Analytical study of fish farming in Egypt (Case study in Sharkia Governorate)

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Abstract: This study investigates the fish farming system in Egypt, a critical food source, particularly given the steady and limited fish catches. The research aims to understand the rising prices of farmed fish species such as tilapia, mullet, and tobar, potentially due to production or marketing issues. The trend equation indicates an annual increase of approximately 0.12 thousand tons in domestic fish production. Concurrently, the fish food gap has been reducing by about 0.033 thousand tons annually. The quantity of Egyptian fish exports has seen an annual increase of about 0.21 thousand tons during the period 2006-2021. The total production costs of tilapia were found to be about 100.2 thousand pounds per feddan, with feed (75.8%), rent (9.4%), transportation (3.4%), and labor (3.7%) being the major cost components. The study reveals that there is only one marketing channel for tilapia, i.e., the wholesaler. It was observed that the net return was highest for mullet fish, and the retailer consistently achieves the highest net return. The marketing efficiency for tilapia, mullet, and tobar was found to be 89.2%, 88.4%, and 89.5%, respectively.

The study concludes with several recommendations to improve the current state of fish farming and counteract the rise in feed prices. These include encouraging investment in fish farming, regulating the internal conditions of fish farms under government control to ensure the production of healthy fish, and establishing wholesale markets for distributing all types of fish with control over wholesalers and retailers.

Key Words: Production Costs, Marketing Channels, Net Return, Marketing Efficiency.

I. INTRODUCTION

In Egypt, fish serves as a significant source of dietary protein. The country has recently seen an expansion in fish farming systems, a crucial technology for augmenting fish production. This increase is particularly important given the limited availability of fish catches to meet the needs of the population and exports, which are a primary source of foreign currency.

Fish farming primarily occurs in freshwater environments, with species such as tilapia, mullet, and tobar being the most common. Saltwater farming is also practiced, but to a lesser extent. In 2020, total fish production reached approximately 2010.56 thousand tons, with marine catches contributing 20.82% and farming accounting for 79.18%.

Research Problem: Recently, the prices of many agricultural commodities, including fish, have risen. Despite the expansion of fish farming for species like tilapia, mullet, and tobar, their prices have increased. This price surge may be due to production or marketing issues. Therefore, it is essential to overcome several challenges to achieve development in the field of fish farming, particularly for the most consumed types.

Research Objectives: This research aims to study and analyze the production and marketing of tilapia, mullet, and tobar. The objectives include:

- Identifying the production and marketing costs and estimating the net return of farmed fish.
- Identifying the different marketing channels of fish from the study sample.
- Estimating marketing costs at the level of farmer, wholesalers, and retailer.
- Estimating the marketing efficiency of farmed fish.

- Identifying the most significant problems for both production and marketing. **Data Source:** The research relies on a random sample collected from fish breeders, wholesalers, and retailers in the Sharkia governorate. Additionally, it utilizes published data from the General Authority for Fish Resources and the annual bulletin of fish production and statistics from The Central Agency for Public Mobilization and Statistics.

II. Methodology

To fulfill the research objectives, both descriptive and quantitative analyses were employed. Economic indicators were utilized to estimate marketing efficiency, production, marketing cost, and net return. These indicators were identified through a questionnaire collected from fish breeders, wholesalers, and retailers. A simple linear regression was used to determine the development of production, consumption, the gap between them, as well as exports and imports of fish.

Sample Selection: The research focused on the Sharkia governorate, a primary region for farmed fish production in Egypt. The production in this region amounted to about 177 thousand tons, representing 11.66% of the total farmed fish production during 2006-2021. The most farmed fish in Sharkia, namely tilapia, mullet, and tobar, were chosen for this study.

Questionnaire forms were collected from various areas in Abo Hammad, including San El Hajar, Husseinya, and Abbasa. In total, 82 forms were collected: 40 for tilapia, 24 for mullet, and 18 for tobar. These were randomly selected. Additionally, 10 sample forms were collected from wholesalers and retailers.

III. Results and Discussion

Related to Fish production in Egypt Table (1) indicates to the relative importance of fish forming during (2006-2021), total fish production increased to about 595 thousand tons in 2006 represented 61.28% and the quantity reached the highest in 2018 to about 80.71%, in general the farmed fish reached about 75.2% from the total. The production from fisheries declined from 38.7% in 2006 to about 21.3% in 2021 and this due to the increase of farmed fish production.

