

## TRENDS AND FACTORS OF DEVELOPMENT OF THE WORLD CONSUMPTION OF FISH AND FISHERY PRODUCTS

---

Renata Knap, Ph.D.

*Department of Foreign Trade and International Economic Relations  
Faculty of Economics and Management  
University of Szczecin  
Mickiewicza 64, 71-101 Szczecin  
e-mail:renataknap@onet.pl*

**Received 15 August 2011, Accepted 31 August 2011**

---

### **Abstract**

The aim of the paper is to present the results of the analysis of development trends in the world consumption of fish and fishery products and the fundamental factors shaping the volume and structure of consumption of fishery products in the last five decades. In the first part, the paper presents the volume, dynamics and structure of world consumption of fishery products, while the second part discusses the determinants of the trend of development in their consumption during this period.

**Keywords:** fish and fishery products consumption, demand factors.

**JEL classification:** Q11.

## Introduction

The world's total consumption of fish and fishery products has seen major changes in the last five decades. The increasing demand for food in general contributed to increases in the demand for food fish, and rapid socio-economic changes in the world initiated both qualitative and structural transformation of the global consumption of fishery and aquaculture products.

The aim of the paper is to present the results of an analysis of development tendencies in the global consumption of fish and fishery products and the major determinants shaping the volume and structure of fish consumption over the last five decades.

The first part of the paper analyses the volume, dynamics and structure of the global consumption of fishery products. The second part discusses the factors which contributed to the development tendencies observed for this consumption in the period of analysis.

### **1. Global consumption of fish and fishery products and its structure in the years 1961–2007**

According to FAO (*Food and Agriculture Organization of the United Nations*) reports, the global consumption of fish and other aquatic animals (total food fish supply)<sup>1</sup> increased from 27.7 million tonnes in 1961 to 114.0 million tonnes in 2007, in other words – it quadrupled. The average total food fish supply in that period increased at an annual rate of 3.1% whereas the world population increased by 1.7% thus raising the global per capita food fish supply. In 1961 the annual per capita fish consumption amounted to 9 kg only to rise up to 11.5 kg a decade later, and 12.5 kg in the 1980s. This upward trend persisted: in the 1990s the figure reached 14.4 kg, and in 2007 – 17.1 kg (see Table 1). According to the preliminary FAO estimates, 2008 saw further increase in per capita consumption whereas in 2009 this upward tendency stopped or even slightly reversed. The decrease in the world food fish supply reported in 2009 was caused mostly by the shrinking demand in developed countries resulting from the global economic crisis<sup>2</sup>.

The analysis of the distribution of the world food fish supply by regions suggests that the greatest volume of food fish was consumed in the analysed period in Asia, which in 1961 accounted for nearly 47% of the global consumption, and in 2007 – for more than 66%. Europe was the second region in terms of the total consumption of fish, molluscs, and crustaceans (in absolute terms) in the years 1961–2007, yet its share of the global consumption showed a decreasing trend dropping from 22.1% in 1961 to 13.6% in 2007. Markedly lower levels of total food fish supply were reported in that period for North and Middle America, Africa

and South America, which accounted for 9.1%, 7.4% and 3.1% of the world total in 2007, respectively. The lowest food fish supply was reported for Oceania, which absorbed in the analysed period only 0.6–1.0% of the world total<sup>3</sup>.

Table 1. World apparent consumption of fish and fishery products and its growth in the years 1961–2007

Years	total consumption		per capita consumption	
	million tonnes	1961 = 100 %	kg/person	1961 = 100 %
1961	27.7	100.0	9.0	100.0
1965	33.4	120.6	10.0	111.1
1970	40.4	145.8	11.0	122.2
1975	47.8	172.6	11.8	131.1
1980	51.0	184.1	11.5	127.8
1985	61.0	220.2	12.6	140.0
1990	71.7	258.8	13.6	151.1
1995	85.4	308.3	14.9	165.6
2000	96.1	346.9	15.7	174.4
2005	107.7	388.8	16.5	183.3
2007	114.0	411.6	17.1	190.0

Source: own calculations based on G. Laurenti, *1961–2007 Fish and Fishery Products: World Apparent Consumption Statistics Based on Food Balance Sheets*, in: *FAO Yearbook. Fishery and Aquaculture Statistics. 2008*, FAO, Rome 2010, (CD-ROM).

