

# Evaluating Broiler Chicken Value Chains Efficiency in Qalyubia Governorate

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## ABSTRACT

This study investigates broiler chicken production and marketing efficiency in Qalyubia Governorate, Egypt. Data analysis from 2012 to 2022 reveals no significant changes in the number of broiler chicken farms or operational houses, suggesting relative stability. However, capacity utilization remains below average, indicating room for improvement. Production costs increase with farm size, while sales prices and revenue per 1,000 chickens follow a similar trend. An analysis of marketing channels demonstrates that wholesalers are the dominant channel, followed by slaughterhouses and retailers. While retailers offer the highest net return per ton, producers achieve greater profitability with larger production capacities across all channels.

A field study in 2023 examines marketing margins, consumer pound distribution, and marketing efficiency. Marketing margins increase throughout the value chain, with producers receiving the largest share (81%-89.6%) and retailers receiving the smallest (5.7%-8.3%). Marketing efficiency is highest for direct sales to slaughterhouses and retailers, highlighting the benefit of fewer intermediaries.

The study also analyzes economic indicators for broiler value chain actors. Broiler farms exhibit favorable profitability and return on investment. Wholesalers and retailers demonstrate strong economic efficiency with high net returns and profit margins. A partial equilibrium analysis explores the impact of government import tariffs, revealing a complex interplay of economic effects. While consumers initially benefit from lower prices, producers face substantial losses and the overall economic welfare may decline.

Finally, the study identifies critical challenges faced by producers and traders. High production input costs, disease prevalence, and limited access to financing are major production concerns. Marketing challenges include fluctuating sale prices, limited consumer demand, and exploitative pricing practices. To improve efficiency, producers propose better access to high-quality inputs, reduced production costs, and improved marketing infrastructure.

This research provides valuable insights into the broiler chicken industry in Qalyubia, highlighting areas for improvement to enhance production efficiency, profitability, and consumer access to affordable chicken.

**Keywords:** Broiler chicken production efficiency, Value chain analysis, A partial equilibrium

## INTRODUCTION

Egypt's poultry industry is a vital sector for the nation's food security, providing animal protein and employing millions directly and indirectly. Over the past three decades, the industry has witnessed impressive growth, fueled by projections of future market opportunities and export potential whereas Egypt exported approximately \$660,000 worth of poultry in 2022 (Worldometer, 2022). However, a recent crisis - Avian Influenza outbreak in 2021 significantly hampered this progress and jeopardized self-sufficiency goals (Ministry of Agriculture and Land Reclamation, 2022). This crisis, particularly for a geographically concentrated industry with a large number of facilities (e.g., 38,000 facilities in 2021, (Ministry of Agriculture and Land Reclamation, 2021) with a concentration in the Nile Delta), highlighted vulnerabilities and prompted actions to prevent similar setbacks. This research delves into the impact of the crisis on the Egyptian poultry industry, focusing on the effectiveness of promoting domestic feed production and attracting investment in Qalyubia governorate.

## THE RESEARCH PROBLEM

The Russia-Ukraine war has triggered a "perfect storm" for Egypt's poultry industry, a critical source of national food security. Disruptions to global food supply chains, particularly for corn and soybeans (essential poultry feed ingredients heavily exported by Russia and Ukraine), have caused a surge in global prices. A United States Department of Agriculture (USDA) report predicts an 11-19% increase in global corn prices in 2024. This, compounded by a depreciating Egyptian currency, has significantly squeezed profit margins for Egyptian poultry farmers as production costs rise. These challenges threaten the sustainability of this vital sector.

## RESEARCH OBJECTIVE

This research aims to analyze the current state of the broiler chicken production sector in Qalyubia governorate, Egypt. Using data from 2012 to 2022, the study will first identify trends in key production indices. Focusing on the 2022/2023 production season, the research will then analyze the efficiency of the broiler chicken value chain in Qalyubia, examining all stages

from farm production to consumer purchase. This analysis, employing a partial equilibrium approach, will include price levels (wholesale, retail, marketing margins), consumer affordability, and measurements of productive, economic, and marketing efficiency at the farm level. By identifying the major production and marketing problems faced by all stakeholders in the value chain, the research will propose actionable solutions to improve overall efficiency and sustainability in the Qalyubia broiler chicken industry.

## DATA AND METHODOLOGY

The study examines broiler production in Qalyubia, Egypt (2012-2022) focusing on hatcheries, farms, and slaughterhouses. It analyzes efficiency and added value at each stage using economic and technical metrics (UNIDO, 2009). The study also explores how government import tariffs might impact the industry, considering effects on producers, consumers, and government revenue using the Partial Equilibrium Model (Tsakok,1990).

**In the case of imported goods, the model consists of the following equations:**

- 1)  $NEL_P = 0.5 E_s (NPC-1)^2 V$
- 2)  $NEL_C = 0.5 E_d (NPC-1)^2 W$
- 3)  $CS = (NPC-1)W - NEL_C$
- 4)  $PS = (NPC-1)V + NEL_P$
- 5)  $GB = (NPC-1)W [1+E_d((NPC-1))] - V (1+E_s\{NPC-1\})$
- 6)  $FE = -(NPC - 1)(E_s V - E_d W)$
- 7)  $NSL = PS + CS + GB = - (NEL_P + NEL_C)$

Loss:  $NSL = PS + CS + GB = - (NEL_P + NEL_C)$ .

### Where,

NPC= Nominal Protection Coefficient

W= Value of Consumption at world price

V= Value of domestic production at world price

$E_s$ = Elasticity of supply

$E_d$ = Elasticity of Demand

$NEL_P$ = Net Social Loss in Production

$NEL_C$ = Net Social Loss in Consumption

PS= Change in Producer Surplus

CS= Change in Consumer Surplus

GB= Change in Government Revenue

FE= Change in Foreign Exchange Outlays

NSL= Net Social Loss

This study investigated broiler chicken production in Qalyubia, Egypt (2012-2023) using a mixed-method approach. Researchers combined historical data (government ministry reports) with a field study conducted during the 2022/2023 season. The field study involved a random sample of 90 farms, wholesalers, and

retailers across various districts. Semi-structured interviews explored farm practices, costs, marketing channels, pricing strategies, and consumer preferences. Farm observations provided additional insights. The farm sample (90) represents nearly 10% of all farms in the study area, with specific villages chosen to reflect different production capacities. Deliberate interviews with wholesalers and retailers (40 total) aimed to identify marketing channels, costs, margins, and industry challenges and solutions.

## RESULTS AND DISCUSSION

### Current Status of Broiler Chicken Industry in Qalyubia Governorate

#### (1) Development of Total and Actual Capacity in Qalyubia Governorate:

Table (1) shows that the number of broiler chicken farms in Qalyubia Governorate fluctuated between 925 (2022) and 1894 (2019) during the period 2012-2022, with an annual average of 1620 farms. Statistical analysis indicates that the number of broiler chicken farms did not exhibit statistically significant changes, suggesting relative stability around the average during the study period.