		To	otal annual p	production in	tons		Average	
Governorates	2016	2017	2018	2019	2020	2021	Quantity in tons	%
Kafr El- Sheikh	671526	723264	700141	767814	693206	737536	715585.7	46.43
Port Said	228478	147345	208217	171446	309577	321628	231115.2	15.00
Sharkia	150562	145536	173133	181724	187417	205511	173980.5	11.29
the lake	139611	161130	161097	194692	192978	211990	176916.3	11.48
Damietta	130928	219020	264599	257717	123857	143206	189887.8	12.32
Rice fields	5413	6535	2797	4643	5942	7606	5489.3	0.36
Other governorates	44142	49011	51473	63913	78919	86370	62304.7	4.04
Total Republic	1370660	1451841	1561457	1641949	1591896	1628873	1541112.7	100.00

Table 1: The relative importance of fish farming in the Egyptian governorates during (2016-2021)

Source: Collected and calculated from **The Fish Production Statistics**, The General Authority for Fish Resources Development.

Table (2) refers to the ranking of governorates according to their contribution, It was found that Kafr El Sheik came first where the production amounted to 715.58 thousand tons represented 46.43% from the total production then, came portsaid, Damietta, Beheiera, Sharkia and rice farms to about 231.11, 189.88, 176.90, 173.98 and 5.48 thousand tons represented 15%, 12.32%, 11.48%, 11.29% and 0.36, respectively, from the total farmed fish in Egypt. Thus, all the previous governorates represented 96% from that total.

Item /		N	atural fisheries	5					
Year	Seas	Northern Lakes	Coastal depressions	Inland lakes	The Nile and its branches	Total of capture fisheries	Fish farming	Total fish production	Fish farming from production %
2006	119606	108346	4238	38728	104976	375894	595029	970923	61.28
2007	130748	106132	5050	32851	97710	372491	635517	1008008	63.05
2008	136243	108960	5522	43402	79688	373815	693815	1067630	64.99
2009	127821	113148	5595	53499	87335	387398	705490	1092888	64.55
2010	121362	133004	4871	41324	84648	385209	919585	1304794	70.48
2011	122303	117137	4652	41550	89712	375354	986820	1362174	72.44
2012	114198	128351	3939	41126	66623	354237	1017738	1371975	74.18
2013	106661	144874	3341	34310	67671	356857	1097544	1454401	75.46
2014	107799	132320	2811	35801	66060	344791	1137091	1481882	76.73
2015	102933	132629	4737	34109	69704	344112	1174831	1518943	77.35
2016	103654	123526	4093	30856	73484	335613	1370660	1706273	80.33
2017	109764	146186	3050	34227	77732	370959	1451841	1822800	79.65
2018	104695	152552	2610	39689	73739	373285	1561457	1934742	80.71
2019	98953	179640	3215	37858	77376	397042	1641949	2038991	80.53
2020	101392	197973	1592	38193	79533	418683	1591896	2010579	79.18
2021	95404	175701	1454	41656	81518	421385	1774168	2195552	80.81
Average	112721	137530	3798	38699	79844	374195	1147214	1521410	73.86
highest value	136243	197973	5595	53499	104976	421385	1774168	2195552	80.81
less value	95404	106132	1454	30856	66060	335613	595029	970923	61.28

Table 2: Development of the Amount of Fish Production in Egypt during (2006-2021)

Source: Collected and calculated from The Fish Production Statistics, The General Authority for Fish Resources Development.

Evaluation of food fish gap in Egypt

Table (3) shows the production, consumption, self-sufficiency rate and Gap. It proved that the fish local production increased from 971 thousand tons in 2006 to about 2034 thousand tons in 2019 with average about 1516.2 thousand tons, but the local consumption increased from 1174 thousand tons in 2006 to about 2510 thousand tons in 2019 by average 1782.6 thousand and tons, therefore the fish gap increased from 114 thousand tons in 2009 to about 471 thousand tons in 2019. The self-efficiency increased from 79.84 thousand tons in 2007 to about 94.5 thousand tons in 2021.

