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ECONOMIC ANALYSIS OF POULTRY PRODUCTION IN LEBANON

COMMERCIAL POULTRY FARM

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ECONOMIC ANALYSIS OF POULTRY PRODUCTION IN LEBANON

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ECONOMIC ANALYSIS OF POULTRY PRODUCTION IN LEBANON[1]

by

Gordon H. Ward and Joseph S. Fuleihan[2]

PURPOSE OF THE STUDY

This study of the competitive position of commercial poultry farms in Lebanon producing either table eggs or broiler chickens for meat was made to ascertain if their costs are such that they can compete successfully with such products imported from other countries. The primary basis for the determination was a comparison of the costs incurred in producing eggs and growing broiler chickens with the prices of imported products of comparable quality. Since commercial poultrymen in Lebanon use improved breeds of chickens selected for high production of large size eggs and rapid growing strains of meat chickens, they are in competition with producers in Europe and America where these improved breeds and strains were developed. They also face indirect competition for their products from the small size eggs (30-45 grams vs. 50 to 75 grams) laid by native chickens in Lebanon, Syria and Turkey and from the small slow-grown native chickens that scavenge for their food and have much less tender and juicy flesh. Farm eggs and chickens from these are marketed without considering the cost which is nominal due to the birds eating what they can pick up.

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1 Research Project No. 38. Faculty of Agricultural Sciences.

2 Professor of Agricultural Economics, Faculty of Agricultural Sciences, American University of Beirut, Lebanon. Joseph Fuleihan and Sabbah al Haj, as graduate assistants in agricultural economics, made the survey of commercial poultry farms in Lebanon and collected the data which was analyzed by Mr. Fuleihan and Dr. Ward. The section on egg production in Lebanon included in this report was revised from the thesis submitted by Mr. Fuleihan in partial fulfilment of the requirements for the M.S. degree at the American University of Beirut, June 1962.

Appreciation is extended to US/AID for the grant of funds to pay part of the costs of the field work and the printing of this report.

Data were collected from poultry producers keeping 500 and more layers or growing 500 and more broiler chickens per week. A total of 134 egg farms and 82 broiler farms was visited. However, usable figures on sales and expenses were secured from only 22 egg farms and 14 broiler farms. The sizes of the flocks included in the analysis ranged from 500 to 4000 layers and from broods of 500 to 3,000 broiler chickens per week. The typical egg farm had 1,500 layers whereas the typical broiler farm raised 7 lots of chickens to 7-8 weeks of age for a total of 10,000 birds on the farm most of the time.

SUMMARY

Commercial poultry farming was started in 1955. It is a young industry which has grown very rapidly, especially since 1959. In addition to farms which specialize in either broilers or eggs, there are now more than 10 farms which produce eggs for hatching and sell baby chicks. These hatcheries sold over 6,500,000 chicks during 1961, more than four times the number turned out in 1959. Even this number was not sufficient to supply the demands of new entrants into poultry production. Some 200,000 more chicks were imported from Europe and United States than the 462,000 exported to countries to the East. Commercial poultry farms reared for layers only about 20 percent of the chicks sold in Lebanon. The balance was raised to sell as broilers.

The average egg farm has around 1500 layers with 18 percent of the farms in the 1001–2000 category. While 65 percent of the farms hold 1000 or fewer layers, they house only 24 percent of the birds. The typical broiler farm markets 600 to 850 birds per week. The 12 percent of farms producing more than 1000 broilers weekly account for 43 percent of the total out–turn of 49,300 birds. Commercial poultry farming is concentrated mainly in the Beka'a and Mount Lebanon. Approximately 75 percent of the egg farms and layers, and 80 percent of the broiler farms and output are found in these two regions.

Data about the number of farms producing eggs or broilers and the output of these farms were collected through a field survey. Figures regarding costs and returns were obtained from those willing to give them. Statistics on imports and exports were assembled from reports published by the customs departments of the various countries. Examination of these data revealed that Lebanon imports less than 6 percent of the total supply of broilers but about one third of the estimated annual consumption of eggs. Commercial egg farms with over 500 layers each produce roughly another third of the eggs consumed. Broiler producers have the protection of an import tariff of 25 percent of the value whereas egg farmers enjoy no such protection. They suffer periodic reduction of their prices when eggs are imported from eastern European countries and sold at about two-thirds the usual price for quality eggs.

Imports of broilers into Lebanon come mainly from Denmark and the United States. Imports of quality eggs are usually from Denmark with lower quality arriving primarily from Turkey and Poland. United States has joined Australia in competing with Lebanon for sales of eggs to Saudi Arabia and Kuwait. Denmark also joins the competition with quality eggs to Kuwait.

Expense figures collected from 22 commercial egg farms indicated that the total net cost per egg, not including management, for the period April 1960–April 1961 was roughly 10.3 piasters. Feed constituted about 68 percent, labor 11.5 percent, and fixed costs 14 percent of the total net cost. Variable costs tended to decrease as the numder of layers went up from 500 to 4000 birds. Good management in seeing that recommended production practices were carried out conscientiously was a major factor in reducing the cost per egg as much as 1.3 piasters. It contributed to economical use of feed in obtaining over 5 eggs per kilogram of feed. Low labor cost per egg was achieved by raising the number of layers cared for per worker from the average of 870 to 953. Small annual fixed costs for depreciation and interest resulted from careful investment in land, buildings and chicks.

Analysis of the production costs for 14 broiler farms during the 1960-61 year showed that it cost the average producer LL 2.06 to produce a bird weighing 1000 grams at 7.55 weeks. Feed constituted 50 to 60 percent of the total net cost of production, the chick about 25 percent, labor 4 percent, and annual fixed costs 5.5 percent. Feed cost per kilogram of live broiler was high due to the high price of feed and poor feed conversion caused by respiratory diseases that slowed down the rate of growth. Costs of slaughtering, eviscerating, and marketing amounted to roughly 20 piasters per kilogram of dressed weight. However, it paid to sell broilers dressed since the net returns were 28 piasters higher per kilogram than for live birds.

The costs of producing an egg are not too far apart in Denmark, Holland, Lebanon, and the United States. The lower cost in Denmark is due to the larger number of eggs produced per bird while in the United States the price of feed averages about 10 piasters per kilogram lower than in Lebanon and egg production per bird is substantially higher.

Denmark and Holland produce a kilogram of broiler at about 20 to 35 piasters lower than in Lebanon. The cost per kilogram in the United States in 1961 was roughly 70 piasters lower than in Lebanon. This was due to lower cost of feed and chicks combined with careful management of the larger flocks. Birds are raised to 9–10 weeks of age when they weigh over 1600 grams with feed conversion around 2.6. Fixed costs are higher in Lebanon on account of the much greater investment per bird in housing. Mortality of the birds is higher as the result of poor management practices that also result in considerable coryza which curtails growth Labor efficiency varies greatly but is highest when each worker cares for over 6,000 broilers.

Comparative analysis suggests that the cost of producing eggs in Lebanon could be lowered through the following:

1. High caliber management which establishes low cost houses with adequate ventilation, ample feeders and waterers for all the birds, and equipment for labor economy; and which also buys chicks from high producing strains and purchases nutritious feed at moderate prices.
2. High rate of daily egg production.
3. High egg output per kilogram of feed.
4. Conscientious workers who perform efficiently.

The cost of producing broilers could be reduced by:

1. Marketing the birds between 9 and 10 weeks of age when they should weigh over 1600 grams.
2. Improving feed conversion through faster growth, less disease and lower mortality.
3. Purchasing fast growing broiler chicks and high energy feed at lower prices.
4. Liberal ventilation to prevent respiratory diseases.
5. Developing efficient workers who care for 7,000 to 10,000 broilers.
6. Adopting the system of having but one age of chicks on a broiler farm. This would make necessary a large scale mechanized poultry slaughter house which could take all the birds from a farm within the space of one or two days.

WHY LARGE SCALE COMMERCIAL PRODUCTION OF EGGS AND BROILERS IN LEBANON WAS STUDIED

As mentioned previously, the poultry industry in Lebanon is less than a decade old. Expansion has been quite rapid since 1959 with production tending to increase faster than domestic demand. Periodically, whenever prices declined, producers have called upon the government for protection against low priced imported poultry products.

Commercial scale production of eggs and broiler chicken meat dates from 1954. In that year, three young men were sent to the United States to visit farm families under the International Farm Youth Exchange Program at the instance of Professor Jenkins, head of the Animal Science Division of the Faculty of Agricultural Sciences, American University of Beirut. Upon returning to Lebanon, Mr. Khalil Ghattas started the Greenleaf Poultry Farm and Hatchery, and Mr. Hassan Shuman initiated the production of broilers on his farm at Hazzine. The third young man, Nuhad Daghir, studied agriculture at AUB and then obtained a PHD degree in poultry science at Iowa State University in 1962. He is now Assistant Professor of Poultry Science in the AUB Faculty of Agricultural Sciences.

Greenleaf hatched 50,000 chicks during 1955 and rapidly expanded the number of layers in its laying flocks to produce hatching eggs for chicks for both layers and broilers. Its hatching capacity increased to 35,000 chicks per week at the end of 1961. Sales of chicks led to the establishment of numerous commercial egg farms with 200 to 4,000 layers. Greenleaf sold feed to many of these farms and collected the eggs for marketing in Beirut and in export markets as did a few other agencies.

Following the development of the Greenleaf Farm, the National Agricultural Corporation under the leadership of Mr. Adib Samaha started a poultry farm near Chtaura to produce hatching eggs and sell chicks. By 1957 its output exceeded the demand for chicks, so it went into the marketing of eggs on a large scale. Later, the Warde Hatchery was established near Zahlé and by the end of 1961 had a weekly chick production of 25,000. Meanwhile, the Abi Nader hatchery had been developed in Mt. Lebanon and fostered the expansion of the poultry industry in that region. By the end of 1961 it had a capacity for 25,000 chicks per week.

According to figures assembled by the Poultry Section of the Ministry of Agriculture, average weekly production of chicks increased from 30,200 in 1959 to 129,000 at the close of 1961. Exports of baby chicks from Lebanon went up from 49,810 in 1959 to 246,140 in 1960 and over 460,000 in 1961, according to official government statistics. Thus, the major part of the output of the growing number of hatcheries went to swell the number of layers and broilers on commercial poultry farms in Lebanon. In addition to the marked increase of chicks from Lebanese hatcheries, imports ot chicks exceeded exports by more than one million during the years 1959–1961. The growth of the poultry industry is shown in Table 1.

Table 1

Growth in Commercial Poultry Production in Lebanon, 1959-61.[1]

	1959	1960	1961
Imports of baby chicks	999,325	676,738	681,475
Exports of baby chicks	49,810	246,140	462,056
Net number imported	949,515	430,598	219,419
Estimated number of chicks produced by commercial hatcheries in Lebanon	1,570,400	3,692,000	6,604,000
Total number of baby chicks	2,519,915	4,122,598	6,823,419
Estimated number of broiler chicks (80 %)	2,015,932	3,298,078	5,458,735
Estimated number of broiler chicks (20 %)	503,983	824,520	1,364,684

When this study was commenced in the fall of 1960, it was estimated that there were about 150 commercial egg farms in Lebanon and around 100 broiler farms. There were also a number of farms producing both market eggs and broilers, and farm-hatcheries which produced hatching eggs and sold baby chicks. Thus, the country had developed a substantial poultry industry using superior strains of chickens imported from America and Europe, scientifically compounded nutritious feeds, and modern production techniques. Following reports of substantial profits realized by the pioneers, enterprising

[1] From un-published data assembled by Mr. Samir Naim, Head, Poultry Section, Department of Livestock Production, Ministry of Agriculture.

business men were establishing modern poultry farms as profitable investments. But in a country which until 1955 had consumed mainly eggs and chickens produced on a small scale by farm women, the demand for the larger eggs and younger chickens turned out by the commercial poultry farms was not growing at the same pace as the supply. Markets were developed in the Persian gulf countries for increasing numbers of eggs until the exportation of eggs was banned by the Ministry of Commerce early in 1960 except to fulfill existing contracts. The reason given for this action was to hold down the prices of eggs for Lebanese consumers. Numerous producers complained about the serious effects on the market for their output.

From time to time, when the market could not take all the broilers at the prevailing prices, the surplus was frozen and put into storage. Farms then curtailed or stopped production until stocks in storage had been sold. With exports of broilers limited to the luxury trade in the oil producing Arab countries, Lebanese producers have had to adjust volume of output mainly to what is consumed within the country.

In the spring of 1960, many egg and broiler producers and the Poultry Producers Syndicate appealed to the Ministry of Agriculture for help in overcoming the difficulties they faced with market prices dropping below what they believed their cost of production to be. Since very few poultry farmers kept records, there were virtually no accurate figures pertaining to the cost of producing eggs and broilers. Because of this acute situation, the Ministry of Agriculture considered that a scientific study was needed to determine the cost of producing poultry products in Lebanon.

The Agricultural Economics and Sociology Division of the Faculty of Agricultural Sciences, American University of Beirut, was asked to undertake the study in cooperation with the Department of Agricultural Economics of the Ministry of Agriculture. A contract was made between the Ministry and the University specifying the nature of the study and the scope of the report to be prepared. Provision was made for re-imbursing the University for expenses incurred in making the study and publishing the report. The contract was dated September 1, 1960. Soon thereafter, two graduate assistants in agricultural economics started visiting commercial farms to collect figures about the volume of eggs and broilers produced and the costs of producing these products.

KINDS OF FARMS STUDIED

There are three main kinds of commercial farms in Lebanon, namely, those producing table eggs, those producing broiler chickens for meat, and multi-product farms producing both of these products or producing hatching eggs and selling day-old chicks. The last mentioned kinds of farms often sell their excess eggs for consumption in large volume. Since this study was concerned with the costs of producing table eggs and broilers, only farms selling either or both of these products were visited. Information regarding the volume of production and production-capacity was collected from all commercial poultry farms which could be found by the interviewers. Figures regarding production costs and sales were obtained from those egg farms and broiler producers who were willing to answer questions about their expenses and receipts. No production cost data were secured from farms producing both eggs and broilers because of the great difficulty of making an accurate division of costs and investment between the egg and the broiler enterprises.

A commercial poultry farm was considered to be a farm which obtained the larger part of its income from the sale of poultry products. In the process of collecting data regarding the number of these farms in the country, it became evident that flocks of less than 500 birds were not large enough to provide over half the income needed by a farm family. This observation provided the basis for deciding that the minimum size for commercial poultry farms to be included in the study of the costs of production should be 500 layers or 500 broilers marketed weekly. Since operations of smaller size than these are usually a side-line activity of the family, generally their costs would not be representative for commercial poultry farms. This is true even though the products are produced for market on a commercial scale.

The survey found that most poultry farms were operated with hired workers. On very few farms is the work done by the owner and the members of his family. In most cases the owner directs the management of the farm and gives instructions to the laborers, a majority of whom are employed on a continuing basis with a monthly salary.

In studies of this kind in other countries it has been found that the individuals who are willing to supply information about their farm operations usually are above the average in operating efficiency and production practices. However, the wide variation in production practices and cost figures suggests

that this may not be the case in this study. Thus, it is probable that the cost data obtained in the survey were reasonably representative for the majority of commercial producers of eggs and of broilers in the country during 1960-61. Production costs have declined since the survey was made. Prices of chicks have dropped 5-10 piasters while the price of feed has declined 2-3 piasters per kilogram. The general level of management has improved.

There are numerous Lebanese poultrymen who will consider the costs reported here to be too high. Since the figures in the various tables of costs are averages, there are many farms with lower costs as well as numerous others whose costs are higher. The lower costs for better managed egg farms are shown in Table 24 and those for more efficiently operated broiler farms are given in Table 53. As commercial poultry producers in Lebanon become more experienced, the general level of management will improve and this will lead to lower costs of producing eggs and broilers.

The data collected indicate that the majority of commercial poultry farms are of moderate size. Table 2 shows that 65 percent of the egg farms have 1000 layers or less while only 16 percent keep over 2000 producing birds but the latter group houses 47 percent of the layers. The data in Table 3 show that over 85 percent of the broiler farms are of moderate size and market not over 1000 birds per week. The total annual output of the 82 farms surveyed was 2,560,000 broilers during 1960. They produced approximately 77 percent of the estimated number of broilers grown during that year, and calculated as follows:

Number of broiler chicks sold (local plus imported)	3,300,000
Half of the number of layer chicks sold (local plus imported)	400,000
Total number of chicks for broilers	3,700,000
Less 10 percent mortality	3,330,000

Specialized poultry farms are concentrated mainly in Mount Lebanon and the Baka'a, as shown in Table 4 giving the geographical distribution of layer farms and in Table 5 for broiler production. Three-fourths of the egg farms and 74 percent of the layers are found in the two regions. Broiler growing is even more important in these same regions with 78 percent of the farms and 80 percent of the weekly production found in them. These regions saw the beginning of commercial poultry production in the country. From them it has spread north and south.

Table 2

Distribution of Layer Farms in Lebanon According to Size, April 1961

Size of Farm No. of Layers	No. of Farms	Percent of Farms	Total No. of Birds	Percent of Birds	Average No. Birds Per Farm
100– 500	34	25.4	10,000	4.9	330
501–1000	54	40.3	40,000	19.4	800
1001–2000	24	17.9	38,000	18 5	1,600
2001–3000	9	6.7	21,700	10.5	2,400
3001–4000	5	3.7	18,000	8.8	3,600
Over 4000	8	6.0	78,000	37.9	9,750
Totals	134	100.0	205,700	100.0	1,535 av.

