.86	0.05	10.44	7.56	5.31	7.50	5.26	0.71	1.01	146.68	130.12	
	Finfish	0.08	0.24	24.52	0.14	0.28	0.27	32.05	29.80	0.05	10.44	7.53	5.29	7.48	5.24	0.71	1.02	146.50	129.94	
Marine fish	0.01	0.01	1.08	0.01	0.01	0.01	1.41	1.33	0.05	0.33	0.25	0.33	0.25	0.00	0.00	0.00	0.00			
F&D fish	0.08	0.23	23.44	0.14	0.27	0.25	30.64	28.47	0.05	10.44	7.20	5.05	7.15	4.99	0.75	1.07	144.33	127.79		
Shellfish	0.00	0.04	0.04	0.00	0.00	0.00	0.07	0.06	0.03	0.02	0.02	0.02	0.03	0.02	0.00	0.00	0.00			
Crustaceans	0.00	0.00	0.04	0.00	0.00	0.00	0.06	0.05	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00			
Molluscs	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Shell molluscs	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Cephalopods	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Fish	0.20	36.13	32.34	0.20	44.36	42.84	40.68	38.88	-0.00	-0.24	8.35	6.56	8.35	6.56	0.00	110.91	101.25			
Finfish	0.18	35.04	31.36	0.18	42.84	41.40	39.29	37.57	-0.00	-0.27	7.93	6.23	7.93	6.23	0.00	113.33	103.54			
Marine fish	33.91	30.35	30.35	41.64	40.25	38.18	36.53	36.53	0.00	0.00	7.83	6.20	7.83	6.20	0.00	0.00	0.00			
F&D fish	0.18	1.13	1.01	0.18	1.21	1.15	1.11	1.04	-0.00	-0.27	0.09	0.03	0.10	0.03	0.00	8.59	3.06			
Shellfish	0.02	1.09	0.97	0.02	1.52	1.44	1.39	1.30	0.42	0.33	0.42	0.33	0.42	0.33	0.00	83.29	75.18			
Crustaceans	0.02	0.75	0.67	0.02	1.05	0.99	0.96	0.90	0.29	0.23	0.29	0.23	0.29	0.23	0.00	71.11	64.17			
Molluscs	0.34	0.34	0.30	0.47	0.44	0.43	0.40	0.40	0.13	0.10	0.10	0.13	0.10	0.00	0.00	0.00				
Shell molluscs	0.22	0.19	0.19	0.29	0.28	0.27	0.25	0.25	0.08	0.06	0.06	0.08	0.06	0.00	0.00	0.00				
Cephalopods	0.12	0.11	0.11	0.18	0.17	0.16	0.15	0.15	0.05	0.04	0.05	0.04	0.05	0.04	0.00	0.00				
Fish	13.20	36.17	199.43	14.10	39.42	38.73	220.48	214.75	0.90	1.32	21.05	15.41	20.16	14.52	4.26	5.82	21.01	16.74		
Finfish	13.20	33.62	185.36	14.10	36.38	35.75	203.45	198.23	0.90	1.32	18.09	12.95	17.19	12.06	4.96	6.93	18.84	14.66		
Marine fish	18.38	101.34	101.34	20.06	19.76	112.17	109.57	109.57	0.90	1.32	10.83	8.27	10.83	8.27	0.00	9.16	6.26			
F&D fish	13.20	15.24	84.02	14.10	16.32	15.99	91.28	88.67	0.90	1.32	7.26	4.68	6.36	3.78	12.36	19.18	9.16			
Shellfish	2.55	14.07	14.07	3.04	2.98	17.03	16.52	16.52	0.90	1.32	2.96	2.46	2.96	2.46	0.00	0.00				
Crustaceans	2.17	11.96	11.96	2.60	2.54	14.53	14.11	14.11	0.90	1.32	2.57	2.16	2.57	2.16	0.00	0.00				
Molluscs	0.38	2.11	2.11	0.45	0.43	2.50	2.41	2.41	0.31	0.39	0.31	0.31	0.39	0.31	0.00	0.00				
Shell molluscs	0.37	2.02	2.02	0.43	0.42	2.39	2.31	2.31	0.37	0.29	0.37	0.29	0.37	0.29	0.00	0.00				
Cephalopods	0.02	0.09	0.09	0.02	0.02	0.10	0.10	0.10	0.02	0.02	0.02	0.01	0.02	0.01	0.00	0.00				

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s			Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)					
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵				
		0.04	33.71	2 175.59	203.16	38.03	2 503.73	2 399.74	0.12	0.01	328.14	225.11	328.02	224.99	0.04	0.05	21.21	16.09	
France	Fish	203.04	33.71	2 175.59	203.16	38.03	2 503.73	2 399.74	0.12	0.01	328.14	225.11	328.02	224.99	0.04	0.05	21.21	16.09	
	Finfish	46.68	23.06	1 488.41	46.80	25.14	1 655.51	1 590.46	0.12	0.05	167.10	102.71	166.98	102.58	0.07	0.12	35.57	26.19	
	Marine fish	5.57	18.80	1 213.20	5.69	20.56	1 353.67	1 301.82	0.12	0.43	140.47	89.16	140.35	89.04	0.09	0.14	92.16	76.23	
	F&D fish	41.11	4.26	275.21	41.11	4.58	301.84	288.64			26.63	13.55	26.63	13.55			10.50	5.86	
	Shellfish	156.36	10.65	687.18	156.36	12.88	848.22	809.28			161.04	122.40	161.04	122.40			15.21	12.26	
	Crustaceans	0.04	3.69	238.06	0.04	4.45	293.01	279.98			54.95	42.02	54.95	42.02			327.41	305.09	
	Molluscs	156.32	6.96	449.12	156.32	8.43	555.21	529.30			106.09	80.38	106.09	80.38			10.92	8.65	
	Shell molluscs	156.32	6.48	417.90	156.32	7.84	516.52	492.53			98.62	74.81	98.62	74.81			10.28	8.14	
	Cephalopods	0.48	31.22			0.59	38.69	36.78			7.47	5.57	7.47	5.57					
		Fish	0.05	36.10	62.95	0.05	41.14	39.83	76.38			16.72	13.46	16.72	13.46			224.86	211.13
Gabon	Finfish	0.05	35.78	62.40	0.05	40.74	39.45	78.89	75.64			13.27	16.48	13.27			223.95	210.25	
	Marine fish	29.20	50.92			33.35	32.34	64.57	62.02			11.13	13.66	11.13					
	F&D fish	0.05	6.59	11.48	0.05	7.39	14.31	13.62			2.83	2.14	2.83	2.14			128.31	116.22	
	Shellfish	0.31	0.55			0.40	0.38	0.74	0.74			0.19	0.24	0.19					
	Crustaceans	0.12	0.21			0.15	0.15	0.30	0.28			0.08	0.07	0.08	0.07				
	Molluscs	0.19	0.34			0.25	0.24	0.49	0.46			0.15	0.12	0.15	0.12				
	Shell molluscs	0.02	0.03			0.02	0.02	0.04	0.04			0.01	0.01	0.01	0.01				
	Cephalopods	0.18	0.31			0.23	0.22	0.45	0.42			0.14	0.11	0.14	0.11				
		Fish	0.04	23.85	48.24	0.05	26.55	25.92	60.65	62.71	4.90	14.46	12.43	14.45	12.42	0.07	0.09	226.44	216.72
	Gambia	Finfish	0.02	22.91	46.35	0.03	25.43	24.83	60.06	58.11	9.20	13.70	11.78	13.69	11.77	0.08	0.09	272.53	261.47
Marine fish		20.49	41.46			22.81	22.30	53.88	52.18			12.42	10.74	12.42					
F&D fish		0.02	2.42	4.89	0.03	2.62	6.18	5.93			1.29	1.04	1.27	1.03	0.82	1.01	132.68	123.26	
Shellfish		0.02	0.93	1.89	0.02	1.12	1.08	2.53	2.53			0.76	0.65	0.76	0.65		108.26	101.65	
Crustaceans		0.89	1.79			1.07	1.03	2.41	2.41			0.72	0.61	0.72	0.61				
Molluscs		0.02	0.05	0.09	0.02	0.06	0.05	0.13	0.13			0.04	0.03	0.04	0.03		25.11	22.04	
Shell molluscs		0.02			0.02														
Cephalopods		0.05	0.09			0.06	0.05	0.13	0.13			0.04	0.03	0.04	0.03				
		Fish	0.75	11.29	45.06	0.96	13.40	12.88	50.68	50.68	0.21	4.94	5.64	7.98	5.44	2.51	3.64	63.95	53.35
Georgia		Finfish	0.75	11.08	44.20	0.96	13.10	12.61	52.09	49.62	0.21	4.94	7.89	7.68	5.23	2.61	3.78	62.85	52.34
	Marine fish	10.57	42.19			12.54	12.07	49.84	47.50			7.65	5.33	7.65	5.33				
	F&D fish	0.75	0.51	2.02	0.96	0.57	2.25	2.12			4.94	0.23	0.10	0.03	-0.10	87.85	197.64	5.55	2.62
	Shellfish	0.22	0.86			0.29	0.27	1.15	1.07			0.29	0.21	0.29	0.21				
	Crustaceans	0.04	0.15			0.05	0.05	0.20	0.19			0.06	0.05	0.06	0.05				
	Molluscs	0.18	0.71			0.24	0.22	0.95	0.88			0.24	0.16	0.24	0.16				
	Shell molluscs	0.18	0.70			0.23	0.22	0.93	0.86			0.23	0.16	0.23	0.16				
	Cephalopods	0.00	0.01			0.01	0.00	0.02	0.02			0.01	0.00	0.01	0.00				

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s			Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁴	Conservative ⁴	Standard ⁴	Conservative ⁴	
		627.98	48.66	6 153.28	627.98	53.01	6 811.12	6 565.96	657.84	415.21	657.84	415.21	657.84	415.21	15.41	10.68
Japan	Finfish	274.67	31.14	3 937.13	274.67	32.82	4 207.91	270.78	129.83	270.78	129.83	270.78	129.83	14.71	8.05	
	Marine fish	230.35	26.13	3 303.51	230.35	28.36	3 540.57	337.06	121.24	337.06	121.24	337.06	121.24	15.20	8.83	
	F&D fish	44.32	5.01	633.62	44.32	5.35	667.34	33.72	8.59	33.72	8.59	33.72	8.59	11.98	3.61	
	Shellfish	353.32	17.53	2 216.15	353.32	20.85	2 603.21	387.06	285.38	387.06	285.38	387.06	285.38	15.95	12.57	
	Crustaceans	1.60	7.14	902.50	1.60	8.46	1 056.27	153.77	114.12	153.77	114.12	153.77	114.12	149.80	135.50	
	Molluscs	351.72	10.39	1 313.64	351.72	12.39	1 546.94	233.30	171.27	233.30	171.27	233.30	171.27	10.71	8.26	
	Shell molluscs	351.72	6.45	815.95	351.72	7.61	949.81	133.86	96.13	133.86	96.13	133.86	96.13	6.66	4.95	
	Cephalopods	3.94	497.69		3.94	4.62	597.12	99.44	75.14	99.44	75.14	99.44	75.14			
	Fish	0.95	5.33	40.87	1.34	5.98	49.06	0.40	7.28	7.79	6.13	6.13	7.79	6.13	57.41	51.21
	Finfish	0.95	5.17	39.63	1.34	5.78	47.40	0.40	7.28	7.77	6.18	6.18	7.37	5.78	5.12	6.44
Marine fish	5.01	38.43		5.61	5.48	46.01	7.58	6.05	7.58	6.05	7.58	6.05				
F&D fish	0.95	0.16	1.20	1.34	0.17	1.39	0.40	7.28	0.18	0.13	0.13	-0.21	-0.27	216.01	314.27	
Shellfish	0.16	1.24		0.20	0.20	1.66	1.58	0.42	0.35	0.42	0.35	0.42	0.35			
Crustaceans	0.15	1.12		0.18	0.18	1.50	1.43	0.38	0.31	0.38	0.31	0.38	0.31			
Molluscs	0.02	0.12		0.02	0.02	0.16	0.15	0.04	0.03	0.04	0.03	0.04	0.03			
Shell molluscs	0.01	0.06		0.01	0.01	0.08	0.08	0.02	0.01	0.02	0.01	0.02	0.01			
Cephalopods	0.01	0.06		0.01	0.01	0.08	0.08	0.02	0.02	0.02	0.02	0.02	0.02			
Fish	0.65	5.12	90.86	0.65	5.41	101.27	10.40	6.87	10.40	6.87	10.40	6.87	10.40	76.09	63.06	
Finfish	0.65	5.00	88.68	0.65	5.28	98.66	9.98	6.56	9.98	6.56	9.98	6.56	9.98	74.71	61.69	
Marine fish	3.33	59.07		3.52	3.44	65.86	6.78	4.63	6.78	4.63	6.78	4.63				
F&D fish	0.65	1.67	29.61	0.65	1.75	32.80	3.19	1.93	3.19	1.93	3.19	1.93				
Shellfish	0.12	2.18		0.14	0.13	2.61	2.49	0.43	0.31	0.43	0.31	0.43	0.31			
Crustaceans	0.07	1.29		0.08	0.08	1.54	1.47	0.24	0.18	0.24	0.18	0.24	0.18			
Molluscs	0.05	0.89		0.06	0.06	1.07	1.02	0.18	0.13	0.18	0.13	0.18	0.13			
Shell molluscs	0.03	0.58		0.04	0.04	0.69	0.65	0.11	0.08	0.11	0.08	0.11	0.08			
Cephalopods	0.02	0.31		0.02	0.02	0.38	0.36	0.07	0.05	0.07	0.05	0.07	0.05			
Fish	32.83	4.34	202.57	51.32	4.95	261.47	18.49	9.34	58.90	42.61	40.42	40.42	24.13	31.39	43.38	
Finfish	32.83	4.33	202.05	51.32	4.93	260.65	18.49	9.34	58.60	42.37	40.11	40.11	23.88	31.55	43.63	
Marine fish	0.15	6.99		0.17	0.16	9.01	8.54	2.02	1.55	2.02	1.55	2.02	1.55			
F&D fish	32.83	4.18	195.06	51.32	4.76	251.64	235.77	18.49	9.34	56.58	40.82	38.10	22.33	32.67	45.29	
Shellfish	0.01	0.52		0.02	0.01	0.82	0.76	0.30	0.24	0.30	0.24	0.30	0.24			
Crustaceans	0.01	0.46		0.01	0.01	0.72	0.67	0.26	0.21	0.26	0.21	0.26	0.21			
Molluscs	0.00	0.07		0.00	0.00	0.11	0.10	0.04	0.03	0.04	0.03	0.04	0.03			
Shell molluscs	0.00	0.02		0.00	0.00	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01			
Cephalopods	0.00	0.05		0.00	0.00	0.08	0.07	0.03	0.02	0.03	0.02	0.03	0.02			