Similarly, the number of operational broiler chicken houses ranged from 1270 (2022) to 2980 (2021) with an annual average of 2319 houses during the study period. Statistical analysis again shows no statistically significant changes in the number of operational houses, indicating relative stability around the average.

Data from Table (1), reveals that the total production capacity of broiler chickens in Qalyubia Governorate varied between 39.084 million chickens (2022) and 72.448 million chickens (2020), with an annual average of approximately 59.866 million chickens. Statistical analysis indicates no statistically significant changes in the total production capacity, suggesting relative stability around the average.

Table (3), also shows that the actual production capacity of broiler chickens in Qalyubia Governorate ranged between 38.298 million chickens (representing 97.9% of total capacity in 2022) and 68.043 million chickens (2021). The annual average was approximately 51.045 million chickens, representing 85.3% of the average total capacity. This indicates fluctuations in capacity utilization, with an average of 14.73% of total capacity remaining unused. Statistical analysis (Table 4) shows no statistically significant changes in actual production capacity, suggesting relative stability around the average.

**Table 1. Evolution of broiler production indicators in Qalyubia Governorate during the period (2012-2022)**

Year	Number of Farms	Number of Operational Broiler Houses	Number of Non-Operational Broiler Houses	Total Number of Broiler Houses	Total Capacity (Million Broilers)	Actual Production (Million Broilers)
2012	1604	2298	24	2322	57,44	46,51
2013	1618	2296	24	2320	57,98	45,96
2014	1631	2308	23	2331	58,235	47,320
2015	1631	2309	23	2332	58,290	47,905
2016	1632	2312	23	2335	57,203	47,295
2017	1741	2418	23	2441	60,956	50,046
2018	1741	2418	23	2441	60,956	50,046
2019	1894	2486	24	2510	62,184	51,138
2020	1795	2416	23	2439	72,448	59,314
2021	1604	2980	0	2980	69,434	68,043
2022	925	1270	0	1270	39,084	38,298
Average	1620	2319	19	2338	59866	51045

Source: Compiled and calculated from data provided by the Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration for Agricultural Economics, Livestock Statistics - Miscellaneous Numbers. (Ministry of Agriculture and Land Reclamation, 2023).

**Table 2. Economic Indicators for Different Broiler Production Capacities in the Study Sample in Qalyubia Governorate for the Production Year (2023)**

Production Capacity (Thousand Birds)	Production Cycle	Average Production (Thous and Birds)	Average Production per Cycle (Tons)	Average Selling Price (1000 LE/ Ton)	Value of Broilers (LE)	Poultry Manure (m <sup>3</sup> )	Poultry Manure Value (LE)	Total Revenue (LE)	Average Production Cost per Cycle (LE)	Cost-to-Revenue Ratio	Revenue per Thousand Birds (LE)	Mortality Rate (%)
Initial production capacity	1	1.90	7.6	63550	482980	27	3240	497600	425300	117	124400	5.2
	2	1.64	8.2	59125	484825	30	3600	511760	425200	120	102352	4.5
	3	1.60	8	61768	494144	31	3660	547240	478230	114	109448	6.3
	4	1.76	7.9	55235	436357	28	3360	438100	389123	113	97356	7
	5	1.60	8	60147	481176	32	3840	483480	422456	114	96696	6.5
	6	1.42	8.5	63569	540337	35	4200	501120	439563	114	83520	5.3
	Average	1.7	8.0	60566	486636	30	3650	496550	429979	115.5	102295	5.8
Second production capacity	1	1.79	14.3	63589	909323	150	18000	947500	826231	115	118438	6
	2	1.83	12.8	55235	707008	144	17280	810880	706126	115	115840	4.3
	3	1.87	20.6	63258	1303115	166	19920	1420720	1262300	113	129156	5.2
	4	1.72	15.5	60758	941749	145	17400	869900	756325	115	96656	5
	5	1.75	17.5	55254	966945	162	19440	1069440	965230	111	106944	4.5
	6	1.88	22.6	66874	1511352	173	20760	1444560	1125369	128	120380	4
	Average	1.8	17.2	60828	1056582	157	18800	1093833	940264	116	114569	5.0
Third production capacity	1	2.19	30.6	63021	1928443	250	30000	2019000	1722230	117	144214	4
	2	2.03	32.4	57258	1855159	270	32400	2041200	1890236	108	127575	5
	3	2.28	45.6	63874	2912654	310	37200	3138000	2487300	126	156900	5.5
	4	2.22	28.9	67000	1936300	260	31200	1620700	1323600	122	124669	4.3
	5	2.23	31.2	58125	1813500	275	33000	1905000	1502536	127	136071	5
	6	1.84	33.1	66542	2202540	295	35400	2120700	1978214	107	117817	6
	Average	2.1	33.6	62637	2108099	277	33200	2140767	1817353	118	134541	4.8

Source: Compiled and calculated from data collected during the field study for the production season (2022-2023).

### Analysis of Key Economic Indicators for Broiler Chicken Production Capacities in Qalyubia Governorate (2022/2023):

Table (2), presents key economic variables for broiler chicken production across different farm sizes (production capacities) within the Qalyubia Governorate study sample (2022/2023 season). The Table highlights the average production yield per cycle, which increases with production capacity. Farms in the first, second, and third capacity categories achieve average yields of approximately 8 tons, 17.2 tons, and 33.6 tons, respectively.

The average sales price per ton of chicken increased with production capacity. Farms in the first, second, and third capacity categories sold their chicken for an average of L.E. 60,565, L.E. 60,828, and L.E. 62,636, respectively. The third capacity farms achieved the highest price, exceeding the first and second capacities by L.E. 2,070 (3.3%) and L.E. 1,808 (2.9%), respectively. This suggests a potential association between larger farm size and higher broiler chicken sales prices.

Analyzing revenue per 1,000 chickens across production capacities within the study sample data (Table 2) reveals a trend. The third production capacity generated the highest revenue at approximately L.E. 102,295. This surpassed the revenue of the second and first capacities, which were L.E. 114,568 and L.E. 134,541 per 1,000 chickens, respectively. Notably, the third capacity achieved revenue exceeding the first and second capacities by L.E. 32,245 (23.9%) and L.E. 19,972 (14.8%), respectively.

The study also examined the cost-revenue ratio for each production capacity. Interestingly, the third capacity exhibited the highest ratio at approximately 118%, followed by the second (116%) and first (115.5%) capacities. While this observational data suggests a potential trend of increasing cost-revenue ratio with production capacity, further analysis is needed to determine causality. Other factors besides production capacity might influence this ratio.