Table 3

Distribution of Broiler Farms in Lebanon According to Size, April 1961

Size of Farm Broiler Per Week	Number of Farms	Percent of Farms	Number of Birds Produced Per Week	Percent of Birds	Av. Number of Birds Per Week Per Farm
50– 250	34	41.5	4,650	9.4	137
251– 500	21	25.6	9,025	18.3	353
501–1000	17	20.7	14,425	29.3	848
1001–2000	5	6.1	7,950	16.1	1,590
2001–3000	5	6.1	13,250	26.9	2,650
Totals	82	100.0	49,300	100.0	601 av.
Annual output of these farms			2,560,000		

Table 4

Geographic Distribution of Layer Farms in Lebanon, April 1961

Region (Muhafaza)	No. of Farms	Percent of Total Farms	Total No. of Layers	Percent of Total Layers	Average Number of Layers
Mount Lebanon	77	57.5	88,500	43.0	1,150
Beka'a	24	17.9	65,000	31.6	2,710
North Lebanon	23	17.2	37,700	18.3	1,640
South Lebanon	7	5.2	12,500	6.1	1,785
Other	3	2.2	2,000	1.0	665
Totals	134	100.0	205,700	100.0	1,535av.

Table 5

Geographic Distribution of Broiler Farms in Lebanon, April 1961

Region	Number of Farms	Percent of Total Farms	Number of Birds Produced Per Week	Percent of Broilers Raised	Av. Number of Birds Per Week Per Farm
Mount Lebanon	38	46.3	19,900	40.3	524
Beka'a	26	31.7	19,070	38.7	733
North	11	13.4	6,330	12.8	575
South	7	8.6	4,000	8.2	571
Totals	82	100.0	49,300	100.0	601 av.

SECURING THE DATA

The data fall into three categories.

1. Data regarding the volume of production of eggs and broilers in Lebanon.
2. Figures pertaining to costs and returns from producing table eggs and broilers .

3. Statistics showing the amounts of eggs and chickens imported and exported, and the imports of poultry products into various Arab countries which are actual or potential customers of Lebanon.

A field survey was used to collect the figures mentioned in item 2. The interviewers obtained a list of poultry farms from the Poultry Producers Syndicate and endeavored to visit each one. When in a village to interview a listed poultryman, the graduate assistants asked about any other commercial farms producing eggs or broilers in the area. This search covered Mt. Lebanon and the Beka'a as far north as Baalbeck. Much of north and south Lebanon were covered and part of the Akkar region. Mr. Fuleihan and Mr. Haj estimated that before they had to discontinue the survey because of their program of graduate studies they had covered about 90 percent of the commercial poultry farms in the country during October 1960. It is known that since then many additional farms have started operating, and a number of the existing farms have either discontinued production or shifted from growing broilers to producing eggs. During the stage of rapid development of the poultry industry it would be desirable to make a survey annually to obtain up–to–date figures regarding the production volume of eggs and poultry meat in the country.

For recording pertinent data a single page questionnaire was used for egg farms and a similar sheet for broiler farms. When a producer was willing to give information regarding costs and returns, supplemental questionnaires were used to record the data, one for egg farms and another for broiler farms. In the office, the figures were transferred from the field survey forms to appropriate tabulation sheets for totaling the data and analyzing costs and returns. When certain data on a questionnaire covering costs was found to be outside the usual range of the figures, revised figures were secured or the data for that farm was omitted from the analysis.

Statistics covering the amounts of eggs, live and dressed poultry imported into Lebanon from various countries, and also the amounts exported to different countries were assembled from the official annual statistics on foreign trade published in official reports by the Customs Department. The Poultry Section of the Ministry had supplementary statistics on total imports of eggs, chicks, live and dressed chickens for the years 1959, 1960 and 1961 from official records of the Customs Office at the airport and the port of Beirut for shipments by sea. The figures for imports of eggs and poultry into various Arab countries in which Lebanese exporters are seeking to develop markets for these products were obtained from official government publications covering foreign trade.

COMPETITION AT HOME AND ABROAD

Imports into Lebanon

Expansion of poultry production in Lebanon during the past decade has taken place in the face of strong competition in the local market and in the Arab states to the east. This competition has come from the United States and certain countries in Europe having well developed poultry industries. They enjoy the advantages of lower priced feed and chicks of high producing breeding lines for both eggs and meat, and thus have lower costs of production. These advantages, however, are offset in varying degrees by the higher cost of shipping eggs and chicken meat under refrigeration as compared with transporting the needed grains in ordinary cargo ships. Thus to prosper, the Lebanese poultry industry must improve the efficiency of production in order to make normal profits from prices at a level little or no higher than those of imported eggs and frozen poultry meat delivered in Beirut.

Lebanese consumers have demonstrated some willingness to pay a slight premium for fresh local poultry products rather than to buy the imported products but the quality has to be first class. When production increases faster than the demand for eggs and poultry of high quality, the prices of the output from commercial poultry farms have to be competitive with the imported products.

Lebanon imports substantially larger quantities of eggs and poultry than are exported as shown by comparison of the data in Tables 6, 7 and 8 with the figures in Tables 10, 11 and 12. During 1961, imports of eggs numbered 34,133,270, or nearly three times the 11,778,780 exported [1]. Imports of dressed poultry amounted to 365,535 kilograms, or seven times the exports of 49,573 kilograms while imports of live chickens numbered 33,916 with exports of only 320.

Imports of eggs have declined since 1959 as local production has expanded. The number of kilograms of eggs imported during 1961 was less

[1] Import and export statistics for 1959-61 are from unpublished data collected from government official reports by Mr. Samir Naim, Head, Poultry Section, Department of Livestock Production, Ministry of Agriculture.

Table 6.

Imports into Lebanon of Eggs and Egg Yolks, Fresh, Canned, Dried or Sugared, 1955 – 1960[1]

Kilograms

Country of Origin	1960	1959	1958	1957	1956	1955
Australia	105					
Belgium	40,680					
Bulgaria	162,600	101,400				
Denmark	247,791	292,667	8,908	8,214	855	10
Egypt		20,260		1,500	65	
Ethiopia		1,100			1,000	
France					13	5
Great Britain		12,262	606	370	2	5
Holland		2,794		600		13
Jordan	281,739	121,161			15,110	1,426
Poland	10,700					
Roumania	272,110	1,069,585	1,683,015	2,283,442	1,738,364	1,627,367
Syria	10,987					
Sweden	1,275,567	1,066,050	32,000	644	20	
Turkey						
West Germany						
Totals	2,302,279	2,687,279	1,724,529	2,294,770	1,755,429	1,628,826

[1] Statistiques du Commerce Exterieur, Années 1955-60; Conseil Superieur Des Douanes, Republique Libanaise.

Table 7.

Imports of Live Poultry into Lebanon, 1955 – 1960[1]

Kilograms

Country of Origin	1960	1959	1958	1957	1956	1955
Belgium	1,880	3,022		10	88	
Bulgaria	100					
Cyprus	70					
Denmark	529	1,031	2,034			30
Egypt			18			10
France	472	1,984	645	363	699	49
Greece		120				
Great Britain	1,714	943	64	498	323	172
Holland	27,645	25,789	7,012	4,572	1,908	227
Italy	3,738	1,502				
Jordan			56			
Syria	214,102	441,089	308,123	502,503	389,343	397,315
Switzerland		8				
Turkey	2,234	2,100				
United States	989	1,248				
West Germany	992	3,133				
Yugoslavia		30	163	85	149	91
Totals	254,465	481,999	318,115	508.031	392,510	397,894

[1] Statistiques du Commerce Exterieur, Années 1955-60; Conseil Superieur Des Douanes, Republique Libanaise.

Table 8.

Imports of Slaughtered Poultry into Lebanon, 1955 – 1960 [1]

Kilograms

Country of Origin	1960	1959	1958	1957	1956	1955
Belgium	1,242	1,240	1,100	74	700	
Cyprus					20	
Denmark	129,304	141,651	155,500	123,903	74,202	21,891
Great Britain	150	208	463	45	444	
Hong Kong			1,500			
Holland	658	1,022	400	1,683	13,300	760
Hungary	9,992	37,712	34,955	9,562	9,272	15,236
Jordan	1,013	1,570	2,897	4,644	1,955	
Poland	70,187			2,570	7,813	
Syria	600	1,588				50
United States	48,567	25,183	8,516	2,993	10,093	4,219
Yugoslavia	203,499	131,333	41,701	38,102	13,356	
Totals	465,212	341,507	247,032	183,576	131,155	42,156

[1] Statistiques du Commerce Exterieur, Années 1955-60; Conseil Superieur Des Douanes. Republique Libanaise.

than for 1959 until December. While imports from Syria have been declining those from Turkey, Bulgaria, and Poland have increased. Poland alone sent 14,900,000 eggs to Lebanon during December 1961, and these were offered to consumers at substantially lower prices, forcing local producers to reduce their prices materially.

Imports of dressed chickens increased rapidly during the past five years, while receipts of live birds from abroad declined. The combined receipts of poultry, however, have been declining since 1959.. Imports of live chickens during 1961 were less than 15 percent of those in 1959 while the imports of dressed poultry for 1961 were 365,335 kilograms compared with 483,177 kilograms in 1960 and 366,439 kilograms in 1959. Poultry imports from Syria continue to drop as the trade with Poland, Yugoslavia and the United States expands. Prices of frozen broilers in the United States were substantially lower the past two years as shown in Table 9. However, when freight, customs and other charges are added, the cost of U.S. broilers in the Beirut market is not far below the local price.

Lebanese eggs and poultry are exported mainly to Saudi Arabia and the Persian Gulf Arab states of Bahrein, Qatar and Kuwait as shown in Tables 10, 11 and 12. The exports of eggs expanded from 5,468,838 in 1959 to 11,778,780 during 1961. Shipments of dressed chickens increased less rapidly, 42,014 kilograms for 1959 and 49,573 kilograms for 1961. Some sales were made to Jordan, Iraq and Syria as local circumstances led to the need from time to time for imports to satisfy local demand. Since these countries have a large farm production of poultry products, the best prospects for expanding markets for Lebanese eggs and broilers are in the oil producing countries where the hot climate makes successful poultry farming difficult.

Stiff competition in sales to Saudi Arabia and the Persian Gulf countries is encountered by Lebanese exporters. In order to assess this competition, a study was made of the imports of eggs and poultry by these countries to ascertain from where the products came. The available statistics for Kuwait and Saudi Arabia, along with those for Iraq, Jordan and Syria, are presented in Tables 13-15. It was not possible to obtain statistics about imports into Bahrein and Qatar.

Imports of Eggs and Poultry by Eastern Arab Countries

According to an analysis of the above tables, there have been no imports of eggs by Iraq since 1958. Jordan has been importing large numbers mainly from Syria. Approximately 15 percent of Jordanian eggs is exported to Saudi Arabia with an import value of about 9.5 piasters per egg. This is less than the average cost of production in Lebanon. Virtually all of Jordan's imports are farm eggs. Its commercial farms supply the local market with

Table 9

Prices of Quick-Frozen Eviscerated Broilers in New York[1] and Price Delivered to Storage Warehouse in Beirut[2]

Price per Kilogram in Lebanese Piasters[3]

Months	Export Price in New York		Price Delivered in Beirut	
	1960[4]	1961	1960	1961
January	213.2	196.0	296.5	275.0
February	213.4	207.6	296.5	289.2
March	219.9	209.7	304.5	291.9
April	207.3	188.8	289.0	266.1
May	213.1	180.3	296.1	255.6
June	212.6	168.0	295.5	240.5
July	218.8	166.4	303.1	237.0
August	227.1	173.1	313.4	246.8
September	198.5	164.2	278.1	225.8
October	194.2	166.8	272.8	239.0
November	194.6	164.4	273.5	236.0
December	196.1	192.5	275.1	270.7
Average	207.4	181.	291.1	257.0

[1] Price reported by U.S. Department of Agriculture for ice- packed ready-to-cook broilers and fryers 2-3 1/4 lbs. plus the usual differential for quick frozen of 1.5c per lb. These chickens are without head and feet but have the neck and giblets.

[2] Ocean freight in a freezer room costs 42 piasters per kilogram from New York to Beirut. Marine insurance costs 2.3 percent of the value. The import tax is equal to 18.63 percent of the delivered price. The municipal tax is 3 percent. These three items total 23.33 percent. Lighterage, dock and storage charges, commission and clearance expenses, porterage and transport to a storage werehouse total approximately 16 piasters per kilogram. All the costs are added to the New York price to obtain the price delivered to a storage warehouse in Beirut.

[3] 1 U.S. cent = 3 Lebanese piasters.

[4] Average price for 1959 was 201.3 piasters.

Table 10.

Exports of Eggs and Egg Yolks, Fresh, Canned, Dried, or Sugared 1955 - 1960 [1]

Country of Destination	1960	1959	1958	1957	1956	1955
Bahrein	33,332	29,478	31,578	20,467	3,065	1,972
Egypt	995			1,900	75,728	102,130
Greece					9,700	42,200
Gold Coast					90	
Iran	2,360					
Iraq			1,610	40		20
Italy						26,000
Jordan			3,000	1,120	500	
Qatar	91,105	99,469	69,431	65,857	63,837	47,710
Kuwait	420,243	392,293	288,781	236,315	94,499	16,950
Syria	8,000			35		5,000
Saudi Arabia	187,745	150,014	133,550	126,546	76,414	21,566
United States				250		
Totals	743,780	671,259	528,398	452,530	323,833	263,548

[1] Statistiques du Commerce Exterieur, Années 1955-60; Conseil Superieur Des Douanes, Republique Libanaise.

Table 11.

Exports of Live Poultry into Lebanon, 1955 – 1960 [1]

Kilograms

Country of Destination	1960	1959	1958	1957	1956	1955
Bahrein	126	65				
Iran	75	65	50			
Iraq	25		54	113	91	
Jordan	990	575				
Qatar	1,182		75	25		
Kuwait	4,975	852				
Libya	25		25			
Saudi Arabia	420	190			48	
Syria	1,487	79		97		
Totals	9,305	2,036	204	235	139	

[1] Statistiques du Commerce Exterieur, Années 1955-60; Conseil Superieur Des Douanes Republique Libanaise.

Table 12

Exports of Slaughtered Poultry from Lebanon, 1955 – 1960 [1]

Kilograms

Country of Destination	1960	1959	1958	1957	1956	1955
Bahrein				35	50	80
Jordan	500	—			172	
Jtaly					85	
Qatar	1,415	102	710	180		340
Kuwait	1,703	9,298	2,050	252	468	215
Syria	200					
Saudi Arabia	6,015	6,694	4,471	4,540	9,364	6,756
Turkey				38		
Totals	9,833	16,094	7,231	5,045	10,139	10,391

[1] Statistiques du Commerce Exterieur, Années 1955-60; Conseil Superieur Des Douanes, Republique Libanaise.

quality fresh eggs.

The only statistics obtainable for Kuwait cover the first six months of 1960. These indicate a highly competitive market. Imports came from 10 countries in all parts of the world, Australia in the Far East to United States in the West. Denmark, Bulgaria and Poland were important suppliers from Europe. Egypt, Syria and Turkey are serious competitors from nearby countries. The eggs from many of the countries are offered at low prices. In spite of this situation, Lebanon supplied 25 percent of the total imports. The stiffest competition in the quality egg market comes from Denmark because of the government program of encouraging exports in order to support and stabilize prices for Danish farmers. This same competition is also experienced in Beirut.

Saudi Arabia increased its imports of eggs from Lebanon from 209,711 in 1956–57 to 2,695,820 during the year 1958–59, the latest year for which statistics are available. Lebanon's share of the market increased from less than 1 percent in the earlier year to over 11 percent in 1958–59. The chief competitor for the quality egg market appears to be Australia. The major supplier of farm-gathered eggs is Ethiopia. The price and quality of these are low. Additional farm eggs come from Jordan.

At certain seasons Syria imports a small quantity of eggs from Lebanon, Jordan and Turkey. It usually has an annual export surplus which goes to Lebanon, Jordan, Kuwait and Saudi Arabia with the largest numbers to the two last countries.

Among the Arab countries to the east, the main importers of poultry are Kuwait and Saudi Arabia. Jordan reported no imports of poultry during the years 1958–1960 because of the development of a growing number of commercial poultry farms producing table eggs and/or broilers.

Syrian farmers produce larger numbers of chickens than are needed to supply the demands of consumers in the cities. Thus, there is generally a surplus to export to neighboring countries, including Lebanon.

During the first six months of 1960 Kuwait's imports of live poultry were mainly baby chicks. Lebanon supplied 75 percent of these. Holland and Great Britain were the principal competitors. Figures for imports of dressed poultry are not available separate from other kinds of meat. However,

Table. 13

Imports of Shell Eggs into Various Arab Countries, 1957–1960 [1]

Country and Origin of Imports	1960	1959	1958	1957
Iraq			Value in Dinars	
Holland	No			142
Lebanon	data		724	
United Kingdom	available		51	273
Other Countries				62
Totals		None	775	477
Jordan		Number of Eggs		
Greece			2,000	
Syria	2,193,840	2,729,720	2,259,360	
Syrian–foreign origin	183,600			
Turkey	72,000			
Totals	2,449,440	2,729,720	2,261360	N.A.

Kuwait	Kilograms	Price Value in Rupees Per. Kg.	Jan.–June
Australia	21,737	4.1	89,559
Bulgaria	26,400	1.12	29,700
Denmark	148,814	1.9	281,192
Egypt	180,663	1.1	199,818
Lebanon	302.826	2.0	597,550
Poland	30,055	2.07	62,000
Syria	313,561	1.6	515,153
Turkey	79,721	1.8	143,699
United States	31,896	3.4	109,072
West Germany	1,037	4.6	4,575

Bahrein			4,800	48,805
Egypt			39,742	14,986
Ethiopia		15,915,269	10,016,847	16,293,989
Holland				148,480
Iraq			1,508	18,245
Jordan		393,037	272,000	21,778
Lebanon		2,695,820	1,649,092	209,711
Syria		589,830	462,343	622,326
United States		42,122	215,724	1,678,224
Other Countries			4,398,451	4,140,480
Totals	N.A.	24,156,238	17,060,507	23,330,564

Syria		Number of Kilograms		
Jordan		3,720		
Lebanon			48	54
Turkey		10	35	21
Totals	N.A.	3,730	83	75

[1] Latest available data taken from the following offical sources:

Statistical Abstract for Foreign Trade. Principal Bureau of Statistics, Ministry of Economics, Republic of Iraq, The Government Press, Baghdad.