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Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s			Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)			
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Standard ⁴	Conservative ⁵	Trend aquaculture growth (000 tonnes)	Annual growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand minus extra supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
Kiribati	Fish	0.01	67.80	7.66	0.01	75.51	74.34	9.29	9.07	1.63	1.41	1.63	1.41	189.75	181.57		
	Finfish	0.01	65.97	7.45	0.01	73.33	72.21	9.02	8.81	1.56	1.36	1.56	1.36	187.55	179.44		
	Marine fish		65.94	7.45		73.30	72.18	9.02	8.81	1.56	1.35	1.56	1.35				
	F&D fish	0.01	0.03	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.68		
	Shellfish		1.83	0.21		2.18	2.13	0.27	0.26	0.06	0.05	0.06	0.05				
	Crustaceans		1.83	0.21		2.18	2.13	0.27	0.26	0.06	0.05	0.06	0.05				
Korea, Republic of	Molluscs																
	Shell molluscs																
	Cephalopods																
	Fish	430.92	52.16	2 628.94	401.92	64.37	61.03	3 304.16	3 102.94	-29.00	-1.38	675.22	475.33	704.22	504.33	20.75	16.03
	Finfish	82.13	32.71	1 648.41	60.66	37.80	36.06	1 940.11	1 833.20	-21.47	-5.88	291.70	185.62	313.17	207.09	35.40	26.66
	Marine fish	65.47	31.38	1 581.52	44.27	36.35	34.69	1 865.86	1 763.70	-21.19	-7.53	284.34	182.98	305.54	204.17	39.82	30.57
	F&D fish	16.66	1.33	66.90	16.39	1.45	1.37	74.25	69.50	-0.28	-0.33	7.36	2.64	7.63	2.92	7.59	2.98
	Shellfish	348.79	19.46	980.52	341.26	26.57	24.97	1 364.04	1 269.74	-7.53	-0.44	383.52	289.71	391.05	297.24	15.99	12.85
	Crustaceans	5.00	3.33	167.78	7.33	4.40	4.15	225.92	210.97	2.33	7.97	58.14	43.28	55.81	40.94	66.08	57.40
	Molluscs	343.80	16.13	812.75	333.93	22.17	20.82	1 138.13	1 058.77	-9.87	-0.58	325.38	246.43	335.25	256.30	14.25	11.42
	Shell molluscs	343.80	9.51	479.11	333.93	12.75	11.99	654.44	609.43	-9.87	-0.58	175.33	130.56	185.20	140.43	8.59	6.65
	Cephalopods		6.62	333.64		9.42	8.84	483.69	449.34			150.05	115.87	150.05	115.87		
Kuwait	Fish	0.32	12.96	51.17	0.34	13.92	13.73	60.61	59.06	0.02	1.38	9.44	7.92	9.42	7.90	0.28	91.85
	Finfish	0.32	11.23	44.37	0.34	11.95	11.80	52.04	50.73	0.02	1.38	7.67	6.39	7.64	6.37	0.35	90.64
	Marine fish	0.00	8.76	34.60	0.00	9.37	9.26	40.77	39.80			6.18	5.23	6.18	5.23		321.12
	F&D fish	0.31	2.47	9.77	0.33	2.59	2.54	11.26	10.93	0.02	1.41	1.49	1.16	1.47	1.14	1.51	1.95
	Shellfish		1.72	6.80		1.97	1.94	8.57	8.33			1.77	1.53	1.77	1.53		41.99
	Crustaceans		1.65	6.51		1.89	1.86	8.21	7.98			1.70	1.47	1.70	1.47		36.36
Kyrgyzstan	Molluscs	0.07	0.29	0.08	0.08	0.08	0.36	0.35	0.06	0.07	0.06	0.06	0.06	0.06			
	Shell molluscs	0.05	0.19	0.05	0.05	0.05	0.24	0.23	0.04	0.04	0.04	0.04	0.04	0.04			
	Cephalopods	0.02	0.09	0.02	0.03	0.03	0.12	0.12	0.02	0.03	0.02	0.02	0.03	0.02			
	Fish	0.57	2.23	13.34	0.85	2.45	2.35	15.72	14.93	0.28	8.39	2.37	1.60	2.09	1.31	11.86	17.65
	Finfish	0.57	2.21	13.25	0.85	2.43	2.33	15.60	14.82	0.28	8.39	2.35	1.57	2.06	1.29	12.01	17.88
	Marine fish		2.08	12.48		2.29	2.20	14.69	13.97			2.22	1.50	2.22	1.50		30.42
F&D fish	0.57	0.13	0.78	0.85	0.14	0.13	0.91	0.85	0.28	8.39	0.13	0.08	0.28	-0.15	2 185.2	369.49	
Shellfish		0.02	0.09		0.02	0.02	0.12	0.11			0.03	0.02	0.03	0.02		4.18	
Crustaceans		0.01	0.04		0.01	0.01	0.06	0.05			0.01	0.01	0.01	0.01			
Molluscs		0.01	0.05		0.01	0.01	0.06	0.06			0.02	0.01	0.02	0.01			
Shell molluscs		0.01	0.03		0.01	0.01	0.05	0.04			0.01	0.01	0.01	0.01			
Cephalopods		0.00	0.01		0.00	0.00	0.02	0.02			0.00	0.00	0.00	0.00			

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		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)		Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)		Trend aquaculture growth	Annual growth rate (%)	Extra food fish supply (000 tonnes)	Standard ⁴	Conservative ⁵	Ratio of extra supply to extra demand ⁶ (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
Liberia	Fish	0.04	4.16	18.98	0.05	4.91	25.30	24.06	0.02	7.35	6.32	5.10	6.30	5.08	0.25	0.31	180.01	168.31	
	Finfish	0.04	4.13	18.84	0.05	4.87	25.08	23.86	0.02	7.35	6.24	5.04	6.22	5.02	0.25	0.31	179.34	167.69	
	Marine fish		3.59	16.36		4.25	21.90	20.88			5.55	4.53	5.55	4.53					
	R&D fish	0.04	0.54	2.48	0.05	0.62	3.18	2.99	0.02	7.35	0.69	0.51	0.68	0.49	2.27	3.09	81.69	71.35	
	Shellfish		0.03	0.14		0.04	0.22	0.20			0.07	0.06	0.07	0.06					
	Crustaceans		0.02	0.11		0.03	0.17	0.16			0.06	0.05	0.06	0.05					
	Molluscs		0.01	0.03		0.01	0.05	0.05			0.02	0.01	0.02	0.01					
	Shell molluscs																		
	Cephalopods		0.01	0.03		0.01	0.01	0.05	0.05		0.02	0.01	0.02	0.01					
	Fish	0.01	16.98	107.05	0.01	21.46	144.68	133.94	0.02	37.63	26.95	26.95	37.63	26.95	3.88	5.64	418.94	385.45	
Finfish	0.01	16.59	104.56	0.01	20.78	140.12	129.92		35.55	25.41	25.41	35.55	25.41			413.10	379.77		
Marine fish		16.51	104.05		20.69	139.51	129.36		35.46	25.37	25.37	35.46	25.37						
R&D fish	0.01	0.08	0.52	0.01	0.09	0.08	0.61	0.55	0.09	0.04	0.04	0.09	0.04						
Shellfish		0.39	2.49		0.68	4.56	4.03		2.07	1.54	1.54	2.07	1.54						
Crustaceans		0.12	0.74		0.19	1.27	1.27		0.53	0.40	0.40	0.53	0.40						
Molluscs		0.28	1.75		0.49	3.29	2.89		1.54	1.14	1.14	1.54	1.14						
Shell molluscs		0.03	0.18		0.04	0.27	0.24		0.09	0.06	0.06	0.09	0.06						
Cephalopods		0.25	1.57		0.45	3.02	2.65		1.45	1.08	1.08	1.45	1.08						
Fish	4.21	44.42	127.21	4.98	52.78	147.19	140.91	0.78	3.44	19.98	13.77	19.20	12.99	3.88	5.64	41.88	33.70		
Finfish	4.21	43.16	123.61	4.98	51.03	142.31	136.32	0.78	3.44	18.70	12.78	17.92	12.00	4.15	6.07	40.34	32.20		
Marine fish		38.72	110.89		45.95	128.14	122.87			17.25	12.04	17.25	12.04						
R&D fish	4.21	4.44	12.72	4.98	5.08	14.16	13.45	0.78	3.44	1.45	0.74	0.67	-0.04	53.59	104.80	6.09	3.30		
Shellfish		1.26	3.60		1.75	4.88	4.59		1.28	0.99	0.99	1.28	0.99						
Crustaceans		0.63	1.82		0.90	2.52	2.38		0.70	0.56	0.56	0.70	0.56						
Molluscs		0.62	1.78		0.85	2.36	2.21		0.58	0.42	0.42	0.58	0.42						
Shell molluscs		0.53	1.52		0.72	1.88	1.88		0.49	0.36	0.36	0.49	0.36						
Cephalopods		0.09	0.27		0.13	0.36	0.33		0.09	0.06	0.06	0.09	0.06						
Fish	1.13	5.80	12.06	0.99	6.75	14.09	13.46	-0.14	-2.68	2.03	1.40	2.17	1.54	2.17	1.54	22.78	17.46		
Finfish	1.13	5.72	11.90	0.99	6.64	13.86	13.24	-0.14	-2.68	1.96	1.35	2.10	1.49			22.27	16.99		
Marine fish		4.55	9.47		5.32	11.11	10.64		1.64	1.17	1.17	1.64	1.17						
R&D fish		1.17	2.43		1.32	2.75	2.61		0.32	0.18	0.18	0.46	0.32						
Shellfish		0.08	0.16		0.11	0.23	0.21		0.06	0.05	0.05	0.06	0.05						
Crustaceans		0.03	0.06		0.04	0.08	0.08		0.02	0.02	0.02	0.02	0.02						
Molluscs		0.05	0.10		0.07	0.15	0.14		0.04	0.03	0.03	0.04	0.03						
Shell molluscs		0.03	0.05		0.03	0.07	0.07		0.02	0.01	0.01	0.02	0.01						
Cephalopods		0.02	0.05		0.04	0.03	0.07	0.07	0.02	0.02	0.02	0.02	0.02						

