

CONSUMPTION AND MARKET VALUE FOR THE FISH PRODUCT IN ROMANIA

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Abstract. *The present analysis represents an evolutive investigation of the total value and the average purchase price for the main fishes grown in Romania. The evolution of total production in the analysed interval reveals the existence of a two-dimensional discrepancy concerning the quantities of fish, shellfish, cockles, etc. Nation-scale observations identified both declining trends and a moderate increase rate. The increase trend during the analysed years also applies to the total value, as well as to the price rendered as a weighted average. Fluctuations also occur, and they can be regarded as significant increase or decrease, in each particular case. Common carp, seen as the main fishing species in Romania, shows an ascending trend along the years, but also a ceiling price. Its price rises at a higher rate than its quality and value. Concerning the other species, there are variations both in the quantity and the value, together with multiple trends in their pricing: descending for the silver carp, moderate increase bighead carp and golden carp, and very strong trends for the trout.*

Keywords: total amount, fishing species, supply price/evaluation, value quantum.

Introduction

The fish product has always been regarded as one of the main food sources and has therefore been of permanent interest for the social-economic areas of research. But the main question at this stage is to analyse this aspect under the market spectrum. This means knowing this problem particularly concerning the consumption and the market value of this food product. The present study starts from finding out the quantitative level and the value of the results of fish farming and describing it for the main species of fish. The comparative analysis carried out identifies variations both in quantity and value. The study aims at providing adequate answers in threefold form concerning: the imperative of use in human alimentation, which will lead to a higher request; the possibilities of providing fish to the market, both in quantity and quality; the consumer's behaviour as it results from the influence of the main market factors (particularly the price).

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Materials and methods

The synthetic form of the present study is the result of several investigations made on a research basis and using adequate methods of analysis.

The research basis is centred on the data provided by “Fishstat-AQNS1 for Romania”, the nationwide statistics (*Anuarul Statistic al României, Disponibilitățile de consum ale populației, anul 2016. INS, 2017*) and the direct discussions and debates at the National Agency for Fishing and Aquaculture (ANPA) of Romania.

The data refer to the dynamics of the interval 2009-2016 and were subject to a comparative analysis. Thus, percentage comparison was used to analyse the quantity, value and price within fish farming. The percentage analytical form was used to make a first comparison with the total, but also against the first year of the analysed dynamics, i.e. 2009, for the cumulative set but also within the structure of the main species of fish (common carp, gold fish, bighead carp, dogwood and trout).

The investigation included the interpretative/correlative analysis of the main parametres. It is worth mentioning the *brutto average food consumption per inhabitant* (i.e. the product weight expressed as commercial weight which still needs preparation in order to be used in human alimentation, reckoned as the ratio between the food available for human consumption and the number of inhabitants, i.e. the human population), the *annual netto average food consumption per inhabitant* (i.e. the product quantity expressed in a form more accessible to human consumption), the levels of the brutto and percentage values resulted from comparison.

The use of these criteria in analysing the fish farming results nationwide enabled the identification of variation in quantity and value on the whole, as well as the comparison between the prices occurring at the moments of providing and selling.

The interpretations resulted from the mentioned parametres highlighted the real situation and the causes of the variations on the fish farming market (concerning the offer, price and request).

Results and discussions

The fish product question is seen in form of a balance which can only be analysed by the three-dimensional approach on quantity, total value and average purchase price. All these are rendered using adequate parametres pointing at the real situation of the fish product market in Romania.