Statistical Year Book. Ministry of National Economy, Department of Statistics, The National Printing Press, Amman, Jordan.

Foreign Trade Statistics for the First Half of 1960. General Directorate of Statistics. The Government of Kuwait, Government Printing Press, Kuwait.

Statistics. General Directorate of Statistics, The Kingdom of Saudi Arabia, Asfahain & Co. Press, Ryad.

Foreign Trade Statistics. Directorate of Customs, Ministry of Finance, United Arab Republic, United Arab Republic Press, Damascus, Syria.

Table 14

Imports of Live Poultry into Various Arab Countries, 1957–1960 [1]

Country and Origin of Imports	1960	1959	1958	1957
			Value in Dinars	
Iraq	Data	None		
Holland	not		279	140
United Kingdom	available		285	140
Other Countries			4	77
Totals			568	357
Jordan	None			

Kuwait	January–June Kilograms	Price Per Kg.	Value in Rupees
Australia	50	10.00	500
Denmark	79	36.50	2,904
Egypt	94	23.24	2,185
Holland	435	25.19	10,958
Iraq	131	2.72	367
Japan	65	17.04	1,108
Lebanon	3,756	11.86	44,420
United Kingdom	277	38.77	10,741

Belgium				
Ceylon			75	
Egypt		864	11	
Ethiopia		1,388	73	473
Holland		2,829	4,646	1,420
India		4		
Iran			22	
Iraq		5	13	
Lebanon			70	20
Malaya		4,829	90	839
Sudan			2	
Yemen		20		
Other Countries		360	1,250	401
Totals	N.A.[2]	10,305	41	15
			6,293	3,186

Syria		Number of Kilograms		
Belgium			10	
Denmark		30	30	2
Holland		237	199	16
Ireland		40		
Lebanon				50
United States		64		
West Germany		85		
Totals	N.A.	456	239	68

[1] Latest available data taken from the official sources listed under Table 13.
[2] N.A. = Not Available.

Table 15

Imports of Slaughtered Poultry into Various Arab Countries, 1957–1960 [1]

Country and Origin of Imports	1960	1959	1958	1957
Iraq No imports reported				
Jordan " " "				
Kuwait (Fresh and Frozen Meat) [2]	(Jan.–June)			
Australia	389,566			
Denmark	287,697			
Holland	185,601			
India	100,319			
Italy	31,626			
Kenya	74,446			
Lebanon	40,422			
Poland	24,877			
Syria	1,043			
United Kingdom	59,529			
United States	187,132			
West Germany	36,727			
Other Countries (Pakistan, Cyprus, Austria, Tanganika, Japan)	36,374			
Australia				145
Egypt				
Ethiopia		538	789	2,015
Holland		1,595	150	
Iraq			85	
Kuwait				1,632
Lebanon		4,837	4,157	28,102
Syria			2,109	1,265
United Kingdom			231	2,375
United States		69,139	51,224	30,451
West Germany		9,684		
Other Countries			720	
Totals	N.A.	85,793	59,465	66,182
Syria				
United States	N.A.	None	26	None

[1] Latest available data taken from the official sources listed under Table 13.

[2] Kuwait customs statistics do not separate poultry from other kinds of meat. Much of the imports from Denmark, Holland, Lebanon, Poland, United States and West Germany probably are frozen chickens as these countries ship poultry meat to Saudi Arabia.

Saudi Arabia's statistics indicate that Kuwait's meat imports from Denmark, Holland, Lebanon, Poland, United States and West Germany probably consist to a large extent of frozen poultry.

The chief competitor of Lebanon in the Saudi Arabia market for supplying dressed poultry appears to be the United States, which during the years 1956–59 furnished 45 to 85 percent of the imports. As shown in Table 9, the price of frozen broilers in New York averaged between 165 and 227 piasters per kilogram in 1959–61. Broilers available at these low prices come from modern, sanitary processing plants in which the chickens are subject to continuous, stringent inspection by veterinarians to assure that only healthy and disease-free birds are slaughtered and sold. Quality chicken meat processed in such plants is perferred by many particular consumers.

Market Prospects in Arab Countries

From the above review, it is apparent that Lebanese poultry producers are encountering real competition in the Arab countries to the east. It is evident that the best prospects for expanding Lebanese exports of eggs and broilers are in Bahrein, Qatar, Kuwait and Saudi Arabia. Even in these countries the demand for quality products at high prices caused by high transport costs will expand slowly as the number of people with incomes sufficiently high enough to pay the prices increases gradually. With the prospects of greater oil output and more factories, called for by economic development plans, it is expected that more people will be able to afford imported foods. Lebanese exporters already supplying these markets are in an opportune position to increase sales as local demand expands and to the extent that the prices of eggs and dressed broilers in Lebanon permit them to meet prices offered by other countries. The establishment here of a modern poultry processing plant with continuous sanitary inspection, veterinary examination of the live chickens, and supervision of the eviscerating process would increase materially the acceptance of Lebanese broilers by westerners both in Arab countries to the east and in the Beirut market. The extent to which these markets can be supplied by Lebanese poultrymen depends upon reducing production costs so that sales can be made profitably at competitive prices.

Competition Among Lebanese Poultrymen

Evaluation of the situation of commercial poultry farms in Lebanon

indicates that competition among them is producing more serious consequences than is the competition from abroad, except for the occasional "dumping" of eggs by a few countries. Imports appear to have serious depressing effect on domestic prices only when a very large shipment of foreign eggs arrives in Beirut. The general decline in the prices of eggs and broilers during the past two years has been the result primarily of the substantial increase in the quantities of eggs and broilers offered in the markets by the rapidly increasing number of commercial producers.

After the pioneers learned through experience how to control diseases and produce eggs and broilers successfully, their profits rose during 1958 and 1959. Hearing of gross profits of 50 to 100 piasters per bird, many people gained the idea that broiler growing was profitable business. The industry expanded rapidly through 1961 for two reasons, namely, (1) with relatively low investment the product is ready for market in 6 to 8 weeks while pullets for laying have to be fed for nearly 6 months before enough eggs are obtained to pay current bills, and (2) a relatively small amount of capital was required in proportion to the turn-over.

As is usual during a period of rapid expansion in any industry, many of the newcomers are without previous experience. Thus, they often make serious mistakes which cause their costs of production to be materially higher than they should be. When disease strikes unexpectedly and they do not know how to handle the situation, they are apt to panic and rush their flocks to market before they may die. Very few keep records or accounts and thus do not know what their costs are and if selling prices are covering expenses. When the market reaches the saturation point due to production expanding faster than demand, the first reaction of the inexperienced producer is to lower prices in order to dispose of his output and get money to meet his chick, feed and labor bills. Other inexperienced sellers underbid their competitors and force prices down, as happened during the latter part of 1961. The experienced producers tried to hold the price level by putting into freezer storage what broilers could not be sold at the market price. Numerous new producers found they did not have the finances to continue and stopped buying chicks. About two months after this curtailment became widespread, the number of broilers coming to market in February and March 1962 fell below current demand and prices rose to the level of six months earlier. At this point many former broiler producers started buying chicks to resume production. These, and newcomers attracted by the stories of broiler profits, are

likely to secure enough credit for purchasing chicks and feed to expand production enough within a year to cause another drop in prices.

Repetition of such up and down swings in the production of broilers and their prices have also been the history of broiler production in United States during the last two decades. As long as chicks and feed can be obtained on credit with payment when the broilers are marketed, the industry seems headed for repeated periods of readjustment whenever production outstrips the growth in consumer demand. The broiler farmer who learns by experience how to produce efficiently at low cost per kilogram and accumulates financial resources to carry him through the low price periods is usually the individual who makes enough profits when prices are favorable to continue permanently in the business.

Commercial production of eggs in Lebanon has shown more gradual expansion of output than has the broiler industry. The five to six months period of raising the pullets before income starts from sale of eggs has kept out most of those with insufficient capital resources. But when broiler prices declined somewhat, those who discontinued production later put layer chicks in their houses and thus shifted to swelling the output of eggs. The more efficient producers are weathering the periods of curtailed income and are learning to cut their costs in order to continue in operation.

Periodic narrowing of profit-margins is the mechanism whereby the competitive free-enterprise system operates to weed out those producers who are not able to bring their costs of production into line with the prices which consumers are willing to pay for the product in the long run. There appears to be less fluctuation in output and prices in those lines of production in which the average profit is moderate so that the number of newcomers attracted to the industry is relatively small. This suggests that the poultry industry of Lebanon will have a smoother course of development over the years if the leaders are able to work toward stabilizing prices at levels which allow a moderate margin of profit for the average producer.

CALCULATED CONSUMPTION OF EGGS AND BROILERS IN 1961

Even though production of table eggs and broiler chickens according to modern methods on commercial poultry farms is less than 10 years old,

specialized farms supply about one third of the estimated volume of eggs consumed in Lebanon and about 94 percent of the broilers, according to the figures in Tables 16 and 17. Commercial farms with 500 or more layers produce about 70 percent of the domestic output of large eggs, or about 60 percent of the total supply of fresh quality eggs when imports are added.

Number of Eggs Consumed

The calculation of the apparent volume of egg consumption in Lebanon of about 100,000,000 eggs during 1961 is shown in Table 16. The number of eggs produced by small farm flocks and by the commercial flocks of less than 500 layers are rough estimates computed from available statistics. The 1960 sampling survey of agriculture reported only the number of chickens on 148,819 farms at 1,272,000. For the purpose of estimating egg production, it was assumed that the average number of layers per farm was 4, or a little less than half the number of chickens. Allowance was made for roosters and young chickens. While it is considered that with proper feed the local Baladi breed of small size chickens will lay around 100 eggs, the great majority does not reach this level because of inability to scavenge enough food.

Number of Broilers Consumed

Table 17 places the apparent number of broilers consumed in Lebanon during 1961 at about 5.800,000. This represents an increase of 77 percent over the previous year. The Poultry Section of the Ministry of Agriculture estimated the number of chicks hatched during the same year to be 6,823,419 with approximately 80 percent of them broiler strains. Adjustment was made for imports and exports of chicks in arriving at the total number placed on farms. The cockerels raised on layer farms, which used straight-run chicks from the hatchery for rearing pullets to replace laying flocks, were considered to have been sold as broilers as the most profitable way of disposing of them.

Imports of frozen broilers during the year were equivalent to 6.6 percent of the number raised in the country and 6.25 percent of the estimated consumption for the year. Thus, the imported birds constituted a very minor part of the supply.

Table 16

Apparent Consumption of Eggs in Lebanon, 1961

	Est. Number of Layers	Est. Av. No. Eggs Per Bird Per Year	Est. No. Eggs Produced During Year
Eggs produced by farm flocks[1] (148,819 farm holders, estimated 4 layers per farm)	595,276	50	29,763,800
Eggs produced by commercial size farm flocks of 100 to 500 layers[2]	100,000	150	15,000,000
Eggs produced by 150 commerial egg farms with over 500 layers[3]	228,500	180	34,275,000
Estimated total number of eggs produced			79,038,800
Number of eggs imported [4]			34,133,270
Estimated total supply of eggs			113,172,070
Less, number of eggs exported [4]			11,778.790
Estimated consumption of eggs in Lebanon			101,393,280

1 J.P. Ecimovic and Haidar El-Assaad, The 1960 Sampling Census of Agriculture in Lebanon, Ministry of Agriculture reported 1,272,000 chickens on 148,819 farms. It is estimated that of this 4 per farm are layers which produce an average of 50 eggs per year.

2 Calculated from the estimated number of layer chicks sold to commercial egg farms in 1960, allowing for 50 percent males and 20 percent for mortality and culling of pullets kept for layers. Average number of eggs per bird is estimated from the production per bird on commercial farms.

3 Calculated from data collected from 134 commercial egg farms in 1960-61 by Joseph Fuleihan.

4 From unpublished data, Poultry Section, Ministry of Agriculture.

Table 17

Apparent Consumption of Broilers in Lebanon, 1961

	Number of Chicks Started	Percent Mortality	Number Raised
Estimated number of broiler chicks sold in Lebanon, local and imported[1]	5,458,735	10%	4,912,862
50% of estimated number of layer chicks, males sold as broilers[1]	682,342	10%	614,108
Estimated number of broilers raised			5,526,970
Number of broilers imported[2]			365,535
Estimated total supply of broilers			5,892,505
Less, broilers exported[2]			49,573
Estimated consumption of broilers in Lebanon			5,842,932

1 From Table 1.

2 From unpublished data assembled by Mr. Samir Naim, Head, Poultry Section, Department of Livestock Production, Ministry of Agriculture. Each kilogram of dressed broilers is assumed to be equivalent to one live broiler.

COSTS AND RETURNS FROM PRODUCING TABLE EGGS

Costs of Producing Eggs

The average cost of producing an egg on the 22 commercial poultry farms from which data were collected, covering the period April 1960–March 1961 was in the range of 9.6–11.2 piasters as shown in Table 18. In view of the wide variations in costs for these farms, it is probable that the average costs for the group are reasonably representative of costs for the "average" commercial egg farm in Lebanon. Thus, the cost per egg, not including management, was 10.3 piasters.

Growing pullets do best with ample floor space, — feeders and water fountains

Analysis of the cost data reported in Table 18 reveals that three items constitute 94 percent of the total net costs of production. These are feed, labor and overhead expenses of depreciation and interest. It should be stated that the figures other than feed include the costs of rearing the pullets to replace the layers at the end of their first year in production because it was found impractical to separate the expenses of raising the replacements from caring for the layers. Therefore, the figures for labor and other expenses are somewhat higher than if they applied to the layers alone.

If it were feasible to make a separate tabulation of the various costs for rearing pullets to laying age, the total of these expenses would be considered a capital investment in the layers to be recovered in part through sale of the birds at the end of the laying year. Due to the low market price for old hens and to mortality during the year, the sum realized from the sale of the exhausted layers is substantially less than the costs of rearing the pullets. The loss is often treated as depreciation of the layers and in such a case is included as an item of expense for producing eggs. This depreciation could not be calculated for the 22 farms because of the impossibility of separating rearing expenses from over-all costs. The same final result in calculating the net cost of producing an egg was achieved by crediting against the over-all costs the proceeds from selling the hens at the end of the year.

Returns from Egg Production

The relation between costs and returns from the production of table eggs for the year 1960–61 is shown in Table 19.

With the average sales price of 12.7 piasters per egg and the net cost of 10.3 piasters for the 22 farms surveyed, the net returns to management were 2.4 piasters per egg. These net returns amounted to L.L. 4.44 per layer for the average producer. The range of net returns per bird from L.L. 2.82 for the small farms up to L.L. 5.83 for those in 2000–3000 group netted the larger farms more than enough money to pay the L.L. 7,200 annual salary for a qualified professional manager. This means that a farm with 3000 layers has to earn net returns of more than L.L. 2.40 per layer per year in order to make a net profit for the owner above the salary of a professional manager.

Major Cost Items

The major cost items for producing eggs are as follows.

Feed

Feed constitutes roughly 68 percent of the net cost of producing an egg in Lebanon. At 34.1 piasters per kilogram, the feed cost was L.L. 12.96 per layer and 7 piasters per egg during the year of the study.

A Leghorn pullet consumes 38 to 40 kilograms of feed costing 29–32 piasters per kilogram during her first year of laying. In this time she

Table 18

Costs of Producing Eggs in Lebanon, 1960–61

22 Commercial Layer Farms

Costs Per Bird[1] and Per Egg

Size of Flock:	Average	500–1000	1001–2000	2001–3000	3001–4000
Average number of layers	1565	793	1400	2100	3325
Number of farms	22	7	9	3	3
Number of eggs per layer per year	183.2	192.2	176.7	191.5	183.0
Items of Cost	Leb. Pounds	Leb. Pounds	Leb. Pounds	Leb. Pounds	Leb. Pounds
Variable Costs					
Layers (chicks plus feed)[2]	5.80	5.75	5.34	5.82	6.69
Feed (for layer only)	12.96	13.98	13.08	13.23	11.71
Labor	2.17	3.25	2.36	1.60	1.71
Electricity	.20	.24	.14	.23	.24
Fuel for brooding	.15	.12	.16	.16	.15
Litter	.12	.18	.12	.10	.06
Medicines	.37	.70	.35	.27	.18
Repairs	.31	.33	.25	.32	.40
Water	.04	.06	.04	.06	.30
Depreciation at:					
Buildings at 4 %	.48	.60	.43	.49	.47
Equipment at 12%	.17	.19	.14	.21	.16
Insurance at 0.15%	.02	.02	.02	.02	.02
Interest on investment at 7%	2.00	2.11	1.67	1.62	2.53
Tax on buildings, 12.5 pts. per/sq. meter	.04	.05	.04	.05	.03
Total fixed costs	2.71	2.97	2.30	2.39	3.21
Total costs	24.83	27.58	24.14	24.18	24.38
Less, misc. receipts from:					
Cockerels	1.00	.86	1.40	.98	.36
Cull and aged hens	4.43	4.67	4.45	4.25	4.32
Litter plus manure	.50	.46	.55	.65	.35
Total misc. receipts	5.93	5.99	6.40	5.88	5.03
Total net cost per layer	18.90	21.59	17.74	18.30	19.35
Net cost of production per egg	.103	.112	.100	.096	.106

[1] Not including management cost.

[2] Cost of chicks plus 10.61 kg. feed. Other expenses of rearing pullets included with those for a layer.

Table 19
Returns from Producing Eggs, 1960–61
22 Commercial Layer Farms.