Nevertheless, despite the lowest fish consumption in absolute terms, Oceania reported the highest per capita figures, which were almost twice as high as the world average. Similar and high levels of per capita food fish supply were also reported in the 1961–2007 period in Europe and North America. The per capita supply in Asia, despite the highest consumption of fish and fishery products in absolute terms, remained very low until the 1980s (below 10 kg and much below the global average) but following the dynamic growth seen by the 1980s and 1990s, from 1993 on it oscillated above the world average. The lowest per capita consumption was reported in the analysed period in Middle America, South America and Africa, where the per capita consumption in the years 1961–2007 was nearly twice lower than the global average<sup>4</sup>.

When analysing the world food fish supply by economic regions, one should emphasise the high dynamics of the total fish consumption in the developing countries, much above the dynamics reported for developed countries (see Table 2).

As a consequence, the share of these countries in the global consumption of fish and fishery products was gradually rising in the analysed period. In 1961 these economies accounted

for 39.5% of the global consumption and in 1987 they outperformed developed economies for the first time in history. Eventually, in 2007, developing economies accounted for over 71% of the global fish consumption (see Table 2).

Table 2. World apparent consumption of fish and fishery products and its dynamics by economic regions and as a percentage of the world total in 1961–2007 (million tonnes; %)

Years	Developed countries			Developing countries		
	total consumption (million tonnes)	dynamics 1961 = 100 (%)	percentage of the world total (%)	total consumption (million tonnes)	dynamics 1961 = 100 (%)	percentage of the world total (%)
1961	17.0	100.0	60.5	11.1	100.0	39.5
1970	24.2	142.4	59.5	16.5	148.6	40.5
1975	27.1	159.4	56.5	20.9	188.3	43.5
1980	27.4	161.2	53.1	24.2	218.0	46.9
1985	31.7	186.5	51.5	29.9	269.4	48.5
1990	32.8	192.9	45.3	39.6	356.7	54.7
1995	30.6	180.0	35.6	55.3	498.2	64.4
2000	31.1	182.9	31.7	66.9	602.7	68.3
2005	31.9	187.6	30.3	73.5	662.2	69.7
2007	32.9	193.5	28.9	81.1	730.6	71.1

Source: as for Table 1.

The per capita consumption, however, remained higher in the group of developed economies in the whole period of analysis. In 1961 this group of countries reported per capita consumption at the level of 17.3 kg whereas in developing countries it was more than three times lower – at only 5.3 kg. This discrepancy persisted until the 1990s when – following the surge in the per capita consumption of developing countries and a significant fall observed in developed economies – it significantly decreased. In the years 2005–2007 the annual per capita consumption in the group of developed countries reached 24.1 kg whereas in the group of developing countries it was by approx. 38% lower at 14.9 kg (see Table 3).

When exploring the next issue, the world food fish consumption by countries, one should point out to the outstanding concentration of consumption in the years 1961–2007 (see Table 4). Although there were significant shifts within the group of the major world consumers, its composition – in general – remained unchanged. China, in particular, had experienced a dramatic increase in its share since the beginning of the 1990s. As a result, in 2007 the PRC alone accounted for as much as nearly 35% of the global consumption (see Table 4).

Table 3. Average annual per capita consumption of fish and fishery products in developed and developing countries against the world averages in 1961–2007

Years	Developed countries (kg/person)	Developing countries (kg/person)	World (kg/person)
1961–1963	17.9	5.5	9.4
1970–1972	22.7	6.6	11.3
1976–1978	23.5	7.3	11.7
1982–1984	24.7	7.9	12.2
1988–1990	26.6	9.7	13.8
1994–1996	23.3	12.6	15.0
2000–2002	23.9	14.2	16.2
2005–2007	24.1	14.9	16.8

Source: own calculations based on *FAO Yearbook. Fishery Statistics*, FAO, Rome (for respective years); *FAO Yearbook. Fishery and Aquaculture Statistics*. FAO, Rome (for respective years).