I. The evolution of the quantity, value and of the average price reached. These are essential elements in knowing this question, which describe the nationwide structure as shown in Table 1. The results suggest the following interpretations:

Table 1. The (cumulative) results on the quantity and value levels concerning the farming of fish, shellfish, molluscs, etc. in Romania

Year	Total quantity		Value (total brutto)		Average price	
	tons	% compared with 2009	total thousands ron	% compared with 2009	ron/kg (in accordance with the weighted average)	% compared with 2009
2009	13131.0	100	72035.70	100	5.48	100
2010	8981.32	68.39	83480.79	115.88	9.29	169.43
2011	8353.27	63.61	67359.86	93.50	8.06	146.99
2012	10004.0	76.18	80864.37	112.25	8.08	147.34
2013	10146.0	77.26	90545.12	125.69	8.92	162.67
2014	10679.98	81.33	85334.80	118.46	7.99	145.64
2015	11041.748	84.08	97348.98	135.13	8.81	160.71
2016	12554.4	95.60	123829.30	171.89	9.86	179.79

Sursa: Fishstat-AQNS1 for Romania (2016), Form for reporting statistics on agriculture of fish, crustaceans, molluscs, etc., by species environment, and fishing areas.

a) The evolution of the quantities obtained in the nationwide farming of fish, shellfish, molluscs etc., fluctuates on the interval 2009 – 2016, when the following trends can be identified: an annual dropping trend for 2010 – 2011 (the comparison is with the year of reference 2009 and the decrease is of around 1/3 of the level of that year); a successive increasing trend on the interval 2012 – 2016 (with the remark that the recovery in the last year of the interval reaches 95.60% of the 2009 level only).

b) The analysis of the brutto total value for the above-mentioned quantities reveals a continuous growing trend compared to the same year of reference (2009). The rhythm of this growth in value is rendered by a successive yearly increase of +71.98 % in 2016 compared against 2009.

c) A first-order quantitative parameter in the analysis is the average price, rendered as weighted average (RON/kg.) in the succession of the annual fluctuations. The annual levels include variations starting from 5.48 (in 2009) and up to 9.86 RON/kg. (in 2016). The levels of these prices are higher than the level of the year 2009, reaching +79.79 % in the last year of the analysed interval.

All these observations suggest the existence of a two-dimensional gap in both quantity and value. The analysis of such situations needs a deeper investigation centred on the same parameters (of quantity and value) in each of the main species of fish used in fish farming.

II. The quantity and value levels of the main fish farming species of Romania

The analysis has been carried out on the main species nationwide: Carp (Common Carp or European Carp), Golden Carp (or Goldfish), Dogwood (Silver Carp), Big Carp (Novac) and Trout (Brown Trout). The analysis of these fish species during the interval 2009-2016 suggests the following economic impact:

Table 2. The quantity and value levels for the fish species **Common carp / Cyprinus carpio (Crap, Crapul comun sau crapul European)** in Romania

Fish species name (code name in English / scientific name / common name)	Year	Quantity (for the market)			Value (estimated at purveyance / delivery)			Price at purveyance / delivery		
		tons	%		total thousands ron	%		ron/kg	%	
			compared with total	compared with 2009		compared with total	compared with 2009		compared with medie	compared with 2009
Common carp / Cyprinus carpio (Crap, Crapul comun sau crapul European)	2009	4142.0	31.54	100	25473.3	35.36	100	6.15	112.22	100
	2010	2888.1	46.11	69.72	37545.3	44.97	147.39	13.0	139.93	211.38
	2011	2652.051	31.74	64.02	23125.88	34.33	90.78	8.72	108.18	141.78
	2012	3266.0	32.64	78.85	34273.01	42.38	134.54	10.49	129.82	170.56
	2013	3395.0	33.46	81.96	37341.23	41.24	146.58	10.99	123.20	178.69
	2014	3736.65	34.98	90.21	37799.61	44.29	148.38	10.11	126.53	164.39
	2015	4348.86	39.38	104.99	44271.39	45.47	173.79	10.18	115.55	165.52
	2016	4840.8	38.55	116.87	50683.18	40.92	198.96	10.47	106.18	170.24

a) **Common carp** is regarded as the main species of fish farming in Romania. Table 2 displays the structure of the quantity and value levels. Its annual dynamics of quantity and value shows the highest percentage within fish farming (for the market) with annual fluctuations. The highest quantity level is recorded in 2010 (46.11%) and the highest value level in 2015 (45.47%). The comparison with the year 2009 reveals an increase along the succession of years, with the last year of analysis (116.87% and 198.96%, respectively). The supply price shows the same annual increases. Moreover, the analytical comparison of the supply prices reveals a much faster increase rate compared to the quantitative level and the value level. Compared to the year 2009, the supply price has a marked difference in value, which ranges between 141.78% (in 2011) and 211.38% (in 2010).

