"An economic study of the factors influencing the consumption of fish in Egypt"

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"Introduction":

The Fishery sector is one of the fundamental pillars of facing the population needs of animal protein, especially given the population increase, which followed by a continuous increase in the demand for fish, as well as the relative scarcity in animal food resources, also fish are important food resources for humans because it contain a large proportion of animal protein, which could reach more than 60% of the weight, and this protein contains high levels of Amino and essential fatty Acids, Vitamins, Calcium, Phosphorus, and Iodine. All of this are important and vital elements and should be available in human's food [(1)].

Fish production sources vary in terms of the places of production like the marine fisheries in the Mediterranean Sea, the Red sea, the Egyptian lakes fisheries, such as the northern lakes in Brullus, Manzala, Edku, and Mriot, and the inland lakes, coastal lowlands, and fisheries in the Nile, and its tributaries at the delta, In addition to traditional fish farming in ponds or the untraditional one in fish cages. [(2)]

Different methods of production, farming and fishing in different production sources, reflects the impact on the quality of the technical means, and various economic inputs for each method. Besides there's a large segment of the population employed in the activity of production, marketing and processing of fish.[(3)]

Although there are multiple sources of fish production that helped in increasing the production especially during recent years, the actual needs of fish still exceed the gross domestic product, whereas available production for consumption amounted to approximately 1.78 million tons while the domestic production amounted to around 1.5 million tons in 2011, which means that the gap reached to 283.7 thousand tons, which indicates that the self- sufficiency rate of fish was approximately 84.1% in the same year(table No:1) .

"Research Problem"

In spite of the economic importance of fish and the increase of fish production especially in recent years, but the continued increase in population, as well as the spread of diseases such as foot - and mouth disease in farm animals, has led to an increase in the demand for fish, so it caused a lack of consumption per capita, increase of imports , balance-of-payments deficit, and the increase of the fish food gap, which increased from about 119 thousand tons in 1990 to around 283.7 thousand tons in 2011 an increase of approximately 164.7 thousand tons represents about 6.3% per year, which constitutes an obstacle to economic development (table No:1) .

"Research objective"

The research aims at studying and analyzing the main factors influencing the consumption of fish in Egypt through estimating the actual needs of fish to meet the needs of the high population while predicting the production and consumption capacity of fish in Egypt during the period (2012-2020) using ARIMA model and studying fish food gap and self-sufficiency ratio of fish in Egypt to reduce the importing of fish for its negative impact on the Egyptian agricultural trade balance, and then visualize the future of some means and appropriate solutions to reduce fish food gap in Egypt.

"Research method and sources of data"

The research adopted the descriptive analysis and inductive methods in accordance with research objective such as estimating averages and percentages and analyzing the regression and correlation then using ARIMA model as a predicting technique to estimate the projected trends of self-sustainment rates of fish in Egypt, also using some other statistical standards that serve the research objectives.

The research was built on data published by the general authority for fish resources development (GAFRD), statistics of the Central Agency for Public Mobilization and Statistics, Ministry of agriculture and land reclamation, and some data published on the internet, in addition to some scientific researches and studies published in journals related to the subject of the research.

"Results and discussion"

First: the current situation of fisheries in Egypt:

Fisheries play an important role in providing healthy food to the people because of its easily digested protein compared to the red meat, they also have a large percentage of fat-free cholesterol, vitamins, calcium, phosphorus, and iodine, which are important and vital to the human body.

Arab republic of Egypt owns natural fisheries in marine fisheries, inland fisheries, northern and inland lakes, coastal lowlands, and the Nile river and its tributaries, However, fish farming has become the main source for fish in Egypt.(4)

In order to specified the current situation of fisheries in Egypt both in terms of production and in terms of consumption it must take a look on Table no. (1), which shows us the evolution of production and consumption, per capita of fish, fish food gap, and the self-sufficiency rate of fish during the period (1990-2011).