ltem Year	Total consumption (thousand tons	Average per capita kg / vear	Total production (thousand	Gap	Self sufficiency %	population million) (people
/	`		(tons			
2006	1174	16.62	971	-203	82.67	70653
2007	1263	16.98	1008	-255	79.84	74357
2008	1198	15.95	1067	-131	89.14	75097
2009	1206	15.89	1092	-114	90.64	76823
2010	1551	19.7	1304	-247	84.13	78728
2011	1535	19.09	1362	-173	88.75	80410
2012	1691	20.55	1371	-320	81.12	82305
2013	1670	19.73	1454	-216	87.1	84628
2014	1808	20.83	1481	-327	81.94	86811
2015	1795	20.18	1518	-277	84.61	88958
2016	1970	21.64	1706	-264	86.63	91023
2017	2154	22.72	1823	-331	84.61	94799
2018	2233	22.98	1934	-299	86.66	97147
2019	2510	25.38	2039	-471	81.24	98902
2020	2282	22.68	2011	-271	88.1	100617
2021	2482	24.73	2115	-367	85.43	102493
Average	1782.6	20.4	1516.0	-266.6	85.2	86484.4
highest value	2510	25.38	2039	-114	90.64	100617
less value	1174	15.89	971	-471	79.84	70653

 Table (3) Total Consumption and average per capita share of fish during (2006-2021)

* Significance at level 0.05 ** Significance at level 0.01

Y = (1, 2, 3) the estimated value of the dependent variable. X_1 = total domestic production. X_2 = available from domestic consumption X_3 = Local food gap.

e= time series in years (1, 2, 3, ...n)

Source: Collected and calculated from The Fish Production Statistics, The General Authority for Fish Resources Development.

Table (4) indicates that the annual change of production amounted to 0.12 at significance 0.01 and determination coefficient 97% during (2006-2021), The change which occurred in the total fish production due to the Time factor. It was also obvious from the table that the annual change of local consumption reached 0.01 at significance 0.01. Related to the fish gap it becomes clear that it has been decreased annually by about 0.033 at significance 0.01 and determination coefficient 0.45 and this due to the time factor.

Table 4: Estimating the general time trend equations for local production andconsumption food gap of fish

Statement	Equation	General annual average thousand) (tons	Amount of annual change (thousand tons)	Annual rate of change (%)	R ²	F
Total local production	Yi= 837.41+ 79.83Xi	1516	79.83	5.27	0.97	499.50**
of fish	(25.78)** (22.35)**					
Available of local	Yi= 990.31+ 93.21 Xi	1782.6	93.21	0.052	0.94	224.98**
consumpotion	(17.53)** (15.00)**					
Local food gap of fish	Yi= -152.91 -13.38 Xi	-266.6	-13.38	27.99	0.45	10.79**
	(-4.13)** (-3.39)**					

*Significance at the level 0.05 **Significance at the level 0.01

Yi = (1,2,3,...n) The estimated value of the dependent variable X1= Total domestic production X2= Available from domestic consumption X3= Local food gap e = time series in years (1,2,3,...n)

Source: collected and calculated from data in table (3).

The current situation	of the Egyptian	Exports and	Imports of fish:
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Item	Ex	ports	In	nports	Covoring overants
Year	Quantity thousand tons	Value pounds thousand	Quantity thousand tons	Value thousand pounds	to imports %
2006	4.05	19326	208	593074	3.26
2007	4.42	25352	259	1221895	2.07
2008	6.73	59510	137	2034893	2.92
2009	7.59	-	136	-	-
2010	10.6	85695	257	2780594	3.08
2011	9.49	140031	182	3106081	4.51
2012	45.81	112627	335	4768902	2.36
2013	20.45	161915	236	2984489	5.43
2014	28	239465	355	5354222	4.47
2015	19.7	236054	296	5752967	4.10
2016	47.81	432981	311	4804757	9.01
2017	35.11	649339	367	10087282	6.44
2018	26.3	578216	324	12306240	4.70
2019	25.01	885885	506	13809005	6.42
2020	28.11	547986	300	10820535	5.06
2021	38.83	74319	406	2725106	2.41
Average	21.28	278292.13	280.60	5361662.40	4.26
value highest	47.81	885885	506	13809005	9.01
Lowest value	4.05	0	136	0	0.00

 Table (5)The Egyptian foreign trade of fish during (2006-2021)

Source: Collected and calculated from The Fish Production Statistics, The General Authority for Fish Resources Development. Various Issues.