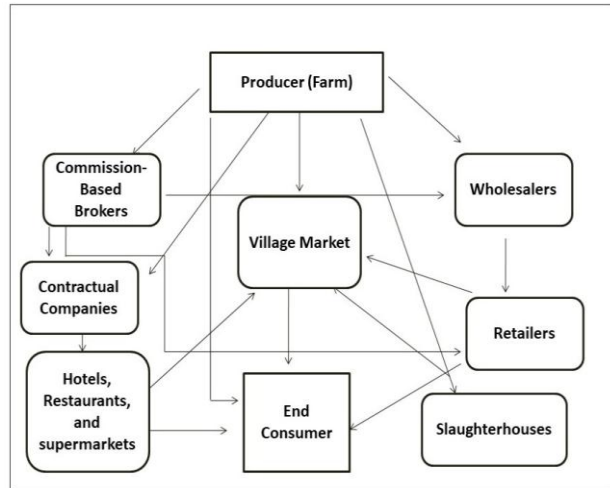
Examining farm-level loss ratios for broiler chickens reveals a trend. The first production capacity experienced the highest loss ratio at approximately 5.8%. This was followed by the second capacity at 5.0%. Conversely, the third production capacity achieved the lowest loss ratio, at around 4.8%.

### Examining Marketing Channel Efficiency for Broiler Chicken in Qalyubia Governorate Farms (2022/2023):

Figure (1) illustrates the various marketing channels used by broiler chicken farms in the Qalyubia

governorate study sample (2022/2023 season). The most prevalent channel, labeled "(First channel)," involves direct farm sales to wholesalers, including the poultry cages. This method is often chosen by producers with limited financial resources or marketing experience.

**Fig. 1. Main Marketing Channels for Broilers in the Study Sample in Qalyubia Governorate**



Source: Collected from Qalyubia Governorate field study data (2022/2023)

Figure (1) also details several other marketing channels used by the studied broiler chicken farms.

- Channel 2: Selling directly to retailers at the farm. However, the quantities sold through this channel are typically limited due to retailers' smaller buying capacity.
- Channel 3: Selling live chickens to poultry slaughterhouses, where the producer transports the birds for slaughter and sale.
- Channel 4: Selling to contracted buyers, such as restaurants, hotels, or supermarkets, who then sell to consumers.
- Channel 5: Selling directly to consumers at local village markets, offering a small portion of the farm's production.

Table (3), details the quantities of broiler chicken sold through various marketing channels in the study sample. Wholesalers were the dominant channel, accounting for 74.1%, 65.7%, and 62% of total sales for the first, second, and third production capacities, respectively. This preference for wholesaler's likely stems from the ease of selling through this channel.

**Table 3. Quantities of Broilers Sold through Different Marketing Channels According to Farm Production Capacities in the Study Sample in Qalyubia Governorate, 2023**

Farm Production Capacity	Cycle	Total Marketed Broilers (Ton)	wholesaler		retailer		Slaughterhouse		restaurants, hotels	
				%		%		%		%
Initial production capacity	1	160.8	124.1	77.18	4.6	2.9	30.1	18.72	2	1.24
	2	158.2	111.1	70.2	5	3.2	40.1	25.3	1.6	1.01
	3	157.4	121.5	77.2	5.5	3.5	29.2	18.6	1.2	0.76
	4	153.4	113.5	74	4.2	2.7	32.7	21.3	1.5	0.98
	5	156.7	122.5	78.2	6.6	4.2	22.4	14.3	2.2	1.40
	6	158.9	107.5	67.7	6.9	4.3	41.8	26.3	2.7	1.70
	Total	945.3	700.2	74.1	32.8	3.5	196.3	20.8	3.2	1.18
Second production capacity	1	387.2	236.5	61.08	31.5	8.1	119.2	30.8	3.7	0.96
	2	302.7	200.5	66.23	8.1	2.7	94.1	31.1	4.2	1.39
	3	283	199.5	70.49	13.1	4.6	70.4	24.9	4.7	1.66
	4	358.4	250.5	69.89	9.9	2.8	98	27.3	3.2	0.89
	5	372.4	248.5	66.74	7.8	2.1	116.1	31.2	1.2	0.32
	6	379.5	226.5	59.68	11.9	3.1	141.1	37.2	1.5	0.40
	Total	2083.2	1362	65.7	82.3	3.9	638.9	30.4	2.2	0.94
Third production capacity	1	577	320.5	55.5	77.5	13.4	174	30.2	4.7	0.81
	2	478	295.6	61.9	65.6	13.7	113	23.6	3.2	0.67
	3	580	350	60.4	92.9	16.0	136	23.4	1.2	0.21
	4	463	333.4	72.0	25.6	5.5	102	22.1	1.6	0.35
	5	572	369.4	64.5	54.9	9.6	147	25.7	1.2	0.21
	6	461	266.8	57.9	45.4	9.8	147	32.0	1.5	0.33
	Total	3131	1936	62	362	11	819	26	13	0.4

Source: Compiled and calculated from Qalyubia Governorate field study data (2022/2023).

Sales to slaughterhouses followed in importance, representing 20.8%, 30.4%, and 26% of total sales for each capacity, respectively. Notably, the first capacity had the lowest sales to slaughterhouses, possibly due to producers' limited financial resources and their need for quicker revenue compared to selling live birds.

Retailers played a minor role, with sales representing only 3.5%, 3.9%, and 11% of total sales for each capacity, respectively. Finally, sales to restaurants, hotels, and supermarkets through contracts were minimal, accounting for 1.2%, 0.94%, and 0.4% of total sales for each capacity, respectively.

#### **Comparison of Net Return per Ton Across Marketing Channels for Broiler Chicken (Qalyubia Sample):**

##### **Net Return by Marketing Channel (First Production Capacity):**

Examining net return per ton of broiler chicken for the first production capacity in Qalyubia (2022/2023 season) reveals the impact of marketing channels (Table 4), the average production cost was L.E. 53,317 per ton. Marketing costs vary significantly: there are no additional costs for sales to wholesalers/retailers who

purchase live chickens at the farm gate (cages included). Slaughterhouse sales incur some marketing costs for the producer, including transportation (L.E. 80/ton) and cage depreciation. Contracted buyers like restaurants, hotels, and supermarkets handle transportation, processing, and onward sales, minimizing marketing costs for the producer in this channel (De Silva, 2011).

Examining average sale prices across marketing channels for the first production capacity reveals a trend. Wholesalers offered the lowest price at L.E. 57,232/ton. Producers earned a higher price by selling directly to retailers (L.E. 61,730/ton), followed by slaughterhouses (L.E. 60,765/ton) and restaurants/hotels/supermarkets (L.E. 60,547/ton). Consequently, selling to retailers yielded the highest net return (L.E. 8,376/ton), followed by slaughterhouses (L.E. 7,412/ton) and wholesalers (L.E. 3,915/ton).