Table 3. The quantity and value levels for the fish species **Goldfish / Carassius auratus** (**Carasul auriu, Aurul, Peștișorul de aur**) in Romania

Fish species name (code name in English / scientific name / common name)	Year	Quantity (for the market)			Value (estimated at purveyance / delivery)			Price at purveyance / delivery		
		tons	%		total thousands ron	%		ron/kg	%	
			compared with total	compared with 2009		compared with total	compared with 2009		compared with medie	compared with 2009
Goldfish / Carassius auratus (Carasul auriu, Aurul, Peștișorul de aur)	2009	1623.0	12.36	0.09	4057.5	5.63	100	2.5	45.62	100
	2010	933.96	18.07	0.20	3222.16	3.85	79.41	3.45	37.13	138
	2011	1047.68	12.54	0.15	3719.26	5.52	91.66	3.55	44.04	142
	2012	...	...	...	...	....	....	.....	.....	.....
	2013	.....	.....	...	.....	.....	....	.....	.....	.....
	2014	.....	.....	...	.....	.....	....	.....	.....	.....
	2015	.....	.....	.....	.....	.....	.....	.....	.....	.....
	2016	882.9	7.03	0.05	5359.203	4.32	132.08	6.07	61.56	242.8

Sursa: Fishstat-AQNS1 for Romania (2016), Form for reporting statistics on agriculture of fish, crustaceans, molluscs, etc., by species environment, and fishing areas (Formular pentru raportarea statisticilor privind agricultura peștilor, crustaceelor, moluștelor etc., pe medii de specii și zone de pescuit)

b) Goldfish has the same specific elements of quality and value, as described in Table 3. Concerning the quantity available for the market, one may remark that, during the analysed interval, it varies between 18.07% (in 2010) and 7.03% (in 2016), with a decreasing trend along the years. The same decreasing trend is detected in comparison with 2009. As for the value quantum in relation to the supply quantities, there are levels that differ from the total production of fish farming, ranging between 3.85% and 5.63%. Most of the years analysed show differences at the level of the year 2009, while the year 2016 has a value that is more than +32.08%. Regarding the prices of this species, the percentage levels are much lower than the weighted average, ranging between 53.82% and 91.24%. Compared to the year 2009, the variations have constantly increased, reaching an additional value of +142.8% in 2016.

It is noteworthy that goldfish has a decreasing trend concerning its harvesting, correlated to the same dropping rhythm of the income values and at the same time with a rise in the prices.

Table 4. Nivelul cantitativ și valoric al speciei piscicole **Silver carp / Hypophthalmichthys molitrix (Sângerul, Crapul de argint)** în România

Fish species name (code name in English / scientific name / common name)	Year	Quantity (for the market)			Value (estimated at purveyance / delivery)			Price at purveyance / delivery		
		tons	%		total thousands ron	%		ron/kg	%	
			compared with total	compared with 2009		compared with total	compared with 2009		compared with medie	compared with 2009
		Silver carp / Hypophthalmichthys molitrix (Sângerul, Crapul de argint)	2009	2971.0	22.62	100	14855.0	20.62	100	5.0	91.24	100
2010	2015.51		33.07	67.83	10077.55	12.07	67.83	5.0	53.82	100
2011	1323.23		15.84	44.53	5742.82	8.52	38.65	4.34	53.84	86.8
2012	2087.0		20.86	70.24	10638.82	13.15	71.61	5.09	62.99	101.8
2013	2031.0		20.91	68.36	12188.03	13.46	82.04	6.00	67.26	120
2014	1899.5		17.78	63.93	9075.70	10.63	61.09	4.77	59.69	95.4
2015	1842.72		16.68	62.02	9213.6	9.46	62.02	5.0	56.75	100
2016	2364.0		18.8	79.56	13663.92	11.03	91.98	5.78	58.62	115.6