A-Evaluation of the domestic production of fish:

Table no. (1) Shows that local fish production has increased from about 339 thousand tons in 1990 to around 1.5 million tons in 2011, with an increase of about 1.16 million tons, representing a 15.6% annually during the period (1990-2011). Time trend equation in table (2) refers to an increase in domestic production of fish during the period (1990-2011) with a statistical rate of increase of about 50.9 thousand tons per year.

B- Available quantities of fish for consumption:

Due to continuing growth of population, the amount of fish available for consumption have increased from about 458 thousand tons in 1990 to nearly 1.78 million tons in 2011, with an increase of nearly 1.33 million tons, represented in 13.2% annually during the period (1990-2011). In table (2), time trend equation also refers to an increase in the available quantities of fish for consumption with an annual and statistical rate of increase of about 55.9 thousand tons per year during this period.

Table (1) evaluation of domestic production and consumption and per capita and the food gap and self-sufficiency ratio of fish in Egypt during the period (1990-2011)

Years	Population (Million)[1]	Production of The Local Fish [2] (Thousand Tons)	Available for Consumption (Thousand Tons)	Average Per Capita Kg/Year	Food Gap (Thousand Tons)	Self-Sufficiency Ratio (%)
1990	55.5	339.0	458.0	6.11	119.0	74.02
1991	56.9	346.0	441.45	7.76	95.45	78.38
1992	58.2	346.3	477.44	5.95	131.14	72.53
1993	59.5	357.0	461.10	6.0	104.10	77.42
1994	60.54	368.2	532.0	6.10	163.8	69.21
1995	61.9	407.0	547.81	6.58	140.81	74.29
1996	63.3	432.0	575.53	6.82	143.53	75.06
1997	63.76	457.0	662.13	7.18	205.13	69.02
1998	63.93	546.0	720.16	8.54	174.16	75.82
1999	64.36	549.0	741.47	8.53	192.47	74.04
2000	65.30	724.0	936.67	11.10	212.67	77.29
2001	66.70	772.0	1032.21	11.57	260.21	74.79
2002	66.72	801.0	952.83	12.0	151.83	84.06
2003	67.98	876.0	1035.87	12.90	159.87	84.57
2004	69.30	865.0	1083.91	12.48	218.91	79.80
2005	70.75	889.3	1072.69	12.57	183.39	82.90
2006	72.21	971.0	1174.90	13.45	203.90	82.65
2007	73.61	1008.0	1262.60	13.70	254.60	79.83
2008	75.10	1085.0	1215.30	14.45	130.30	89.28
2009	76.92	1093.0	1221.40	14.21	28.40	89.49
2010	78.73	1304.8	1551.20	16.57	246.40	84.12
2011	80.40	1500.0	1783.70	18.67	283.70	84.10
Average	66.89	728.94	906.38	10.62	177.44	78.76

Source; collected and calculated from:

1- Central agency for public mobilization and statistics. **Statistical yearbook** various issues.[9]

2- The ministry of agriculture and land reclamation, the general authority for fish resources development. **Fishery bulletin of statistics** . various issues.[10]

C- Average per capita fish:

By reviewing the data table no. (1), it turns that the average per capita fish of need increased from about 6.11 kg in 1990 to about 18.67 kg in 2011 with an increase of around 12.56 kg representing a 3.9% per year

despite the volatility of per capita fish in some years, but it kept increasing as a result of continued population growth, and the continuous high price tag of the other kinds of meat compared to fish which caused it to take their places in the market and by estimating the time trend equation of fish per capita during (1990-2011) and as table no. (2) shows an increase of per capita fish at a statistic rate about 0.56 kg annually and this increase and paradigm of measurement have been proven at the level of 0.01 statistically and the coefficient of determination also reveals that 91% of this increase is due to the time factor.

D- Fish food gap:

The continuing growth population with high level of per capita incomes leads to an increase in demand for fish, thus increasing the food gap.