Returns Per Bird and Per Egg

Size of flock, number of layers	Average	500–1000	1001–2000	2001–3000	3001–4000
Average number of layers	1565	793	1400	2100	3325
Number of farms	22	7	9	3	3
Number of eggs per layer per year	183.5	192.2	176.7	191.5	183.0
	Leb. Pounds	Leb. Pounds	Leb. Pounds	Leb. Pounds	Leb. Pounds
Value of eggs sold per layer	23.27	24.41	22.44	24.13	23.42
Net cost per layer per year [1]	18.90	21.59	17.74	18.30	19.35
Returns to management per layer	4.37	2.82	4.70	5.83	4.07
	Piasters	Piasters	Piasters	Piasters	Piasters
Sales price per egg	12.7	12.7	12.7	12.6	12.8
Net cost per egg	10.3	11.2	10.0	9.6	10.6
Return to management per egg	2.4	1.5	2.7	3.0	2.2

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should lay 200 to 225 eggs. Thus, it takes around 200 grams of nutritious feed, combined with ample water, etc., to supply the raw materials for one egg When the price of feed is 30 piasters, the feed to produce an egg by a hen laying 200 eggs in a year is 6 piasters.

Labor

Wages of the workers caring for the layers account for 11.5 percent of the net cost of producing eggs. While the monthly wage of workers is relatively low, averaging L. L. 150, the labor cost per layer and per egg is relatively high because the average worker cares for only 1565 layers. On this basis, the labor cost per layer in 1960 was L. L. 2.17 and per egg was 1.13 piasters.

Fixed Costs

Fixed costs absorb about 14 percent of the total net cost in the production of eggs. They are depreciation of the buildings and equipment, insurance against fire damage, interest on the money invested in the farm and used in its operation, and the government tax on buildings. These costs are fixed for each year regardless of the number of eggs produced. Because these expenses are not paid periodically, as are bills for feed, labor and other current expenditures, farmers tend to overlook them. For the 22 farms studied, the average fixed annual costs amounted to L. L. 2.64 per layer, or 1.44 piasters per egg.

Effect of Size of Flock on Costs

Cost data for producing eggs were tabulated for the four sizes of farm groups listed in Table 18 in order to discover whether size of flock had any observable effect upon the cost of producing eggs. Analysis of the data in the table reveals that while the variable costs tend to decrease on a per bird basis as the number of layers goes up from 500 to 4000, there is no connection between size and cost in the total costs, or total net costs after allowance is made for the credits for miscellaneous sales. This is because of the great variations in fixed costs among the different size farm groups included in the study. However, it is evident that the annual depreciation cost of buildings and equipment is less for the farms with more than 3000 layers than for those with under 1000 birds. The decisions of the owners of the intermediate size farms, regarding the amount of money they would invest in buildings and equipment to start egg production, were evidently based on factors other than the cost of

what was essential for an efficient egg production unit. It would appear that if economic considerations had predominated, total fixed costs should show a definite decreasing trend as the number of layers per farm increased. The investment in the large farms with 3000 to 4000 layers is out of proportion because of the high cost of their land and their layers. These particular farms purchased mostly sexed pullet chicks at a high price.

There is a generally evident trend of decrease of cost with increase of size of flock relative to feed, labor, medicines, litter and water. The wide variation in expense for chicks arose from differences in the percent of sexed pullets purchased at the much higher price compared with mixed sexes as they come from the incubator. There were also great differences in the amount of electricity used by various farms and the prices paid for it. Each farm owner has his favored method of brooding and there is no evident relation between cost and the number of birds brooded.

The return per bird from the sale of hens culled from the laying flock and sold at the end of the production year tended to decrease with increasing size of farm. Revenue from sale of manure and litter varied with the local demand and sales ability of the farm manager while receipt from sales of cockerels decreased as the proportion of sexed pullets purchased by the farms in the various size groups increased. Study of the cost of chicks and the sales of cockerels as broilers in relation to labor cost suggests that larger farms appear to have sufficient labor so that the extra chicks, representing the cockerels in straight run chicks, can be raised to broiler age profitably. Accordingly, it is not economic to pay the extra price for sexed pullet chicks until the feed cost for the cockerels exceeds the sale price for broilers. With the recent decline in broiler prices, Leghorn cockerels sold as broilers show a loss.

The decrease in cost per egg as the size of flock increased from 500 to 3000 indicates that, other things being equal, the cost of production per egg tends to decrease as size of flock increases to 3000 layers. The cost of production for the particular farms in the 3000-4000 layer group was raised by abnormally high interest on investment, extra expenses for sexed pullet chicks, and small receipts from sales of cockerels as broilers. If their fixed cost were in line with those of the other size groups, they might fit into the decreasing cost pattern. However, the fact that the most profitable farms having the lowest cost of production per egg were those with larger than average numbers of layers, as shown in Table 18, suggests that under present circumstances in Lebanon the medium size farms have the lowest net cost per egg.

Factors Contributing to Larger Profits

In searching for the factors that contribute to higher profits, figures were assembled for the most profitable farms to compare with the average for all the 22 farms and with the least profitable of the groups surveyed.

Good Management

From the study of costs in Table 20, the importance of good management for keeping costs low on a true economical basis is clearly evident. The most profitable farms sold their eggs at the average price obtained by all farms included in the study and made their money from reducing the net cost of producing an egg substantially below the average. Their returns to management were 4.2 piasters per egg. Of this amount, 3.6 piasters resulted from lower cost of production and only six-tenths of a piaster came from selling at a higher price than the least profitable farms.

Lower Major Variable Cost Items

The high profit farms had lower than average expenses for chicks, feed and labor. The reasons for these bear separate analysis.

Bought straight run chicks

It is more economical for well-managed farms to buy unsexed chicks than the much-higher priced sexed pullet chicks as long as the cockerels can be marketed profitably as broilers. The most profitable farms bought nearly 75 percent of their chicks straight-run from the incubators, compared with 65 percent for all farms and 55 percent for the least profitable group. They also paid a lower price per chick, doubtless because their large size enabled them to obtain a quantity discount.

Used feed efficiently and economically

Not only did the most profitable farms spend less for feed but they used it more efficiently. Table 21 shows that they obtained 5.1 eggs per kilogram compared with the average of 4.8 eggs for all farms. They used 2 kilograms less feed than the least efficient farms to produce 193 eggs per layer and rear the replacement for the hen. With the quantity discount, the feed cost 2 piasters less per kilogram. Good management in buying and using feed resulted in the feed per egg costing 6.4 piasters on the most profitable farms and 8.1 piasters on their least efficient competitors' farms.

Table 20

Receipts and Expenses Per Layer on Commercial Egg Farms, 1960–61

22 Commercial Layer Farms

	Most Profitable	Average All Farms	Least Profitable
Number of farms	5	22	5
Average number of layers	1,620	1,565	1,110
Receipts			
Eggs produced per bird	193.00	183.20	171.00
Price per egg in piasters	12.70	12.70	12.10
Receipts from sales of eggs	LL 24.51	23.27	20.69
Expenses			
Variable Costs			
Layers (chicks plus feed)	LL 5.51	LL 5.80	LL 5.56
Feed	12.56	12.96	14.15
Labor	2.02	2.17	3.19
Medicines	.38	.37	.38
Repairs	.27	.31	.47
Electricity	.13	.20	.23
Bedding	.12	.12	.09
Brooding	.18	.15	.13
Water	.04	.04	.05
[illegible] equipment 12%	.17	[illegible]	[illegible]
Insurance at 0.15%	.02	.02	.02
Interest on investment 7%	1.54	2.00	2.25
Tax on buildings at 12.5 pts./sq. meter	.03	.04	.05
Total fixed costs	2.18	2.71	3.06
Total costs	23.39	24.83	27.31
Miscellaneous Receipts			
Sale of hens	4.61	4.43	4.45
Cockerels	1.52	1.00	1.19
Manure	.72	.50	.50
Total misc. receipts	6.85	5.93	6.14
Total net costs	LL 16 54	LL 18.90	LL 21.17
Net cost per egg	P:s. 8.5	10.3	12.3
Returns to management per egg	Pts. 4.2	2.4	(–) 0.2

Table 21

Feed Consumption Per Layer on Commercial Egg Farms, 1960–61

Class of Farms	Most Profitable Farms	Average of All Farms	Least Profitable Farms
Number of farms	5	22	5
Average number of layers per farm	1,620	1,565	1,110
Average number of eggs per layer	193	183	171
No. kilograms feed consumed per layer	38.2	38.0	40.3
Price of feed per kilogram	32.2	34.1	34 2
Feed cost for year per layer	L.L. 12.30	L.L. 12.96	L.L. 13.78
Feed cost per egg	6.37 pts.	7 08 pts.	8.06 pts.
Number of eggs per kilogram of feed	5.1	4.8	4.2

Table 22

Efficiency of Workers and Labor Cost Per Layer on Commercial Egg Farms, 1960–61

Class of Farms	Most Profitable Farms	Average of All Farms	Least Profitable Farms
Number of farms	5	22	5
Average number of layers per farm	1,620	1,565	1,110
Average number of eggs per layer	193	183	171
Eggs sold per worker per year	183,930	146,950	94,905
Number of full time workers	1.7	1.8	2.0
Number of layers per worker	953.0	870.0	555.0
Average wage per worker per month	L.L. 160.0	L.L. 150.0	L.L. 148.0
Labor cost per layer per year	L.L. 2.02	L.L. 2.17	L.L. 3.20
Labor cost per egg produced	1.04 pts	1.13 pts.	1.87 pts.

Developed high labor productivity

The most profitable group had the lowest labor cost per egg sold, namely, 1.04 piasters. Table 22 indicates that this was due to the workers caring for 953 layers and their replacements as compared with 870 on the average farms. Even though workers on the high profit farms were paid above average wages of L. L. 160 per month the labor cost per egg was lower because of the larger number of eggs sold during the year for each worker employed

Small Annual Fixed Costs

The most profitable farms had substantially lower annual fixed costs for depreciation and interest. The lower fixed costs resulted from careful investment in land, buildings, equipment and chicks for rearing into layers. As shown in Table 23, the investment in these items was substantially lower than for the other categories of farms. The best managed farms had paid L.L. 2.56 per square meter of land compared with L.L. 6.70 for the least profitable farms. However, the farms that obtained the best results raised only 91.3 birds per 100 square meters while poorly operated farms put 126.1 birds in the same area. The former group kept 3.1 layers and their replacements per square meter of floor space in their buildings as against 2.9 for the latter farms. Each meter of floor space cost the well managed farms L.L. 31.30 as against L.L. 39.20 for the least profitable farms and L.L. 36.60 for all farms surveyed.

The best run farms had the lowest investment per bird in equipment, namely, L.L. 1.37. However, their net returns to management demonstrates that it is profitable to provide enough feed hopper and water trough space for the birds to eat and drink all they want without being crowded by other hens

Relation of Management to Production Costs

The very great importance of skillful management in the financial success of a commercial egg farm is indicated by the variations in net returns shown in Tables 19 and 20. The least profitable farms had no compensation for the management provided by the owner or his hired manager. On the other hand, the most profitable farms earned a return of LL 8 per layer. This was equivalent to about double the LL 7200 salary for a professional manager. Such a manager is a good investment for the owner of an egg farm seeking profits from his capital. He sees that the important things in determining profits are given proper attention.

Table 23

Investment Per Layer in Commercial Eggs Farms, 1960–61

Items	Average for 22 Farms		Five Most Profitable Farms		Superior 3000 layer Farm[1]	
	Unit & Price	Leb. Pounds	Unit & Price	Leb. Pounds	Unit & Price	Leb.s Pound
Land	1 M² per layer	6.55	1 M² per layer	2.56	2/3M² per layer	2.00
Buildings	3.1 layers/M²		2.9 layers/M²		4 layers/M²	
	LL. 36.60 per M²	12.00	LL. 31.30 per M²	10.67	LL. 20.00 per M²	5.00
Equipment	Feeders, waterers, nests, egg handling	1.40	Feeders, waterers, nests, egg handling	1.37	Feeders, waterers, nests, egg handling, washer, scales	2.17
Layers	Chicks + 11 kg. feed	5.80	Chicks + 11 kg. feed	5.77	All cost of rearing	6.85
Replacements[2]	½ of 2½ chicks	1.10	½ of 2 ½ chicks	.95	½ of 1.17 sexed pullets at LL. 1.50	1.75
Operating capital	1/12 of cash costs	1.70	1/12 of cash costs	1.61	1/12 of cash costs	1.16
Total investment		28.55		22.83		18.93

1 Farm planned for economical production of eggs.

2 2 1/2 chicks of mixed sexes are purchased 6 months before the end of the laying year. For calculating annual interest, 1/2 their cost is used.

Regardless of whether a farm is managed by the owner or a hired manager, the skill with which the functions of management are performed very largely determines the profitability of the enterprise. Whoever manages a poultry farm has to combine its resources in the way which will yield maximum profits by producing at low cost per unit of product. Scientists have pointed out that profitable poultry production depends upon breeding, feeding, housing and management.

The way in which good management operates to reduce the cost of production on well run poultry farms is shown in the data presented in Table 24. The total annual cost per layer is reduced from LL 21.31 for average farms to LL 20.57 on the well managed farms. Not only do competent managers use the workers more efficiently to reduce the labor cost per layer but they hold down the other operating expenses. Their farms require less medicine because the birds are healthier as a result of correct ventilation of the houses, proper sanitation and careful production practices. Annual fixed costs per bird (see Table 25) are reduced by wise investment in a suitable low-cost building and equipment selected to give economical production and enable a few workers to care for a large number of birds, including grading and preparing the eggs for market at the highest prices obtainable. The cost per egg is reduced by getting a larger number laid by each bird. In these ways, the well managed farms are able to produce eggs for about 1.3 piasters less per egg than ordinary farms. The comparison would probably be more favorable for the savings achieved by good management if more accurate figures could be obtained for the depreciation of layers on ordinary farms, including the most profitable among them.

Estimated Cost of Production on Well Managed Farms

The estimated cost of producing eggs on well managed large scale commercial poultry farms with the prices of feed and other production items at 1962 levels is shown in Table 26. The amount of feed may be as much as 2 kilograms per bird below what is common on many farms but 40 kilograms is adequate to supply the nutrition requirements for a small size Leghorn pullet to lay 200 eggs during the year she is in the laying house. The wage rates used for the workers are those being paid by large farms which have a competent manager to direct their daily activities. Interest on the conservative investment in a well planned and organized egg farm is charged at 5.5 percent, the rate at which money is loaned by the Credit Bank for Agriculture, Industry and Real Estate. Farms in this category currently can produce eggs for about

	Average Farms		Most Profitable Farms		3000 Layer Farms[1]	
Number of farms	22		5		2	
Average number of layers	1565		1620		3000	
Average number of eggs per layer	183		193		200	
Expenses						
Variable Costs						
Feed at 30 pts. per kg.	LL. 11.40	LL.	11.46	LL.	12.00	
Labor	2.17[2]		2.02[2]		1.10	
Medicines	.37		.38		.33	
Repairs	.31		.27			
Electricity	.20		.13		.45	
Litter	.12		.12			
Water	.04		.04			
Total variable costs	14.61		14.42		13.88	
Annual fixed costs[3]	2.71		2.26		1.83	
Depreciation of layers	3.99[4]		3.96[4]		4.86	
Total costs	21.31		20.64		20.57	
Credit for sale of manure	.50		.72		.50	
Total net costs	20.81		19.92		20.07	
Net costs of production of 1 egg[5]	.1136		.1031		.1003	
Cost per egg, including management[6]	.1386		.1261		.1120	

1 Farm planned and managed for economical production of eggs.
2 All expenses other than feed include rearing replacements.
3 See Table 25 for calculations.
4 Calculated on basis of 1961 sales prices for old hens.
5 Omitting cost of management.
6 Adding cost of salary of a manager at LL 7,200 per year.

Table 25

Calculation of Fixed Annual Overhead Costs of Egg Production, 1960 – 61

Cost Per Layer

Annual Fixed Costs	Average for 22 Egg Farms		Five Most Profitable Farms		3000 Layer Farms[1]	
	Investment Per Layer	Fixed Costs Per Layer	Investment Per Layer	Fixed Costs Per Layer	Investment Per Layer	Fixed Costs Per Layer
Depreciation of :	Leb. Pounds	Piasters	Leb. Pound	Piasters	Leb. Pound	Piasters
Buildings at 4 %	12.00	48.05	10.67	42.68	5.00	20.00
Equipment at 12%	1.40	16.80	1.37	16.44	2.17	26.04
Total depreciation cost		64.85		59.12		46.04
Insurance on buildings and Buildings	12.00	84.00	10.67	74.69	5.00	35.00
Equipment	1.40	9.80	1.37	9.59	2.17	15.19
Layers and replacements[2]	6.90	48.30	6.72	47.04	8.60	60.20
Operating capital[3]	1.70	11.90	1.61	11.27	1.16	8.19
Total interest cost		199.85		160.51		132.58
Tax on buildings 12.5 pts.[4] per M^2	.32 M^2	4.00	.34 M^2	4.25	.25 M^2	3.00
Total fixed costs		270.70		225.88		182.92

1 Farm planned for economical production of eggs.

2 For the 22 and 5 farms, includes cost of the chicks and feed only.

3 1/12 of annual costs other than chicks.

4 Buildinng cost LL 36.60 per M^2 ; 3.1 layers per M^2 .

Table 26

Estimated Cost of Producing Eggs on Efficient Commercial Farms with 3000 Layers, 1962
Pullets Averaging 200 Eggs Per Year

Cost Items	Amount	Per Layer	Per Egg
		Leb. Pounds	Piasters
Feed, pullet weighing 1700 grams consumes annually 40 kg. [1] at 30 pts.		12.00	6.00
Labor, 2 men paid LL 3,300 per year (LL 150 and LL 120 per month)		1.10	.55
Other operating expenses (medicines, electricity, litter, repairs, etc.)		.78	.39
Annual fixed costs[2] for depreciation of buildings and equipment, insurance, interest at 5.5%, and tax on buildings.		1.54	.77
Depreciation of layers: cost LL 6.67, less sale of 8/10 of a hen for $ 1.81.		4.86	2.43
Management[3] : salary of LL 7,200 per year.		2.40	1.20
Total costs		22.68	11.34
Less, credit for misc. receipts, as manure		.17	.08
[illegible]		22.51	11.26
Depreciation of :	Investment	Rate	Piasters	Piasters
Buildings	5.00	4%	20.00	0.100
Equipment	2.17	12%	26.04	.130
Insurance on buildings and equipment	7.17	0.15%	1.00	.005
Interest on capital invested in				
Land	2.00	5.5%	11.00	.055
Buildings	5.00	"	27.50	.138
Equipment	2.17	"	11.94	.060
Layers and replacements	8.60	"	47.30	.237
Operating capital	1.16	"	6.38	.030
Tax on buildings (1/4 M^2 per layer)	5.00	12.5pts.per M^2	3.12	.015
Total annual fixed costs			154.28	0.770

1 National Research Council of U.S.A., Publication 827, 1961, states that 38 kg. is adequate but most commercial poultry farms use about 40 kg.