Table (5): shows that the quantities of the Egyptian exports have increased from 4.05 thousand tons in 2006 to 47.81 thousand tons in 2016. By estimating the trend equation for Exports it was found that the quantity increased by an annually to about 0.21 thousand tons at significance 0.01 and determination coefficient 0.47 which due to the time factor.

Table (6) shows the trend equations for the total imports of the Egyptian fish it was clear that the quantity increased by annual rate reached about 0.033 thousand tons at significance 0.01 and determination coefficient 53% during the period (2006-2021) and this change due to the time factor The study sample for fish farming.

Table 6: Estimating the trend equations for the quantity of exports and imports ofEgyptian Fish.

Item	Equation	General annual average thousand) (tons	The amount of annual change thousand) (tons	Annual change rate (%)	R2	F
Quantity of	Yi= 3.781 + 2.186 Xi	21.28	2.186	10.27	0.42	11.30*
exports	(0.64)(3.36)*					
Quantity of	Yi= 155.03 + 15.70 Xi	280.60	15.70	5.59	0.53	14.77**
imports	(4.17)**(3.84)**					

Where *Significance at the level 0.05 **Significance at the level 0.01

Yi = The estimated value of the dependent variable X1= Total domestic production X2= Available from domestic

consumption X3= Local food gap e = time in years

Source: collected and calculated from data in table (3)

The Study Sample of Fish Farming:

Table (7): shows the holding system of fisheries, it was found that the type of rental holding system is the most spread system for tilapia, mullet and tobar it reached about 95%, 91.7% and 88.9% for the three types, respectively, from the total number. According to the type of farming for tilapia the individual type reached about 40% and mixed type reached 60% for both types. It was found that semi intensive culture was a widespread type where the percentage reached 77.5%, 62.5% and 61.1%, respectively for tilapia, mullet and tobar, but the intensive reached about 22.5%, 37.5%, and 38.9%, respectively for the same types of fish. It was shown from the study sample that there were no hatchery in most farms and there is one only for all types of fish according to the sample.

Itom		Baltic		- Pur	Puri		Tobar	
	Item	Dattic		Tull		Tobal		
		Views	%	Views	%	Views	%	
Type of	Property	2	5	2	8.3	2	11.1	
ownership	rent	38	95	22	91.7	16	88.9	
Farming	Individually	16	40	-	-	-	-	
types	mixed	24	60	24	100	18	100	
Culture	Semi-	31	77.5	15	62.5	11	61.1	
methods	condensed							
	capacitor	9	22.5	9	37.5	7	38.9	
There is a	There is	1	2.5	1	4.2	1	5.6	
hatchery on	nothing	39	97.5	23	95.80	17	94.4	
the farm								

 Table 7: Description of the study sample for fish farming

Source Production cost for tilapia, mullet and tobar.

Table (8) indicates that the total production of tilapia amounted to about 100.2 thousand pounds per feddan and the cost items were fodder, rent, transportation and labor which amounted to about 75.8%, 9.4%, 3.9% and 3.7%, respectively. The remain items such as: electricity, fuel, maintenance, seed and preparing the land cost about 7.2%. The total cost of tilapia production reached about31 thousand pounds per ton.

It was also obvious from table (8) that the total production cost for mullet reached about 101.6 Thousand pounds per feddan. The highest item cost was fodder 74.4%, then rent, fingerlings, means of transportation about 9.6%, 4.9% and 4.13%, respectively. The remain items reached about 6.77%. For tobar the total cost reached about 36.2 thousand pounds per ton and fodder was the highest item about 76.2%, then came rent, means of transportation and labor which reached 9.7%, 4.3% and 2.44%. the remain items reached 7.36%. Lately the total cost of tobar fish was about 36.2 thousand pounds per ton.

Type of	Costs item	Costs per fedden	Productivity of	Production 2+1(3)	%
fish		(1)	feddan (2)	per ton	
	Land preparation	917.5		284.1	0.9
	Depreciation	381.5		118.1	0.4
	Rent	9450		2925	9.4
	Labor	3663.3		1134.1	3.7
	fingerlings	1695	3.230	524.7	1.7
Tilpia	fodder	76025		23537.2	75.84
	maintenance	466		144.2	0.5
	fuel	233		72.1	0.2
	electricity	932		288.5	0.9
	Transportation	2512.5		777.7	2.5
	Others	3931.6		1217.2	3.9
Total		100206.9	3.230	31023.8	100

Table 8: Production cost for Tilapia, Mullet and Tobar according to the study.