By estimating fish food gap on the basis of the difference between domestic production and available consumption quantities it found that the gap is caused by the inability of local production to meet

Table (2): equations of time trend of population growth, local production, available quantities for consumption, per capita and fish food gap during the period (1990-2011)

Statement	The time trend equations	Coefficient of determination	(T) Value calculated	Rate of change (%)
Population (million)	Y= 54.5 + 1.08	0.98	29.37**	1.61
Domestic production (thousand tons)	Y=143 + 50.9 X	0.94	17.78**	1.61
Available for consumption	Y=263 + 55.9 X	0.93	16.42**	1.61
the average per capita Kg/year	Y=4.15 + 0.56 X	0.92	14.92**	1.61
the food gap (thousand tons)	Y=120 + 5.1 X	0.37	3.44**	1.61
Self-Sufficiency Ratio (%)	Y=70.7 + 0.70 X	0.60	5.53**	1.61

** Significant at 0.01 the rate of change = $(b/y^{-}) \times 100$

Source: data collected and calculated from table no (1) method of ARIMA time series analysis.

Population needs whereas the ratings in table no. (1) refers to an increase in fish food gap from about 119 thousand tons in 1990 to about

283.7 thousand tons in 2011, with an increase of 164.7 thousand tons or 6.3% annually during the period (1990-2011).

As the equation of time trend of the fish food gap refers to an increasing in fish food gap during the study period by a statistic significant increasing rate to approximately 3.44 tons indicating a growing fish food gap from one year to another which implies the necessity to learn the reasons behind this increasing rates and to find solutions and ways to reduce or stabilize it, especially in light of the significant development in the field of fish farming.

From the above, it's now clear that despite the increasing of fish production, it could not meet the requirements to face the increasing demand for fish, which reflects the rate of increase in production, leading to an increase in fish consumption gap.

E- Fish Self - Sufficiency:

It can differentiate between the meaning of food security and self-sufficiency, as food security means achieving local production of goods for a period in the year to cover consumption needs of this commodity, whether by importing or domestic production, but Self-sufficiency means the ability of potentials and economic resources available locally to cover the full consumption. (5)

Second: Fish Foreign Trade Development.

Although Arab Republic of Egypt have a large amount of water in the Mediterranean and the red sea as well as many coastal and inland fisheries and all tributaries of the Nile River never exploits well to meet the ongoing population needs. To develop fisheries process must regulate fishing operations. As a result of increasing population and the production not enough for this so the country imports a large amount of fish to face this deficit. Even that fish imports witnessed extremely increase during the little past years, therefore exporting the fish decreased.

By studying the movements of imports and exports of fish during the period (1990-2011) , it's appear through the date base in the table(3).

Fish imports fluctuated from year to year, reaching the lowest in 1991 till it reached to about 98.45 tons, then increased to about 294 thousand tons in 2011 , an increase of about 195.6 thousand tons are 9.03% annually during the same mention period. As The general Time Trend Direction of

the quantity of fish imports refer as the table (4) during the same period to upward trend statistically and the moral about 5.33 thousand tons per year.

Referring to the Egyptian fish imports, as the date of the table show that there were increasing about 436.6 million pounds in 1990 to about 3.18 billion pounds in 2011, an increase by about 2.74 billion pounds, about 28.6% annually during the period (1990-2011), as shown in the table (3).

It's worth to mention that the Egyptian fish imports increasing value lead to increase the burden of Egyptian trade balance, which represents an obstacle for expanding economic development plans.

With exports amounting reached to about 10.6 thousand tons, with a value of about 85.7 million pounds, after dropping the quantity of fish exports to about 10.3 thousand tons, with a value of about 82.5 million pounds.

With regard to the update of fish imports and exports prices as demonstrated in the previous table, This table's data have shown fluctuation fish imports reached to a minimum in 1994, with a value of about 1.5 thousand pounds a tons from fish, reaching to a maximum in 2009 with a value of about 16.96 thousand pounds for importer ton with increasing about 15.46 thousand pounds per ton, representing a 46.8 % annually.

The average price for ton of exporter fish, Cleared in the same table that the average price for ton exporter fish decreased to about 29.9 thousand pounds per ton in 1990, to about 8.01 thousand pounds a tons from fish in 2011. Perhaps the decline of fish exports prices because there are different kinds of fish.