2 See tabulation below for itemization of investment and fixed costs.

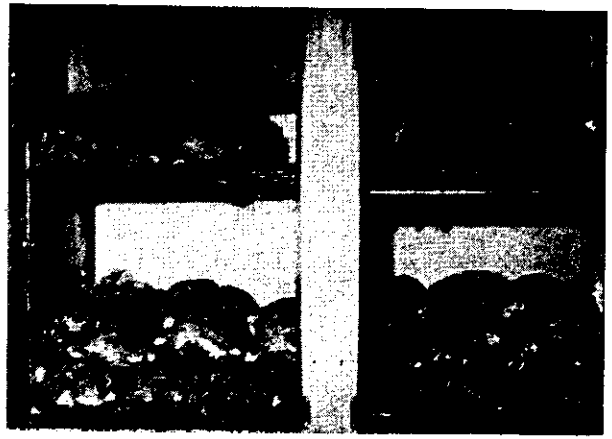
3 Management is a direct cost of production for farms operated by a hired manager. If managed by the owner, he is entitled to the same salary for his managerial work.

11 piasters per egg, including the cost of management.

Some leaders in the poultry industry in Lebanon consider that farms with 3000 layers are too small to carry the expense of a full-time manager. They suggest that for low cost of production, the management should be done by a working farmer assisted by a well trained and carefully supervised worker, with an additional worker or two on the largest farms.

COSTS AND RETURNS FROM PRODUCING BROILERS IN LEBANON

Data collected from 14 commercial broiler farms for the period April 1960 through March 1961 indicate that the average cost of producing a broiler weighing a kilogram live weight was about L.L. 2.05. The cost in the spring of 1962 dropped to around L.L. 1.95 due to lower cost of chicks and feed. The data in Table 27 show that in 1961 the cost of producing broilers averaging 1,032 grams at 7.84 weeks was L.L. 2.01 on large farms marketing 2,488 birds per week. On the other hand, the cost was L.L. 2.13 for broilers weighing 976 grams at 7.25 weeks on small farms selling an average of 633 birds weekly. The medium size farms showed intermediate costs amounting to L.L. 2.07 per bird.



Dressed Broilers with Head and Feet (Upper Shelf)
Packaged Broilers Ready-to-Cook (Lower Shelf)
Kept In A Refrigerator Until Sold

The data presented in Table 27 are on the basis of one broiler because this is the way that many poultry farms think of the cost of production, namely, "How much does it cost to produce a broiler?" However, most broilers are sold for a price per kilogram, either alive or dressed. Since returns are generally on a kilogram basis, cost figures are so presented in Table 29. The costs per kilogram were higher for the small and medium size farms because the broilers they sold weighed less than a kilogram. Conversely, the costs per kilogram are less for the average and large size farms, because their birds weighed more than a kilogram when marketed.

These cost figures are approximations and not actual costs. As stated before, farms did not maintain accounts of receipts and expenditures. Consequently, it was necessary for the interviewer to ask questions to assist the manager of each farm to recall the amounts of money he had spent for the various items. It was apparent that very few broiler producers had realistic ideas regarding the extent of their costs. Some managers gave figures for the amount of feed consumed by their chickens during the previous months which were either about two thirds of the amount required or up to 50 percent above the recognized feed requirements for broilers sold at various ages. Strenuous efforts were made to secure as accurate figures as posible for feed consumption and related costs by revisiting the farms with wide deviations.

Production Costs

Variable Costs

Chicks

Chicks constitute about 25 percent of the cost of producing broiler meat. The farms covered by the study paid from 60 to 72 piasters per chick. Nine paid less than the average price of 62.6 piasters. Most farms purchased straight-run broilers chicks from Lebanese hatcheries. Part of these hatcheries are putting in their incubators eggs from breeding stock that originated in some of the outstanding breeding farms in Europe and America for developing fast growing strains and crosses that convert feed into meat with great efficiency up to live bird weight of 1.75 to 2.0 kilograms. When reared in suitable houses under proper sanitation and ventilation conditions combined with proper management practices, these chicks give very good conversion of high energy feed into meat.

With the recent increase in hatcheries in Lebanon producing quality broiler chicks, the price of such chicks declined from the usual range of 60-65

Table 27

Costs in Producing Broilers Per Bird Started [1], Lebanon, 1960–61

14 Broiler Farms

Size of poultry farm	Average[2]	Small	Medium	Large
Number of farms	14	5	5	4
Range in weekly production		500–999	1,000–1,999	2,000–3,000
Average weekly flock	1,355	670	1,136	2,488
Average number broilers sold weekly	1,269	633	1,058	2,329
Percent mortality[3]	6.37	5.53	6.80	6.40
Av. age at sale, in weeks	7.55	7.25	7.24	7.84
Av. live weight per bird, grams	1,007	976	982	1,032
Av. no. kgs. feed consumed	2.55	2.54	2.46	2.61
Feed conversion, kg. feed to kg. meat	2.52	2.61	2.48	2.53
Items of Cost				
Variable Costs	Piasters	Piasters	Piasters	Piasters
Chick	62.88	62.91	63.35	62.61
Feed	104.62	105.94	103.25	105.02
Labor	9.42	12.51	11.84	6.65
Fuel for brooding	9.27	10.86	11.33	7.00
Electricity	2.15	1.48	3.51	1.59
Litter	1.68	1.3	0.73	2.16
Medicine and vaccine	5.62	5.16	2.73	7.3
Water	0.17	0.15	0.21	0.16
Total direct costs	195.81	200.31	196.95	192.49
Total annual fixed costs[4]	10.97	13.27	2.37	9.40
Total production expenses	206.78	213.58	209.32	201.89
Less, credit for sale of manure plus litter	1.53	0.95	2.42	1.01
Net total costs per bird	205.25	212.63	206.90	200.88

1 Number ordered. Hatcheries generally ship 2 per cent more to allow for deaths in transit to the farm.

2 Average weighted by numbers of broilers produced by the various size farms.

3 Figured on number ordered from hatchery.

4 See Table 30 for itemization.

piasters in 1961 to 50-55 piasters per chick in the spring of 1962. Most of the better managed broiler farms currently pay 55 piasters.

Feed

Feed is the major expense item in producing broilers, averaging around 50-60 percent of the total cost per kilogram of live weight. The cost of the feed to produce a kilogram of live broiler is determined by the number of kilograms consumed and also the price per kilogram of feed. The number of kilograms of feed to produce a kilogram of meat is related not only to the productive quality of the feed but also to the feed conversion capability of the chick, and particularly to the management practices under which the chick grows. Thus, the price is only one factor in determining the cost of the feed per kilogram of broiler meat. Among the farms surveyed, the variations in price paid for feed apparently were largely offset by the different rates of feed conversion for various farms so that there was but little difference in the cost of feed per bird. The differences in feed cost per broiler shown in Table 27 are in direct proportion to the ratio of feed conversion. The higher the number of grams of feed to produce a kilogram of live broiler, the higher the cost of feed per bird.

The farms included in the study paid from 38.2 piasters to47.5 piasters per kilogram for feed. The average price was 41 piasters which declined to around 39 piasters in early 1962. There was no observable relation between the price paid for feed and the cost of feed per kilogram of broilers produced.

Five of the farms fed a local mixed feed while the others bought an imported concentrate and mixed it with ground corn and other cereal grains. The proportion of ground grains added ranged from half to two-thirds. The usual proportions were 40 percent concentrate and 60 percent ground grains. The price paid for concentrate ranged from 58 to 70 piasters per kilogram while the cost of corn was 24 to 26 piasters.

The number of kilograms of feed used to produce a kilogram of live broiler showed wide variation, even within the various age proups. Normally the number of kilograms of feed per kilogram of live broiler increases from 1.80-2.15 at 6 weeks to 2.10-2.40 at 8 weeks of age, and 2.35 - 2.65 at 10 weeks of age. The Lebanese broilers farms from which data were obtained showed conversion ratios from 2.20 at 9 weeks of age to 3.20 at 6 weeks. After careful investigation, revised figures on quantities of feed used brought the

feed conversion figures reasonably close to those to be expected in relation to the kinds of chicks, feed, and management practices on the various farms. Apparently, feed conversion obtained by the 14 farms studied in 1960-61 averaged around 2.4 for broilers marketed at 6 weeks of age to 2.8 for birds slaughtered at 9 weeks. Growth and feed conversion seem to be about normal for the first 3-4 weeks. From then on, the rate of growth slows down and feed conversion increases above normal due to over-crowding and respiratory diseases fostered by poorly ventilated houses and poor management practices. Thus, the feed cost per kilogram of live broiler is materially higher for the average producer than on well managed farms.

The effect of the ratio of feed conversion obtained by the various farms selling their broilers at 7 weeks of age is shown in Table 28. The cost per kilogram of live weight increased from L.L. 2.06 with conversion of 2.40 up to LL 2.20 when the ratio was 2.66. The costs for the ratios 2.51 and 2.54 were distorted and thrown out of line by the live weights being so far below and so far above the average for the 7 weeks age group.

Labor

The cost of labor per broiler raised on the 14 farms surveyed ranged from 6.65 piasters on the large farms to 12.51 piasters per bird on the small farms. It was the one cost item that definitely declined on a per unit basis as the number of birds increased from 4,820 on small farms to 8,120 on medium size farms and to 19,465 in the large broiler plants.

Labor cost per bird is a function of the efficiency quality of the work done in combination with the wage or salary paid. The monthly salaries paid to full-time workers on broiler farms in the winter of 1960-61 varied from L.L. 90 to L.L. 200 with L.L. 125 and L.L. 150 most common. The average monthly salary was L.L. 150. There was no definite relation, however, between the monthly salary paid and the labor cost per bird raised. The labor expense to produce a broiler on one of the farms that paid L.L. 200 per month was 6.46 piasters compared with 7.27 piasters on the farm that paid L.L. 90. The important factors in low labor cost per broiler and per kilogram of meat appeared to be the quality of the management and the work ability of the man. There was a general positive relation between the number of birds cared for per worker and low labor cost. The two farms whose labor cost per bird averaged 5 piasters cared for 6,300 birds per man while the three whose labor cost averaged 19 piasters had one man for each 1,200 broilers. Three farms

that averaged 300,2 birds per worker had average labor cost of 7.40 piasters per bird. Efficient poultrymen consider that their labor cost per bird should not average more than 6 piasters.

The twelve farms that sold part or all of their broilers eviscerated used part of their labor force to do the work of slaughtering, de-feathering, and removing the viscera. On the average for each 1000 broilers prepared for sale as dressed chicken, it required half the time of a full-time worker, plus two part-time workers assisting. Thus, it was necessary to apportion the work time of the permanent workers between production and marketing. The 14 farms averaged 4.1 full-time men, whereas the average number of workers used full-time for taking care of the birds was 3.5. The six-tenths of a full-time man devoted to slaughtering and dressing the broilers was supplemented by part-time workers paid on a daily basis. Girls received L.L. 2.0-2.50 and men up to L.L. 6.00 per day. Usually a team of one man and 2 women can slaughter, pick feathers, eviscerate and prepare for market around 350 broilers per day with the aid of a mechanical feather picker,

The average labor cost for the 12 broiler farmers selling dressed broilers to prepare a kilogram of dressed chicken for market was 6 pisaters, as shown in Table 33. This cost was less for farms that were able to engage women at lower wages. It increased on the larger farms where full-time workers receiving a salary of L.L. 200 per month did the work.

Brooding

Fuel is the principal expense for brooding chicks. It cost 9 piasters per kilogram of live broiler produced on the 14 farms as shown in Table 29. The cost of fuel or heat varied greatly from farm to farm due to several factors. Mazoot fuel oil heating a local-made brooder gave the lowest cost brooding. Bottled liquid petroleum gas was a somewhat more expensive fuel, and electricity the most expensive. Efficient broiler producers using mazoot state that the fuel cost per bird for brooding should not exceed 4.5 piasters.

The cost of brooder fuel per broiler is proportional to the number of weeks the chicks are supplied heat. Farms reported brooding chicks from 2 to 7. The most common practice was 3 weeks. Production specialists recommend extending the heat period to 4 weeks during cold weather. Thus, the cost of brooding a broiler is about a third higher in winter than in summer.

Table 28

Relation of Feed Conversion to Cost Per Kilogram of Live Broilers at 7 Weeks of Age, 1960–61

Live Weight and Feed Consumption Reported by 5 Farms

Live weight in grams	925	950	800	1,060	900
Grams of feed consumed	2,220	2,360	2,010	2,692	2,394
Feed conversion	2.40	2.48	2.51	2.54	2.66

	Cost Per Broiler				
	Piasters	Piasters	Piasters	Piasters	Piasters
Cost of chick at 60 pts.	60.00	60.00	60.00	60.00	60.00
Cost of feed at 41 pts.	91.02	96.76	82.41	110.37	98.15
Labor and other direct and overhead costs	39.28	39.28	39.28	39.28	39.28
Total cost per broiler	190.30	196.04	181.69	209.65	197.43
Cost per kilogram live weight	205.73	206.35	227.11	197.78	219.37

Electricity

Electricity makes up a small part of the cost in producing broilers, amounting to 2.15 piasters per bird for the average farm. There is considerable variation in the cost for various farms due to difference in the amount used and the price per kilowatt hour. Better managed farms figure the cost of electricity at 1 piaster per broiler raised.

It is important to keep low wattage bulbs giving a dim light in broiler houses during darkness in order to avoid losses arising from smothering of the birds. Strange noises have caused birds in dark houses to become frightened so that they piled up in a mass in a corner and many smothered to death.

Some broiler farms away from electric power lines maintained their own generators at considerable expense. Their cost for electricity was unduly high. Likewise, electricity bills go up on poultry farms which use an electric motor for the grinding machine in the preparation of feed.

Litter

Litter for the floor of the broiler house is another necessary expense. The litter absorbs the moisture from the manure excreted by the chickens, helps to keep the floor dry, and reduces trouble from internal parasites and coccidiosis. It costs the average broiler farm 1.56 piasters per kilogram of live broiler produced. Tables 27 and 29 indicate that this expense was virtually offset by the sale of the litter plus the accumulated manure when a pen was cleared after a brood had been marketed, and the place was being prepared for another lot of chicks. Most broiler farmers do not consider litter a cost of production because it is covered by the receipts from litter plus manure.

Medicine and Vaccines

Control and prevention of diseases involve the broiler producer in substantial expense. Table 29 shows these items amounting to 5.46 piasters per kilogram of live broiler. Well managed farms calculate the cost at 4 piasters per bird. Considerable variation existed among the farms according to the disease problems they experienced. The prevalence of Newcastle in Lebanon makes it standard practice to immunize each brood of broilers twice at a cost of 2.4 piasters per chick. Generally producers use other medicants to combat coryza and chronic respiratory diseases. These add to the cost. The farms with well ventilated houses and following recommended management practices had lower medicine expenses.

Table 29
Costs In Producing Broilers Per Kilogram Live Weight, 1960 – 61
14 Broiler Farms

	Average	Small	Medium	Large
Number of farms	14	5	5	4
Range in weekly production		500–999	1,000–1,999	2,000–3,000
Average weekly flocks	1,355	670	1,136	2,488
Items of Cost	Piasters	Piasters	Piasters	Piasters
Variable Costs				
Chick	62.44	64 46	64.51	60.93
Feed	103.89	108.54	105.14	101.76
Labor	9 25	12.81	12.06	6.14
Fuel for brooding	8.97	11.13	11.54	6.78
Electricity	2.14	1.52	3.57	1.54
Litter	1.56	1.38	0.74	2.09
Medicine and vaccines	5.46	5.29	2.78	7 09
Water	0.17	0.15 +	0.21 +	0.16 –
Total direct costs	193.88	205.28	200.55	186.79
Total annual fixed costs[1]	10.89	13.66	12.59	9.13
Total production expenses	204.77	218.94	213.14	195.92
Less, credit for sales of manure and litter	1.52	0.98	2.46	0.98
Net total costs per kilogram live weight	203.25	217.96	210.68	194.94

[1] See Table 31 for itemization.

Water

Although a minor item of expense, every broiler farm has to supply ample, fresh, clean water to the birds. The farms with the above average cost of water in Table 27 had either to pay more for the water purchased from the municipality or for operating their own well with its pump and piping system.

Annual Fixed Costs

The calculation of annual fixed costs is shown on a broiler basis in Table 30 and on a kilogram basis in Table 31. Very few poultry farmers realize that depreciation, insurance, interest and tax on buildings are really parts of their costs of production. Since they constitute 5 to 7 percent of total costs, these items have to be recovered from sales returns or the producer will find himself bankrupt and unable to continue his operations when his buildings and equipment have to be replaced.

Since most buildings constructed specifically for broiler production will be quite worn out at the end of 25 years, they are depreciated at 4 percent annually. Equipment has an average life span of 8 to 10 years. Its depreciation is charged at 12 percent. Repairs are assessed at 1 percent annually on buildings and at 2 percent for equipment because the producers interviewed had no records of their repair bills. These rates correspond with farm management practice in the United States when exact repair costs are not obtainable.

While most poultry farmers do not have their buildings and equipment insured against fire, this is a usual expense which should be recovered from the sale of broilers. Even though the tax on buildings is not always paid, it is usual to include real estate taxes in the cost of production.