Table 4. The world's major consumers of fish food in the years 1961 and 2007 (million tonnes; %)

1961			2007		
country	total supply (million tonnes)	percentage of the world total (%)	country	total supply (million tonnes)	percentage of the world total (%)
1. Japan	4.6	16.5	1. China	34.9	30.6
2. China	3.2	11.5	2. Japan	7.4	6.5
3. USSR	3.1	10.9	3. USA	7.2	6.3
4. USA	2.5	8.9	4. India	6.3	5.5
5. UK	1.1	3.8	5. Indonesia	5.4	4.7
6. Indonesia	0.9	3.3	6. Russia	3.2	2.8
7. India	0.9	3.0	7. Philippines	3.1	2.7
8. France	0.8	3.0	8. South Korea	2.7	2.4
9. Spain	0.8	2.8	9. Vietnam	2.6	2.3
10. Italy	0.8	2.7	10. Bangladesh	2.3	2.0
11. Germany	0.7	2.5	11. France	2.1	1.8
12. Philippines	0.6	2.3	12. Thailand	2.0	1.8
13. Portugal	0.5	1.8	13. Spain	1.9	1.7
14. Vietnam	0.5	1.7	14. Italy	1.5	1.3
15. Bangladesh	0.4	1.5	15. Malaysia	1.4	1.2
Total 1–15	21.4	76.3	Total 1–15	84.0	73.6
Other countries	6.7	23.7	Other countries	30.0	26.4
World	28.1	100.0	World	114.0	100.0

Source: own calculations based on G. Laurenti, *op.cit.*

A markedly uneven distribution of the per capita consumption of fish and other aquatic animals by individual countries, unrelated to the geographic or economic region in the world, has been one of the most characteristic features describing the global food fish supply. A good illustration of this fact is provided by the differences in the annual per capita food fish supply between individual countries – the figure ranged from below 0.5 kg to over 100 kg<sup>5</sup>.

The vast majority of countries reported in the analysed period an increase in the per capita fish consumption, yet the dynamics of this growth varied a lot with the country. In developing countries, for instance, the growth rate was nearly twice as high as in the developed countries (270.9% and 134.6%, respectively)<sup>6</sup>. This surge in consumption reported in the countries with its low level and a moderate growth (or even stagnation or decline) reported in the group of major consumers have offset the disproportions in the total food fish supply in the world.

While examining the world's total food fish supply by groups of species, one will observe the diversification of the global consumption related to the distribution of the species produced by the world fisheries in the analysed period. The most characteristic phenomenon involved the decreasing share of marine fish (from approx. 70% in 1961 to 42.9% in 2007) in favour of freshwater and diadromous fish as well molluscs and crustaceans (from 16.8% to 32.4%, from 8.9% to 15.1% and from 4.6% to 9.6%, respectively). The increased share of freshwater and diadromous fish in the total food fish supply was related to a rapid development of aquaculture which delivered as much as 36% of the global fisheries production in 2007<sup>7</sup>.

The structure of the total food fish supply by groups of species varied in the analysed period with the geographic region and level of the region's economic development. These significant differences in consumption by groups of species between developing countries and developed countries were related mostly to the increasing share of freshwater and diadromous fish in the total consumption. The differences in consumption were also seen within the groups of fish, molluscs and crustaceans. The species consumed in developed countries were – generally – more expensive (e.g. demersal fish within marine fish, and salmon and trout among freshwater and diadromous fish). The consumption of fishery products in developing countries, on the other hand, was dominated by cheaper species such as pelagic fish within marine fish, and carp and panga within freshwater and diadromous fish. Generally speaking, the quality of fishery products (related to the species and form of the product, measured, for instance, with the amount of protein per unit of the product) consumed in more developed countries was much higher than in less developed countries<sup>8</sup>.