Table (3) development of foreign trade indicators for fish in Egypt and the average exchange rate during the period (1990-2011)

years	imports		exports		Average price of	Average Price
	Quantity	Value	Quantity	Value		

1990	122.30	436.20	3.34	99.80	3.57	29.92
1991	98.45	227.20	3.0	100.0	2.31	33.33
1992	133.26	252.30	2.12	70.60	1.90	33.30
1993	105.76	155.90	1.70	45.60	1.74	26.82
1994	165.43	250.80	1.63	38.40	1.52	23.56
1995	141.74	240.30	0.933	19.03	1.70	20.40
1996	144.11	490.0	0.577	11.80	3.40	20.45
1997	207.36	414.70	2.23	45.60	2.0	20.44
1998	176.30	310.04	2.14	41.04	1.76	19.18
1999	193.16	334.10	0.692	4.13	1.73	5.97
2000	213.63	476.41	0.957	4.20	2.23	4.39
2001	261.43	534.0	1.22	5.11	2.04	4.19
2002	154.39	424.0	2.56	10.14	2.75	3.96
2003	163.00	543.6	3.13	18.22	3.33	5.82
2004	220.83	755.13	1.91	5.61	3.42	2.94
Avera	180.94	840.29	3.50	24.65	4.51	13.80

Source: collected and calculated from:

1- **Central agency for public mobilization statics. Annual Bulletin of The Movement Of Production. Foreign trade and available for consumption of agricultural commodities. various issues.**(11)

Table (4): Equation of general time trend of the development of foreign trade indicators for fish in Egypt and the average exchange rate during the period (1990-2011)

Statement	The time trend equations	Coefficient of determination	(T) Value calculated	Rate of changes (%)
The Quantity of fish imports (thousand tons)	Y =120 + 5.33x	0.41	3.71**	2.95
The value of fish imports (million pounds)	Y=-393 + 107x	0.62	5.67**	2.95
Quantity of fish exports (thousand tons)	Y=-.26 + 55.9x	0.53	4.67**	2.95
The average price of a ton of imports (thousand ounds)	Y= -0.92 + 0.47x	0.47	4.17**	2.95
The average price per ton of exports (thousand pounds)	Y=29.2 - 1.34x	0.68	6.55-**	2.95

** Significant at 0.01 the rate of change = $(b/\bar{y}) \times 100$

Source: data collected and calculated from table no. (3) Method of ARIMA time series analysis.

Third: forecast production and consumption of fish food gap in Egypt by 2020:

Forecast production and consumption Studies of fish food gap in Egypt during the period (2014-2020), using the method of ARIMA time series analysis [6]. The so-called "Auto Regressive Integrated Moving Average" based on (BOX-JENKINS), which is used to forecast economic variables either yearly or monthly. This method of forecasting method other that dynamic model takes into account the impact of other variable on the dependent variable, and represented in the model.

This method relies on the inductive method to predict the quantitative analysis using standard analysis method for time series regression functions for forecasting, and model is to maximize the probability logarithmic regression models for the integration of self-module centre where this contains level slope self auto regressive class (AR"P"), a Moving Average

error class (MA "q"), the difference of (d), and can say that this method evolved into several stages as follows:

1. Auto regressive process (AR)
2. Moving average process (MA)
3. Auto regressive moving average process (ARMA)
4. Auto regressive integrated moving average process (ARIMA)

The fourth stage is the final form of the assessment model (ARIMA) where differences are Appreciated variables called integration.

A- Stages and Methods of Estimating Model (ARIMA):

First Stage: Auto Regressive Process (AR)

Is the prediction of the dependent variable in this stage function for the same variable values with different delays, and the variable value of the subject of the current forecast values of the same variable (y) in previous periods (y_{t-1}. Y_{t-2}. ... y_{t-p}) with different delays is controlled in the analysis model. In the slope of the (p) level for current (y_t) views and generated from the weighted views of a (p) and is called the slope of rank (p), symbolized by the symbol $(ar)_{(p)}$ the total regression coefficients is less than (one) it is called a condition.