Interest is calculated at 7 precent as a rough average of rates commonly paid by farmers ranging from 5.5 percent charged by the Credit Bank for Agriculture, Industry, and Real Estate and the 8–9 percent rate commonly paid by business men who also own poultry farms. Interest is charged on the reported cost of land for an area about double the area of the poultry houses. Buildings and equipment were listed at the cost supplied by the various owners. Operating capital included the cost of all the chicks on the farm plus one twelfth of the total operating expenses for the year. This amount was taken as the average sum used in carrying on the operation pending collection of the money for broilers sold.

Table 30

Annual Fixed Costs of Producing Broilers Per Bird Started[1], 1960–61

14 Broiler Farms

Size of poultry farm	Average[2]	Small	Medium	Large
Number of farms		5	5	4
Range in weekly production		500–999	1,000–1,999	2,000–3,000
Average no. broilers per farm per year	70,500	34,840	59,060	129,375
Average no. of broilers on a farm	10,180	4,820	8,120	19,465
Items of annual fixed costs	Lebanese Piasters	Lebanese Piasters	Lebanese Piasters	Lebanese Piasters
Depreciation of:				
Buildings at 4%	2.55	2.55	2.70	2.48
Production equipment at 12 %	.77	0.90	1.00	0.60
Total depreciation charges	3.32	3.45	3.70	3.08
Insurance on bldg. and equipment at L.L. 1.50 per L.L. 1000 of value	0.11	0.11	0.11	0.10
Interest at 7% on investment[3] in:				
Land	1.64	3.80	2.20	0.60
Buildings	4.48	4.50	4.70	4.36
Production equipment	0.45	0.52	0.58	0.35
Operating capital	0.03	0.05	0.03	0.03
Total interest cost	6.60	8.87	7.51	5.34
Repairs to :				
Buildings at 1%	0.64	0.64	0·67	0.62
Production equipment at 2 %	0.13	0.15	0.17	0.10
Total annual repair charges	0.77	0.79	0.84	0.72
Taxes on buildings L.L. 125 per 1000M²	0.17	0.15	0.21	0.16
Total annual fixed costs	10.97	13.27	12.37	9.40

1 Number ordered from hatchery.

2 Average weighted by number of broilers produced by the various size farms.

3 See Table 49 for itemization.

Table 31

Annual Fixed Costs of Producing Broilers Per Kilogram Live Weight, 1960–61

14 Broiler Farms

Size of poultry farm	Average	Small	Medium	Large
Number of farms		5	5	4
Range in weekly production		500–999	1,000–1,999	2,000–3,000
Average live weight in grams	1,006	924	982	1,032
Items of annual fixed costs	Piasters	Piasters	Piasters	Piasters
Depreciation of:				
Buildings at 4%	2.53	2.61	2.75	2.40
Production equiqment at 12%	0.77	0.92	1.01	0.59
Total depreciation charges	3.30	3.53	3.76	2.99
Insurance on bldg and equipment at L.L. 1.50 per L.L. 1000 of value	0.10	0.11	0.12	0.10
Interest at 7% on investment in:				
Land	1.63	3.89	2.24	0.58
Buildings	4.45	4.61	4.79	4.22
Production equipment	0.44	0.53	0.59	0.34
Operating capital	0.03	0.04	0.03	0.03
Total interest cost	6.55	9.07	7.65	5.17
Repairs to:				
Buildings at 1%	0.64	0.66	0.68	0.60
Production equipment at 2%	0.13	0.15	0.17	0 10
Total annual repair charges	0.77	0.81	0.85	0.70
Taxes on buildings L.L. 125 per 1000 M²	0.17	0.14	0.21	0.17
Total fixed costs	10.89	13.66	12.59	9.13

[1] Derived from the data in Table 30 by dividing the fixed costs per bird by the average weight of a live bird produced by each size of farm.

Table 32

Cost Per Bird for Dressing and Marketing Broilers, 1960–61

12 Broiler Farms

	Average[1] 12 Farms	Small 3 Farms	Medium 5 Farms	Large 4 Farms
Av. number of birds sold weekly	1,743	487	1,058	2,329
Av. age at slaughter, weeks	7.59	7.25	7.24	7.84
Av. live weight in grams	1.007	976	982	1,032
Items of Cost	Piasters	Piasters	Piasters	Piasters
Variable Costs:				
Labor	4.21	3.72	3.77	5.21
Bags and supplies	4.20	3.70	4.34	4.28
Transportation	5.92	5.52	5.32	6.36
Total variable costs	14.33	12.94	13.43	15.85
Annual Fixed Costs:				
Depreciation of equipment at 12%	0.324	0.346	0.382	0.292
Insurance on equipment[2]	0.004	0.004	0.004	0.003
Interest on investment in eqpt. at 7%	0.189	0.202	0.223	0.171
Repairs to equipment at 2% of cost	0.054	0.058	0.064	0.049
Total fixed costs	0.571	0.610	0.673	0.515
Total marketing costs	14.901	13.550	14.103	16.365

[1] Average weighted by the number of farms in each size group.

[2] LL 1.50 per LL 1000 of value.

Table 33.
Costs of Dressing and Marketing Broilers Per Kilogram of Dressed Weight, 1960–61
12 Broiler Farms

	Average[1] 12 Farms	Small 3 Farms	Medium 5 Farms	Large 4 Farms
Av. no. birds sold weekly	1,743	487	1,058	2,329
Av. age at slaughter, weeks	7.59	7.25	7.24	7.84
Av. live weight in grams	1,007	976	982	1,032
Av. dressed weight in grams	752	670	738	788
Items of Cost	Piasters	Piasters	Piasters	Piasters
Variable Costs:				
Labor	6.02	5.55	5.11	6.61
Bags and supplies	5.50	5.52	5.88	5.43
Transportation	7.89	8.24	7.21	8.07
Total variable costs	19.41	19.31	18.20	20.11
Annual Fixed Costs:				
Depreciation of equipment at 12%	0.431	0.516	0.518	0.371
Insurance on equipment[2]	0·005	0.006	0.006	0.004
Interest on investment in eqpt. at 7%	0.251	0.302	0.302	0.217
Repairs to equipment at 2% of cost	0.072	0.087	0.087	0.062
Total fixed costs	0.759	0.911	0.913	0.654
Total marketing costs	20.269	20.221	19.113	20.764

1 Average weighted by numbers of broilers sold by various size farms.

2 L.L. per L.L. 1000 of value of equipment.

Fixed costs were abnormally high for the small and medium size farms because of the high cost of their land, buildings, and equipment. They had excessive cost for buildings, some of which apparently were built of stone so they could be used for homes by the owners in case broiler production proved unprofitable.

Marketing Costs and Returns

The net returns which commercial broiler farms obtain and from which they cover their costs depend upon the prices at which the output is sold and the costs incurred in marketing the products.

Dressing and Marketing

Twelve of the farms studied sold part or all of their broilers in dressed form. The costs for killing, removing the feathers and entrails, bagging, and delivering to customers are shown on a per broiler basis in Table 32, and per kilogram of dressed weight in Table 33. Higher marketing costs for the large farms were attributable to using high wage regular workers to do most of the slaughtering and eviscerating, and to expensive delivery trucks. These costs were moderated on a kilogram basis by the heavier weight of the broilers marketed.

Returns from Sales of Broilers

Nearly 90 percent of the broilers raised on the farms surveyed were sold eviscerated because of the higher returns realized compared with selling alive. Only two of the smaller size farms disposed of their entire output alive and one sold at a premium of 25 piasters above the prevailing price. The other two farms, which sold part of their broilers alive, obtained premium prices. The average price netted for live broilers by the 4 farms was L.L. 2.37 compared with the usual market price of L.L. 2.25. Monthly prices of live and eviscerated broilers for 1960 – 61 are listed in Table 34.

The prices at which the farms sold dressed broilers during 1960 – 61 are shown in Table 35. Eviscerated broilers sold with head and feet brought an average of L.L. 3.38. There was considerable variation in the prices obtained by the various farms for the dressed birds, both those with head and feet and those sold ready – to – cook. The latter brought an average of L.L. 3.79 per kilogram. Comparison of these prices with the market for live birds, after deducting the cost of dressing and delivering to customers and allowing for shrinkage in weight, indicates that there was a net gain of 11 to 37 piasters

Table 34

Monthly Prices to Producers for Eggs and Broilers in Beirut, 1960–1961

Month	Table Eggs	Live Broilers	Eviscerated Dressed Broilers with Head and Feet
1960	Piasters Per Egg[1]	Leb. Pounds Per Kilogram	Leb. Pounds Per Kilogram
January	11.5 –12.0	2.25–2.50	3.25–3.50
February	10.5 –11.0	2.25–2.50	3.25–3.50
March	10.5 –11.0	2.25–2.50	3.25–3.50
April	10.0 –10.5	2.25–2.50	3.00–3.25
May	10.0 –10.5	2.25–2.50	3.00–3.25
June	9.5 –10.5	2.25–2.50	3.00–3.25
July	10.0 –10.5	2.25–2.50	3.00–3.25
August	10.5 –11.0	2.25–2.50	3.00 3.25
September	10.5 –11.5	2.25–2.50	3.00–3.25
October	11.5 –12.5	2.25–2.50	3.00–3.25
November	11.5 –12.5	2.20–2.35	3.00–3.25
December	11.5 –12.5	2.10–2.25	3.10–3.25
Year av.	10.6 –11.3	2.23–2.47	3.07–3.31
1961			
January	12.5 –13.0	2.10–2.25	3.10–3.25
February	12.25–12.75	2.10–2.25	3.10–3.25
March	12.0 –12.5	2.10–2.25	3.10–3.25
April	12.0 –12.5	2.10–2.25	3.10–3.25
May	10.5 –11.5	2.10–2.25	3.00–3.10
June	9.5 –10.5	1.90–2.10	2.80–3.00
July	9.5 –10.5	1.90–2.10	2.70–2.90
August	11.5 –12.0	1.00–2.00	2.70–2.90
September	12.0 –12.5	1.70–1.75	2.65–2.80
October	12.5 –13.0	1.60–1.75	2.60–2.75
November	12.5 –13.0	1.60–1.75	2.60–2.75
December	12.5 –13.0	1.90–2.00	2.60–2.70
Year av.	11.6 –12.3	1.90–2.06	2.84–2.99

[1] Prices paid by wholesalers in Beirut, as collected by Antoine Sayegh of the Ministry of Agriculture.

Table 35

Returns from Sales of Broilers by Commercial Poultry Farms, 1960–1961

14 Broiler Farms

	Average	Small	Medium	Large
Number of farms	14	5	5	4
Number selling live broilers	4	3	1	0
Number selling dressed meat	12	3	5	4
Number birds sold live	24,250[1]	88,650	8,363	0
Number of kilograms sold live	24,910[1]	90,464	9,200	0
Average price per kilogram	LL 2.37	LL 2.39	LL 2.65	0
Kg. sold eviscerated, with head and feet[2]	34,570	25,220	135,378	254,280
Average price per kilogram	LL 3.38	LL 3.37	LL 3.55	LL 3.28
No. kg. sold eviscerated, ready-to-cook[3]	17,740	25,708	60,356	127,296
Average price per kilogram	LL 3.79	LL 3.46	LL 3.80	LL 3.85
Average price per kilogram for dressed broilers	LL 3.51	LL 3.42	LL 3.63	LL 3.47
Less, cost of marketing, including shrinkage	LL .98	LL 1.06	LL 1.01	22 .96
Equivalent price for live broilers	LL 2.52	LL 2.36	LL 2.62	22 2.51
Usual market price for live broilers	LL 2.25	LL 2.25	2.25	2.25
Gain from selling dressed broilers	.28	.11	.37	.26

[1] For farms selling live broilers.

[2] Shrinkage from live weight is 20 percent.

[3] Shrinkage from live weight is 32 percent.

per kilogram by marketing broilers dressed. The gain amounted to 33 piasters, on the average, when the birds were sold with the head and feet and 22 piasters when sold ready – to – cook. This implies that most consumers buy the lowest priced product even though the net cost per gram of edible meat is higher.

COMPARATIVE COSTS IN COMPETING COUNTRIES

Imports of eggs and broilers exert a substantial influence on the prices of these poultry products in Lebanon. The influence of imports is greater in the case of eggs since 25 percent of annual consumption of large size quality eggs is imported. Imports of dressed broilers, on the other hand, are about 10 percent of domestic consumption. In view of the influence which imports have on prices of eggs and broilers, it was considered important to look into the costs of producing these products in the chief countries shipping them to Lebanon in order to evaluate their probable influence upon prices in the future.

Egg Production Costs

Egg production costs in Denmark, Holland, and the United States are here studied because they offer substantial competition to the quality eggs produced by Lebanese commercial poultry farms. Danish eggs are imported into Lebanon in substantial volume while eggs from Holland and the United States compete with Lebanese eggs in Saudi Arabia and Persian Gulf countries.

Denmark

Danish eggs generally are of good quality. As part of the stabilization program to maintain domestic prices at levels profitable for Danish farmers, prices for sales abroad are often lowered to dispose of whatever volume cannot be sold in the country at the desired figure. Table 36 gives the cost of producing eggs in Denmark in 1960. It indicates that cost per egg is somewhat lower than in Lebanon although the cost per layer per year is about the same. The main reason for this is the larger number of eggs laid per pullet during the year, ranging from an average of 207 on ordinary farms up to 236 on superior farms. These outputs compare with 183 to 200 for Lebanese egg farms.

Holland

Table 36 shows that production costs in Holland average about the same as in Lebanon when the allowance for management is deducted. The cost per

Table 36
Costs of Producing Eggs on Commercial Poultry Farms in Denmark and Holland
Costs Per Layer for One Year

	Denmark, 1960[1]			Holland[2]				
	Superior	Ordinary		1957–58		1958–59		1959–60
Number eggs per layer	236	207		205		200		205
Items of Cost:	Leb. Pounds	Leb. Pounds	Leb. Pounds		Leb. Pounds		Leb. Pounds	
Chicks for rearing layer	5.28[3]	5.18[3]	1.18		1.08		1.10	
Feed for rearing layer replacement	10.41	10.91	17.43		16.73		16.86	
Labor	3.72[4]	3.72	5.38		5.16		4.57	
Management by farmer			1.20		0.74		0.68	
Miscellaneous			0.77		0.67		0.70	
Depreciation of buildings, equipment and facilities	1.44	1.44	1.21		1.11		1.08	
Interest on investment			0.35		0.34		0.34	
Total costs for year	20.85	21.25	27.52		25.83		25.33	
Less, misc. receipts from cockerels and hens,	2.82	2.71	2.81		2.85		2.90	
Litter plus manure			0.14		0.14		0.15	
Total misc. receipts	2.82	2.71	2.95		2.99		3.05	
Total net cost per layer	18.03	18.54	24.57		22.84		22.28	
Net cost of production per egg	7.64 pts.	8.96 pts.	12.00 pts.		11.4 pts		10.9 pts.	

1 Unpublished data supplied by the Ministry of Agriculture of Denmark.
2 Unpublished data supplied by Bureau Programmering En Statistische Documentatie, Ministerie Van Lanbbouw En Visserij, February 22, 1961.
3 Includes miscellaneous costs of rearing the replacement pullet.
4 Superior producers obtained an additional return of Leb. pounds 3.33 per layer due to lower cost per egg and sale of the larger number of eggs.

Table 37

Wholesale Price Per Egg, Producer Price of Eggs and Feed in New York, 1960–1961

Month	Wholesale Price of Large Eggs in N.Y. City[1]		Producers Price in New York State[2]		Price of All-Mash Layer Feed[3]	
	1961	1960	1961	1960	1961	1960
	Piasters Per Egg		Piasters Per Egg		Piasters Per Kilogram	
January	11.17	8.07	9.75	7.00	23.0	23.9
February	11.51	7.91	10.25	7.00	23.0	23.9
March	10.23	10.39	9.00	9.25	24.2	23.9
April	9.15	10.77	8.00	9.75	24.2	23.9
May	8.71	9 07	7.25	8.00	25.0	22.9
June	9.43	9.28	7.75	7.75	24.9	26.1
July	10.69	9.92	8.75	8.50	24.1	23.1
August	11.52	11.91	8.75	9.75	24.1	23.1
September	12.43	13.81	9.00	11.25	24.1	23.1
October	11.55	13.89	8.75	11.75	23.0	22.9
November	11.40	14.74	8.75	12.50	23.4	22.2
December	10.57	13.61	8.50	11.50	23.2	22.2
Year av.	10.69	11.12	8.71	9.50	23.9	23.4

1 Reported by the United States Department of Agriculture.

2 Average price paid to members of Cooperative G-L-F Exchange for all eggs delivered.

3 Average price charged farmers by Cooperative G-L-F Exchange.

egg during 1960, omitting management, was 10.2 piasters compared with 10.3 piasters here.

United States

Although eggs from the United States are not imported into Lebanon, they do compete with Lebanese eggs in Saudi Arabia and the Persian Gulf countries. Export prices are indicated by the prices of large white eggs in New York given in Table 37. The price at commercial poultry farms is 1 to 2 piasters less per egg. As shown in the table, egg producers in New York received in 1961 lower prices than did their counterparts in Lebanon. Feed in New York averaged 23–24 piasters per kilogram during 1960–61 compared with 31–34 piasters in Lebanon. Feed prices have been more favorable to egg producers after 1955 than they were previously. The average egg-feed ration (number of pounds of poultry ration equal in value to one dozen eggs) for the years 1956–1960 was 10.56 compered with 10.38 for the years 1950–55. The ratio for 1961 was 10.5. In spite of the favorable comparison with feed prices, increases in wages of labor and other costs have absorbed a larger part of the sales income so that the returns for management of an egg farm have decreased.

About 70 percent of the egg-type chicks bought are sexed pullets. Even though these sell at 2.5 to 3.5 times the price of broiler chicks, they are more economical than mixed sex chicks. This is because with the low prices for broilers, cockerels of egg breeds raised to broiler size generally do not bring enough to pay for the feed. Despite their higher costs, pullet chicks of higher laying strains are advantageous because of the larger number of eggs they produce during the year. The increase in number of eggs laid per layer since 1950 resulting from the use of these higher producing strains is indicated by the figures in Table 38 for egg farms on the Pacific Coast, the North Atlantic Coast, and the United States as a whole.