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)		Total demand (000 tonnes)	Trend aquaculture growth (000 tonnes)	Annual aquaculture growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)		Ratio of extra supply to extra demand ⁴ (%)		Standard ⁵	Conservative ⁵	
						Standard ⁴	Conservative ⁴					Standard ⁵	Conservative ⁵	Standard ⁵	Conservative ⁵			
Madagascar	Fish	10.01	4.56	112.08	12.55	5.00	141.01	135.21	2.54	4.63	28.93	23.20	26.39	20.66	8.78	10.95	31.22	27.11
	Finfish	4.16	4.41	108.43	5.16	4.82	135.77	130.24	1.00	4.40	27.34	21.87	26.34	20.88	3.65	4.56	49.91	44.30
	Marine fish		2.92	71.75		3.19	89.82	86.39			18.06	14.68	18.06	14.68				
	R&D fish	4.16	1.49	36.68	5.16	1.63	45.95	43.85	1.00	4.40	9.27	7.19	8.28	6.20	10.77	13.88	26.42	22.24
	Shellfish	5.85	0.15	3.65	7.39	0.19	5.24	4.97	1.54	4.79	1.59	1.33	0.05	-0.22	96.82	116.27	4.93	4.17
	Crustaceans	5.85	0.13	3.13	7.39	0.16	4.48	4.26	1.54	4.79	1.36	1.13	-0.19	-0.41	113.71	135.89	4.26	3.61
	Molluscs		0.02	0.52		0.03	0.03	0.76	0.71		0.24	0.19	0.24	0.19				
	Shell molluscs		0.00	0.05		0.00	0.00	0.06	0.06		0.02	0.01	0.02	0.01				
	Cephalopods		0.02	0.47		0.02	0.02	0.69	0.65		0.22	0.18	0.22	0.18				
		Fish	5.32	7.41	129.53	8.07	8.02	163.03	156.32	2.75	8.68	33.50	26.85	30.75	24.11	8.20	10.23	48.79
	Finfish	5.32	7.41	129.46	8.07	8.02	162.93	156.22	2.75	8.68	33.47	26.83	30.72	24.08	8.21	10.24	48.76	43.28
	Marine fish		0.24	4.24		0.26	5.33	5.15		1.09	0.91	0.91	0.91					
	R&D fish	5.32	7.16	125.22	8.07	7.76	157.60	151.08	2.75	8.68	32.38	25.92	29.63	23.17	8.48	10.60	47.92	42.46
	Shellfish		0.00	0.07		0.00	0.10	0.09		0.03	0.02	0.02	0.03	0.02				
	Crustaceans		0.00	0.02		0.00	0.03	0.03		0.01	0.01	0.01	0.01	0.01				
	Molluscs		0.00	0.05		0.00	0.00	0.07	0.07	0.02	0.02	0.02	0.02	0.02				
	Shell molluscs		0.00	0.05		0.00	0.00	0.07	0.07	0.02	0.02	0.02	0.02	0.02				
	Cephalopods		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
	Fish	257.03	54.28	1 657.66	217.16	67.31	2 192.64	2 036.37	-39.87	-3.32	534.98	378.79	574.85	419.67			25.24	19.90
	Finfish	166.81	45.26	1 382.34	150.15	54.32	1 769.28	1 648.40	-16.66	-2.08	386.95	266.97	403.61	283.63			27.12	21.06
	Marine fish	25.79	39.79	1 215.18	32.15	48.02	1 564.06	1 459.07	6.36	4.51	348.88	244.68	342.51	238.32	1.82	2.60	70.78	60.00
	R&D fish	141.02	5.47	167.15	118.00	6.30	5.88	205.23	189.33	-23.02	-3.50	38.07	22.29	61.10	45.31		4.90	2.98
	Shellfish	90.22	9.01	275.33	67.01	13.00	423.36	387.97	-23.21	-5.77	148.03	112.83	171.24	136.04			21.44	17.61
	Crustaceans	46.98	4.92	150.40	23.77	7.05	229.51	211.00	-23.21	-12.74	79.11	60.70	102.32	83.91			21.83	18.05
	Molluscs	43.24	4.09	124.93	43.24	5.95	193.85	176.97			68.92	52.13	68.92	52.13			21.00	17.14
	Shell molluscs	43.24	1.76	53.61	43.24	2.43	79.02	72.23			18.66	25.41	18.66	25.41			9.69	7.44
	Cephalopods		2.34	71.32		3.53	114.83	104.74			43.51	33.46	43.51	33.46				
	Fish	155.12	56.93	569.93	177.59	171.53	70.24	67.07	13.31	10.22	13.31	10.22	13.31	10.22				
	Finfish	152.31	55.90	559.90	173.97	168.10	68.81	65.73	12.91	9.91	12.91	9.91	12.91	9.91				
	Marine fish	152.17	55.85	558.5	173.82	167.96	68.75	65.67	12.90	9.90	12.90	9.90	12.90	9.90				
	R&D fish		0.13	0.05		0.15	0.06	0.06		0.01	0.01	0.01	0.01					
	Shellfish		2.81	1.03		3.62	3.43	1.34		0.40	0.31	0.40	0.31					
	Crustaceans		2.11	0.77		2.70	2.57	1.01		0.30	0.23	0.30	0.23					
	Molluscs		0.70	0.26		0.91	0.85	0.36		0.10	0.08	0.10	0.08					
	Shell molluscs		0.32	0.12		0.40	0.37	0.15		0.04	0.03	0.04	0.03					
	Cephalopods		0.38	0.14		0.51	0.48	0.20		0.06	0.05	0.06	0.05					

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³				Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)	
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Trend aquaculture growth	Annual food fish supply growth rate (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
Mali	Fish	2.04	7.13	127.32	2.36	7.82	162.41	155.78	0.32	2.99	35.08	28.51	34.76	28.19	0.92	1.13	71.89
	Finfish	2.04	7.12	127.21	2.36	7.81	162.25	155.63	0.32	2.99	35.03	28.47	34.71	28.15	0.92	1.13	71.84
	Marine fish		1.45	25.96		1.63	33.95	32.80			7.99	6.85	7.99	6.85			
	F&D fish	2.04	5.67	101.26	2.36	6.18	128.30	122.83	0.32	2.99	27.04	21.62	26.72	21.30	1.19	1.49	63.32
	Shellfish		0.01	0.11		0.01	0.16	0.15			0.05	0.04	0.05	0.04			
	Crustaceans		0.01	0.10		0.01	0.15	0.14			0.04	0.04	0.04	0.04			
	Molluscs		0.00	0.01		0.00	0.00	0.01			0.00	0.00	0.00	0.00			
	Shell molluscs		0.00	0.01		0.00	0.00	0.01			0.00	0.00	0.00	0.00			
	Cephalopods		0.00	0.00		0.00	0.00	0.00			0.00	0.00	0.00	0.00			
	Fish	5.97	31.00	13.00	8.75	36.57	35.30	15.49	14.82	2.79	7.96	2.48	1.84	-0.30	-0.95	112.17	151.71
Finfish	5.97	23.32	9.78	8.75	26.46	25.67	11.21	10.78	2.79	7.96	1.42	1.01	-1.36	-1.77	195.53	275.47	4.38
Marine fish	5.97	19.34	8.12	8.75	22.07	21.44	9.35	9.00	2.79	7.96	1.23	0.90	-1.56	-1.89	226.41	310.30	3.82
F&D fish		3.97	1.67		4.39	4.23	1.86	1.78			0.19	0.11	0.19	0.11			
Shellfish		7.68	3.22		10.11	9.63	4.28	4.04			1.06	0.83	1.06	0.83			
Crustaceans		1.84	0.77		2.37	2.27	1.01	0.95			0.23	0.18	0.23	0.18			
Molluscs		5.84	2.45		7.73	7.35	3.28	3.09			0.83	0.64	0.83	0.64			
Shell molluscs		4.37	1.83		5.68	5.40	2.40	2.27			0.57	0.44	0.57	0.44			
Cephalopods		1.47	0.62		2.06	1.95	0.87	0.82			0.25	0.20	0.25	0.20			
Fish	17.97	0.95	0.95	20.76	20.18	1.10	1.07	1.06			0.15	0.12	0.15	0.12			
Finfish	17.88	0.95	0.95	20.64	20.06	1.09	1.06	1.06			0.15	0.12	0.15	0.12			
Marine fish	17.88	0.95	0.95	20.64	20.06	1.09	1.06	1.06			0.15	0.12	0.15	0.12			
F&D fish											0.00	0.00	0.00	0.00			
Shellfish		0.09	0.01		0.12	0.11	0.01	0.01			0.00	0.00	0.00	0.00			
Crustaceans		0.09	0.01		0.12	0.11	0.01	0.01			0.00	0.00	0.00	0.00			
Molluscs																	
Shell molluscs																	
Cephalopods																	
Fish	9.13	37.60	37.60	9.95	9.72	46.03	44.56	6.98	8.44	6.98	8.44	6.98	8.44	6.98			
Finfish	9.08	37.39	37.39	9.89	9.66	45.76	44.29	6.92	8.36	6.92	8.36	6.92	8.36	6.92			
Marine fish	5.21	21.44	21.44	5.62	5.62	26.52	25.76	4.33	5.08	4.33	5.08	4.33	5.08	4.33			
F&D fish	3.87	15.95	15.95	4.16	4.04	19.23	18.53	2.59	3.28	2.59	3.28	2.59	3.28	2.59			
Shellfish	0.05	0.21	0.21	0.06	0.06	0.28	0.27	0.06	0.07	0.06	0.07	0.06	0.07	0.06			
Crustaceans	0.03	0.11	0.11	0.03	0.03	0.15	0.15	0.03	0.04	0.03	0.04	0.03	0.04	0.03			
Molluscs	0.02	0.09	0.09	0.03	0.03	0.13	0.12	0.03	0.03	0.03	0.03	0.03	0.03	0.03			
Shell molluscs																	
Cephalopods		0.02	0.09		0.03	0.03	0.13	0.12			0.03	0.03	0.03	0.03			

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Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)			
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
Mongolia	Fish	0.68	11.36	7.11	1.26	13.49	8.44	0.28	5.18	1.33	0.95	1.05	0.67	21.25	29.76	18.67	14.48	
	Finfish	0.64	1.92	2.30	0.73	2.43	2.30	0.38	0.51	0.38	0.51	0.51	0.38	0.38	0.38	0.38	0.38	
	Marine fish	0.64	1.92	2.30	0.73	2.42	2.30	0.38	0.51	0.38	0.51	0.51	0.38	0.38	0.38	0.38	0.38	
	F&D fish	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Shellfish	0.03	0.09	0.14	0.05	0.04	0.15	0.14	0.05	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	
	Crustaceans	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Molluscs	0.03	0.09	0.13	0.04	0.04	0.14	0.13	0.05	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	
	Shell molluscs	0.03	0.09	0.13	0.04	0.04	0.14	0.13	0.05	0.04	0.05	0.05	0.04	0.04	0.04	0.04	0.04	
	Cephalopods																	
Montenegro	Fish	0.98	11.36	7.11	1.26	13.49	8.44	0.28	5.18	1.33	0.95	1.05	0.67	21.25	29.76	18.67	14.48	
	Finfish	0.80	8.95	5.60	1.08	10.22	9.88	6.13	0.28	6.22	0.79	0.53	0.25	35.83	53.34	14.67	10.67	
	Marine fish	0.09	6.57	4.11	0.09	7.56	7.33	4.73	0.62	4.44	0.62	0.44	0.44	0.44	0.44	0.44	0.44	
	F&D fish	0.71	2.38	1.49	0.99	2.66	2.55	1.66	0.28	6.95	0.17	0.09	-0.11	167.17	309.30	4.38	2.46	
	Shellfish	0.18	2.41	1.51	0.18	3.28	3.11	2.05	1.93	0.54	0.42	0.54	0.42	0.42	0.42	0.42	0.42	
	Crustaceans	0.39	0.25	0.31	0.52	0.49	0.32	0.31	0.08	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	
	Molluscs	0.18	2.02	1.26	0.18	2.76	2.61	1.73	1.62	0.46	0.36	0.36	0.36	0.36	0.36	0.36	0.36	
	Shell molluscs	0.18	1.19	0.75	0.18	1.58	1.49	0.99	0.93	0.24	0.18	0.24	0.18	0.18	0.18	0.18	0.18	
	Cephalopods	0.83	0.52	0.69	1.18	1.12	0.74	0.69	0.22	0.18	0.22	0.18	0.22	0.18	0.22	0.18	0.22	
Morocco	Fish	1.11	17.83	617.01	1.56	20.28	19.58	743.09	0.45	7.01	126.08	92.84	125.63	92.39	0.36	0.48	157.96	142.80
	Finfish	0.82	17.21	595.47	1.22	19.47	18.80	713.21	0.40	8.36	117.74	86.33	117.34	85.93	0.34	0.47	170.73	154.56
	Marine fish	0.19	16.62	575.09	0.36	18.85	18.21	690.44	0.17	13.26	115.34	85.21	115.18	85.04	0.14	0.19	259.65	238.56
	F&D fish	0.62	0.59	20.38	0.86	0.62	0.59	22.78	0.24	6.65	2.40	1.12	2.16	0.89	9.87	21.09	37.13	22.87
	Shellfish	0.30	0.62	21.53	0.34	0.82	0.77	29.87	0.05	2.95	8.34	6.51	8.29	6.46	0.56	0.72	96.05	86.92
	Crustaceans	0.53	18.37		0.69	0.66	25.34	23.81	6.97	5.45	5.45	5.45	6.97	5.45	5.45	5.45	5.45	5.45
	Molluscs	0.30	0.09	3.16	0.34	0.12	4.53	4.22	0.05	2.95	1.37	1.05	1.32	1.01	3.41	4.42	41.09	35.31
	Shell molluscs	0.30	0.02	0.60	0.34	0.02	0.78	0.72	0.05	2.95	0.18	0.12	0.13	0.08	26.45	37.92	9.73	7.15
	Cephalopods	0.07	2.56		0.10	0.10	3.75	3.49	1.19	0.93	0.93	0.93	1.19	0.93	0.93	0.93	0.93	0.93
Mozambique	Fish	1.38	9.84	279.06	2.48	12.35	11.38	400.28	1.09	12.34	121.22	86.63	120.12	85.54	0.90	1.26	145.17	129.44
	Finfish	1.36	9.47	268.64	2.46	11.71	10.82	379.72	1.09	12.49	111.08	78.94	109.99	77.85	0.98	1.38	141.66	125.92
	Marine fish	0.24	6.26	177.53	0.48	7.73	7.19	250.76	0.25	15.32	73.23	53.45	72.99	53.20	0.34	0.46	215.08	195.91
	F&D fish	1.13	3.21	91.11	1.97	3.98	3.63	128.96	0.85	11.85	37.85	25.49	37.01	24.65	2.24	3.32	103.11	88.19
	Shellfish	0.02	0.37	10.42	0.02	0.63	0.56	20.56	18.10	10.13	7.69	7.69	10.13	7.69	7.69	7.69	248.80	230.09
	Crustaceans	0.02	0.28	8.01	0.02	0.48	0.43	15.70	13.91	7.68	5.90	5.90	7.68	5.90	5.90	5.90	230.06	213.10
	Molluscs	0.08	2.41		0.15	0.13	4.86	4.20	1.79	2.45	1.79	1.79	2.45	1.79	1.79	1.79	230.06	213.10
	Shell molluscs	0.01	0.29		0.02	0.01	0.52	0.45	0.45	0.16	0.23	0.16	0.23	0.16	0.16	0.16	230.06	213.10
	Cephalopods	0.07	2.12		0.13	0.12	4.34	3.74	2.22	1.63	2.22	1.63	2.22	1.63	1.63	1.63	230.06	213.10