Second Stage: Moving Average Process (MA)

At this stage be moving average of (q) is the dependent variable (y_t) function per bug ($£_t$) in prior periods ($£_{t-1}$. $£_{t-2}$. .....$£_{t-q}$)

As independent variables, called the model class q moving average and symbolized by the symbol $(MA)_{(q)}$. And a total regression coefficient is less than one, it is called a reflection.

Third stage: Auto Regressive Moving Average Process (ARIMA) p.q

There are many models there is a slope or moving average only. At this stage is the integration processes of $MA_{(q)}$. $AR_{(p)}$ together in a single equation.

Fourth stage: auto regressive integrated moving average process. (ARIMA) p.d.q

This stage is the final one, where the dependent variable differences (y_t) class (d). These differences are called integration, used to convert the variable from the static image or unstable.

B- Stages of prediction by using a model (ARIMA):

The definition here grading (p.d.q) model of ARIMA to appreciation requires forecasting where test distribution and stillness, and stability time series used, trough the use of certain statistical criteria in the description of the time series, and thus easier to obtain the form. These are the criteria in the table. (5) of the following:

Table (5) Description of the statistical variables of the study fish in Egypt

Variable	Unit	Average	Minimum	Maximum	Standard Deviation
1-the total production of fish	Thousand tons	728.94	339.0	1500.0	340.90
2-the total consumption of fish	Thousand tons	906.38	441.45	1783.70	376.30
3- the size of the food gap	Thousand tons	177.44	95.45	283.70	53.20
4-self-sufficiency rate	%	78.76	69.02	89.49	5.82

During the period (1990-2011)

Source: calculated from data collected in the table (1)

C - Auto correlation function (ACF):

This function can be re presented in the following equation:

$P_k = \frac{\sum_{t=1} n-k\,(yt-y)(yt+k-y)}{\sum (yt-y)}$ where this function shows how contiguous string values ranging from the value of the coefficient of auto correlation (k^p) between

(-1 . 1) where (k) is the time period between the (y_t) (y_{t+k}), called the food gap , t is the time factor , the variable (y_t) to predict tags.

D- Partial auto-correlation function (PACF)

Is the measure the function of the link partial impact to add values to a variable the later and can be obtained from the following equation:

$Y_t = a + q_1 y_{t-1} + ... + q_n y_{t-n} + £_t$.

Where (a) fixed. (q_1, q_n) parameters of the function. (£) the random error limit. And can be summarized as different types of autocorrelation functions, partial auto correlation operations auto regressive static moving averages processes, and integration between them. As shown in table no. (6) follows:

Table (6) auto correlation functions and partial autocorrelation models for non – seasonal [6]:

Model	Autocorrelation	Partial autocorrelation
AR (p)	Near zero gradually	Equal to zero after the time gap(p)
MA (q)	Equal to zero after the time gap(q)	Near zero gradually
ARI MA (p.)	Near zero gradually	Near zero gradually

Fourth: Stage of fish production and consumption predict in Egypt :

The predicting is use of (ARIMA), to time series analysis on the estimation method of ARIMA for forecasting total fish production in Egypt during the period (2014-2020) where possible obtain estimates shown in table (7), which shows that although the expected consumption needs significantly exceeded the quantities consumed of fish is produced in the time period mentioned, where the table mentioned that local production of fish in 2014 will reach approximately 1.87 million tons, while consumption will reach to approximately 2.19 million tons in 2020, and the average price of a real hash will reach about 15.23 pounds/kg. which shows that fish food gap will reach around 320.17 thousand tons, and self-sufficiency will reach about 85.38% .

It is expected to increase fish production until up to about 2.9 million tons in 2020. While you will increase available for consumption after it too

even up to about 3.3 million tons, and the average retail price will be up to about 19.37 pounds/kg, which is expected to increase with fish food gap until it reaches about 396 thousand tons, and the rate of self sufficiency will amount to about 88% during the same year.

Table (7) the expected volume of production and consumption and the average retail price of real fish in Egypt during the period (2012-2020).