Table 38

Number of Eggs Laid Per Layer Per Year, 1950–1960

Year	Pacific Coast	N. Atlantic Coast	United States
1950	197	189	174
1955	211	199	192
1960	229	211	209

Source: U.S. Department of Agriculture, Supplement to Statistical Bulletin 249, 1960.

The increasingly higher production per bird has helped efficient producers to continue in business in the face of declining egg prices. The combination of layers bred for higher production and efficient converison of feed into eggs, plus more nutritious feed, has led to a substantial reduction in the amount of feed required to produce an egg, as shown by the following data.

Table 39

Number of Eggs Laid Per Year and Grams of Feed Per Egg in Sacramento County, California, Egg Cost Study, 1940–59

Year	Egg Production Per Layer	Grams Feed Per Egg
1940	176	311
1945	178	311
1950	184	284
1955	210	269
1959	212	235

Comparative figures for costs of producing eggs in Lebanon and in Arkansas, California, and New York are shown in Tables 40 and 41. California and New York have many large scale flocks in the 5,500 to 7,500 layer category while Arkansas flocks average about the same size as in Lebanon.

The cost of production per egg in Lebanon falls within the range of costs in the United States shown in Table 42. Higher costs for certain items are largely offset by lower expenses in other things. Higher feed cost here is partly offset by lower wage rates while greater fixed expenses are counterbalanced by smaller depreciation of layers.

Layers

Sexed chicks are more expensive than in the United States but the higher cost is offset in Lebanon by the greater returns from the sale of old hens at the end of the year. Thus, the depreciation per layer is less.

Feed Cost per Layer and per Egg

The annual feed cost per layer in Lebanon and United States was not very different for the years 1957-1961, ranging between LL 11.04 and LL 11.78 as shown in Table 42. California and New York use strains of birds of heavier

Table 40

Comparison of Cost of Producing Eggs in California, U.S., and Lebanon, 1961

Annual Cost Per Layer[1]

Items of Cost	California, U.S.[2] Average – 5,500 layers Cost Per Layer		Lebanon, 22 Farms Average — 1565 layers, Cost Per Layer	
		Leb. Pounds		Leb. Pounds
Variable Costs :				
Pullet chicks	1¼ sexed at 90 pts.[3]	1.12	2½ mixed sexes at 70 pts.	1.75
Feed for chicks	11 kg. at 24 pts.	2.64	11 kg. at 31 pts.	3.41
Feed for the layer	46 kg. at 24 pts.	11.04	38 kg. at 31 pts.	11.78
Labor	1 hour at 450 pts.	4.50	L.L. 150 per month	2.17
Medicine, litter, brooder fuel, lights, etc		1.50		1.18
Total variable costs		20.80		20.29
Annual Fixed Costs:				
Depreciation of buildings and equipment		1.20	Bldgs. at 4%; Eqpt. at 12%	.65
Interest on investment.[4]	6%	1.73	7%	2.00
Total fixed costs		2.93		2.65
Total cost per layer		23.73		22.94
Less, receipts from sale of culled bird		1.00	Plus cockerels, litter and manure	5.93
Net cost per layer		22.75		17.01
Net cost per egg (243 eggs per year)		9.35 pts.	(183 eggs per year)	pts. 9.30[5]

1 Costs, other than chicks and feed, include the costs of rearing replacement pullets to six months of age.

2 Based on figures given in "If You Want An Egg Ranch", A.D. Read. Agricultural Extension Service. Leaflet 8. Revised, 1956. University of California.

3 1961 prices.

4 See Table 43 for itemization of investment.

5 Omitting cost of management of 1.25 pts. per egg.

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Table 41

Cost of Producing Eggs on Commercial Poultry Farms in Arkansas and New York, U.S., 1957–1959

Annual Costs Per Layer[1]

	Arkansas, 1957[2] 52 Flocks, Av. 1,560 Layers			New York, 1958–59[3] 53 Farms, Av. 7,482 Layers		
	Quantity	Price	Leb. Pounds	Quantity	Price	Leb. Pounds
Variable Costs						
Feed: Mash	39.37 kg.	27.0 pts.	10.63	45.86 kg.	24.35 pts.	11.17
Grain	1.60 kg.	25.3 pts.	0.41			
Shell and grit	.39 kg.	10.6 pts.	0 04			
Medicines, electricity, supplies, repairs, taxes, misc.			0.26			0.63
Cooling and hauling to market			0.83			0.57
Labor	1.3 hrs.	LL 1.76	2.28	0.85 hrs	LL 3.78	3.21
Total variable costs			14.45			15.58
Annual Fixed Costs						
Depreciation:						1.86[4]
Building and equipment			0.53			
Flock	Cost minus sales		3.19	16% mortality; cost minus sales		3.72
Interest on investment		6%	0.46	5%		·63
Total fixed costs			4.18			6.21
Total costs			18.63			21.79
Less credit for manure			0.19	(Not reported)		--
Net cost per layer			18.44			21.79
Net cost per egg	(222 eggs per year)		8.3 pts.	(209 eggs per year)		10.4 pts.

1 Cost of management not included.

2 E.B. Smith and J.H. White, Producing Table Eggs in Arkansas, Arkansas Farm Research, Vol. VIII, No. 6, Nov.- Dec., 1959.

3 M.G. Pincock, An Economic Study of Poultry Management and Egg Marketing Systems, Cornell University Agricultural Experiment Station, Bulletin 967, 1961.

weight which require more feed. The higher feed bill per layer in Lebanon is due to the price being about 10 piasters higher per kilogram.

The other big factors in the high feed cost per egg are the waste of feed through careless filling of the hoppers and the lower rate of lay per bird, namely, 170–200 eggs per year vs. 200–243. Consumption per bird here is about 1.5 kilograms more than is required to supply the nutrients for the number of eggs produced. This raises the annual feed cost by about 50 piasters per layer.

Labor Cost

The cost of the labor per egg is less in Lebanon than in California and New York. Wage rates are lower in Arkansas than in these states where large scale egg farms are common, so that with the high production per bird the labor cost per egg is lower than in Lebanon even though the hourly rate of pay is much higher.

Fixed Costs

Fixed costs per egg are higher here than in the United States because of the higher interest rate, averaging about 7 percent compared with 5–6 percent.

Table 43 shows that the total investment per bird is about the same but the distribution in Lebanon among the various items is low in the kinds of equipment which contribute to reducing the over-all cost of production. California producers have found it profitable to increase the investment in buildings to provide efficient ventilation to keep down moisture and thus reduce the occurrence of diseases, while fogging-cooling equipment has been installed to increase egg production during hot weather. Automatic feeders and waterers, though costing more, make it possible for one man to care for a much larger number of birds. Thus, they reduce labor cost per egg below what it would be with ordinary types of equipment.

Broiler Production Costs

The principal exporters of frozen broilers to the Middle East are Denmark, Hungary, Poland, United States and Yugoslavia. These countries compete with Lebanese producers in the Persian Gulf countries as well as in the domestic market. Most poultry meat in Denmark is produced as a side-line

Table 42.

Costs of Production Per Egg in Lebanon and the United States

	Lebanon	Arkansas[1]	California[1]	New York[1]
	1961	1957	1960	1958–59
Feed cost (price per kg.)	31	27	24	24
Amount of feed consumed (kg.)	38	41	46	46
Feed cost per bird at 31 pts. per kg.	11.78	11.07	11.04	11.17
No. of eggs per layer	183	222	243	209
Feed cost per egg (pts.)	6.43	4.99	4.54	5.34
Labor cost per egg	1.17	1.00	1.85	1.54
Fixed costs, depreciation, interest, taxes	1.45	.45	1.20	1.19
Depreciation of layers	.40[2]	1.44	1.14	1.78
Other costs except management	.67	.49	.62	.57
Total costs, other than management	10.12	8.37	9.35	10.42
Miscellaneous credits	.82	.07	.00	.02
Net coat of production per egg	9.30	8.30	9.35	10.40

1 See Tables 40—41 for references

2 Does not include the costs of rearing replacements other than chicks and feed. Other costs included with those for the layers.

Table 43

Comparison of Investment Per Bird on Commercial Egg Farms in California and Lebanon

	California, U.S.[1]		Lebanon	
		Investment Per Bird L. Lebanese		Investment Per Bird L. Lebanese
Land	8–20 dunums for 2000 bird laying flock	1.20	1.5 dunums for 1565 bird laying flock	6.55
Buildings (Includes space for brooding and rearing replacements)	3 layers per M^2	15.60	3.1 layers per M^2	12.00
Equipment, brooders, feeders, waterers, etc.	Automatic feeder and waterers	4.20	Hand-filled feeders	1.40
Layers	Cost of pullets	6.00	Cost of chicks and feed only, other costs omitted	5.80
Replacement pullets	Cost of chicks	.56[2]	Cost of chicks[3]	1.10
Operating capital	1/12 of cash costs L.L. 21	1.75	1/12 of cash cost of L.L. 19	1.70
Total capital investment		29.31		28.55

1 Based on figures given in " If You Want an Egg Ranch", A.D. Reed, Agricultural Service, University of California, Leaflet 8, Revised, 1956.

2 Half the cost of 1 1/4 sexed chicks since investment is for 6 months.

3 Sexed chicks cost L.L. 2.20 for rearing one replacement but the investment is for 6 months while other investment is for 12 months.

enterprise so that costs are difficult to determine. However, the Ministry of Agriculture collected data on the costs of producing broilers during the year 1959–60, which are reported in Table 44. With the farm cost at L.L. 178 per kilogram live weight, the cost of frozen dressed broilers is above L.L. 2. Actually, Denmark's exports are regulated by the program for stabilizing returns to farmers. Hungary, Poland, and Yugoslavia have government controlled and directed economies. Consequently, their exports conform to plans for selling products abroad in order to secure foreign exchange rather than to net profits for the producers.

In as much as Holland sells frozen broilers to the Persian Gulf states and Saudi Arabia, the costs of producing broilers in that country are given in Table 45. They appear to be generally similar to those found in Denmark. The cost per kilogram is nearly 2 piasters less when the birds reach 1200 grams at 9 weeks compared with 1000 grams.

United States is the main exporting country offering broilers on the basis of prices determined by the quantities sent to market by producers seeking profits from production and marketing. A number of cost studies[1] of producing broilers in the United States are available for analysis to ascertain the major factors determining selling prices, and thus the prices of frozen broilers offered to importers in Beirut.

1 See list of references cited in appendix.

Table 44

Costs of Producing Broilers in Denmark, 1959–60[1]
Weight About One Kilogram

Variable Costs	Piasters
Chick	40.32
Feed	97.92
Labor	10.56
Miscellaneous, depreciation, interest, etc.	28.80
Total cost of production	177.60

1 Unpublished data supplied by Ministry of Agriculture.

Table 45

Costs of Producing Broilers in Holland, 1959[1]

Live weight at slaughter	Sold at 9 Weeks of Age	
	1000 Grams	1200 Grams
	Costs Per Kilogram Live Weight	
Variable Costs	Piasters	Piasters
Chick	39.8	32.9
Feed	97.2	92.8
Labor	18.9	15.7
Fuel for brooding	7.4	6.2
Litter	4.6	3.8
Medicines and vaccines	2.8	2.3
Total variable costs	170.7	153.7
Fixed Costs		
Depreciation of:		
Houses	4.6	3.8
Equipment	4.6	3.8
Interest on investment	0.5	0.4
Total fixed costs	9.7	8.0
Total cost per kilogram	180.4	161.7

1 Unpublished data supplied by Bureau Programmering En Statistische Documentatie Ministerie Van Landbouw en Visserij, February 22,1961.

Broiler production in the United States expanded very rapidly during the decade 1950–1960. The number produced increased from 631,185,000 in 1950 to 1,805,000,000 in 1960 and expansion continued in 1961 as shown in Table 46. It is estimated that over 90 percent of its broiler production is financed by dealers who supply feed on a special credit arrangement, or by companies which integrate feed selling with processing dressed broilers, and sometimes with chick hatcheries. Producers prefer contracting with these agencies to grow broilers for their account instead of for themselves. The companies take

Table 46

Production, Prices and Production Efficiency of Broilers in the United States, 1947–1961

Year	Commercial Broilers Raised[1] (Thousands)	Av. Price Received by Farmers[1] Piasters Per Kg.	No. of Days to Reach 3.5 lbs.[2] (1590 gr.)	Pounds of Feed Consumed Per Pound Live Broiler[2]	Broiler Feed Piasters[1] Per Kg.	Broiler Chicks[1] Piasters Per Chick
1947	295,333	213.18	89	N.A.	34.7	43.5
1948	355,785	237.60	84	N.A.	37.2	47.7
1949	487,089	186.12	81	N.A.	32.3	47.7
1950	616,185	180.84	79	3.33	32.7	43.8
1951	791,878	188.10	73	3.12	35.7	46.8
1952	886,036	190.08	74	3.13	38.0	46.5
1953	946,533	178.86	76	2.94	34.8	48.0
1954	1,047,800	152.46	67	2.66	35.0	44.7
1955	1,091,700	166.32	65	2.66	33.0	44.1
1956	1,343,700	129.36	65	2.57	32.7	42.6
1957	1,447,528	124.74	62	2.25	32.3	36.3
1958	1,659,519	121.10	60	2.18	32.8	39.3
1959	1,730,541	106.26	56	2.12	32.0	29.8
1960	1,805,000	111.54	55	2.14	30.5	35.4
1961	1,935,000	93.72	54	2.13	30.6	40.2

[1] Reported by U.S. Department of Agriculture.

[2] Report on broiler tests by State of Maine.

the risk of broiler prices dropping below the cost of the chicks, feed, brooder fuel, vaccines and medicines because of the profit margin they have on the feed. Furthermore, the volume of feed sold to broiler enterprises adds materially to their total volume of business so that the cost of handling each ton of feed decreases. This increases the profits on all kinds of feed sold.

As a result of this system of broiler financing, the output of broilers has tended to outstrip the growth in consumer demand. For periods during the past three years, broiler prices have dropped below the cash costs of the chicks, feed and other purchased items. Farmers over a period of time have received about 1.5–2.5 cents per pound (9.9 to 16.5 piasters per kilogram) of live broiler to cover their labor and overhead costs. The average producer has netted for his labor and management roughly the equivalent of the wages paid to farm laborers.

United States and Lebanon

A very rough calculation of costs of producing broilers in the United States for comparison with costs in Lebanon is given in Table 47. The costs for fuel, electricity, litter, medicines and vaccines, and miscellaneous expenses were obtained from studies made by agricultural economists in state experiment stations from Texas to Maine. The average for 7 states covers the areas which produce commercial broilers for the eastern markets. Since a number of these are southern states with milder climate than Mt. Lebanon and the Bekàa regions these figures have been adjusted to coincide roughly with conditions comparable to Lebanon. The cost prices of chicks and feed used are those reported in Table 48 for the Del-Mar-Va broiler area of the Atlantic coast states of Delaware, Maryland and Virginia which ship many broilers to eastern markets. Prices of feed and broilers in this area are given in Table 48.

Labor costs have been calculated on the basis of the net returns to broiler farmers for their work. Over 90 percent of the broilers in the area supplying the New York market is grown under contracts of the type explained in the preceding section. The farmer is paid either a small sum per broiler delivered to the processing plant, or a combination of fixed payment per kilogram of broilers delivered plus an incentive payment related to low feed conversion.

Since this payment covers not only his labor but also the fixed costs of depreciation of buildings, equipment, interest on his investment, insurance,

Table 47

Comparison of Cost of Production Per Kilogram of Live Broiler in the United States and Lebanon, 1961.

	United States	Lebanon
Av. number of broilers per farm	6,000	10,000
Av. number of broilers per worker	12,000	3,200
Percent mortality	3 - 5	6.5 (3 - 10)
Ave. age when marketed	9 - 10 weeks	7 - 8 weeks
Av. weight in grams when slaughtered	1650 (1360 - 1700)	1000 (800 - 1200)
Av. and usual feed conversion	2.5 (2.45 - 2.65)	2.5 (2.40 - 2.8)

Items of Cost	Price Per Unit	Av. of 7 States [1]	Comparable to Lebanon [2]	Price Per Unit	Cost
Variable Costs		Piasters	Piasters		Piasters
Chick	35 - 40 pts. per chick	25.00	22.00	55.pts per chick	55.00
Feed	29 pts. per kg.	72.50	72.50	39 pts per kg.	97.50
Labor	L.L. 540 per month	3.50	4.00	L.L. 200 per month	9.00
Fuel for brooding		3.16	3.75		9.00
Electricity		0.50	0.65		1.50
Litter		1.56	1.75		1.50
Medicine and vaccines		3.58	3.50		5.00
Miscellaneous		2.18	1.50		0.50
Total variable costs per kilogram		111.98	109.65		179.00
Total fixed costs per kilogram [3]			9.82		11.69
Total costs per kilogram live boiler			119.47		190.69

1 Alabama, Delaware, Louisiana, Maine, Mississippi, Texas, West Virginia.

2 Atlantic coast states from Maine to Virginia.

3 See Table 49 for itemized costs.

Table 48

Monthly Average Prices Per Kilogram of S.S.C. Broiler Feed[1] and of Live Broilers in the Del–Mar–Va Area of U.S., 1960–1961

Month	S.S.C. Broiler Feed[1] (Piasters)		Live Broilers in Del–Mar–Va Area[2] (Piasters)	
	1961	1960	1961	1960
January	29.47	30.07	114.7	120.8
February	30.76	30.01	124.7	120.6
March	30.97	30.14	116.2	123.7
April	31.32	30.69	101.4	116.0
May	31.90	29.81	98.6	120.0
June	30.81	29.02	89.3	119.5
July	30.18	29.19	89.8	124.7
August	29.68	29.09	92.5	114.8
September	28.86	28.46	85.3	110.0
October	28.08	27.73	87.6	106.6
November	28.82	27.98	83.2	108.8
December	28.05	27.83	104.1	103.9
Year Average	29.90	29.17	98.9	115.8

1 Prices quoted by Southern States Cooperative for broiler feed in Seaford, Delaware, U.S.

2 Major broiler producing area in the Atlantic coast of Delaware, Maryland and Virginia which ships many eviscerated broilers to New York. Price reported by the U.S. Department of Agriculture. Broilers weigh 1360—1700 grams when sold at 9—10 weeks of age.

repairs and taxes, it is necessary to deduct these fixed costs to determine return to labor and management. Repairs are included with the fixed costs shown in Table 49 because they are borne by the farmer and are not recorded in the costs generally accounted for by the contractor. Repairs average over a period of years about 1 percent annually for buildings and 2 percent for equipment.