It should be emphasised that there were also huge differences in the structure of consumption by groups of species between individual countries representing the same geographic or economic

region on the one hand, and countries reporting similar levels of per capita consumption of fishery products on the other<sup>9</sup>.

## **2. The factors driving the global consumption of fish and fishery products**

The global consumption of a given type of food (at the level of the whole world, individual country or region) is determined by two factors: population and per capita consumption. From the viewpoint of demand, the dynamics of the global consumption is determined by the development trends of both factors.

The changes in the population of the world as a whole and individual countries and regions exerted a huge influence on the volume and structure of the global food fish consumption in the analysed period. A more than 2.5-fold increase in the world population between the years 1950 and 2007 was the major driver of the surge in the total consumption of fishery products observed for the world as a whole in that period. The uneven distribution of the human population in the world contributed in turn to the differences in the total food fish supply across the world. The regions inhabited by large populations (Asia, Europe) reported much higher levels of the total consumption of fishery products than less populated regions (Oceania) – see Table 2.

The differences in the dynamics of population increases between individual countries and regions, in turn, affected the regional structure of the world consumption. It manifested itself, for instance, in the increasing share of countries reporting rapid population growth (Asia, developing countries) at the expense of countries with less dynamic growths (Europe, North America, and developed countries in general) – see Tables 2 and 3.

Nevertheless, the population factor alone does not provide a sufficient explanation for the phenomena observed in the global consumption of fishery products as the total food fish supply was increasing faster in the whole period of analysis than the world population while the distribution of consumption across the world and the changes in the total supply in certain countries or regions remained disproportionate to both their populations and population growths. These phenomena reflect the impact of the per capita consumption on the development trends observed for the global consumption of fishery products in the years 1961–2007. The huge dynamics of the global fish consumption was related not only to the increase in the world population but also to the aforementioned growth in the per capita consumption.

The huge differences in the per capita consumption between individual countries and regions were the major (sometimes even decisive) factor shaping the geographic structure of the world total food fish supply. The difference in the levels of per capita supply provided an

explanation for the discrepancies between the distribution of population across the world and the contribution of individual countries and regions to the total food fish supply. For instance, the low per capita consumption reported in Africa placed the continent below North America in terms of a percentage of the world total despite North America's population being smaller, yet owing to its very high per capita consumption. At the beginning of the analysed period the group of developing countries had also a markedly lower share in the global consumption of fishery products than the developed countries even though the preceding accounted for as much as approx. 68-69% of the world's population. The per capita consumption in developing countries, however, was nearly three times lower than in developed countries in the same period (see Table 3).

These differences in the growth in the per capita consumption between individual countries and regions were a major contributor to the changes in the geographic structure of the world consumption of fishery products. The increase in the share of developing countries in the global consumption from approx. 30% at the beginning of the analysed period to as much as 71.1% in 2007 is a good illustration of this phenomenon. It resulted not only from the increased population in this group of countries but mostly from a surge in the per capita consumption, exceeding significantly the growth in per capita consumption in developed countries reported between the mid 1970s and late 1990s.

Appropriate recognition of the drivers of the world consumption of fishery products requires therefore identification of the determinants of per capita fish consumption, i.e. factors shaping consumer behaviour (preferences).

The volume, dynamics and structure of per capita consumption of fish and fishery products, like in the case of other food products, is affected by a variety of factors of environmental, economic, political, religious and like character<sup>10</sup>. In the literature several of them are mentioned as the most important ones: traditional consumer habits and tastes, disposable income level, prices of fishery products and fish substitutes as well as the availability of these products<sup>11</sup>.

Traditional consumer habits and tastes are an important element shaping eating patterns in the world and assuring diversified diets in various regions of the world. They provide a good explanation for the differences in the per capita fish consumption observed across the world. The existing variety of traditional eating habits, on the other hand, is attributed to the differences in the natural conditions which determine both production and structure of the food consumed in individual regions or countries. In the case of fishery products it usually comes down to the variety of natural conditions such as an access to the sea, occurrence of certain resources in the coastal waters or access to inland waters rich in fish resources.