Yers	Production (Thousand Tons)	Consumption (Thousand Tons)	Average Price Retail [(2)] (Pounds/kg)	Food Gap (Thousand Tons)	Self-Sufficiency Ratio (%)
2014	1869.29	2189.46	15.23	320.17	85.38
2015	2011.59	2344.27	15.85	332.68	85.80
2016	2164.72	2510.03	16.50	345.31	86.24
2017	2329.51	2687.52	17.18	358.01	86.68
2018	2506.83	2877.55	17.88	370.72	87.11
2019	2697.66	3081.02	18.61	383.36	87.56
2020	2903.02	3298.87	19.37	395.85	88.0

Source: collected and calculated from:

1) Data table (1) using the method of **ARIMA** time series analysis.
2) Data table (4) using the method of **ARIMA** time series analysis.

Which indicates that the expected increase in the volume of fish production, but the food gap of fish expected will increase year after year, thus necessitating the development of a future vision for the reasons that may lie behind their increase. and try to develop solutions and proposals and means of working to reduce, especially in light of the huge development in aquaculture, and follow the best ways and means in the production processes and fishing.

Fifth: factors affecting the consumption of fish in Egypt:

The ultimate aim of any economic activity is to satisfy human needs and desires, in order to raise the level of welfare of the community. It is then necessary to intensify efforts in order to increase fish production to

meet the food needs of the fish. The fish consumption is influenced by many factors and the most important of which income as a major factor and a specific amount of consumption of fish, whether at the national level or at the individual level and fish prices, of red meat, and The price of white meat and poultry in addition to the population.

It will be made in this part of the analysis of the most important economic variables that affect the amount of fish consumed to stand on the most important economic variables that impact on the quantities consumed, and the amount of the effect of each of them. And thus determine the priorities and policy directions of producer and consumer in the future.

It is a function by estimating the demand for fish and the amount consumed them using the double logarithmic as follows:

$$LnY = 0.0012 + 3.29Ln\ X_1 + 0.12Ln\ X_2 - 0.55Ln\ X_3 + 0.48Ln\ X_4 - 0.38Ln\ X_5$$

$$(2.33)^{*} \quad (0.66) \quad (-3.39)^{**} \quad (2.08)^{*} \quad (-2.23)^{*}$$

It has been shown through this function that increasing the number of residents increased by 3.29%. it turned out not to moral estimate real income as an influence on the consumption of fish, due to the presence of a strong correlation between this multi-variable and a number of other variables. So estimate the demand function on income as a relationship between the amount of fish consumed and the real income as in the following function:

$$LnY = 172 + 1.11\ LnX_1$$

$$(13.2)^{**}$$

$R^2 = 0.897 \quad F = 175.4^{**}$

It was clear that the estimate of the function at the moral level of 0.01, and that the income elasticity in this function of 1.11, that any increase in real income by 1% lead to increased consumption of fish by 1.11 %

As it turns out also that the price elasticity of demand for fish has reached about – 0.55, this means that the fish was a necessary commodity in Egypt, and that the price increase by 1% leads to lower quantity required by 0.55 %.

For the cross elasticity between the price of meat and the required amount of fish has returned out to be positive and value of about 0.48 which means that there is a disintegrative relationship rather weak prices between red meat and the required amount of fish, as it turns out, also that the cross elasticity between the price of poultry and the required quantity of fish represent an inverse relationship amounted to about -0.38 which explains that the fish and poultry commodities complementary and increase the demand for the greatest number of the population, and the greatest national income.

"Summary"

Fish is the main sources of animal protein's higher nutritional value is where the fisheries sector of the important sectors in the national economy, which is built upon a lot of vital industries, in addition to its contribution in providing many jobs opportunities, either in production or in marketing or in manufacturing, despite what Egypt enjoys the shores of lakes, and the river Nile and its branches. However the available for consumption of fish was more than the produced amount, and the self-sufficiency rate of fish has reached about 78.76% on average for the period (1990-2011), which requires shed light on the current status of the fishery in Egypt.