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)			
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
		0.71	11.20	27.85	0.89	12.63	34.85	33.10	0.19	4.86	7.00	5.27	6.81	5.08	2.70	3.59	61.33	53.30
Myanmar	Fish	1 012.56	60.91	3 296.85	1 206.28	86.98	4 911.56	4 288.06	193.72	3.56	1 614.72	993.04	1 421.00	799.32	12.00	19.51	21.01	14.65
	Finfish	963.97	60.83	3 292.77	1 163.07	86.86	4 904.63	4 282.20	199.10	3.83	1 611.85	991.25	1 412.76	792.15	12.35	20.09	21.72	15.19
	Marine fish	0.18	31.57	1 709.12	0.26	44.97	2 539.35	2 336.13	0.07	6.87	830.22	527.95	830.15	527.88	0.01	0.01	437.58	391.06
	F&D fish	963.79	29.26	1 583.65	1 162.82	41.89	3 665.28	2 046.07	199.03	3.83	781.63	463.30	582.60	264.27	25.46	42.96	12.61	8.17
	Shellfish	48.59	0.08	4.07	43.21	0.12	0.10	6.94	5.86	-5.38	-2.32	2.86	1.79	8.25	7.17	1.15	1.15	0.73
	Crustaceans	48.59	0.07	3.52	43.21	0.11	0.09	6.03	5.10	-5.38	-2.32	2.50	1.58	7.88	6.96	1.01	1.01	0.64
	Molluscs		0.01	0.55		0.02	0.01	0.91	0.76		0.36	0.21	0.36	0.21				
	Shell molluscs		0.00	0.10		0.00	0.00	0.15	0.12		0.04	0.02	0.04	0.02				
	Cephalopods		0.01	0.45		0.01	0.01	0.77	0.64		0.32	0.19	0.32	0.19				
	Fish	0.71	11.20	27.85	0.89	12.63	34.85	33.10	0.19	4.86	7.00	5.27	6.81	5.08	2.70	3.59	61.33	53.30
Namibia	Finfish	0.13	10.51	26.14	0.20	11.74	32.38	30.80	0.07	9.28	6.24	4.68	6.17	4.61	1.15	1.54	118.15	106.20
	Marine fish	9.17	22.81		10.31	9.93	28.43	27.08	0.07	9.28	0.62	0.39	0.55	0.32	11.60	18.25	42.20	32.34
	F&D fish	0.13	1.34	3.33	0.20	1.43	3.95	3.72	0.07	9.28	0.76	0.59	0.64	0.47	15.38	19.85	18.33	15.13
	Shellfish	0.58	0.69	1.71	0.69	0.90	2.48	2.30	0.12	3.77	0.76	0.20	0.20	0.16				
	Crustaceans		0.19	0.46		0.24	0.23	0.66	0.62		0.20	0.16	0.20	0.16				
	Molluscs	0.58	0.50	1.25	0.69	0.66	1.82	1.68	0.12	3.77	0.56	0.43	0.44	0.31	20.85	27.16	14.57	11.81
	Shell molluscs	0.58	0.24	0.61	0.69	0.31	0.29	0.85	0.12	3.77	0.25	0.19	0.13	0.07	47.74	63.25	7.35	5.73
	Cephalopods		0.26	0.65		0.35	0.33	0.96	0.89		0.32	0.25	0.32	0.25				
	Fish	45.91	2.17	62.18	61.66	2.39	72.55	68.93	15.75	6.08	10.37	6.79	-5.39	-8.96	151.98	231.95	4.16	2.80
	Finfish	45.91	2.17	62.18	61.66	2.39	72.55	68.93	15.75	6.08	10.37	6.79	1.58	1.18	151.98	231.95	4.16	2.80
Marine fish	0.28	8.12		0.32	0.31	9.69	9.29	1.58	6.08	1.58	1.18	1.58	1.18					
F&D fish	45.91	1.89	54.07	61.66	2.07	62.86	59.65	15.75	6.08	8.79	5.62	1.58	1.18	179.26	280.53	3.57	2.33	
Shellfish																		
Crustaceans																		
Molluscs																		
Shell molluscs																		
Cephalopods																		
Nepal	Fish	55.61	22.04	373.64	55.60	24.57	24.03	422.90	410.05	-0.01	-0.00	36.58	49.28	36.59			13.53	10.64
	Finfish	3.56	18.58	315.05	3.55	20.35	19.93	350.27	340.12	-0.01	-0.06	35.23	25.21	35.24	25.21		61.23	51.88
	Marine fish	0.27	15.66	265.56	0.26	17.18	16.84	295.69	287.36	-0.01	-0.80	30.13	21.92	30.14	21.93		157.11	141.42
	F&D fish	3.29	2.92	49.49	3.29	3.17	3.09	54.58	52.76			5.10	3.29	5.10	3.29		20.58	14.88
	Shellfish	52.05	3.46	58.59	52.05	4.22	4.10	72.63	69.93			14.04	11.36	14.04	11.36		4.89	4.03
	Crustaceans		2.40	40.77		2.86	50.65	48.85			9.89	8.10	9.89	8.10			1.55	1.22
	Molluscs	52.05	1.05	17.83	52.05	1.28	21.98	21.08			3.26	4.15	3.26	4.15			1.10	0.87
	Shell molluscs	52.05	0.76	12.94	52.05	0.92	0.89	15.86	15.23			2.92	2.30	2.92	2.30		1.10	0.87
	Cephalopods		0.29	4.89		0.36	6.11	5.85			1.23	0.97	1.23	0.97				

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Extra demand minus extra supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
		Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
New Zealand	Fish	102.90	25.36	115.33	98.19	27.65	130.17	-4.70	-0.93	19.70	14.89	24.40	19.59	3.56	2.74		
	Finfish	11.04	21.15	96.17	9.30	23.25	110.41	-1.74	-3.36	14.25	10.48	15.98	12.22	18.03	14.28		
	Marine fish		19.91	90.52		21.36	104.09			13.58	10.06	13.58	10.06				
	F&D fish	11.04	1.24	5.65	9.30	1.33	6.32	-1.74	-3.36	0.67	0.42	2.41	2.15	1.19	0.75		
	Shellfish	91.86	4.22	19.17	88.89	5.18	5.01	24.62	-2.97	-0.65	5.45	4.41	8.42	7.37	1.16	0.94	
	Crustaceans		2.37	10.79		2.90	2.81	13.80			3.01	2.45	3.01	2.45			
	Molluscs	91.86	1.84	8.38	88.89	2.28	2.19	10.82	-2.97	-0.65	2.44	1.95	5.41	4.92	0.53	0.42	
	Shell molluscs	91.86	0.66	3.02	88.89	0.80	0.77	3.80	-2.97	-0.65	0.78	0.61	3.75	3.58	0.17	0.13	
	Cephalopods		1.18	5.36		1.48	1.42	7.03			1.66	1.34	1.66	1.34			
	Fish	33.71	4.86	29.69	48.53	5.74	5.52	37.00	14.83	7.56	7.31	5.48	-7.52	-9.35	202.82	270.65	4.00
Finfish	0.03	3.68	22.48	0.03	4.16	4.02	26.84			4.36	3.16	4.36	3.16				
Marine fish		3.51	21.45		3.98	3.84	25.65			4.20	3.06	4.20	3.06				
F&D fish	0.03	0.17	1.03	0.03	0.18	0.18	1.19			0.16	0.10	0.16	0.10				
Shellfish	33.68	1.18	7.22	48.51	1.58	1.50	10.16	14.83	7.57	2.95	2.32	-11.88	-12.51	503.04	639.00	1.69	1.34
Crustaceans	33.68	0.43	2.66	48.51	0.59	0.57	3.83	14.83	7.57	1.17	0.95	-13.65	-13.87	1 266.37	1 554.34	0.69	0.56
Molluscs		0.75	4.56		0.98	0.93	6.34			1.78	1.37	1.78	1.37				
Shell molluscs		0.74	4.54		0.98	0.92	6.31			1.77	1.36	1.77	1.36				
Cephalopods		0.00	0.02		0.00	0.00	0.03			0.01	0.01	0.01	0.01				
Fish	0.34	2.97	60.35	0.58	3.32	3.17	82.37	0.24	11.48	22.02	17.81	21.78	17.56	1.10	1.36	131.46	121.98
Finfish	0.34	2.97	60.34	0.58	3.32	3.17	82.36	0.24	11.48	22.02	17.80	21.78	17.56	1.10	1.36		
Marine fish		0.08	1.61		0.09	0.09	2.28			0.67	0.58	0.67	0.58				
F&D fish	0.34	2.89	58.73	0.58	3.23	3.08	80.08	0.24	11.48	21.35	17.22	21.10	16.98	1.14	1.41		
Shellfish		0.00	0.01		0.00	0.00	0.01			0.00	0.00	0.00	0.00				
Crustaceans		0.00	0.01		0.00	0.00	0.01			0.00	0.00	0.00	0.00				
Molluscs																	
Shell molluscs																	
Cephalopods																	
Fish	358.94	13.41	2 474.74	511.72	14.69	14.13	3 076.05	152.78	7.35	601.31	461.09	448.53	308.31	25.41	33.13	21.75	17.97
Finfish	358.94	13.23	2 441.64	511.72	14.48	13.94	3 032.51	152.78	7.35	590.87	453.06	438.09	300.28	25.86	33.72	21.49	17.74
Marine fish		9.65	1 781.51		10.61	10.23	2 220.98			439.47	342.37	439.47	342.37				
F&D fish	358.94	3.58	660.13	511.72	3.88	3.71	811.53	152.78	7.35	151.40	110.69	-1.38	-42.09	100.91	138.02	7.29	5.52
Shellfish		0.18	33.10		0.21	0.20	43.54			10.44	8.03	10.44	8.03				
Crustaceans		0.10	18.75		0.12	0.11	24.87			6.12	4.78	6.12	4.78				
Molluscs		0.08	14.35		0.09	0.08	18.67			4.32	3.25	4.32	3.25				
Shell molluscs		0.08	13.85		0.09	0.08	18.02			4.16	3.13	4.16	3.13				
Cephalopods		0.00	0.50		0.00	0.00	0.66			0.16	0.12	0.16	0.12				