Countries with a high per capita consumption of fishery products as an important element of the population's diet usually are islands or have a developed coastline, their economic development has been historically related with the sea, and a large percentage of their population has been employed in professions related to the sea. All these factors have affected the historical development of both certain eating habits in these societies – with fish and fishery products playing a large part in them, and certain taste preferences, regardless of any other factors: from the geographical point of view, these countries represented all the continents, and from the economic perspective, they included both developed and developing countries<sup>12</sup>.

The geographical conditions have also affected the development of tastes and preferences for certain types of fish food consumed in individual regions or countries. The warm waters of the Atlantic and the Pacific Oceans provide a wide variety of species of fish, molluscs and crustaceans, whereas their cold waters offer less variety of seafood. As a consequence, the populations of developed countries in northern Europe and North America usually valued a small number of species. Their food fish consumption – unlike in other regions with a large demand for more species of fish, molluscs and crustaceans – was less diverse<sup>13</sup>.

Consumers' disposable income is also considered an important factor shaping the total food fish supply and its structure. A positive relation between disposable income and fish consumption was reflected in the differences in per capita consumption between individual economic regions of the world: as already shown, in the whole period of analysis, the per capita consumption in the group of "rich" countries was much higher than in the "poor" ones (see Table 4). The differences in income between individual countries and regions also explained the differences in the structure of consumption by species on the scale of the world: developed countries usually consumed more of more expensive products (such as marine demersal fish, farm salmon and trout, oysters, crawfish, lobsters, caviar) whereas less developed countries consumed more of cheaper fishery products (such as marine pelagic fish or farm carp)<sup>14</sup>.

Increase in income is usually perceived as the major driver of changes in the volume and structure of the food consumed (according to the E. Engel's law). Higher income and better satisfaction of nutrition needs lead to changes in the demand for individual groups of food products depending on their income elasticity.

Taking into account the estimated income elasticity of the demand for food in the world, it may be concluded that the increase in the world per capita consumption of fishery products in the post-war period was to a large degree a result of the increasing average income in the world seen in that period. According to the available estimates, the income elasticity of demand for

fishery products was high in the entire period, so their contribution to the total consumption was rising along with increasing income (see Table 5).

Both the dynamics of income rises and income elasticity varied with the economic region, which should be considered one of the most important factors shaping the changes in the structure of the total food fish supply in the world. Owing to markedly higher dynamics of income rises<sup>15</sup> and a higher income elasticity of the demand for food fish in developing countries than that in developed economies, the dynamics of per capita consumption in less developed countries was twice as high as in the advanced economies (see Table 5).

Table 5. Income elasticity of demand for food by product groups and groups of countries in the late 1990s

Groups of countries*	Products							
	Beverages, tobacco	Breads, cereals	Meat	Fish	Dairy	Fats, oils	Fruits, vegetable	Other foods
Low-income average	1.247	0.527	0.780	0.910	0.860	0.546	0.636	0.777
Middle-income average	0.836	0.373	0.641	0.720	0.693	0.402	0.514	0.639
High-income average	0.440	0.170	0.356	0.393	0.381	0.196	0.281	0.355

\* Elasticity indicators for each of the analysed groups of countries are simple averages of the indicators for individual countries in that group. 114 countries classified according to their per capita income were used as a basis.

Source: J. Seale, A. Regmi, J. Bernstein, *International Evidence on Food Consumption Patterns*, US Department of Agriculture, Technical Bulletin 2003, No. 1904, p. 42.

Nevertheless, the increases in the per capita consumption of fish and fishery products which accompanied the increasing wealth of consumers have been so far limited to a certain degree. The research has shown that in several countries with traditionally high consumption of fishery products, when its level exceeded a certain limit, further increases in the population's income no longer drove per capita consumption, on the contrary – they led to its fall<sup>16</sup>. The changes in the individual consumption of fishery products initiated by increases in the societies' wealth were therefore determined by the level of their current per capita consumption. It is usually assumed that the lower the current consumption, the stronger the positive impact of higher income on consumption. The evidence from the research into correlation between income and per capita fish consumption is, however, inconclusive. On the one hand, this correlation was visible for instance in China (relatively low consumption, high correlation coefficient) and Japan (high consumption, negative correlation), on the other hand, however, it was not observed for Norway (high consumption, high correlation coefficient) or Germany (low level of current consumption, low correlation coefficient)<sup>17</sup>.