Sursa: Fishstat-AQNS1 for Romania (2016), Form for reporting statistics on agriculture of fish, crustaceans, molluscs, etc., by species environment, and fishing areas (Formular pentru raportarea statisticilor privind agricultura peștilor, crustaceelor, moluștelor etc., pe medii de specii și zone de pescuit

c) For **dogwood**, the data displayed in Table 4 render the problems related to quantity and value. The analysis of the quantities prepared for the market reveals the occurrence of significant annual variations ranging between 15.84% and 33.07%. Moreover, one may remark the existence of levels which are lower than the level of the year 2009. Concerning the value analysis on the interval 2009 - 2016, both overall and compared to the year 2009, one may remark annual decreases both in relation to the total and to the year 2009. Prices varying between 4.34 (in 2011) and 6.00 lei/kg. (in 2013) suggest annual variations on a dropping trend. The weighted values for each years analysed are lower even than the weighted average for all the years. When these prices are compared to the year 2009, one may remark variations ranging between 86.08% (in 2011) and 115.6% (in 2016).

Thus, dogwood may well have a quantitative representativity, but one may also speak of representativity in value that is given both by low levels and the comparative level of price.

Table 5. The quantity and value levels for the fish species
Bighead carp / Hypophthalmichthys nobilis (Crapul mare, Novac) in Romania

Fish species name (code name in English / scientific name / common name)	Year	Quantity (for the market)			Value (estimated at purveyance / delivery)			Price at purveyance / delivery		
		Tone	%		total thousands ron	%		ron/kg	%	
			compared with total	compared with 2009		compared with total	compared with 2009		compared with medie	compared with 2009
		Bighead carp / Hypophthalmichthys nobilis (Crapul mare, Novac)	2009	2352.0	17.91	100	11760	16.32	100	5.0	91.24	100
2010	1019.98		26.18	43.36	5099.9	6.10	37.37	5.0	53.82	100
2011	1288.64		15.42	54.78	5270.57	7.82	47.91	4.09	50.74	81.8
2012	2110.0		21.09	89.71	9909.87	12.25	75.06	4.69	58.04	93.8
2013	2110.0		20.79	89.71	12662.11	13.98	85.66	6.00	67.26	120
2014	2286.89		21.41	97.23	11566.98	13.55	83.02	5.05	63.20	101
2015	1839.85		16.66	78.22	9548.82	9.80	60.04	5.19	58.91	103.8
2016	2120.5		16.89	90.15	12341.31	9.96	61.02	5.82	59.02	116.4

Sursa: Fishstat-AQNS1 for Romania (2016), Form for reporting statistics on agriculture of fish, crustaceans, molluscs, etc., by species environment, and fishing areas (Formular pentru raportarea statisticilor privind agricultura peștilor, crustaceelor, moluștelor etc., pe medii de specii și zone de pescuit).

d) Regarding **Bighead Carp**, the data displayed in Table 5 give rich information about the quantities, evaluations and supply prices for this species. The quantities range from 2352.0 tons (in 2009) to 1019.98 tons (in 2010). The percentage of these annual levels in the total annual quantities of fish range from 26.18% (in 2010) and 15.42% (in 2011). Compared to the reference year 2009, the levels are lower, with percentage variations between 43.36% (in 2010) and 97.23% (in 2014). The value at the moment of supplying, compared to the total, has levels that range between 6.10% (in 2010) and 16.32% (in 2009). The comparison with the year 2009 reveals levels that are lower each year, the extreme values occurring in 2010 (37.37%) and in 2013 (85.66%) respectively. The supply/delivery prices vary between 4.09 (in 2011) and 6.0 RON/kg. (in 2013), with a percentage variation between 91.24% (in 2006) and 50.74% (in 2011) compared to the average of the overall fish production. The analysis of the prices during the whole interval 2009 – 2016 compared to the year 2009 shows a fall in

these prices to 81.8% in 2011, a level which rises in the next years up to 116.4% in 2016.