##### **Net Return by Marketing Channel (Second Production Capacity):**

The average production cost per ton for the second capacity was L.E. 54,614. Similar to the first capacity,

**Table 4. Net Return per Ton of Broiler Chicken by Marketing Channel in the Value Chain of the Study Sample in Qalyubia Governorate, 2023**

production capacity	Cycle	Production Quantity (Chickens/ Cycle)	Farm Production Costs (LE/Ton)	Selling to wholesaler		Selling to retailer		Total production and marketing costs for farmers (LE/ton)	selling to slaughterhouse		selling to restaurants and hotels	
				Selling price (LE/ton)	Net profit (LE/ton)	Selling price (LE/ton)	Net profit (LE/ton)		Selling price (LE/ton)	Net profit (LE/ton)	Selling price (LE/ton)	Net profit (LE/ton)
Initial production capacity	1	6312.4	55961	58550	2589	63450	7489	56041	60125	4164	61256	5295
	2	5445.7	51854	59125	7271	64555	12701	51934	60210	8356	60365	8511
	3	5430.5	59779	62768	2989	65123	5344	59859	60982	1203	60569	790
	4	5865.4	49256	52235	2979	59250	9994	49336	57125	7869	56852	7596
	5	5123.6	51557	55147	3590	59250	7693	51637	62950	11393	61254	9697
	6	4352.9	51713	55569	3856	58750	7037	51793	63200	11487	62984	11271
	Average	5421.75	53317	57232	3915	61730	8376	53397	60765	7412	60547	7193
Second production capacity	1	7924.5	57778	63589	5811	67650	9872	57858	66982	9204	65654	7876
	2	9985.9	55166	55235	69	58750	3584	55246	57642	2476	56258	1092
	3	10895.6	61277	63258	1981	66250	4973	61357	65000	3723	65700	4423
	4	11799.9	48795	60758	11963	64290	15495	48875	62250	13455	63258	14463
	5	11865.9	55156	55254	98	59530	4374	55236	57123	1967	56541	1385
	6	8950.2	49795	66874	17079	70250	20455	49875	68147	18352	68200	18405
	Average	10237	54614	60828	6214	64453	9840	54694	62857	8196	62602	7941
Third production capacity	1	13450.9	59550	65021	5471	67750	8200	59630	64456	4906	63456	3906
	2	12930.8	48341	67258	18917	69250	20909	48421	58245	9904	59541	11200
	3	15865.9	55318	63874	8556	65900	10582	55398	64235	8917	65465	10147
	4	20895.7	52720	67000	14280	71570	18850	52800	68550	15830	67952	15232
	5	14992.3	54568	68125	13557	65400	10832	54648	60178	5610	61854	7286
	6	14895.2	59765	66542	6777	70025	10260	59845	69452	9687	70692	10927
	Average	15505.13	58044	62636.67	11260	68316	13272	55124	64186	9142	64827	9783

Source: Compiled and calculated from field study data.

**Table 5. Broiler Production: Prices, Margins, & Consumer Distribution (2023)**

production capacity	Prices (LE/kg)			Marketing Margins						Consumer Pound Distribution (%)				%
	Farm (1)	Wholesaler (2)	Retailer (3)	Farm - Wholesaler		Wholesaler - Retailer		Farm - Retailer		Producer's share (10)	Wholesaler's share (11)	Retailer's share (12)	share of intermediaries (12+11)	
				Absolute (4)	Relative (5)	Absolute (6)	Relative (7)	Absolute (8)	Relative (9)	100*3/1	100*3/4	100*3/6	10+11+12	
Initial	55.3	57.2	61.7	1.9	3.3	4.5	7.3	6.4	10.4	89.6	3.1	7.3	10.4	100
Second	55.3	60.8	64.5	5.5	9.0	3.7	5.7	9.2	14.3	85.7	8.5	5.7	14.3	100
Third	55.3	62.6	68.3	7.3	11.7	5.7	8.3	13	19.0	81.0	10.7	8.3	19.0	100
Sample Mean	55.3	60.2	64.8	4.9	8.1	4.6	7.1	9.5	14.7	85.3	7.6	7.1	14.7	100

Marketing margins include marketing profits and costs.

Source: Data collected and calculated from the questionnaire survey for the field study sample for the 2023 production season.

sale prices followed a pattern: wholesalers offered the lowest (L.E. 60,828 / ton), followed by restaurants/hotels/supermarkets (L.E. 62,602/ton) and slaughterhouses (L.E. 62,857/ton). Retailers offered the highest price (L.E. 64,453/ton). Consequently, the net return mirrored these trends, with retailers yielding the highest (L.E. 9,840/ton), followed by slaughterhouses (L.E. 8,196/ton), and wholesalers (L.E. 7,941/ton).

#### Net Return by Marketing Channel (Third Production Capacity):

The average production cost per ton for the third capacity was L.E. 58,044. As observed in the previous capacities, sale prices followed a pattern: wholesalers offered the lowest (L.E. 62,636/ton), followed by restaurants/hotels/supermarkets (L.E. 64,827/ton) and slaughterhouses (L.E. 64,186/ton). Retailers again offered the highest price (L.E. 68,316/ton). Consequently, the net return mirrored these trends, with retailers yielding the highest (L.E. 10,272/ton), followed by restaurants/hotels/supermarkets (L.E. 6,783/ton), and slaughterhouses (L.E. 6,142/ton).

Analyzing net return across production capacities reveals a clear trend: higher capacity leads to higher profitability across all marketing channels. For wholesalers, retailers, and slaughterhouses, the third production capacity consistently delivered the highest net return per ton (wholesalers: L.E. 11,260, retailers: L.E. 13,272, slaughterhouses: L.E. 9,142). Compared to smaller capacities, this represents significant increases: 65.2% and 44.8% for wholesalers (1st and 2nd capacity), 36.9% and 25.9% for retailers, and 18.9% and 10.3% for slaughterhouses. This suggests that expanding production capacity can boost profitability. Two factors likely contribute to this advantage: economies of scale leading to lower production costs per chicken for larger farms, and potentially stronger marketing capabilities that allow them to optimize weight for different markets or delay sales during unfavorable price fluctuations.

### **Marketing Margins, Consumer Pound Distribution, and Marketing Efficiency for Value Chain Actors in Broiler Chicken Farms: A Field Study in Qalyubia Governorate, 2023**

This section examines marketing margins, consumer pound distribution, and marketing efficiency for actors in the broiler chicken value chain during the study period. Analyzing marketing margins is crucial for identifying inefficiencies and evaluating potential problems within the marketing system.

#### **1- Marketing Margins - Producer vs. Wholesale:**

The study estimated absolute marketing margins between the producer price and the wholesale price for broiler chickens, revealing a variation based on production capacity. These margins ranged from L.E. 1.9/kg for the first capacity to L.E. 7.3/kg for the third capacity, with the total sample averaging L.E. 4.9/kg. Expressed as a percentage of the producer price, the relative marketing margin also varied, reaching 3.3% for the first capacity, 9.0% for the second, 11.7% for the third, and 8.1% for the total sample.

#### **2- Marketing Margins - Wholesale vs. Retail:**

Similar to the producer-wholesaler margins, the study also analyzed the absolute and relative marketing margins between wholesale and retail prices. Absolute margins varied by production capacity, ranging from L.E. 3.7/kg to L.E. 5.7/kg. The total sample averaged L.E. 4.6/kg. Expressed as a percentage of the wholesale price, the relative marketing margin also showed some variation, with values between 5.7% and 8.3%. The total sample had a relative margin of 7.1%.