Higher income and better standard of living caused also changes in the structure of the overall fish consumption as the elasticity of demand for fish and fishery products varied a lot with the product. Higher elasticity indicators were observed for high-quality and high-value species considered luxury goods<sup>18</sup>. As the consumers become wealthier, they tended to substitute more expensive species for the cheaper ones. The scale and extent of the demand shift towards more expensive and valuable products was different in individual countries and regions – it was related to the current level of fish consumption and the role of fish in the local diet. This phenomenon was observed to a higher extent in wealthy countries with high fish consumption levels and consuming high quality food but they played usually a supportive role in the consumption and nutrition patterns in these societies. In other words, developed countries rarely reported proportionate increases in the amount of consumption as their wealth increased. In spite of that, their expenditure on fish food was rising along with the changes in the structure of consumption in favour of more expensive fishery products. In other words, the demand – in volume terms – in those countries was less elastic to income than the demand in value terms.

In less developed countries fish and fishery products, in general, were not consumed as an element of a varied diet, but remained an important, sometimes even basic, source of animal protein. In other words, these products served the basic nutrition needs of the populations in these countries. An income increase was a major driver of per capita consumption but it still concerned mostly cheap rather than luxury fishery product<sup>19</sup>.

Other factors determining the volume and structure of the demand for fish and fishery products at the household level include also the prices of both fishery products and their substitutes. The research studies on price elasticity reveal that its average level for all fishery products remained relatively high and as such it induced consumer reactions to changes in the prices of fishery products.

The literature provides a wide array of studies on the price elasticity of demand for fishery products in various markets. They have revealed that price elasticity is generally higher in low-income countries. As a consequence, the changes in the prices of fishery products have a stronger impact on the consumption in less developed countries than in advanced economies. It is noteworthy to observe, however, that the indicators vary a lot with the country, and developed economies report much higher levels than selected less developed countries<sup>20</sup>.

The response of the demand to price changes varies also with the type of product. The huge variety of fish and fishery products translates into a number of different relations. Generally, however, higher value products have higher simple price elasticities<sup>21</sup>, and so the changes in the prices of individual product groups affected the structure of consumption. For instance, falling

prices of certain luxury species of fish and molluscs (such as salmon or shrimp) seen in the last two decades, significantly increased their contribution to the global consumption of fishery products, also in developing countries with low per capita income levels<sup>22</sup>.

The volume of fish consumption was also determined by changes in the prices of substitutes, i.e. other protein-rich food products, mostly meat. Like in the case of price elasticity of demand for fishery products, however, the cross-elasticity of demand for these products varied a lot with the country. A 10 per cent rise in beef prices, for instance, translated into markedly higher consumption of fish and fishery products in Norway and Egypt – by 9% and 8%, respectively, yet had a less significant impact on fish consumption in the United States and China where 1% and 3% increases, respectively, were observed<sup>23</sup>.

Organisation of the market is another important determinant of fish consumption. It is a factor which determines the availability of fishery products and their accessibility to consumers. Consumers are more susceptible to demand goods which are widely distributed and easily available.

The changes in the distribution of fish and fishery products witnessed in the second half of the 20<sup>th</sup> century, which determined the availability of these products to consumers, contributed significantly to the increases in food fish consumption on the global scale. They were initiated by the rapid development of food preservation technology, transport opportunities, and convenience of handling and organising the trade.