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		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra demand generated by income and population growth (000 tonnes)	Extra demand minus extra supply (000 tonnes)	Ratio of extra supply to extra demand ⁴ (%)	Standard ⁵	Conservative ⁵	Standard ⁶	Conservative ⁶	Standard ⁶	Conservative ⁶		
								Annual growth rate (%)	Standard ⁵	Conservative ⁵	Standard ⁶	Conservative ⁶	Standard ⁶	Conservative ⁶	Standard ⁶	Conservative ⁶	Standard ⁶	Conservative ⁶	
Norway	Fish	1 491.84	51.67	270.83	1 902.34	57.05	314.84	307.40	44.01	36.71	932.74	1 118.35	0.58	0.49					
	Finfish	1 489.54	37.88	198.53	1 899.67	40.86	225.46	220.40	4.98	26.94	21.97	1 522.51	1 866.80	0.36	0.29				
	Marine fish	6.33	31.85	166.93	6.33	34.45	190.08	185.97	23.15	19.12	19.12	14 382.09	36.02	32.07					
	F&D fish	1 483.21	6.03	31.59	1 893.34	6.41	6.30	35.38	34.43	2.85	-406.34	14 382.09	0.05	0.04					
	Shellfish	2.30	13.79	72.30	2.67	16.20	15.91	89.38	87.00	0.37	14.74	16.70	2.52	53.11	49.22				
	Crustaceans		12.75	66.82		14.99	14.74	82.74	80.57	13.78	13.78	15.91	2.52						
	Molluscs	2.30	1.05	5.48	2.67	1.20	1.18	6.64	6.43	0.37	0.95	0.79	38.87	8.49	7.18				
	Shell molluscs	2.30	1.00	5.24	2.67	1.15	1.12	6.34	6.15	0.37	0.91	0.73	40.68	8.16	6.90				
	Cephalopods	0.05	0.05	0.24		0.05	0.05	0.29	0.28	0.04	0.04	0.05	0.04						
	Fish	0.37	20.85	95.35	0.59	22.13	21.89	107.03	104.89	11.68	9.58	11.46	2.26	100.31	92.80				
Oman	Finfish	0.01	20.05	91.66	0.01	21.22	21.00	102.64	100.61	0.01	13.81	10.98	0.07	340.78	323.53				
	Marine fish		19.88	90.88		21.04	20.83	101.78	99.78	10.90	8.93	10.90	0.07						
	F&D fish	0.01	0.17	0.78	0.01	0.18	0.17	0.85	0.83	0.01	13.81	0.08	10.73	66.06	56.79				
	Shellfish	0.37	0.81	3.69	0.58	0.91	0.89	4.39	4.28	0.21	9.48	0.70	35.51	23.79	21.17				
	Crustaceans	0.37	0.62	2.85	0.58	0.70	0.69	3.38	3.30	0.21	9.48	0.53	46.49	19.61	17.41				
	Molluscs		0.18	0.84		0.21	0.20	1.01	0.98	0.17	0.14	0.17	0.14						
	Shell molluscs		0.01	0.03		0.01	0.01	0.03	0.03	0.00	0.00	0.00	0.00						
	Cephalopods		0.18	0.82		0.20	0.20	0.98	0.95	0.16	0.14	0.16	0.14						
	Fish	151.97	1.93	369.11	162.88	2.18	2.09	459.38	435.00	10.91	1.40	90.27	16.51	9.77	7.49				
	Finfish	151.64	1.88	358.73	162.35	2.11	2.02	444.06	420.79	10.71	1.37	85.32	17.21	9.34	7.12				
Marine fish		0.51	96.51		0.58	0.56	122.18	116.64	25.68	20.18	25.68	20.18							
F&D fish	151.64	1.37	262.23	162.35	1.53	1.46	321.87	304.15	10.71	1.37	59.65	17.96	6.86	5.02					
Shellfish	0.33	0.05	10.38	0.53	0.07	0.07	15.33	14.21	0.20	9.72	4.95	3.98	73.73	65.71					
Crustaceans	0.33	0.01	1.46	0.53	0.01	0.01	2.09	1.96	0.20	9.72	0.63	39.43	23.55	20.08					
Molluscs		0.05	8.92		0.06	0.06	13.24	12.25	4.32	3.34	4.32	3.34							
Shell molluscs		0.01	1.32		0.01	0.01	1.85	1.71	0.52	0.39	0.52	0.39							
Cephalopods		0.04	7.60		0.05	0.05	11.40	10.54	3.80	2.95	3.80	2.95							
Fish	0.02	57.64	1.24	0.02	69.39	66.81	1.56	1.47	0.32	0.26	0.32	0.26	78.28	71.18					
Finfish	0.02	54.63	1.17	0.02	65.27	62.95	1.47	1.38	0.29	0.24	0.29	0.24	79.64	72.58					
Marine fish		53.51	1.15		64.09	61.81	1.44	1.36	0.29	0.24	0.29	0.24							
F&D fish	0.02	1.12	0.02	0.02	1.19	1.13	0.03	0.02	0.00	0.00	0.00	0.00	2.93	1.66					
Shellfish	0.00	3.02	0.06	0.00	4.12	3.86	0.09	0.08	0.03	0.02	0.03	0.02	67.03	59.49					
Crustaceans	1.21	0.03		1.53	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01							
Molluscs	0.00	1.81	0.04	0.00	2.49	2.33	0.06	0.05	0.02	0.01	0.02	0.01	53.18	46.29					
Shell molluscs	0.00	0.10	0.00	0.00	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	5.78	4.48					
Cephalopods	1.71	0.04		2.37	0.05	0.05	0.01	0.01	0.02	0.01	0.02	0.01							

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²				Projected situation in the early 2020s ³				Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)		Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)		Trend aquaculture growth	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
										Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
Panama	Fish	10.74	13.21	52.30	14.68	15.40	69.23	64.92	3.94	6.46	16.93	12.64	12.98	8.70	23.31	31.20	20.83	16.84		
	Finfish	2.00	11.22	44.41	3.35	13.25	56.46	53.21	1.35	10.88	12.05	8.82	10.70	7.47	11.22	15.33	47.69	40.17		
	Marine fish	1.61	10.48	41.51	2.96	12.42	52.91	49.90	1.35	12.97	11.40	8.40	10.05	7.06	11.86	16.07	51.89	44.17		
	F&D fish	0.39	0.73	2.90	0.39	0.83	3.55	3.31			0.65	0.40	0.65	0.40			21.60	15.27		
	Shellfish	8.74	1.99	7.89	11.33	3.00	2.78	12.76	11.71	2.59	5.33	4.88	3.83	2.28	1.23	53.17	67.76	9.27	7.53	
	Crustaceans	8.74	1.02	4.06	11.33	1.56	1.46	6.65	6.14	2.59	5.33	2.59	2.09	-0.00	-0.51	100.02	124.21	5.33	4.38	
	Molluscs		0.97	3.83		1.32	6.12	5.57		2.28	1.74		2.28	1.74						
	Shell molluscs		0.48	1.88		0.69	0.64	2.94	2.69		1.06	0.80	0.80	1.06	0.80					
	Cephalopods		0.49	1.95		0.75	0.68	3.18	2.88		1.23	0.93	0.93	1.23	0.93					
	Fish	2.38	15.47	119.07	3.16	17.30	16.98	146.98	142.81	0.78	5.80	27.91	23.80	27.13	23.03	2.78	3.26	66.28	61.51	
	Finfish	2.37	15.43	118.74	3.15	17.25	16.93	146.53	142.38	0.78	5.83	27.80	23.71	27.02	22.93	2.79	3.27	66.34	61.56	
	Marine fish		13.61	104.76		15.37	15.10	130.52	126.98			25.76	22.27	25.76	22.27					
	F&D fish	2.37	1.82	13.97	3.15	1.89	1.83	16.01	15.40	0.78	5.83	2.04	1.44	1.26	0.66	38.04	54.01	13.23	9.95	
	Shellfish	0.01	0.04	0.33	0.01	0.05	0.05	0.44	0.43			0.11	0.10	0.11	0.10			55.53	51.13	
Crustaceans	0.01	0.03	0.21	0.01	0.03	0.03	0.28	0.27			0.07	0.06	0.07	0.06			44.00	40.44		
Molluscs		0.02	0.12		0.02	0.02	0.16	0.15			0.04	0.03	0.04	0.03						
Shell molluscs		0.01	0.08		0.01	0.01	0.11	0.10			0.03	0.02	0.03	0.02						
Cephalopods		0.01	0.04		0.01	0.01	0.05	0.05			0.01	0.01	0.01	0.01						
Fish	9.03	3.88	25.90	14.11	4.23	4.09	30.04	28.73	5.08	9.33	4.14	2.84	-0.94	-2.24	122.73	178.72	7.83	5.62		
Finfish	9.03	3.79	25.30	14.11	4.11	3.98	29.23	27.96	5.08	9.33	3.93	2.68	-1.14	-2.40	129.09	189.58	7.50	5.33		
Marine fish		0.39	2.61		0.44	0.42	3.09	2.98			0.48	0.37	0.48	0.37						
F&D fish	9.03	3.40	22.69	14.11	3.68	3.55	26.14	24.98	5.08	9.33	3.45	2.30	-1.63	-2.77	147.20	220.36	6.68	4.65		
Shellfish		0.09	0.61		0.11	0.11	0.81	0.77			0.20	0.16	0.20	0.16						
Crustaceans		0.03	0.19		0.04	0.04	0.26	0.25			0.07	0.06	0.07	0.06						
Molluscs		0.06	0.41		0.08	0.07	0.55	0.52			0.14	0.11	0.14	0.11						
Shell molluscs		0.06	0.40		0.07	0.07	0.53	0.50			0.13	0.10	0.13	0.10						
Cephalopods		0.00	0.01		0.00	0.00	0.02	0.02			0.01	0.00	0.01	0.00						
Fish	140.58	21.83	689.36	204.09	24.99	24.21	837.31	802.56	63.51	7.74	147.94	113.59	84.43	50.07	42.93	55.92	15.47	12.57		
Finfish	49.39	17.73	559.82	76.97	19.77	19.22	662.25	637.16	27.58	9.28	102.43	77.66	74.84	50.08	26.93	35.52	25.18	20.80		
Marine fish		0.00	15.42	487.03		17.26	16.81	578.35			91.31	70.30	91.31	70.30			663.20	624.31		
F&D fish	49.39	2.31	72.79	76.97	2.50	2.42	83.90	80.10	27.58	9.28	11.11	7.35	-1.67	-20.23	248.21	375.06	4.14	2.82		
Shellfish		4.10	129.54		5.22	4.99	175.06	165.40			35.93	35.93	35.93	35.93			8.44	6.87		
Crustaceans	23.06	0.31	9.87	30.91	0.40	0.39	13.45	12.80	7.85	6.03	3.58	2.94	-4.26	-4.90	218.96	266.70	2.93	2.43		
Molluscs	68.12	3.79	119.68	96.21	4.82	4.60	161.61	152.60	28.08	7.15	41.94	32.99	13.85	4.90	66.97	85.14	10.07	8.22		
Shell molluscs		2.64	83.31		3.32	3.17	111.12	105.03	28.08	7.15	27.81	21.77	-0.27	-6.31	100.99	129.00	7.09	5.70		
Cephalopods		1.15	36.37		1.51	1.44	50.49	47.56			14.12	11.22	14.12	11.22						