#### **3- Marketing Margins - Farm to Retail:**

The study also estimated marketing margins between the farm gate price (producer price) and the retail price. These margins, reflecting the total cost added throughout the marketing chain, increased with production capacity. They ranged from L.E. 6.4/kg for the first capacity to L.E. 13.0/kg for the third capacity, with the total sample averaging L.E. 9.5/kg. Expressed as a percentage of the farm gate price, the relative marketing margin also showed a rising trend across capacities, reaching 10.4% for the first capacity, 14.3% for the second, 19.0% for the third, and 14.7% for the total sample.

#### **Distribution of Consumer Pound:**

Table (5) shows how a consumer's pound is distributed among actors in the broiler chicken value chain (producers and intermediaries) within the study sample. Producers received the largest share, ranging from 81% (third production capacity) to 89.6% (first capacity), averaging 85.3% across the sample. Wholesalers received a smaller and more variable share, ranging from 3.1% (first capacity) to 10.7% (third capacity) with an average of 7.6%. Retailers' share also varied, averaging 7.1% and ranging from 5.7% (second capacity) to 8.3% (third capacity).

#### **Marketing Efficiency of Broiler Chicken Farms in Qalyubia (2023):**

Table (6) highlights the positive correlation between marketing efficiency and the number of intermediaries in the marketing channel for broiler chickens in Qalyubia governorate. Fewer steps in the marketing chain lead to lower marketing margins and higher efficiency. Consistent with this trend, direct sales to slaughterhouses or retailers achieved the highest marketing efficiency (84.9% and 86%, respectively). The most common channel, selling to wholesalers, exhibited a slightly lower efficiency (83.6%). This reinforces the notion that efficiency declines with an increasing number of intermediaries.

Field study data from Qalyubia, as shown in Figure (2), reveals that three main parties comprise the broiler chicken value chain before the product reaches the consumer: producers, wholesalers, and retailers.

A study in Qalyubia investigated the input sources for broiler chicken farms. The majority of chicks (76%) came from companies, while hatcheries supplied the remaining 24%. Feed sources were split evenly, with 50% coming directly from factories and the other 50% obtained from dealers. Veterinary supplies showed a more diverse distribution: 40% of drugs, serums, and vaccines originated from pharmaceutical companies, followed by veterinary pharmacies (32%), veterinary clinics (23%), and lastly, drug dealers (5%).

**Table 6. Marketing Efficiency of Broiler Chickens in Different Marketing Channels in the Study Sample in Qalyubia Governorate**

Marketing Channels	Producer price LE/kg	Consumer price LE/kg	Marketing margins LE/kg	Production costs LE/kg	Marketing efficiency %
Selling to wholesalers	55.3	65.5	10.2	52.1	83.6
Selling to slaughterhouses	55.3	64.6	9.3	52.1	84.9
Selling to retailers	55.3	63.8	8.5	52.1	86.0

Marketing Margins = Consumer Price - Farmgate Price (El Safty, 2022).

Marketing Efficiency =  $100 - ((\text{Marketing Margins})/(\text{Marketing Margins} + \text{Production Costs})) \times 100$  (Moussa, 2022).

The study examined broiler chicken sales channels. Producers primarily sell (88.2%) to wholesalers, with the remaining (11.8%) going directly to retailers. Wholesalers then distribute their purchases: 80.8% to retailers, 12.2% to slaughterhouses, 4.5% to hotels and restaurants, and 2.5% directly to consumers. Finally, retailers sell their chickens to end consumers (90.3%), restaurants (7.7%), and supermarkets/village markets (2.0%).

#### **Economic and Efficiency Indicators for Broiler Value Chain Actors: Qalyubia Study:**

##### **At the producer level:**

Based on the field study sample in Qalyubia governorate (single cycle), Table (7) reveals broiler farm efficiency at the producer level. On average, farms produce 10,388 chickens per cycle, generating revenue of L.E. 1,202.5 thousand, which includes the value of poultry manure (L.E. 18.55 thousand). Total income per cycle reaches L.E. 1,253.45 thousand, while production costs average L.E. 1,074.1 thousand. This results in a net return of L.E. 179.4 thousand per cycle, representing 14.3% of the total revenue.

Examining profitability at the producer level, the study revealed a return above variable costs of L.E. 190.9 thousand per cycle and a return on cost ratio of 22.6%. This high ratio signifies that each Egyptian pound invested yields a return of L.E. 0.226 per cycle. In simpler terms, the return on investment is favorable compared to other options, indicating high productivity efficiency within the sampled broiler farms.

In addition to profitability, the study assessed value added at the producer level. The gross value added, representing the total return for all production elements involved in the cycle, reached L.E. 237.8 thousand. Net value added, which excludes the annual depreciation share, was L.E. 226.3 thousand per cycle.

##### **At the wholesaler level:**

Examining economic efficiency at the wholesaler level (Qalyubia 2023 sample data), the study revealed average monthly sales of 33,998 chickens and revenue