Owing to the extreme perishability and limited shelf-life of both fish and fishery products, the development of freezing technologies in all the phases of fisheries production (from freezing fresh catches on ships, cold storing fish in harbours and transporting it in mobile freezers, to modern chilling and freezing technologies in food processing plants, cold stores in shops, and refrigerators and freezers in individual households) was of particular importance to this sector of the economy. Freezing is the best known method of long-term preservation of the properties of fresh fish, and as such it enabled long-distance transportation and storage of long-term stocks thus opening new markets and offering new ways to satisfy the demand.

Progress in transport and logistics in turn reduced both the time and cost of the distribution of fishery products. Development of various means of transport, rail networks, hard-surfaced roads, highways and air connections enabled transportation of the full assortment of both processed and fresh fishery products to almost any, even the most distant from the production or unloading site, place in the world<sup>24</sup>.

The availability of fishery products to consumers was also boosted by the changes in the organisation of trade such as expansion of chain large format stores (super- and hypermarkets)

as a distribution channel for fishery products. A very rapid growth in the share of large stores in the total sales of fishery products was reported in the last two decades of the 20<sup>th</sup> century in developed countries, where these stores are currently the major channel of food distribution. This phenomenon was observed also in developing countries, mostly in South America and Asia<sup>25</sup>. The inclusion of large store chains in the distribution of fishery products practically eliminated the need for traditional fishmongers', making these products available to consumers shopping for other products thus saving their time. The requirements placed on producers by super- and hypermarkets concerning the regularity of deliveries and quality of products contributed additionally to better supply of fishery products and growth in their per capita consumption<sup>26</sup>.

The factors determining the global volume of fish consumption include also the development of various forms of products. Fishery products are made of many species of fish, molluscs and crustaceans, and each of them is available in the market in various forms (from fresh fish and frozen fillets, to salted, marinated, dried and smoked products, tinned fish and fish pastes to freshly prepared fish dishes – salads, cakes, soups, sushi, etc.). This extensive variety of fishery products becoming available in the market in the analysed period has made it possible to tailor the products to the varied and changing tastes and preferences of consumers thus increasing per capita consumption of fish and fishery products<sup>27</sup>.

## **Conclusions**

Based on the above analysis, the following should be considered the most important factors determining the global consumption of fish and fishery products between 1961 and 2007: the surge in the world's total and per capita consumption; higher dynamics of per capita consumption in the group of developing countries than in developed countries and shrinking disproportions in the levels of per capita consumption between economic regions; the rising contribution of Asia and developing countries in the total food fish supply; persistent huge differences in the per capita consumption between individual countries; significant differences in the structure of consumption by groups of species between geographic and economic regions as well as individual countries.

The development tendencies in the consumption of fish and fishery products were determined in the analysed period by demographic changes as well as changes in the per capita consumption which were shaped by traditional eating habits and tastes, levels of consumers' disposable income and its growth rates, prices of fishery products and their substitutes, changes

in the distribution of fish and fishery products as well as the development of various forms of fishery products.

## Notes

<sup>1</sup> FAO statistics define the total amount of fish available for apparent human consumption in individual regions or countries by using the following method: total fish production destined for direct human consumption (in live weight) less exports plus imports plus or less variation in stocks (exports, imports and stocks are provided in live weight). This sum divided by population generates the per capita consumption (food supply). This figure is an estimate of the total food fish supply (the so-called apparent consumption), i.e. the quantity of fish made theoretically available to consumers in a given period rather than the actual consumption of fish in the given country or region.

<sup>2</sup> See *The State...* (2010), p. 64.

<sup>3</sup> Own calculations based on Laurenti (2010).

<sup>4</sup> Ibidem.

<sup>5</sup> See ibidem

<sup>6</sup> Own calculations based on ibidem.

<sup>7</sup> See *The State...* (2010), p. 3.

<sup>8</sup> See Delgado et al. (2003), p. 33–37; Ye (1999) p. 12; *FAOSTAT*, FAO Statistical Database, <http://faostat.fao.org>.

<sup>9</sup> See *FAOSTAT...*

<sup>10</sup> See Bywalec, Rudnicki (1992), p. 60–67.

<sup>11</sup> See Ye (1999), p. 15; *The State* (2009), p. 59.