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	Land preparation	1004.2		358.6	0.09
	Depreciation	257.5		91.96	0.25
	Rent	9708.3		3467.25	9.6
	Labor	2421.5	2.8	864.85	2.40
	fingerlings	4937.5		1763.4	4.9
Puri	fodder	74.958		26770.7	74.4
	maintenance	303		108.21	0.3
	fuel	165.13		58.97	0.16
	electricity	766.42		273.72	0.7
	Transportation	2875		1026.8	2.8
	Others	4164		1487.1	4.1
Total		101560.55			100
	Land preparation	1016.6		376.52	1.04
	Depreciation	263.1		97.44	0.12
	Rent	9444.4		3497.9	9.7
	Labor	2385.8	2.7	883.63	2.44
	fingerlings	1844.4		683.111	1.8
Tobar	fodder	74388.8		27551.44	76.2
	maintenance	267.5		99.07	0.3
	fuel	202.5		75	0.17
	electricity	786.5		291.3	0.80
	Transportation	2916.6		1080.222	3
	Others	4199.7		1555.44	4.30
Total		97715.9	2.7	36191.07	100

Source: Collected and calculated from thequestionnaire forms, 2023.

Return of the invested pound per feddan for tilapia, mullet and tobar:

Table (9) indicates that the production of tilapia, mullet and tobar reached about 3.23, 2.8and 2.7 tons per feddan, respectively and the sold price reached about 36.6, 56.3 and 46.4 thousand tons. Total production and marketing cost reached 106.1, 109.4 and 104 thousand pounds, respectively. SoThe total return reached 118.1, 157.5 and 125.2 thousand pounds per feddan, but the net return reached 12, 48 and 21.4 thousand pounds, respectively for the same types.

Table 9: Return of the invested	pound for tilapia, mullet and tol	bar from the study sample
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	Itom		type	
	item	Tilapia	Mullet	Tobar
(1)	Quantity of production per fedden	3.230	2.8	2.7
(2)	Selling price (pounds/ton)	36.575	56.250	46.380
(3)	Production cost per feddan (pound)	100206.9	101560.55	97715.9
(4)	Marketing costs (pounds)	5906.9	7875	6261.3
(5)	Total cost of production and marketing (3+4)	106113.8	109435.55	103988.2
(6)	Total Return (1,2)	118137.250	157500	125226
(7)	Net return (5,6)	12023.5	48064	21248.8
(8)	Return of invested pound (7/5)*100	11.3	43.9	20.4

Marketing cost= (production quantity)(selling price) (Merchant commission) (0.05)

Source: collected and calculated from questionnaire farms.

From the same table it is proved that the return of the invested pound pound for tilapia, mullet and tobar reached 11.3, 43.9 and 20.4 pounds. It was obvious that the invested pound of mullet reached the highest to about 43.9 pounds more than, tilapia and tobar. Thus, tilapia fish will still suitable to consumers preferences.

Marketing channels for tilapia mullet and tobar:

Table (10) refers to the marketing channels for tilapia, mullet and tobar It was obvious that the main channel for tilapia was wholesaler where the sold quantity for one farm reached 119 tons represented 99.7% from the sales of one farm, but the remain quantity reached about 0.3 ton was consumed by the family related to bullet the main channel was wholesaler, the sales per farm amounted to 55.5 tons represented 99.75% from the sold quantity, the remain production reached 0.3 ton was consumed by the family. Lately tobar main channel was also wholesaler, the saled reached 37 tons per farm represented 99.75 and the rest was 0.3 ton to the family.

From the previous presentation there is only one marketing channel, it is the wholesaler and this is the prevailing pattern for selling.

	Total	Quantit	ies mar	keted by samp	e Marketed quantities per farm				
Type of fish	productio n of the sample	Family consumption	%	Selling to wholesaler	%	Family consumption	%	Selling to wholesaler	%
Tilapia	4777.7	13.3	0.3	4764.4	99.7	0.3	0.3	119.11	99.7
Puri	1335	3.4	0.25	1331.6	99.75	0.1	0.25	55.5	99.7 5
Tobar	668	1.7	0.25	666.3	99.75	0.1	0.25	37	99.7 5

Table 10: Marketing channels for tilapia, mullet, and tobar:

Source: collected and calculated from questionnaire 2022.