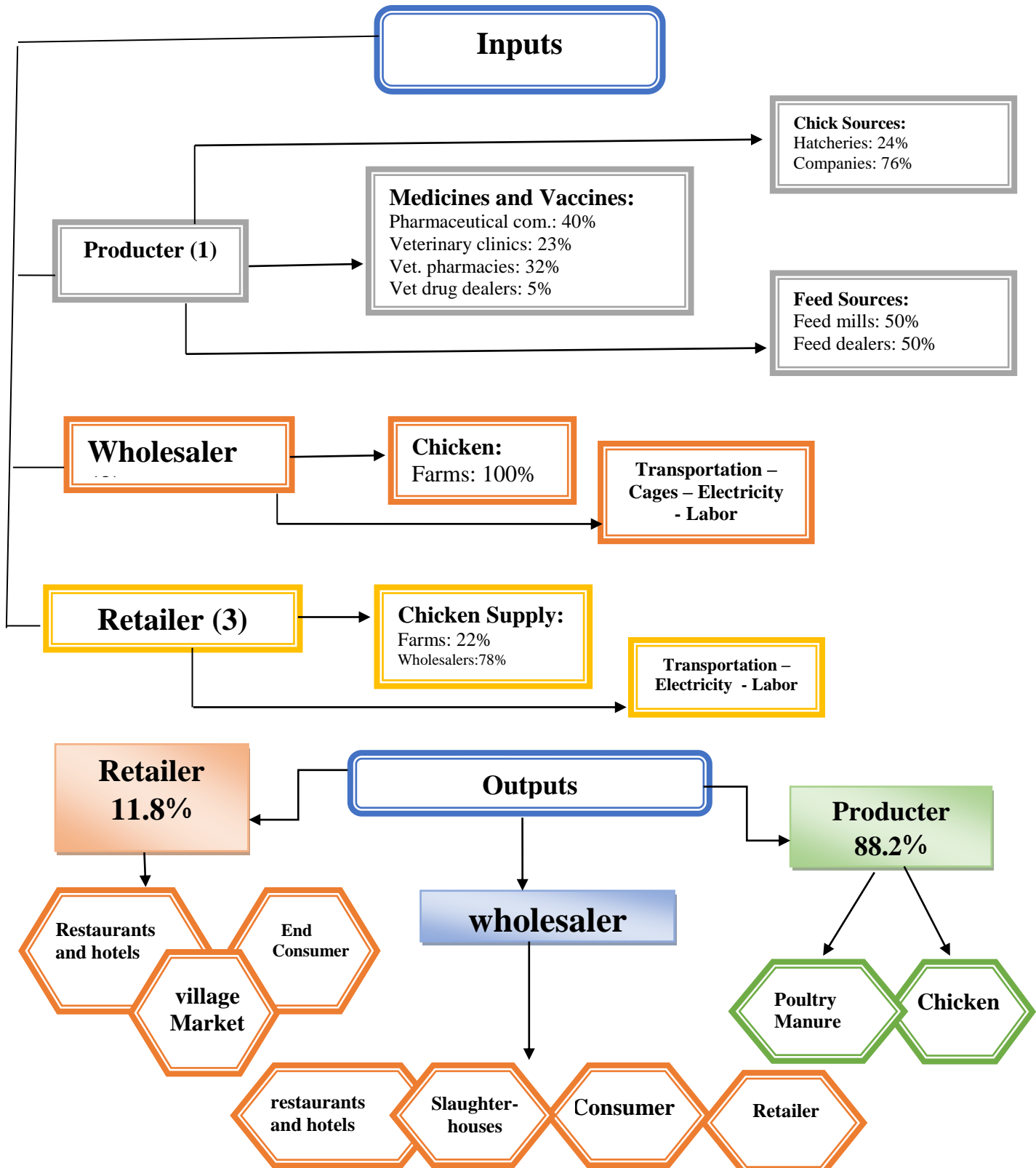
of L.E. 4,605.1 thousand. Monthly costs averaged L.E. 1,968.6 thousand, including variable costs (L.E. 1,963.1 thousand) and depreciation spread over the year. This resulted in a strong net return of L.E. 2,636.4 thousand per month. Profitability was further bolstered by a high margin above variable costs (L.E. 2,641.9 thousand/month) and a return on invested pound of L.E. 1.34. Value added was also significant, with gross value added (total revenue for production elements) reaching L.E. 2,641.9 thousand per month, and net value added (excluding depreciation) at L.E. 2,636.4 thousand per month. These findings suggest increased economic efficiency for broiler wholesalers in the study sample.

##### **At the retailer level:**

Analyzing economic efficiency at the retailer level (Qalyubia 2023 sample data), the study found retailers sold an average of 11,654 chickens per month, generating L.E. 1,699.2 thousand in monthly revenue. Monthly costs averaged L.E. 7,206 thousand, including variable costs (L.E. 7,191 thousand) and depreciation spread throughout the year. This resulted in a net return of L.E. 978.6 thousand per month. Profitability was strong, with a high margin above variable costs (L.E. 980.1 thousand/month) and a return on invested pound of L.E. 1.36. Value added was also significant, with gross value added reaching L.E. 980 thousand per month and net value added at L.E. 978.6 thousand per month (excluding depreciation). Interestingly, the study revealed that retailers held the highest profit margin (57.6%) compared to producers (17.5%) and wholesalers (57%) within the broiler value chain for this sample.

**Impact of Government Import Tariffs on the Broiler Industry: A Partial Equilibrium Analysis:** The Table (8) presents the economic impacts of imposing fixed prices on broiler chicken production in Qalyubia Governorate, Egypt, as analyzed using a partial equilibrium model. The data is for the year 2022.





**Fig. 2. Flowchart of the Broiler Chicken Production and Marketing Value Chain in the field Study Sample**

Source: Based on the questionnaire responses from Qalyubia Governorate field study data 2023.

**Table 7. Economic and Productive Efficiency Indicators for Broiler Value Chain Actors at the Product Level in the Qalyubia Field Study Sample, 2023**

Item	Producer Average Total Sample	Item	Wholesaler	Retailer
Average production (chicken/cycle)	10388			
Production quantity (ton)	19.6			
Selling price (LE/kg)	55.3	Selling price (LE/kg)	60.2	64.8
Average chicken weight (kg)	2.1	Average chicken weight (kg)	2.25	2.25
Production value (LE/cycle)	1202528.7	Total quantity sold (chicken)	33998.2	11654.2
Total revenue (LE/cycle)	1253451.72	Total revenue (LE/month)	4605056	1699182
Annual depreciation (LE)	11523	Annual depreciation (LE)	5560	1523
Variable costs (LE/cycle)	1062532	Variable costs (LE/month)	1963083	719102
Total production costs (LE/cycle)	1074055	Total costs (LE/month)	1968643	720625
Net profit (LE/cycle)	179396	Net profit (LE/month)	2636413	978557
Margin over variable costs (LE/cycle)	190920	Margin over variable costs (LE/cycle)	2641973	980080
Cost-Revenue Ratio	1.24	Cost-Revenue Ratio	1.34	1.36
Return on investment (LE/cycle)	0.23	Profitability (LE/cycle)	134.30	136.08
Input cost	1015695	Input cost	1963083	719102
Total added value (LE/cycle)	237757	Total added value (LE/cycle)	2641973	980080
Net total value (LE/cycle)	226233	Net total value (LE/cycle)	2636413	978557
Profit margin percentage (%)	17.5	Profit margin percentage (%)	57.25	57.59

Revenue over Variable Costs = Total Revenue - Total Variable Costs (El-Tokhy and Khattab, 2017).

Net Revenue= Revenue – Costs.

Return on Investment= (Net Revenue / Total Costs) \* 100.

Cost-Revenue Ratio= Total Revenue / Total Costs.

Profit Margin= (Net Revenue / Total Revenue) \* 100.

Input Costs: (Chick costs - Feed costs - Medication costs) (Soliman & Shafiq, 2019 and Abdel Latif et al., 2020).

Source: Collected and calculated from the questionnaire data for the field study sample for the 2023 production season.

**Producer's Net Economic Loss:** The fixed prices resulted in a net economic loss of 5.8 million Egyptian pounds for producers. This suggests that the fixed prices were lower than the market equilibrium price, leading to reduced profits for producers.

**Consumer's Net Economic Gain:** Consumers, on the other hand, experienced a net economic gain of 1.6 million Egyptian pounds. This indicates that the fixed prices were lower than the market equilibrium price, leading to lower prices for consumers.

**Producer Surplus Loss:** The producer surplus loss of 23.3 million Egyptian pounds further highlights the negative impact on producers. Producer surplus represents the difference between the maximum price producers are willing to accept and the actual market

price. The fixed prices reduced this surplus, indicating a decline in producers' welfare.

**Consumer Surplus Loss:** Despite the initial gain, consumers also experienced a substantial loss in consumer surplus of 46.02 million Egyptian pounds. Consumer surplus represents the difference between the maximum price consumers are willing to pay and the actual market price. The fixed prices, while initially lowering prices, may have led to shortages or reduced quality, ultimately reducing consumer welfare.