<sup>12</sup> See Laurenti (2010).

<sup>13</sup> See Niegolewski (1979), p. 60.

<sup>14</sup> See *The State* (2009), p. 40.

<sup>15</sup> See *UNCTAD Handbook...*

<sup>16</sup> See *The State* (2000), p. 109.

<sup>17</sup> Ibidem.

<sup>18</sup> See Delgado et al., (2003), p. 39.

<sup>19</sup> See *The State* (2009), p. 64.

<sup>20</sup> For more see Asche, Bjørndal, Gordon (2005), p. 37–43.

<sup>21</sup> Ibidem, p. 23.

<sup>22</sup> *The State* (2009), p. 64.

<sup>23</sup> Delgado, Courbois (1997), p. 24.

<sup>24</sup> See Wiefels (2004), p. 45.

<sup>25</sup> For more see Papageorgiou (2002), p. 54; *Supermarkets and the Artisanal Fisheries Sector* (2006).

<sup>26</sup> See Papageorgiou (2002), p. 55.

<sup>27</sup> See *The State* (2009), p. 64–65.

---

## References

---

- Asche, F., Bjørndal, T., Gordon, D.V. (2005). *Demand Structure for Fish*. SNF Working Paper No. 37/05, Institute for Research in Economic and Business Administration, Bergen.
- Bywalec, C., Rudnicki, L. (1992). *Podstawy teorii i metodyki badania konsumpcji*. Akademia Ekonomiczna w Krakowie, Kraków.
- Delgado, Ch.L., Courbois, C. (1997). *Changing Fish Trade and Demand Patterns in Developing Countries and Their Significance for Policy Research*. MSSD Discussion Paper No. 18, International Food Policy Research Institute, Washington.
- Delgado, Ch.L. et al. (2003). *Fish to 2020. Supply and Demand in Changing Global Markets*, IFPRI, WorldFish Center, Washington–Penang.
- FAO Yearbook. *Fishery and Aquaculture Statistics*, FAO, Rome (for individual years).
- FAO Yearbook. *Fishery Statistics*, FAO, Rome (for individual years).
- FAOSTAT, FAO Statistical Database, <http://faostat.fao.org/>.
- Laurenti, G. (2010). *1961–2007 Fish And Fishery Products: World Apparent Consumption Statistics Based on Food Balance Sheets*, in: *FAO Yearbook. Fishery and Aquaculture Statistics. 2008*, FAO, Rome (CD-ROM).
- Niegolewski, A. (1979). *Ekonomiczne podstawy rozwoju gospodarki rybnej*. Wydawnictwo Morskie, Gdańsk.
- Papageorgiou, P.A. (2002). *National Seafood Market Information and Analysis of Demand Factors*, w: *Seafood Market Studies for the Introduction of New Aquaculture Products*, ed. P. Paquotte, C. Mariojoulis, J. Young, CIHEAM-IAMZ, Zaragoza.
- Seale, J., Regmi, A., Bernstein, J. (2003). *International Evidence on Food Consumption Patterns*, US Department of Agriculture, Technical Bulletin, No. 1904.
- Supermarkets and the Artisanal Fisheries Sector in Latin America – Case Studies from Brazil and Peru*, Globefish Research Programme, Vol. 85, April 2006.
- The State of World Fisheries and Aquaculture 2000*, FAO, Rome 2000.
- The State of World Fisheries and Aquaculture 2008*, FAO, Rome 2009.
- The State of World Fisheries and Aquaculture 2010*, FAO, Rome 2010.
- UNCTAD Handbook of Statistics 2008. On-line Version, <http://stats.unctad.org/handbook/ReportFolders/ReportFolders.aspx>.
- Wiefels, R. (2004). *Consumer Requirements for Supply from Sustainable Resources*. FAO Fisheries Report No. 744, FAO, Rome.
- Ye, Y. (1999). *Historical Consumption and Future Demand for Fish and Fishery Products: Exploratory Calculations for the Years 2015/2030*, FAO Fisheries Circular No. 946, FAO, Rome.