The discussion dealt with the study of the current situation of fisheries in Egypt, and the development of local production of fish, and the available quantity for consumption. In addition to the average per capita fish and fish food gap during the period (1990-2011) has found that despite the increase in the productivity of large fish, but the per capita consumption was less than the world average. It turns out that the food gap which has increased from about 119 thousand tons in 1990 to about 283.7 thousand tons in 2011, an increase of about 164.7 thousand tons an increase of 6.3% per annum.

The average price of a ton of imports and exports has been shown to increase the amount of fish imports compared to the amount of fish imports. Also found to increase the average price per ton of fish imports and a lower average price per ton of exports which indicates that Egypt export the species with the highest price and the import of species of fish at a lower price to meet the increase consumer of fish.

The research that the volume of production and consumption are expected until 2020 will reach about 2.9 million tons of the produced quantity of fish, while the volume of consumption will reach about 3.3 million tons, which in turn affects the size of the food gap which is expected to increase to about 88% until 2020 thus necessitating the development of a future vision for the reasons that may lie behind their increase and try to develop solutions and proposals and means of working to reduce, especially in light of the huge development in aquaculture, and follow the best ways and means in the production processes and fishing.

The research also study the most important factors affecting the consumption of fish has been shown to be the most important fish prices, and per capita income, and alternative commodity prices in the price of red meat, white meat (poultry). It has been shown that increasing the number of residents increased by 1 %, it decreases the per capita rate of 3.29% and increase real income by 1 % lead to increased consumption of fish by 1.11 %

Also found that there is a disintegrative relationship rather weak prices between red meat and the required amount of fish and that cross elasticity between the price of poultry and the required quantity of fish represent an inverse relationship amounted to about -0.38 which explains that the fish and poultry commodities complementary. Suggesting that the consumer will consume interchangeably and increase the demand for the greatest number of the population, and the greatest national income.

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12- Central agency for public mobilization and statistics, **Annual bulletin of the movement of production. Foreign trade and available for consumption of agricultural commodities**. various issues.

13- The ministry of planning and international cooperation. **National accounts.** various issues.

"Supplement"

Table (1) the evolution of the most important factors affecting the consumption Of fish in Egypt during the period (1990-2011)

years	Population (million)	Real per capita income (thousand pounds)	Available For Consumption (thousand tons)	Average retail prices of real (pounds)		
				fish	Meat red	White Meat
1990	55.5	1.92	458.0	6.58	7.95	3.10
1991	56.9	2.24	441.45	6.70	7.25	3.27
1992	58.2	2.33	477.44	7.04	7.36	3.60
1993	59.5	2.65	461.10	8.40	8.58	4.22
1994	60.54	3.10	532.0	8.90	10.84	4.70
1995	61.9	3.50	547.81	8.96	11.40	5.22
1996	63.3	3.65	575.53	6.85	15.30	5.12
1997	63.76	4.18	662.13	7.60	15.0	6.80
1998	63.93	3.35	720.16	7.70	15.50	6.75
1999	64.36	4.48	741.47	6.70	15.70	6.80
2000	65.30	4.73	936.67	6.50	15.70	6.50
2001	66.70	4.76	1032.21	6.60	16.10	6.50
2002	66.72	4.87	952.83	7.50	18.0	7.90
2003	67.98	5.04	1035.87	8.40	21.0	6.40
2004	69.30	4.93	1083.91	10.0	24.50	8.0
2005	70.75	5.20	1072.69	8.60	27.0	9.60
2006	72.21	5.41	1174.90	9.20	27.0	7.70
2007	73.61	5.90	1262.60	10.0	27.70	8.0
2008	75.10	5.87	1215.30	10.80	36.30	11.90
2009	76.92	5.85	1221.40	12.0	40.50	12.60
2010	78.73	5.87	1551.20	12.30	49.0	14.60
2011	80.40	7.02	1783.70	13.50	52.0	15.40

Source: calculated from collected: The central agency for public mobilization and statistics. The statistical yearbook. Various issues (9). Ministry of planning and international cooperation. National accounts. Various issues (12) Ministry of agriculture and land reclamation general authority for fish resources development (gafrd) fisheries statistics. Various issues (10).