**Government Gain:** The government, however, gained 15.2 million Egyptian pounds in revenue due to the fixed prices. This could be attributed to taxes or other revenue-generating mechanisms associated with the price controls.

**Table 8. Partial Equilibrium Analysis: Economic Effects of Fixed Broiler Prices (Qalyubia, 2022)**

Basic data:	Unit	Value
(1)- Domestic price (Pd)	LE/ton	64800
(2)-World price (Pf)	US\$/ton	4651
(3)-Exchange rate (EER)	LE/US\$	19.16
(4)-Border price (Pb)	LE/ton	89113
(5)-Nominal Protection Coefficient (NPC)		0.7272
(6)-Tariff		27.3%
(7)-Modified Tariff (t')		0.3752
(8)-Elasticity of Supply (Es)		1.10
(9)-Elasticity of Demand (Ed)		-0.20
(10)-Elasticity of Supply at Pb		1.0708
(11)-Elasticity of Demand at Pb		-0.2941
(12)-Production at Pd	Thousand ton	1200
Production at Pb	Thousand ton	1695
(13)-Consumption at Pd	Thousand ton	1825.0
Consumption at Pb	Thousand ton	1689
(14)-Value of Production at Pd (V')	Thousand LE	77760000
(15)-Value of consumption at Pd (W')	Thousand LE	118260000
(16)-Value of Production at Pb	Thousand LE	151070695
(17)-Value of consumption at Pb	Thousand LE	150549587
Multiple effects given an import tariff:		
(18)-Net Economic Loss in production (NELP)	Thousand LE	5,860,861
(19)-Net Economic Loss in Consumption (NELC)	Thousand LE	1,648,185
(20)-Change in Producer Surplus (PS)	Thousand LE	23,314,931
(21)-Changes in Consumer Surplus (CS)	Thousand LE	-46,019,702
(22)-Changes in Government Revenues (B)	Thousand LE	15,195,725
(23)-Changes in Balance Payment (BP)	Thousand LE	-60,911,236
(24)-Change in Balance Payment	US\$	-3,179,083
(25)-Net Socail Loss (NSL)	Thousand LE	-7,509,046

Source: The analysis is based on data compiled from a representative sample, official Egyptian statistics (CAPMAS), international food and agriculture data (FAO), and relevant prior research (Abd Elrazek and Mehiesin, 2022).

**Foreign Currency Loss:** The implementation of fixed prices resulted in a significant foreign currency loss of 60.9 million Egyptian pounds. This suggests that the fixed prices may have impacted import-export dynamics, potentially affecting the availability of foreign currency.

**Net Economic Loss (Net Import Impact):** The overall net economic loss, considering the impact on imports, was 7.5 million Egyptian pounds. This negative impact highlights the potential economic consequences of imposing price controls without considering broader market dynamics and their effects on various stakeholders.

The partial equilibrium analysis of fixed prices on broiler chicken production in Qalyubia Governorate, Egypt, reveals a complex interplay of economic impacts. While consumers initially benefit from lower

prices, producers face substantial losses and the overall economic welfare may suffer. Additionally, the impact on foreign currency and government revenue highlights the need for careful consideration of broader economic implications when implementing price controls.

#### **Challenges and Solutions for Broiler Production & Marketing in Qalyubia: A Field Study Analysis**

A field study in Qalyubia identified critical production challenges faced by broiler chicken producers (Table 9). Nearly all producers (97.8%) highlighted the high cost of production inputs like chicks, feed, and medication as the top concern. This burden is compounded by high operational costs for electricity, water, heating, and maintenance (96.7%). Disease prevalence, particularly intestinal and respiratory illnesses in winter (87.8%), further threatens production. Insufficient funding to expand operations

and meet market demands (82.2%) was another major concern. Producers also reported issues with the quality of breeding stock (75.6%) and chicks (73.3%), suggesting a need for improvement in these areas. These combined challenges significantly increase production costs, hinder farm growth, and threaten overall broiler production efficiency.

#### Marketing Challenges in Qalyubia Broiler Value Chain:

A field study in Qalyubia identified critical marketing challenges faced by broiler chicken producers and traders (Table 10). The most significant concern

(84.4%) is the fluctuation of sale prices due to control by traders and brokers. This is compounded by reduced consumer demand resulting from high broiler chicken prices (80%). Further challenges include significant price discrepancies between wholesalers and retailers (74.4%), exploitative pricing practices by traders (72.2%), and limited and expensive transportation options (67.8%). These issues collectively create an unstable and inefficient marketing environment for broiler chickens in the region, hindering profitability for producers and limiting consumer access to affordable chicken.

**Table 9. Production Problems Facing Broiler Chicken Producers in Qalyubia Governorate in 2023**

No.	Problem	Frequency	Percentage	Rank
1	Poor quality of chicks	66	73.3%	6
2	High prices of production inputs (chicks, feed, medicines, vaccines, etc.)	88	97.8%	1
3	High proportion of deferred financing	55	61.1%	8
4	Prevalence of intestinal and respiratory diseases, especially in winter	79	87.8%	3
5	Ineffectiveness of medicines, vaccines, sera, and counterfeiting	56	62.2%	7
6	Lack of adequate financing to revive the industry and increase market supply	74	82.2%	4
7	Weak strains of good mothers free from diseases	68	75.6%	5
8	Lack of adequate support for production inputs	43	47.8%	11
9	Lack of trained labor and rising wages	45	50.0%	10
10	High costs of electricity, water, heating, and maintenance	87	96.7%	2
11	Non-compliance with biosecurity requirements in farms due to lack of awareness	53	58.9%	9
12	Problems with prolonging the fattening period beyond the appropriate marketing age due to high production costs compared to stock exchange prices	36	40.0%	13
13	Increased mortality, especially in older flocks	42	46.7%	12
14	Weak efficiency of the advisory system for breeder awareness	35	38.9%	14

Source: Collected and calculated from the questionnaire data of the study sample in Qalyubia Governorate in 2023.

**Table 10. Marketing Problems Facing Broiler Chicken Producers in Qalyubia Governorate in 2023**

No.	Problem	Frequency	Percentage	Rank
1	Control and exploitation of prices by merchants and brokers	65	72.2%	4
2	Fluctuations and high prices of broiler chicken sales	76	84.4%	1
3	High commission rates for brokers	48	53.3%	8
4	Stock exchange prices are often lower than market prices	51	56.7%	7
5	Price conflicts between wholesalers and retailers	67	74.4%	3
6	Decreased demand due to high prices	72	80.0%	2
7	High marketing costs such as advertising and others	53	58.9%	6
8	Few marketing outlets	34	37.8%	10
9	Lack of modern slaughterhouses in the governorate	26	28.9%	11
10	Competition from frozen or imported chicken for local chicken	43	47.8%	9
11	Lack of transportation and high costs	61	67.8%	5
12	Competition between farms and lack of coordination between them in the field of production and marketing	22	24.4%	12

Source: Collected and calculated from the questionnaire data of the study sample in Qalyubia Governorate in 2023.