All these observations suggest that bighead carp has a dropping trend both in quantity and value, but also a successive annual increase of the level of prices.

Table 6. The quantity and value levels for the fish species
Sea trout / *Salmo trutta* (Păstrăvul, Păstrăvul brun) in Romania

Fish species name (code name in English / scientific name / common name)	Year	Quantity (for the market)			Value (estimated at purveyance / delivery)			Price at purveyance / delivery		
		tons	%		total thousands ron	%		ron/kg	%	
			compared with total	compared with 2009		compared with total	compared with 2009		compared with medie	compared with 2009
		Sea trout / <i>Salmo trutta</i> (Păstrăvul, Păstrăvul brun)	2009	898	6.83	100	8441.2	11.71	100	9.4	171.53	100
2010	900.0		9.99	100.22	13500.0	16.71	159.92	15.0	161.46	159.57
2011	16.91		0.20	1.88	272.31	0.40	3.22	16.1	199.75	171.27
2012	.....		.....	....	.....	.....	.....	.....	.....	.....
2013	.....		.....	.....	.....	.....	.....	.....	.....	.....
2014	.....		.....	.....	.....	.....	.....	.....	.....	.....
2015	27.21		0.24	3.03	515.35	0.52	6.10	18.9	214.52	201.06
2016	22.0		0.17	2.44	352.0	0.284	4.17	16.0	162.27	170.21

Sursa: Fishstat-AQNS1 for Romania (2016), Form for reporting statistics on agriculture of fish, crustaceans, molluscs, etc., by species environment, and fishing areas (Formular pentru raportarea statisticilor privind agricultura peștilor, crustaceelor, moluștelor etc., pe medii de specii și zone de pescuit)

e) The **trout** species, whose data are displayed in Table 6, is on a decreasing trend both in quantity and value. Thus, concerning its quantity, one may notice a drastic decrease (from 898 tons in 2009 to 22 tons in 2016, which respectively represent 6.83% and 0,17% of the total fish farming). Compared to the year 2009, these percentage levels represent an excessive decrease, ranging between 1.88% and 2.44%. A similar representation has the value levels, rendered by the estimations at the moment of purveyance, which range between 0.284% and 16.71% of the total. Compared to the year 2009, the levels range between 3.22% and 6.105, except for the year 2010. The price of purveyance/delivery reveals, in the case of this species, favourable levels which are over the weighted

average of all the years analysed in this study. Even a comparison to the year 2009 shows values which range between 159.57% and 201.06%.

The analysis conducted on this species leads to the conclusion that the interval 2009 – 2016 is marked by a sharp decrease in quantity and income, but, at the same time, an increase in price.

Conclusions

The synthetic and analytic-structural form of the analysis carried out in this study, on the main fish farming species of Romania during the interval 2009-2016, highlights the main parts of what can be described as a three-dimensional situation of the production, value and price of the fish product in Romania.

1.- The overall nationwide production shows a two-dimensional discrepancy centred on: the evolution of the quantities of fish, shellfish, molluscs, etc., where decreasing trends are present, together with a moderate increase rhythm; concerning the total value of the quantities previously mentioned, there is a successive increase trend along the years analysed; the price, rendered in form of a weighted average, is on an increase trend from year to year (with annual variations that may be regarded as considerable increases/decreases, on a case by case basis).

2.- Common carp, regarded as Romania's most important fish farming species, has the largest percentage of the total, both in quantity and value. Moreover, the quantity/value levels increased compared to the respective levels of the year 2009. It is noteworthy that the price reached its highest level in the last year of the analysis while keeping the same increase trend that was present every year. A comparative survey of the purveyance prices reveals the fact that their increase rate is much faster than the quantitative and value levels.

3.- For the rest of the analysed species, there are variations both in quantity and in value, together with a differentiating trend in prices (a decreasing trend for dogwood, a moderately increasing trend for bighead carp and goldfish, and a very strong increasing trend for trout).

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