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)					
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵			
Sao Tome and Principe	Fish	26.96	5.18	17.43	12.87	409.77	22.69	13.46	472.02	461.48	5.26	5.42	62.25	51.93	1.59	1.27	35.52	31.81		
	Finfish	26.60	5.11	11.76	11.45	364.56	17.02	12.04	416.78	407.61	5.26	7.68	52.23	43.24	1.56	1.25	40.32	36.14		
	Marine fish	26.40	5.07	2.63	6.97	221.85	3.37	7.38	7.30	255.55	250.43	0.74	5.07	33.69	28.69	1.55	1.24	69.04	64.10	
	F&D fish	0.20	0.04	9.13	4.48	142.70	13.65	4.66	161.23	157.18	4.52	8.38	18.53	14.55	0.01	0.01	24.82	21.00		
	Shellfish	0.36	0.07	5.67	1.42	45.21	5.67	1.60	55.23	53.87	8.69	10.02	8.69	8.69	0.03	0.02	22.58	20.42		
	Crustaceans	0.08	0.02	5.67	1.32	42.12	5.67	1.49	51.44	50.20	9.32	8.09	9.32	8.09	0.01	0.01	21.47	19.41		
	Molluscs	0.28	0.05	5.67	0.10	3.09	5.67	0.11	3.79	3.68	0.70	0.59	0.70	0.59	0.02	0.02				
	Shell molluscs	0.28	0.05	5.67	0.02	0.76	5.67	0.03	0.91	0.88	0.15	0.12	0.15	0.12	0.02	0.02				
	Cephalopods	0.07	2.33	0.07	0.07	0.08	2.88	0.08	2.88	2.80	0.55	0.47	0.55	0.47	0.02	0.02				
	Fish	1.19	23.79	365.43	1.19	28.89	27.54	2.14	512.31	483.80	0.95	12.42	146.88	118.56	118.56	145.93	117.61	0.65	0.80	
Senegal	Finfish	0.87	22.79	0.87	22.79	350.10	1.58	27.53	26.28	488.16	461.73	0.71	12.74	138.06	111.82	137.35	111.10	0.52	0.64	
	Marine fish	20.37	312.81	0.87	2.43	37.28	1.58	2.80	2.64	49.62	46.34	0.71	12.74	12.33	9.08	11.62	8.37	5.77	7.84	
	F&D fish	0.87	2.43	37.28	1.58	2.80	2.64	49.62	46.34	415.39	102.74	0.24	11.56	8.82	6.74	8.58	6.51	2.67	3.50	
	Shellfish	0.32	1.00	15.33	0.18	2.75	0.56	1.36	1.26	24.15	22.07	0.24	11.56	8.82	6.74	1.68	1.34	72.38	62.89	
	Crustaceans	0.32	0.82	12.58	0.56	1.10	19.53	0.56	1.10	19.53	17.81	0.24	11.56	7.14	5.40	6.90	5.17	3.30	4.36	
	Molluscs	0.32	0.81	12.47	0.56	1.10	19.53	0.56	1.10	19.53	17.81	0.24	11.56	7.06	5.34	6.83	5.11	3.34	4.41	
	Shell molluscs	0.01	0.11	0.01	0.01	0.19	0.17	0.01	0.01	0.19	0.17	0.08	0.08	0.06	0.08	0.08	0.06	87.29	77.25	
	Cephalopods	6.92	7.98	70.46	6.92	9.27	8.90	80.20	76.35	76.35	9.74	5.93	9.74	5.93	9.74	5.93	9.74	5.93	19.21	13.17
	Finfish	6.92	7.62	67.26	4.03	35.58	6.92	8.75	8.42	75.77	72.22	8.51	4.99	8.51	4.99	8.51	4.99	17.39	11.47	
	Marine fish	6.92	3.59	31.68	6.92	3.59	31.68	6.92	4.71	4.55	40.78	39.04	3.32	1.52	3.32	1.52	3.32	1.52	8.14	4.04
Serbia	F&D fish	0.36	3.20	0.36	3.20	0.48	4.43	4.13	0.48	4.43	4.13	0.07	0.06	0.07	0.06	0.07	0.06			
	Shellfish	0.34	2.97	0.34	2.97	0.48	4.43	4.13	0.48	4.43	4.13	0.07	0.06	0.07	0.06	0.07	0.06			
	Crustaceans	0.19	1.71	0.19	1.71	0.25	2.28	2.13	0.25	2.28	2.13	0.58	0.43	0.58	0.43	0.58	0.43			
	Molluscs	0.14	1.27	0.14	1.27	0.20	1.85	1.72	0.20	1.85	1.72	0.58	0.45	0.58	0.45	0.58	0.45			
	Shell molluscs	0.14	1.27	0.14	1.27	0.20	1.85	1.72	0.20	1.85	1.72	0.58	0.45	0.58	0.45	0.58	0.45			

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Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s			Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)	
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth (000 tonnes)	Annual growth rate (%)	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴
Spain	Fish	256.43	42.81	1 973.44	255.65	48.12	2 324.42	-0.77	-0.06	350.98	230.88	351.76	231.66	18.82	13.70
	Finfish	58.20	29.12	1 342.03	57.43	31.38	1 509.82	-0.77	-0.27	167.79	95.45	168.56	96.22	31.17	21.43
	Marine fish	41.99	25.22	1 162.27	41.22	28.41	1 312.20	-0.77	-0.37	149.93	88.22	150.70	89.00	35.52	25.40
	F&D fish	16.21	3.90	179.76	16.21	4.28	197.62			17.86	7.22	17.86	7.22	16.02	7.65
	Shellfish	198.23	13.70	631.40	198.23	17.63	814.60			183.20	135.43	183.20	135.43	13.99	10.98
	Crustaceans	0.13	3.29	151.43	0.13	4.18	193.12			41.69	30.86	41.69	30.86	216.30	197.89
	Molluscs	198.09	10.41	479.97	198.09	13.45	621.48			141.50	104.58	141.50	104.58	11.38	8.85
	Shell molluscs	198.09	7.18	330.79	198.09	9.13	421.96			91.18	66.37	91.18	66.37	7.87	5.95
	Cephalopods	0.00	3.24	149.18	0.00	4.32	199.51			50.33	38.21	50.33	38.21		
	Fish	39.61	31.02	643.98	67.99	37.17	787.73	28.38	11.41	143.75	97.15	115.37	68.77	19.74	35.86
Sri Lanka	Finfish	34.35	29.86	620.00	61.27	35.55	753.41	26.92	12.27	133.42	89.59	106.49	62.66	20.18	30.05
	Marine fish														
	F&D fish	34.35	4.61	95.78	61.27	5.31	112.48	26.92	12.27	16.70	9.01	-10.22	-17.91	161.22	298.73
	Shellfish	5.26	1.16	23.99	6.72	1.62	34.32	1.46	5.01	10.33	7.57	8.88	6.11	14.11	19.27
	Crustaceans	5.25	0.98	20.42	6.69	1.38	29.25	1.45	4.99	8.83	6.54	7.39	5.09	16.38	22.12
	Molluscs	0.02	0.17	3.56	0.03	0.24	5.07	0.01	11.68	1.50	1.03	1.49	1.01	0.78	1.13
	Shell molluscs	0.02	0.13	2.67	0.03	0.17	3.70	0.01	11.68	1.03	0.69	1.02	0.68	1.13	1.69
	Cephalopods	0.04	0.89	0.89	0.06	0.06	1.36			0.47	0.34	0.47	0.34		
	Fish	1.98	0.93	38.03	1.98	0.98	44.76	6.73	4.96	6.73	4.96	6.73	4.96	34.49	28.51
	Finfish	1.98	0.93	38.03	1.98	0.98	44.76	6.73	4.96	6.73	4.96	6.73	4.96	34.49	28.51
Sudan	Marine fish	0.13	0.13	5.28	0.14	0.14	6.49	6.28		1.20	1.00	1.20	1.00		
	F&D fish	1.98	0.80	32.74	1.98	0.83	38.27	36.69		5.53	3.96	5.53	3.96		
	Shellfish														
	Crustaceans														
	Molluscs														
	Shell molluscs														
	Cephalopods														
	Fish	0.08	16.66	9.09	0.08	18.74	10.63	10.30		1.54	1.22	1.54	1.22	83.14	75.18
	Finfish	0.00	9.97	5.44	0.00	10.77	6.11	5.93		0.67	0.50	0.67	0.50	167.19	152.12
	Marine fish		9.06	4.94		9.80	5.56	5.40		0.62	0.47	0.62	0.47		
F&D fish	0.00	0.91	0.50	0.00	0.97	0.94	0.53		0.05	0.03	0.05	0.03			
Shellfish	0.07	6.69	3.65	0.07	7.97	7.78	4.36		0.87	0.72	0.87	0.72			
Crustaceans	0.07	6.64	3.62	0.07	7.92	7.72	4.49		0.87	0.71	0.87	0.71			
Molluscs	0.05	0.04	0.02	0.05	0.05	0.03	0.03		0.01	0.00	0.01	0.00			
Shell molluscs	0.04	0.02	0.02	0.05	0.05	0.03	0.03		0.01	0.00	0.01	0.00			
Cephalopods	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00			

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		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵
		0.09	1.30	1.68	0.07	1.35	1.86	1.81	-0.03	-6.53	0.17	0.13	0.20	0.15	0.20	0.15	23.55	18.92
Swaziland	Finfish	0.09	1.26	1.63	0.07	1.29	1.79	1.75	-0.03	-6.53	0.16	0.12	0.19	0.15	0.19	0.15	22.70	18.10
	Marine fish	0.09	0.79	1.02	0.07	0.82	1.13	1.11	0.08	0.08	0.11	0.08	0.11	0.08	0.11	0.08		
	R&D fish	0.09	0.47	0.61	0.07	0.48	0.66	0.64	-0.03	-6.53	0.03	0.03	0.08	0.06	0.08	0.06	9.56	6.58
	Shellfish		0.04	0.05		0.04	0.06	0.06			0.01	0.01	0.01	0.01	0.01	0.01		
	Crustaceans		0.04	0.05		0.04	0.06	0.06			0.01	0.01	0.01	0.01	0.01	0.01		
	Molluscs																	
Sweden	Shell molluscs																	
	Cephalopods																	
	Fish	15.57	30.48	299.19	19.89	34.99	355.28	343.76	4.33	5.03	56.08	44.71	51.76	40.38	7.71	9.68	35.70	31.09
	Finfish	14.07	22.09	216.84	18.55	24.48	248.56	241.02	4.48	5.69	31.72	24.29	27.24	19.80	14.13	18.46	26.62	22.21
	Marine fish	14.07	7.36	72.24	18.55	8.03	81.50	78.67	4.48	5.69	9.27	6.47	4.78	1.99	48.37	69.27	10.65	7.86
	Shellfish	1.50	8.39	82.36	0.00	10.51	106.72	102.74	-0.16	-2.19	24.36	20.42	24.52	20.58			76.77	71.02
	Crustaceans	0.00	7.51	73.73	0.00	9.44	95.85	92.33			22.11	18.63	22.11	18.63			598.15	574.65
	Molluscs	1.50	0.88	8.63	1.34	1.07	10.87	10.41	-0.16	-2.19	2.25	1.79	2.40	1.94			20.12	17.01
	Shell molluscs	1.50	0.83	8.19	1.34	1.02	10.32	9.89	-0.16	-2.19	2.13	1.70	2.29	1.85			19.37	16.36
	Cephalopods		0.04	0.43		0.05	0.55	0.52			0.12	0.09	0.12	0.09				
	Fish	1.43	17.69	147.49	1.59	19.36	168.13	163.65	0.16	2.14	20.63	16.22	20.47	16.06	0.78	0.99	72.77	65.23
	Finfish	1.43	13.41	111.81	1.59	14.36	124.73	121.53	0.16	2.14	12.92	9.78	12.76	9.62	1.24	1.64	58.53	50.89
Marine fish		7.28	60.72		7.82	7.71	67.96			7.25	5.67	7.25	5.67					
R&D fish	1.43	6.13	51.09	1.59	6.54	56.76	55.18	0.16	2.14	5.68	4.11	5.52	3.95	2.82	3.89	37.75	31.07	
Shellfish		4.28	35.69		5.00	43.40	42.11			7.71	6.44	7.71	6.44					
Crustaceans		2.63	21.92		3.08	26.72	25.97			4.80	4.07	4.80	4.07					
Molluscs		1.65	13.77		1.88	16.68	16.14			2.91	2.38	2.91	2.38					
Shell molluscs		1.25	10.38		1.44	12.53	12.13			2.14	1.75	2.14	1.75					
Cephalopods		0.41	3.39		0.48	4.15	4.01			0.76	0.63	0.76	0.63					
Fish	365.23	32.99	771.50	421.62	40.21	940.71	895.72	56.40	2.91	169.20	125.64	112.81	69.25	33.33	44.89	7.91	6.09	
Finfish	235.41	15.45	361.26	279.28	17.14	401.00	384.57	43.87	3.48	39.75	23.52	-4.12	-20.35	110.37	186.52	3.17	1.92	
Marine fish	59.73	8.65	202.22	92.94	9.66	226.10	217.56	33.21	9.25	23.88	15.45	-9.33	-17.76	139.05	214.89	6.96	4.71	
R&D fish	175.68	6.80	159.04	186.34	7.48	174.90	167.01	10.66	1.18	15.86	8.06	5.20	-2.59	67.19	132.15	1.74	0.90	
Shellfish	129.81	17.54	410.25	142.34	23.07	539.71	512.15	12.53	1.86	129.46	102.13	116.93	89.60	9.68	12.27	14.84	12.31	
Crustaceans	24.10	4.73	110.61	30.53	6.21	145.26	138.52	6.43	4.85	27.98	27.98	28.22	21.54	18.57	23.00	19.51	16.66	
Molluscs	105.71	12.81	299.64	111.81	16.86	394.45	373.63	6.10	1.13	94.81	74.15	88.71	68.05	6.43	8.22	13.66	11.21	
Shell molluscs	105.71	7.40	173.10	111.81	9.61	224.77	213.20	6.10	1.13	51.67	40.20	45.57	34.10	11.80	15.17	8.28	6.66	
Cephalopods		5.41	126.54		7.25	169.68	160.43			43.14	33.95	43.14	33.95					