Production and marketing problems of tilapia mullet and tobar:

First, related to the productive problems Table (11) refers to the main problems which face fish producers such as the high price of feed according to the observations which reached 40, 24 and 18 for tilapia, mullet and tobar with a relative frequency 100% respectively for each. Then, unavailability of feed according to 35 observations from 40 and relative frequency 87.5% for mullet, and about 14 observations from 18 for tobar with relative frequency 77.7%, the last two problems were adulteration of feed and the in delivered number of fry with relative frequency reached 72.5% and 62.5%, respectively for tilapia, but for bullet reached 66.6% and 62.5%, respectively, for tobar reached 61.1% and 5.5%, respectively.

Second, related to the marketing problem: Table (11) refers to the marketing problems which face the producers; the first problem was the exploitation of the traders, the observations reached about 29.19 and 15 for tilapia, mullet and tobar, respectively represented 72.5%, 79.16% and 83.3%, respectively. The second problem was the distance between farm and market, only one observation for both tilapia and mullet with 2.5% and 4.16%; respectively, and two observations of tobar which reached about 11.11% nearly.

01	os ervat ion number	tilapia	Repetition	mullet	Repetition	Views	Repetition
	Problem		Relative		Relative	Tobar	Relative
Pro	ductive problem						
1-	Unavailability of feed	35	87.5	20	83.3	14	77.7
2-	High price of feed	40	100	24	100	18	100
3-	Feed adulteration	29	72.5	16	66.6	11	61.1
4-	Lack of seed	1	2.5	1	4.16	1	5.5
5-	High price of seed	25	62.5	15	62.5	11	61.1
6-	The delivered number is less than the actual number	1	2.5	1	4.16	1	5.5
7-	High fuel prices and far from markets	1	2.5	1	4.16	1	5.5
8-	High labor wages	1	2.5	1	4.16	1	5.5
	1.4.11						
Mai	<u>keting problems</u>						
	1- Exploitation of traders	29	72.5	19	79.16	15	83.3
	2- After the markets	1	2.5	1	4.16	2	11.11

Source: collected and calculated from questionnaire 2022.

Marketing costs at the level of wholesaler and retailer:

Table (12) shows that the items of the marketing costs reached about L.E. 396.56, 132, 1068.4, 80.35 and 400.7, respectively, per ton and the total cost amounted to about LE1780 per ton.from the previous results it proved that marketing cost of retailer was more than the whole saler and this due to the labor and transportation costs.

			pounds/ton			
Merchant	Туре	Packages	labor	ice	others	Total
Wholesaler	Tilapia/mullet/tobar	51.4	20.3	82.8	10.9	165.4
Retail	Tilapia/mullet/tobar	132	1068.4	80.35	400.7	1780

Table 12: Marketing coasts at the level of wholesaler and retailer:

Source: collected and calculated from questionnaire 2022.

Net return of wholesaler and retailer:

Table (13) shows that purchase price of tilapia which was LE 36575 per ton marketing cost about LE 165.4 per ton, and selling price about L.E. 38404 per ton, therefore the net return reached about E.L 1663 per ton for the wholesaler. For mullet purchase price was L.E. 56250 per ton, marketing cost L.E. 165.4 per ton and selling price 59063the net return was about L.E. 2647 per ton for the wholesalers, lately for tobar the purchase price was L.E. 46380 per ton, marketing cost about L.E. 165.4 per ton and selling price L.E. 48699 per ton, So the net return reached L.E. 2153.6 per ton for the wholesalers. Retated to the retailer, the purchase price and marketing cost about L.E 1785 per ton and the sold price amounted to L.E 51085 per ton and the net return amounted to about 10901.2.

Related to the retailer the Purchase price for the three types tilapia, mullet and tobar reached about L.E. 38403.8, 59062.5 and 48699 respectively per ton, The marketing cost reached L.E. 1780, 1780 and 1780 respectively per ton, The selling price reached 51085, 9517.4 and 80583 respectively per ton, The net return for retailer reached about L.E. 10901.2, 34331.5 and 30104 respectively per ton. From the previous the net return for mullet is better than tobar and tilapia due to the retailer profits from mullet and tobar compared with tilapia.Finally, the net return for wholesaler was in mullet then tobar, but tilapia is better as a consumer preference.