دراسة اقتصادية للعوامل المؤثره على استهلاك الاسماك فى مصر

مستخلص

تعتبر الأسماك من المصادر الأساسية للبروتين الحيوانى العالى فى قيمته الغذائية، حيث يعد قطاع الثروة السمكية من القطاعات الهامة فى الاقتصاد القومى والذى يبنى عليه الكثير من الصناعات الحيوية ، بالإضافة الى مساهمته فى توفير فرص عمل كثيرة سواء فى الإنتاج، أو فى التسويق، أو فى التصنيع، وعلى الرغم مما تتمتع به مصر من سواحل وبحيرات ونهر النيل وفروعه، إلا أن الطلب عاى الأسماك أكبر من المعروض، مما أثر على نسبة الاكتفاء الذاتى من الأسماك والتي بلغت حوالى ٧٨،٧٦% كمتوسط للفترة (١٩٩٠-٢٠١١)، مما يستلزم القاء الضوء على الوضع الراهن للثروة السمكية فى مصر.

كما تناول البحث دراسة الوضع الحالى للثروة السمكية فى مصر، حيث تبين إنخفاض معدل استهلاك الفرد من الأسماك، وقد تبين ذلك من الفجوة الغذائية والتى زادت من نحو ١١٩ ألف طن عام ١٩٩٠ إلى نحو ٢٨٣،٧ ألف طن عام ٢٠١١، بزيادة بلغت حوالى ١٦٤،٧ ألف طن ، أى بنسبة ٦،٣% سنوياً.

كما تبين زيادة كمية واردات الأسماك مقارنة بكمية صادراتها والتى لا تمثل سوى ٢% من كمية واردات الأسماك، أيضاً زيادة متوسط سعر طن صادرات الأسماك، وانخفاض في متوسط سعر طن الواردات، مما يشير إلى أن مصر تقوم بتصدير أنواع ذات سعر أعلى وتستورد أنواع من الأسماك بسعر أقل لمواجهة زيادة الطلب على الأسماك.

وقد تبين من نتائج البحث أيضاً أن حجم الإنتاج والاستهلاك المتوقع حتى عام ٢٠٢٠ سوف يصل إلى نحو ٢،٩ مليون طن من الكمية المنتجه من الأسماك ، فى حين سوف يبلغ حجم الاستهلاك نحو ٣،٣ مليون طن، مما يؤثر بدوره على حجم الفجوة الغذائية والتى من المتوقع زيادتها إلى نحو ٣٩٥،٨٥ ألف طن ، وبنسبة اكتفاء ذاتى سوف تصل إلى نحو ٨٨% حتى عام ٢٠٢٠.

وتناول البحث أيضاً دراسة أهم العوامل المؤثرة على استهلاك الأسماك، وقد تبين أن أهمها أسعار الأسماك، والدخل الفردي، وأسعار السلع البديلة والمتمثلة فى سعر اللحوم الحمراء، واللحوم البيضاء (الدواجن). وقد تبين أنه بزيادة عدد السكان بنسبة ١% فإنه ينخفض نصيب الفرد بنسبة ٣،٢٩% ، وأن زيادة الدخل الحقيقى بنسبة ١% تؤدى إلى زيادة استهلاك الأسماك بنسبة ١،١١%. وأن هناك علاقة إحلالية ضعيفة نوعاً ما بين أسعار اللحوم الحمراء والكمية المطلوبة من الأسماك،

وأن المرونة التقاطعية بين سعر الدواجن والكمية المطلوبة من الأسماك تمثل علاقة عكسية بلغت حوالى -٠،٣٨ ، مما يفسر أن الأسماك والدواجن سلعتين متكاملتين ، مما يشير إلى أن المستهلك يقوم باستهلاكها بالتبادل ويزيد الطلب عليها كلما زاد عدد السكان، وكلما زاد الدخل القومى.