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)			
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵		
		0.37	0.50	4.30	0.37	0.52	5.12	4.89	Extra food fish supply (000 tonnes)	Annual growth rate (%)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
Tajikistan	Fish	0.37	0.50	4.30	0.37	0.52	4.89	0.82	0.60	0.82	0.60	0.82	0.60	0.82	0.60	0.82	26.14	21.07	
	Finfish	0.37	0.49	4.24	0.37	0.51	5.05	0.80	0.59	0.80	0.59	0.80	0.59	0.80	0.59	0.80	25.79	20.76	
	Marine fish	0.37	0.32	2.74	0.37	0.33	3.27	0.53	0.40	0.53	0.40	0.53	0.40	0.53	0.40	0.53			
	R&D fish	0.37	0.18	1.50	0.37	0.18	1.78	0.28	0.19	0.28	0.19	0.28	0.19	0.28	0.19	0.28	11.68	8.58	
	Shellfish	0.01	0.01	0.06	0.01	0.01	0.07	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02			
	Crustaceans	0.01	0.01	0.05	0.01	0.01	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
	Molluscs	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
	Shell molluscs	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
	Cephalopods																		
		Fish	5.28	5.48	297.65	9.42	6.23	393.54	4.14	12.27	95.89	72.77	91.75	68.63	4.32	5.69	80.49	71.36	
Tanzania, United Republic of (including Zanzibar)	Finfish	4.84	5.39	292.87	8.76	6.11	386.00	3.92	12.59	93.13	70.56	89.21	66.64	4.21	5.56	82.47	73.16		
	Marine fish	0.77	0.77	41.75	0.83	0.83	54.97	13.22	10.49	13.22	10.49	13.22	10.49	13.22	10.49				
	R&D fish	4.84	4.62	251.12	8.76	5.24	331.03	3.92	12.59	79.91	60.07	75.99	56.15	4.91	6.53	77.26	68.05		
	Shellfish	0.44	0.09	4.78	0.66	0.12	7.54	0.22	8.43	2.76	2.21	2.54	1.99	7.93	9.91	48.79	43.27		
	Crustaceans	0.44	0.05	2.84	0.66	0.07	4.53	0.22	8.43	1.69	1.38	1.47	1.16	12.99	15.91	37.08	32.83		
	Molluscs	0.04	0.04	1.94	0.05	0.04	3.02	2.77	1.08	0.83	0.83	1.08	0.83	0.83	0.83				
	Shell molluscs	0.02	0.02	1.28	0.03	0.03	1.93	1.78	0.66	0.50	0.50	0.66	0.50	0.66	0.50				
	Cephalopods	0.01	0.01	0.66	0.02	0.02	1.08	0.99	0.42	0.33	0.33	0.42	0.33	0.42	0.33				
		Fish	838.27	24.67	1 678.53	774.89	29.77	2 042.37	-63.37	-1.56	363.84	221.86	427.21	285.24	100.00	100.00	7.48	4.81	
	Thailand	Finfish	398.67	19.32	1 315.11	352.68	22.32	1 531.09	-46.00	-2.42	215.97	114.84	261.97	160.83	100.00	100.00	9.04	5.19	
Marine fish		2.68	11.06	752.86	2.44	12.77	875.84	-0.25	-1.92	122.97	68.07	123.22	68.32	100.00	100.00	115.82	92.40		
R&D fish		395.99	8.26	562.25	350.24	9.55	655.25	-45.75	-2.43	93.00	46.76	138.75	92.51	100.00	100.00	4.31	2.26		
Shellfish		439.59	5.34	363.42	422.22	7.45	511.28	-17.38	-0.80	147.87	107.03	165.24	124.40	100.00	100.00	5.97	4.45		
Crustaceans		279.48	1.42	96.59	268.23	1.92	131.51	-11.25	-0.82	34.92	24.90	46.17	36.15	100.00	100.00	2.38	1.72		
Molluscs		160.11	3.92	266.82	153.99	5.54	379.77	-6.12	-0.78	112.95	82.13	119.07	88.25	100.00	100.00	11.27	8.63		
Shell molluscs		160.11	1.81	123.29	153.99	2.45	167.94	-6.12	-0.78	44.65	31.25	50.77	37.37	100.00	100.00	5.04	3.63		
Cephalopods		2.11	143.53		2.86	211.83	194.34			68.30	50.88	68.30	50.88	100.00	100.00				
		Fish	0.06	5.77	6.91	0.06	4.38	6.24	0.00	1.52	-1.09	-0.66	-1.09	-0.66	100.00	100.00			
Timor-Leste		Finfish	0.06	5.58	6.68	0.06	4.27	6.08	0.00	1.55	-1.00	-0.59	-1.01	-0.60	100.00	100.00			
	Marine fish	0.06	0.07	0.08	0.06	0.06	0.07	0.08	0.00	1.55	-0.01	-0.01	-0.01	100.00	100.00				
	R&D fish	0.00	0.19	0.23	0.00	0.12	0.14	0.16	0.00	1.55	-0.09	-0.09	-0.07	100.00	100.00				
	Shellfish	0.00	0.11	0.13	0.00	0.06	0.08	0.09	0.00	1.55	-0.09	-0.09	-0.07	100.00	100.00				
	Crustaceans	0.00	0.11	0.13	0.00	0.06	0.08	0.09	0.00	1.55	-0.09	-0.09	-0.07	100.00	100.00				
	Molluscs	0.08	0.09	0.09	0.04	0.05	0.06	0.07	0.04	1.55	-0.04	-0.04	-0.03	100.00	100.00				
	Shell molluscs	0.05	0.06	0.06	0.03	0.03	0.04	0.04	0.03	1.55	-0.02	-0.02	-0.02	100.00	100.00				
	Cephalopods	0.03	0.04	0.04	0.02	0.02	0.02	0.02	0.02	1.55	-0.02	-0.02	-0.01	100.00	100.00				

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)		
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Annual growth rate (%)	Extra food fish supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
		24.07	17.05	762.74	24.72	20.01	871.63	0.65	0.53	108.90	67.32	108.25	66.67	0.59	0.96	40.75	30.58
Ukraine	Finfish	23.99	15.26	682.48	24.63	17.67	769.46	0.65	0.53	86.98	52.20	86.33	51.55	0.74	1.24	35.84	26.00
	Marine fish	1.10	13.03	582.80	1.74	15.13	658.91	0.65	0.71	76.11	47.19	75.46	46.55	0.85	1.37	134.16	113.18
	R&D fish	22.89	2.23	99.69	22.89	2.54	110.56	10.87	5.00	10.87	5.00	10.87	5.00			8.08	4.03
	Shellfish	0.09	1.79	80.25	0.09	2.35	102.17	21.92	15.12	21.92	15.12	21.92	15.12			202.67	181.12
	Crustaceans	0.00	0.51	22.64	0.00	0.68	29.43	6.79	4.99	6.79	4.99	6.79	4.99			476.45	442.13
	Molluscs	0.09	1.29	57.61	0.09	1.67	72.74	15.13	10.13	15.13	10.13	15.13	10.13			181.84	160.24
	Shell molluscs	0.09	1.28	57.38	0.09	1.66	72.43	15.05	10.07	15.05	10.07	15.05	10.07			181.55	159.96
	Cephalopods	0.01	0.24	0.24	0.01	0.32	0.29	0.08	0.06	0.08	0.06	0.08	0.06				
	Fish	0.93	23.55	216.95	1.62	26.08	257.78	0.69	11.71	40.83	33.43	40.14	32.74	1.69	2.06	113.93	105.74
	Finfish	0.53	21.10	194.34	1.00	23.13	228.65	0.47	13.54	34.31	28.05	33.84	27.58	1.37	1.68	130.89	121.92
Marine fish	0.37	20.28	186.81	0.70	22.26	220.05	0.34	14.03	33.24	27.27	32.90	26.93	1.02	1.24	147.05	137.56	
R&D fish	0.17	0.82	7.53	0.30	0.87	8.60	0.13	12.41	1.07	0.78	0.94	0.65	12.32	16.94	49.43	41.60	
Shellfish	0.40	2.45	22.61	0.62	2.95	29.13	0.22	9.09	6.52	3.88	6.30	5.16	3.35	4.06	76.77	70.53	
Crustaceans	0.40	1.70	15.70	0.62	2.06	20.32	0.22	9.09	4.62	3.87	4.40	3.65	4.73	5.65	65.79	60.48	
Molluscs	0.75	0.75	6.91	0.89	0.86	8.81	0.82	1.52	1.90	1.52	1.90	1.52					
Shell molluscs	0.53	0.53	4.87	0.62	0.62	6.12	0.62	1.25	0.98	0.98	1.25	0.98					
Cephalopods	0.22	2.04	2.04	0.27	0.26	2.69	2.57	0.65	0.53	0.53	0.65	0.53					
Fish	207.84	20.58	1 335.65	219.71	23.30	1 558.28	11.87	1.12	222.63	177.08	210.76	165.21	5.33	6.70	15.68	13.12	
Finfish	187.70	15.36	997.04	206.09	16.92	1 131.72	18.39	1.89	134.67	103.99	116.28	85.59	13.66	17.69	111.42	92.2	
Marine fish	0.30	12.32	799.69	0.30	13.63	911.57	887.55	11.88	88.24	111.88	88.24	88.24			227.66	212.52	
R&D fish	187.40	3.04	197.35	205.79	3.29	220.14	213.00	18.39	1.89	22.79	15.74	4.40	-2.65	80.69	2.32	1.63	
Shellfish	20.14	5.22	338.60	13.62	6.38	426.56	411.53	-6.53	-7.53	87.96	73.09	94.48	79.62		39.94	35.86	
Crustaceans	3.73	242.36	242.36	4.60	4.49	307.71	297.38	65.35	55.14	65.35	55.14	65.35					
Molluscs	20.14	1.48	96.25	13.62	1.78	118.85	114.15	-6.53	-7.53	22.60	17.95	29.13	24.48		16.24	13.59	
Shell molluscs	20.14	1.28	83.06	13.62	1.53	102.50	98.50	-6.53	-7.53	19.44	15.47	25.96	22.00		14.46	12.07	
Cephalopods	0.20	13.18	13.18	0.24	0.24	16.35	15.65	3.17	2.48	3.17	2.48	3.17					
Fish	424.52	21.70	7 009.54	431.78	24.90	8 332.84	7 942.38	7.26	0.34	1 323.30	936.24	1 316.04	928.99	0.55	0.78	37.71	26.23
Finfish	206.24	12.46	4 022.92	207.26	13.53	4 527.13	4 325.16	1.02	0.10	504.21	304.19	503.19	303.16	0.20	0.34	28.07	19.87
Marine fish	2.81	7.18	2 319.38	3.83	7.81	2 614.61	2 503.60	1.02	6.40	295.24	185.35	294.22	184.33	0.35	0.55	154.23	131.89
R&D fish	203.43	5.28	1 703.54	203.43	5.71	1 912.51	1 821.55	208.97	118.83	208.97	118.83	208.97	118.83		15.18	9.64	
Shellfish	218.28	9.25	2 986.62	224.52	11.37	3 800.71	3 617.23	6.24	0.56	819.09	632.06	812.86	625.82	0.76	0.99	36.58	31.25
Crustaceans	60.48	5.56	1 795.45	69.49	6.87	2 300.05	2 189.18	9.01	2.81	504.60	394.60	495.59	385.60	1.78	2.28	56.35	49.72
Molluscs	157.80	3.69	1 191.17	155.03	4.50	1 505.66	1 428.05	-2.77	-0.35	314.49	237.45	317.26	240.22		24.51	20.16	
Shell molluscs	157.80	3.34	1 077.26	155.03	4.06	1 360.51	1 290.75	-2.77	-0.35	283.25	214.01	286.02	216.78		22.82	18.70	
Cephalopods	0.35	113.91	113.91	0.43	0.41	145.15	137.29	31.25	23.44	31.25	23.44	31.25	23.44				