Merchant	Туре	Purchasing price pound/ ton	Marketing costs Pound/ ton	Prices selling pound/ ton	Net return Pound/ ton
		(1)	(2)	(3)	
wholesaler	tilapia	36575	165.4	38401.8	1663.4
	Mullet	56250	165.4	59062.5	2647.1
	Tobar	46380	165.4	48699	2153.6
Retail	Tilapia	38403.8	1780	51085	10901.2
	Mullet	59062.5	1780	9517.4	34331.5
	Tobar	48699	1780	80583	30104

Table 13: Return to fish wholesaler and retailer

(selling price) purchase price from the table of return on invested pounds per acre .**Source:** collected and calculated from tables questionnaire forms.

Net profits of producer and middlemen for tilapia mullet and tobar:

Table (14) shows the net profit for producer wholesaler and retailer for tilapia reached about L.E. 3722, 1663 and 10901, respectively, per ton, but for mullet reached about L.E. 17166, 2647 and 34331, respectively per ton and lately, for tobar reached about L.E. 7870, 2154 and 30104, respectively, per ton According to these results it is clear that the retailer achieves profits two or three times more than the producer. Additionally, the retailer achieves profits more than the wholesaler.

pounds/ ton			
Туре		Profit	
	farm	Wholesaler	Retailer
Tilapia	3722.4	1663.4	10901.2
Mullet	17165.7	2647.1	34331.5
Tobar	7869.9	2153.6	30104

Table14: profits of the producer middlemen

Source: collected and calculated from questionnaire 2022.

nounds/ton

Marketing margins and distribution of a consumer pound:

Table (15) refers to the marketing margins, for tilapia it reached about L.E. 1828.8 per ton as a wholesaler- farmer represented 71.6% and about L.E. 14510 per ton as a retailer-farmer therefore the share of middlemen reached about 28.4%. related to mullet the marketing margins wholesaler – farmer reached L.E. 2812.5 per ton represented 59.1% and for retailer – farmer about L.E. 38924 per ton and about L.E. 40.9 for middlemen. Lastly fortobar the marketing margins wholesaler – farmer reached L.E. 2319 per ton represented 57.6%, for retailer – farmer about L.E. 34203 per ton and 42.4% for middlemen.

Туре	selling price			Marketing margin		distribution of	
						consume	r pound
	Farmer	Wholesaler	Retailer	Wholesale Retail-		Farmer	Middlemen
				farmer -	Farmer		
Tilapia	36575	38403.8	51085	1828.8	14510	71.6	28.4
Mullet	56250	59062.5	95174	2812.5	38924	59.1	40.9
Tobar	46380	48699	80583	2319	34203	57.6	42.4

 Table 15: marketing margins and distribution of consumer pound

Source: collected and calculated from questionnaire 2022.

Marketing efficiency of farming fish from the study sample:

Table (16) refers to the marketing efficiency for the three types tilapia, mullet and tobar which reached about 89.2%, 88.4% and 89.5% this mean that the marketing efficiency was high for all types. The table shows the production cost for tilapia mullet and tobar which reached L.E. 31024, 36272 and 36191 per ton, the marketing cost about L.E. 3774, 4758 and 4264 per ton, respectively. The total of production and marketing cost about L.E. 34798, 41030 and 40456 per ton, respectively.The marketing efficiency respectively reached about 89.2%, 88.4% and 89.5%. these percentages are high for tilapia, Mullet and tobar respectively.

Table 16: calculating t	he marketing	g efficiency	of farmed	fish from	n the study	v simple
- abie -of eareanabing		,				,

	Production costs pounds/ton	Ma	rketing costs: po	ounds/ton	cost Total	Solling		
Туре		producer	wholesolers	retial	Total	of production and marketing	price to the consumer	Marketing efficiency
Tilopia	31023.8	1828.8	165.4	1780	3774.2	34798	51085	89.2
Mullet	36271.6	2812.5	165.4	1780	4757.9	41029.5	95174	88.4
Tobar	36191.10	2319	165.4	1780	4264.4	40455.5	80583	89.5

Total of marketing cost/ (marketing cost + production cost)* 100

Source: collected and calculated from questionnaire 2022.

IV. References

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