**Table 11. Relative Importance of Key Proposals for Improving the Efficiency of Broiler Chicken Production and Marketing in the Study Sample**

No.	Proposal	Frequency	Percentage
1	Conduct training courses for chicken breeders and veterinarians on new developments and practices in broiler chicken rearing to improve their ability to deal with crises and diseases.	68	75.6%
2	Support the industry and alleviate the burden of production input costs.	77	85.6%
3	Tighten control over medicines and vaccines and prevent counterfeiting.	68	75.6%
4	Implement biosecurity standards in broiler chicken farms.	63	70.0%
5	The need to provide production inputs with high feed conversion efficiency.	78	86.7%
6	Improve the efficiency of available slaughterhouses and supervise them.	56	62.2%
7	Increase marketing outlets and encourage the establishment of specialized companies for the sale and marketing of live chicken.	52	57.8%
8	Develop production strategies to determine the required production volume in the poultry industry chain.	45	50.0%
9	Coordination between farms in the field of production and marketing.	22	24.4%

Source: Collected and calculated from the questionnaire data of the study sample in Qalyubia Governorate in 2023.

### Proposals to Improve Broiler Production and Marketing

A field study in Qalyubia revealed key proposals from broiler chicken producers to improve production and marketing efficiency (Table 11). Their top priorities focus on access to high-quality inputs (86.7%) and industry support to reduce production costs (75.6%). Producers also emphasized the importance of knowledge sharing through educational programs for breeders and veterinarians (75.6%), stricter regulations to prevent fraud in drugs and vaccines (75.6%), and implementing biosafety standards on farms (70%). Upgrading slaughterhouses (62.2%), increasing marketing outlets with specialized live chicken sales companies (57.8%), and improved production planning and coordination between farms (50% & 24.4% respectively) were also seen as crucial improvements. These proposals collectively address critical inefficiencies in the broiler chicken value chain, aiming to enhance overall profitability.

### CONCLUSION

This study investigated the current status and economic performance of the broiler chicken industry in Qalyubia Governorate, Egypt. The research revealed a broiler production sector with relatively stable capacity utilization across various farm sizes. However, the industry grapples with significant challenges that constrain profitability, particularly for producers.

While larger farms demonstrate economies of scale with higher revenue and lower production costs per chicken, inefficiencies within the marketing system present a major hurdle. Price fluctuations, significant price discrepancies between wholesalers and retailers, and exploitative practices by some traders create an

unstable and inefficient marketing environment. Additionally, the high cost of essential inputs like chicks, feed, and medication significantly burdens producers.

The study also explored the potential drawbacks of government intervention in the form of price controls. While such measures might aim to benefit consumers by lowering broiler chicken prices, the analysis suggests unintended consequences. Fixed prices can lead to substantial losses for producers, potentially impacting the overall quality and availability of chicken in the long run. This underscores the importance of considering broader economic implications when implementing price controls.

The path towards a more sustainable and profitable broiler chicken industry in Qalyubia Governorate lies in addressing these key challenges. Producers prioritize access to high-quality chicks and feed at lower costs, alongside industry support to reduce overall production expenses. Educational programs for breeders and veterinarians, stricter regulations to prevent fraud in medications, and implementing biosecurity standards on farms are crucial steps towards improving overall production efficiency and animal health. Upgrading slaughterhouses, establishing more marketing outlets specializing in live bird sales, and fostering improved production planning and coordination between farms can further enhance the industry's performance. By implementing these solutions and fostering collaboration throughout the value chain, stakeholders in Qalyubia's broiler chicken industry can work towards a more secure and prosperous future.

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## الملخص العربي

### تقييم كفاءة سلاسل القيمة لدجاج التسمين بمحافظة القليوبية

فاطمة أحمد مصطفى البطح ، محمود مصطفى الهياق

المجازر وتجار التجزئة، مما يوضح فائدة وجود عدد أقل من الوسطاء التسويقيين في هذه الصناعة للعمل على استقرار أسعار المستهلكين.

كما تبين من دراسة المؤشرات الاقتصادية لسلسلة القيمة لدجاج التسمين. أن المزارع يحصل على ربحية جيدة وعائدًا على الاستثمار. يظهر تجار الجملة وتجار التجزئة كفاءة اقتصادية قوية مع صافي عائدات وهامش ربح مرتفعين. ويوضح تحليل التوازن الجزئي تأثير التعريفات الحكومية المفروضة على استيراد لحوم الدواجن، وأثارها الاقتصادية ومدى استفادة المستهلكين منها في صورة انخفاض الأسعار. وأخيراً، توضح الدراسة التحديات الحرجة التي يواجهها المنتجون والتجار مثل تقلب أسعار البيع، وانخفاض طلب المستهلكين، وممارسات التسعير الاستغلالية. ولتحسين الكفاءة، يقترح المنتجون سهولة الوصول إلى مدخلات عالية الجودة وتقليل تكاليف الإنتاج وتحسين البنية التحتية للتسويق. يقدم هذا البحث رؤى قيمة حول صناعة دواجن التسمين في محافظة القليوبية، مع تسليط الضوء على مجالات التحسين لتعزيز كفاءة الإنتاج والربحية وحصول المستهلكين على الدواجن بأسعار معقولة.

تستهدف الدراسة تقييم كفاءة إنتاج وتسويق دواجن التسمين في محافظة القليوبية. حيث يتبين من البيانات خلال الفترة 2012-2022، عدم وجود تغييرات كبيرة في عدد المزارع أو العنابر التشغيلية العاملة في تسمين الدواجن، مما يشير إلى وجود استقرار نسبي. ومع ذلك، لا يزال استغلال الطاقة الإنتاجية بمعدل أقل من المتوسط، مما يدل على وجود مجال لزيادة الطاقة الإنتاجية. كما تبين زيادة تكاليف الإنتاج مع زيادة حجم المزرعة، في حين تسير أسعار البيع والإيرادات لكل 1000 دجاجة على نفس المنوال. ويوضح تحليل القنوات التسويقية أن تجار الجملة هم أكثر الوسطاء سيطرة على هذه الصناعة، يليهم كل من المجازر وتجار التجزئة. في حين يحقق تجار التجزئة أعلى صافي عائد لكل طن، ويحقق المنتجون ربحية أكبر مع قدرات إنتاج أكبر عبر جميع القنوات التسويقية لدواجن التسمين.

وبدراسة ميدانية في عام 2023 لكل من الهوامش التسويقية، وتوزيع جنيته المستهلك، والكفاءة التسويقية. تبين أن الهوامش التسويقية تزيد عبر سلسلة القيمة، حيث يحصل المنتجون على الحصة الأكبر منها بنحو (81% - 89.6%)، ويحصل تجار التجزئة على أقل نسبة (5.7% - 8.3%). وبلغت الكفاءة التسويقية أعلاها للمبيعات المباشرة إلى