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Country or country group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s				Annual aquaculture growth rate needed to close demand-supply gap (%)					
	Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth (000 tonnes)	Annual aquaculture growth rate (%)	Extra food fish supply (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand generated by income and population growth (000 tonnes)	Standard ⁴	Conservative ⁵	Extra demand minus extra supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
Uruguay	Fish	0.25	7.48	25.73	0.42	8.47	8.21	29.65	28.46	3.93	2.74	3.76	2.58	4.16	5.95	75.41	64.12			
	Finfish	0.25	6.52	22.43	0.41	7.25	7.04	25.38	24.42	2.95	2.00	2.79	1.84	5.53	8.16	66.37	55.03			
	Marine fish		5.06	17.40		5.66	5.51	19.82	19.11	2.42	1.71	2.42	1.71							
	R&D fish	0.25	1.46	5.03	0.41	1.59	1.53	5.56	5.31	0.53	0.29	0.37	0.12	30.68	56.82	25.52	16.46			
	Shellfish	0.00	0.96	3.30	0.00	1.22	1.17	4.27	4.04	0.97	0.74	0.97	0.74			540.82	507.29			
	Crustaceans	0.00	0.16	0.55	0.00	0.21	0.20	0.72	0.69	0.17	0.14	0.17	0.14			352.23	332.29			
	Molluscs	0.80	2.75			1.01	0.97	3.55	3.35	0.80	0.61	0.80	0.61							
	Shell molluscs	0.60	2.07			0.76	0.72	2.65	2.51	0.58	0.44	0.58	0.44							
	Cephalopods	0.20	0.67			0.26	0.24	0.90	0.84	0.22	0.17	0.22	0.17							
	Fish	30.53	0.74	22.31	51.40	0.83	0.78	26.50	24.68	20.87	10.98	2.39	-16.68	-18.49	498.13	873.99	2.61	1.52		
Finfish	30.53	0.74	22.21	51.40	0.83	0.78	26.36	24.56	20.87	10.98	2.36	-16.72	-18.51	502.72	883.66	2.58	1.50			
Marine fish		0.30	8.90		0.33	0.32	10.65	10.00			1.75	1.10	1.10			1.53	0.81			
R&D fish	30.53	0.44	13.31	51.40	0.49	0.46	15.71	14.56	20.87	10.98	2.40	1.26	-18.47	-19.61	868.97	1 653.13				
Shellfish	0.00	0.10	0.00	0.00	0.00	0.14	0.12	0.00	0.00	0.00	0.03	0.03	0.04	0.03						
Crustaceans	0.00	0.06	0.00	0.00	0.00	0.08	0.07	0.00	0.00	0.02	0.01	0.02	0.01	0.02						
Molluscs	0.00	0.04	0.00	0.00	0.00	0.06	0.05	0.00	0.00	0.02	0.01	0.02	0.01	0.02						
Shell molluscs	0.00	0.03	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.01	0.01	0.01	0.01	0.01						
Cephalopods	0.00	0.01	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.01	0.00	0.01	0.00	0.01						
Fish	0.09	30.98	8.29	0.11	35.27	34.61	10.48	10.18	0.02	4.43	1.89	2.17	1.87	0.96	1.11	92.28	86.93			
Finfish	0.07	28.76	7.69	0.09	32.54	31.96	9.66	9.40	0.02	4.43	1.97	1.70	1.69	0.86	0.99	96.45	91.02			
Marine fish		28.36	7.59		32.12	31.56	9.54	9.28			1.96	1.69	1.69							
R&D fish	0.07	0.40	0.11	0.09	0.42	0.40	0.12	0.12	0.02	4.43	0.02	0.01	-0.00	-0.01	102.32	144.64	4.34	3.14		
Shellfish	0.02	2.22	0.59	0.02	2.73	2.65	0.81	0.78	0.00	4.42	0.22	0.19	0.21	1.87	2.19	69.36	64.40			
Crustaceans	0.02	1.29	0.35	0.02	1.58	1.54	0.47	0.45	0.00	4.42	0.13	0.11	0.12	0.10	3.25	53.23	49.28			
Molluscs	0.93	0.25			1.15	1.11	0.34	0.33			0.09	0.08	0.09	0.08						
Shell molluscs	0.31	0.08			0.38	0.37	0.11	0.11			0.03	0.02	0.03	0.02						
Cephalopods	0.62	0.16			0.77	0.74	0.23	0.22			0.06	0.05	0.06	0.05						
Fish	35.73	7.80	244.27	51.07	7.34	7.49	244.33	246.86	15.34	7.41	0.06	2.73	-15.29	-12.62	26 686.25	562.52	0.03	1.48		
Finfish	9.07	6.41	200.66	12.79	6.09	6.21	202.90	204.48	3.71	7.10	2.24	3.94	-1.47	165.44	94.31	4.52	7.47			
Marine fish	0.00	5.25	164.31	0.00	4.98	5.07	165.73	166.97			1.41	2.75	1.41	2.75						
R&D fish	9.07	1.16	36.34	12.79	1.12	1.14	37.18	37.51	3.71	7.10	0.83	1.19	-2.88	-2.53	446.41	312.60	1.77	2.49		
Shellfish		1.39	43.62		38.28	1.24	1.29	41.43	42.38			1.163	7.51	-13.82	-12.84	100.00	100.00			
Crustaceans	26.65	0.59	18.41	38.28	0.52	0.54	17.40	17.78	11.63	7.51	-1.01	-0.62	-12.65	-12.25	100.00	100.00				
Molluscs	0.00	0.80	25.20	0.00	0.72	0.75	24.03	24.60			-1.17	-0.59	-1.17	-0.59	100.00	100.00				
Shell molluscs	0.00	0.75	23.51	0.00	0.67	0.70	22.45	22.97			-1.07	-0.53	-1.07	-0.53	100.00	100.00				
Cephalopods	0.05	1.69			0.05	0.05	1.58	1.63			-0.11	-0.06	-0.11	-0.06						

Venezuela,
Bolivarian
Republic of

TABLE A: SUMMARY OF DEMAND-SUPPLY GAP PROJECTIONS¹

Country or country group	Species group	Baseline situation in the mid-2010s ²			Projected situation in the early 2020s ³			Demand and supply growth from the mid-2010s to the early 2020s				Demand-supply gap in the early 2020s			Annual aquaculture growth rate needed to close demand-supply gap (%)				
		Aquaculture production (000 tonnes)	Per capita consumption (kg)	Total consumption (000 tonnes)	Aquaculture production (000 tonnes)	Per capita demand (kg)	Total demand (000 tonnes)	Trend aquaculture growth	Annual growth rate (%)	Extra food fish supply (000 tonnes)	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	Standard ⁴	Conservative ⁵	
Viet Nam	Fish	3 645.67	34.87	3 275.88	4 506.54	49.16	4 846.02	4 304.27	860.87	4.33	1 570.13	1 030.41	709.26	169.54	54.83	83.55	7.43	5.10	
	Finfish	2 951.70	25.60	2 405.35	3 647.13	32.90	3 243.55	2 902.08	695.44	4.32	838.19	498.21	142.76	-197.22	82.97	139.59	5.13	3.17	
	Marine fish	120.02	12.26	1 151.87	167.67	15.63	1 541.15	1 388.90	47.65	6.92	389.29	237.75	341.64	190.10	12.24	20.04	33.52	24.41	
	F&D fish	2 831.68	13.34	1 253.49	3 479.46	17.27	1 552	1 702.39	1 513.18	647.79	4.21	448.91	260.47	-198.88	-387.32	144.30	248.70	2.99	1.78
	Shellfish	693.98	9.27	870.53	859.41	16.25	1 438	1 602.47	1 402.19	165.43	4.37	731.94	532.19	566.51	366.76	22.60	31.09	15.49	12.06
	Crustaceans	492.00	4.60	431.78	600.93	7.97	709	786.07	691.42	108.93	4.08	354.29	259.91	245.36	150.98	30.75	41.91	11.46	8.85
	Molluscs	201.98	4.67	438.76	258.48	8.28	729	816.40	710.77	56.50	5.06	377.65	272.28	321.14	215.78	14.96	20.75	23.47	18.62
	Shell molluscs	201.98	2.62	246.09	258.48	4.41	390	435.05	379.74	56.50	5.06	188.96	133.80	132.46	77.30	29.90	42.23	14.12	10.70
	Cephalopods	2.05	192.67			3.40	381.35	331.03		188.69		138.48		188.69	138.48				
	Fish	0.10	2.35	63.90	0.10	2.60	81.07	78.07		17.18		14.21		17.18	14.21			180.22	169.86
Yemen	Finfish	2.31	62.81			2.62	2.55	79.52	76.59		16.70	13.82	16.70	13.82					
	Marine fish	2.27	61.76			2.58	2.51	78.23	75.37		16.48	13.65	16.48	13.65					
	F&D fish	0.04	1.06			0.04	0.04	1.28	1.23		0.23	0.17	0.23	0.17					
	Shellfish	0.10	0.04	1.08	0.10	0.05	1.56	1.48	0.47	0.39	0.47	0.39	0.47	0.39			41.87	37.69	
	Crustaceans	0.10	0.03	0.90	0.10	0.04	1.29	1.22	0.39	0.33	0.39	0.33	0.39	0.33			37.55	33.78	
	Molluscs	0.01	0.19			0.01	0.01	0.27	0.25		0.08	0.07	0.08	0.07					
	Shell molluscs	0.00	0.07			0.00	0.00	0.10	0.10		0.03	0.02	0.03	0.02					
	Cephalopods	0.00	0.11			0.01	0.01	0.17	0.16		0.05	0.04	0.05	0.04					
	Fish	23.50	5.93	97.72	35.83	6.49	62.6	118.84	118.84	12.33	8.80	26.64	21.18	14.31	8.85	46.27	58.21	16.36	13.71
	Finfish	23.50	5.92	97.52	35.83	6.47	62.4	124.08	118.58	12.33	8.80	26.55	21.11	14.23	8.78	46.42	58.40	16.32	13.67
Marine fish	0.69	11.29			0.75	0.73	14.35	13.81			3.06	2.53	3.06	2.53					
F&D fish	23.50	5.24	86.23	35.83	5.72	55.2	109.73	104.77	12.33	8.80	23.49	18.58	11.17	6.25	52.47	66.34	14.86	12.35	
Shellfish	0.01	0.20			0.01	0.01	0.28	0.27			0.08	0.07	0.08	0.07					
Crustaceans	0.00	0.08			0.01	0.01	0.11	0.11			0.04	0.03	0.04	0.03					
Molluscs	0.01	0.12			0.01	0.01	0.17	0.16			0.05	0.04	0.05	0.04					
Shell molluscs	0.01	0.10			0.01	0.01	0.15	0.14			0.04	0.03	0.04	0.03					
Cephalopods	0.00	0.01			0.00	0.00	0.02	0.02			0.01	0.01	0.01	0.01					
Fish	14.06	2.68	42.29	22.89	2.89	51.07	49.05	49.05	8.83	10.24	8.78	6.79	-0.05	-2.04	100.57	130.06	10.19	8.20	
Finfish	14.06	2.66	42.05	22.89	2.87	50.75	48.75	48.75	8.83	10.24	8.70	6.73	-0.13	-2.10	101.47	131.28	10.12	8.14	
Marine fish	0.71	11.25			0.77	0.75	13.57	13.10			2.32	1.86	2.32	1.86					
F&D fish	14.06	1.95	30.80	22.89	2.11	2.04	37.18	35.65	8.83	10.24	6.38	4.87	-2.45	-3.96	138.37	181.38	7.78	6.13	
Shellfish	0.02	0.24			0.02	0.02	0.32	0.30			0.08	0.06	0.08	0.06					
Crustaceans	0.00	0.06			0.00	0.00	0.08	0.07			0.02	0.02	0.02	0.02					
Molluscs	0.01	0.19			0.01	0.01	0.24	0.23			0.06	0.05	0.06	0.05					
Shell molluscs	0.01	0.17			0.01	0.01	0.23	0.22			0.05	0.04	0.05	0.04					
Cephalopods	0.00	0.01			0.00	0.00	0.01	0.01			0.00	0.00	0.00	0.00					

Source: Authors' estimation.

As opposed to most work that forecasts future fish demand and supply focusing on medium- or long-term projections at the global or regional level, a short-term projection model is developed by the Food and Agriculture Organization of the United Nations (FAO) to assess and monitor potential future fish demand-supply gaps at the national (nearly 200 countries or territories), regional (about 40 country groups) and global levels for nine species groups. Results generated by the short-term projection model can be used by governments to facilitate the establishment of evidence-based regulations, policies and development strategies and plans, by development agencies or donors to set targets and allocate resources, and by fish farmers or investors in business or investment planning.

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