Efficient producers have netted for their labor about 4 piasters per kilogram of live broilers marketed. Each man has to care for a large number of birds to make a modest annual income. Since it has been found by various studies that 6,000 is a typical number of broilers per house, one man has to have at least two such houses if he is devoting full time to broiler production. Many producers care for more than 12,000 birds in their endeavor to obtain a large annual income.

In Table 47 it is indicated that the cost per kilogram of live broiler in 1961 amounted to 191 piasters in Lebanon and 119 piasters in U.S. The primary reasons for the higher cost of production in Lebanon are management and the higher prices for chicks and feed.

Two other important factors are the smaller size at which Lebanese broilers are marketed and the higher feed conversion. As shown in Table 51, the cost per kilogram of live broiler in Lebanon decreases as age increases up to 8 weeks and increases thereafter. Thus, lowest costs are attained by marketing broilers at 8–9 weeks of age, whereas in the United States with better management lowest costs are at 9–10 weeks.

Table 49 points out that annual overhead costs for the use of buildings equipment and operating capital are spread over the total number of birds produced on the farm during the year. Even though the annual fixed costs per bird raised in the United States are higher than in Lebanon, (16.19 piasters vs. 11.69 piasters) the overhead cost per kilogram live broiler is lower (9.82 piasters vs. 11.69 piasters). This is due to broilers being grown 9–10 weeks in United States and only 7–8 weeks in Lebanon. In addition, an United States broiler averages 1665 grams and a Lebanese 1000 grams.

The main reason for the higher fixed costs in Lebanon is the much greater investment per bird in housing. As shown in Table 50, the housing investment per bird was L.L. 4.47 compared with L.L. 2.55 in the United

Table 49

Comparison of Fixed Annual Overhead Costs and Investment for Broiler Production in the United States and Lebanon, 1955–1961

Investment and Fixed Costs Per Bird and Kilogram Live Weight

Annual Fixed Costs	United States, 1955					Lebanon, 1961				
	Investment Per Bird[1] Piasters	Rate Per Year	Piasters Per Bird Capacity	Piasters Per Bird Produced[2] 1650 Gms.	Piasters Per Kg.	Investment Per Bird Piasters	Rate Per Year	Piasters Per Bird Capacity	Piasters Per Bird Produced[3] 1000 Gms.	Piasters Per Kg.
Depreciation:										
Buildings	255	4.65%	11.86	2.97	1.80	447	4%	17.88	2.75	2.75
Equipment	105	10 %	10.50	2.63	59	52	12%	6.24	0.96	0.96
Total depreciation cost			22.36	5.60	3.39			24.12	3.71	3.71
Insurance on buildings and equipment	360	1.1 %	3.96	1.00	0.61	499	.15%	.75	0.12	0.12
Interest on investment in:										
Buildings	255	6%	15.30	3.83	2.32	447	7%	31.29	4.81	4.81
Equipment	105	6%	6.30	1.58	0.96	52	7%	3.64	0.56	0.56
Operating capital	180	6%	10.80	2.70	1.64	135	7%	9.45	1.45	1.45
Total interest cost			32.40	8.11	4.92			44.38	6.82	6.82
Repairs to: Buildings	255	1%	2.55	0.64	0.39	447	1%	4.47	0.69	0.69
Equipment	52	2%	2.10	0.53	0.32	52	2%	1.04	0.16	0.16
Total repair cost			4.65	1.17	0.71			5.51	0.85	0.85
Taxes on buildings and equipment	360	.34%	1.23	.31	.19	12.5 pt. (1/10 M² per) M²		1.25	.19	.19
Total fixed costs per kg.			64.60	16.19	9.82			76.01	11.69	11.69

1 From Maine Agricultural Experiment Station, Bulletin 571, p. 18.

2 Maine producers raise 4 lots of broilers per year.

3 Lebanese producers selling at 7-8 weeks of age raise 6-5 lots per year.

Table 50
Investment in an Average Size Broiler Farm in Lebanon and United States

	Investment in Average Farm		Investment Per Bird		
	Lebanon	Maine, U.S.[1]	Lebanon		Maine
	1960–61	1954–55	Recommended[2]	14 Farms	
Average number of broilers	10,182	11,727			
	Leb. Pounds	Leb. Pounds	Leb. Pounds	Leb. Pounds	Leb. Pounds
House, 10 birds per M^2	45,553	29,907	2.00	4.47	2.55
Brooders	1,925	4,926	.50	.19	.42
Feeders	1,765	2,814	.55	.17	.24
Waterers	1,125	1,056	.25	.11	.09
Other equipment	515	3,519	.30	.05	.30
Total fixed investment	50,883	42,220	3.60	4.99	3.60
Operating capital	13,746	21,110	1.35	1.35	1.80[3]
Total capital used	64,629	63,330	4.95	6.34	5.40

1 R.F. Saunders, Contract Broiler Growing in Maine, Maine Agricultural Experiment Station, Bulletin 571, 1958.

2 Based on recommendations by Dr. Raino K. Lanson, Associate Professor of Poultry Science, AUB Faculty of Agricultural Sciences. Central oil heated hot water brooding system is recommended for farms with 10,000 or more broilers. Adequate numbers of suitable size feeders and waterers for various age birds are recommended for economical production of broilers.

3 Harley Debout, Financing the Production and Marketing of Texas Broilers, Texas Agricultural Experiment Station, Bulletin 849, 1957.

States. On the other hand, properly designed and economically constructed poultry houses have been built in Lebanon for L.L. 20 per M^2, which is equal to L.L. 2 per bird when there are ten birds per M^2.

Factors Affecting The Cost of Producing Broilers

Economic studies of the costs of producing commercial broilers in the United States[1] indicate that several factors have a measurable effect upon the cost per kilogram of live broiler. The more important of these are discussed below. Some of them are interrelated but deserve individual consideration.

Size of Flock

Saunders[2] found that total costs per pound of live broiler decreased by 5 cents per pound as the size of flock increased from under 5,000 to 20,000 and over. The major items of cost which decreased as size of the flock increased were labor, fixed costs for depreciation, insurance, interest, repairs and taxes, and miscellaneous expenses.

Analysis of costs for the 14 farms studied in Lebanon, 1960–61, showed a generally similar effect of size in reducing the cost per kilogram. Farms producing 2,000 and more broilers per week (total of 19,465 or more on the farm) reported less than average cost for chicks, labor, fuel for brooding and annual fixed costs. The medium size farms had lower costs than the small farms only in the category of fixed costs.

Age Marketed

Hansing stated that the records covering 2,920 broiler flocks in Delaware, 1952–55, revealed increasing returns for birds marketed at older ages up to 10 weeks[3]. Costs rose about 1 cent per pound for each week the birds were fed above 10.

In Maine, Saunders reported the same observation. The cost per pound went up when birds were kept from 10.4 to 12.1 weeks[4]. Factors contributing

1 F.D. Hansing, pp. 11-21.
2 Saunders, *op. cit.*, pp. 34-87.
3 Hansing, *op. cit.*, p. 3.
4 Saunders, *op cit.*, p. 38

to the increasing cost with advancing age were more feed per pound of meat, more hours of labor and greater mortality.

The 14 broiler farms in Lebanon studied in 1960–61 showed decreasing cost per kilogram of live broilers as the age for marketing extended from 6 weeks to 9 weeks, as reported in Table 51. The cost per kilogram for 9 weeks old broilers was L.L. 2.12, or 11 piasters less than the L.L.2.23 cost for broilers sold at 6 weeks of age and 2 piasters less than for a 7 week old broiler. The cost at 9 weeks would be substantially lower if growth were normal and feed conversion were around 2.6. Calculations based on the usual higher feed conversion for 10 weeks old broilers indicate that the cost per kilogram would be very little more per kilogram. This is why at the present time in the United States the great majority of broilers are marketed between 9 and 10 weeks of age at average weight of 1650 grams.

The main reason for the cost per kilogram being lowest at 9 to 10 weeks age is the fact that after this age the cost of feed begins to increase faster from week to week than the fixed costs per kilogram of live broiler decrease. As a broiler increases in weight, the fixed costs for the chick, depreciation, insurance, interest and taxes are spread over a larger number of grams of meat. Thus, fixed costs decrease per kilogram as a broiler grows older. The lowest cost per kilogram comes at the point where the increase in feed cost per week just offsets the decrease in fixed costs.

Feed Conversion

The analysis of broiler costs in Delaware and Maine shows that the cost of production increases as the feed conversion ratio goes up. This is because a higher ratio indicates a larger quantity of feed was required to produce a kilogram of broiler.

A high conversion rate is the result of one or more factors operating singly or together.

1. The older a bird gets, the larger is the quantity of feed required to add a kilogram of live weight. Feed conversion goes up more rapidly after a broiler passes the age of 10 weeks.

2. The higher the mortality, the lower is the number of kilograms of broilers marketed from the weight of feed consumed. The cost

Table 51
Cost Per Kilogram of Broilers Sold at Ages 6 to 9 Weeks in Lebanon, 1960–61
14 Commercial Broiler Farms

	6 Weeks	7 Weeks	8 Weeks	9 Weeks	10 Weeks[1]
Age at slaughter	3	5	4	2	0
Number of farms	775	925	1100	1200	1325
Average live weight in grams	1.86	2.32	2.77	3.36	3.98
Kilograms of feed consumed	2.40	2.51	2.52	2.80	3.0
Feed conversion					

	Cost Per Broiler				
	Piasters	Piasters	Piasters	Piasters	Piasters
Chick	62.88	62.88	62.88	62.88	62.88
Feed, at 41 piasters per kg.	76.26	95.12	113.57	137.76	163.18
Labor[2]	8.18	9.42	11.27	13.27	14.55
Other direct costs[3]	16.22	18.89	21.21	25.07	27.58
Fixed overhead costs[4]	9.84	12.07	12.86	15.20	16.70
Total	173.38	198.38	221.79	254.18	284.89

	Cost Per Kilogram of Live Broiler				
	Piasters	Piasters	Piasters	Piasters	Piasters
Chicks, at 62. 88 piasters each	81.13	67.97	57.16	52.40	47.46
Feed, at 41 piasters per kg.	98.15	102.81	103.24	114.80	123.15
Labor[2]	10.55	10.18	10.25	11.06	10.98
Other direct costs[3]	20.93	20.42	19.30	20.90	20.81
Fixed overhead costs[4]	12.70	13.04	11.69	12.67	12.60
Cost per kg. of live weight	223.46	214.42	201.64	211.83	215.00

1 Feed consumption estimated from expected increase over that for 9 weeks.
2 Calculated from annual salary and number of broods reared during the year.
3 Calculated from average of 18.89 piasters for 14 farms at approximately 7 weeks.
4 Calculated from average farm capacity of 10,180 broilers having annual fixed costs of L.L. 8,510. 64.

effect of mortality is more marked when deaths are high during the last few weeks before the birds are sold.

3. Disease in a broiler flock increases the feed conversion ratio. It reduces a chicken's appetite so that less feed is consumed, This slows down the rate of growth with the result that more feed has to go for body maintenance during the longer period of time it takes for the bird to reach marketable weight.

4. Waste of feed increases when feed hoppers are filled more than half full. The higher the level of feed in a feeder, the more the birds pull out with their beaks while eating. Mash falling on the floor is lost in the litter because the birds are unable to pick up the finely ground particles. This kind of loss is reduced by careful partial filling of feeders and the use of pelletted feed. Birds can see the pellets in the litter and eat them from the floor.

The effect of feed conversion upon the cost of producing a kilogram of live broiler in Lebanon is shown in Table 28, which gives data from 5 farms selling broilers at 7 weeks of age. The cost of a kilogram of live broiler amounted to L.L. 2.06 when feed conversion was 2.40 and L.L. 2.20 when feed conversion equalled 2.66.

Mortality

Hansing calculated that 38 percent of the variation in costs of producing broilers in Delaware could be attributed to mortality.[1] When it stayed less than 5 percent, the cost per pound was 1.3 cents less than when mortality ranged from 5 to 9.9 percent. If the percent mortality rose to between 10 and 14.9 percent, the cost per pound of broiler increased by 1.7 cents.

In the Maine study, Saunders found that the cost per pound of live broiler went up six tenths of a cent to 1 cent per pound for each increase in mortality of 2 percent. The cost per pound for flocks with 6 percent and more mortality was 9.3 cents higher than for flocks with mortality under 2 percent. [2]

1 Hansing, *op. cit.*, p. 13.

2 Saunders, *op. cit.*, p. 37.

Connecticut had mortality of less than 2 percent in 1961.[1] This was a factor in its low feed conversion of 2.2. to 2.6 for broilers 9–10 weeks of age.

Analysis of the effect of mortality upon the cost per kilogram of broilers produced in Lebanon in 1960–61 points out that the cost was 9 piasters per kilogram higher for flocks showing 10 percent mortality than for those with 3 percent deaths. Each 1 percent mortality above or below 6 percent increased or decreased the cost per kilogram of live weight by 1.25 piasters.

Labor Efficiency

Saunders in Maine, 1954–55, showed that when the hours of man labor per 1000 birds was 70 and over, the labor cost per pound of broiler was 1.8 cents higher than when less than 30 hours of labor were used. [2] Efficient use of labor is related to the organization and lay-out of the broiler plant, the kind of work–methods, brooding equipment, feeders and waterers used.

In Lebanon in 1960–61, the labor cost per broiler was directly related to the number of broilers cared for per worker. When a laborer looked after 1,090 birds, the cost was 19 piasters per bird. At 5,800 birds per man, the labor cost per broiler dropped to 6.5 piasters, and then to 4.6 piasters at the ratio of 6,750 birds per worker.

Labor cost per kilogram of broiler is higher in Lebanon than in the United States partly on account of the practice of starting a new flock each week in order to have broilers ready for slaughter every week. This requires that each flock be kept in a separate pen, thus slowing the performance of feeding, watering and cleaning due to time consumed in opening and closing doors going from one pen to the next. In the United States, all the houses on the farm are filled with chicks at the same time. Each house is not divided into pens but is one big room through which the farmer can move efficiently in performing the various tasks of caring for the flock.

Season of the Year

In Delaware, the cost per pound for producing broilers was 2 cents less in summer than in winter.[3] Likewise in summer, the mortality rate was

1 Letter from W.A. Abo, January 11, 1962.

2 Saunders, *op. cit.*, p. 37

3 Hansing, *op. cit.*, p 3

nearly one–third lower, fuel cost for brooding was less, and feed conversion better. Similar seasonal influence on production costs appeared in Connecticut. The extension poultryman, W.A. Abo, stated that feed conversion was 2.2-2.3 in the summer and fall as compared with 2.4–2.6 during the winter season. [1]

Lebanese broiler producers reported in 1960–61 higher production cost in the winter due to brooder heat being needed for an extra week. Feed conversion is higher when the birds have to use more energy to keep warm in the colder temperature.

Improvements in Broiler Production in United States

Chicks

The average cost of broiler chicks in the United State ranged between 30 and 40 piasters during the years 1959–1961, as shown in Table 46. In the Del–Mar–Va area along the Atlantic, commercial broiler producers paid an average of 31 piasters per chick in 1961. In New York state, broiler chicks sold for around 35 piasters each in January 1962.

Chick prices vary in different parts of the country and according to quality. Chicks from the faster growing strains and crosses, developed by the farms which have specialized in breeding for efficient meat production, sell for a few cents more than the ordinary quality. The higher quality chicks are economical for broiler farms with superior management that maintain conditions most favorable for rapid chick growth and most efficient conversion of feed into broiler meat.

The development of these superior broiler chicks was stimulated by the "Chicken–of–Tomorrow" contests during the 1940's with substantial awards for faster growing meatier broilers. This encouraged breeders to search for birds that could transmit the desired characteristics. The awards were made on the basis of the conformation of the bird and also according to fast growth, low mortality and greater efficiency in converting feed into meat.

In 1925, Dr. Jull at the University of Maryland[2] crossed Rhode Island

1 Abo, *op. cit.*

2 Journal of Agricultural Research, No. 36, 1928, pp. 541-550.

Reds with Barred Plymouth Rocks to produce faster growing broiler chicks possessing hybrid vigor. He made a new record of 862 grams (mixed sexes) at 10 weeks of age with feed conversion of 3.23. By 1950, Professor Singsen at the University of Connecticut reached broiler weight of 1,362 grams (average of males and females) at 10 weeks.[1] This represented progress in both breeding and poultry nutrition science. Five years later, Dr. Raino K. Lanson, later Associate Professor of Poultry Science, Faculty of Agricultural Sciences, American University of Beirut, had raised the weight to 1,611 grams[2]. Professor Skoglund of New Hampshire attained 1,838 grams at 10 weeks with feed conversion of 2.32[3]. Special broiler chicks in the 1961 Maine Broiler Test exceeded the New Hampshire record by reaching 1,698 grams at 8 weeks but the feed conversion was not so low[4]. These research studies and tests showed what can be attained with chicks specially bred for fast growth and efficient conversion of high energy feed into meat. They established progressive goals which superior farmers have striven to achieve. Thus, they have been vital factors in improving the efficiency of broiler production in the United States.

Similar broiler tests can serve the same purpose in Lebanon. Mr. El Hassany, Ministry of Agriculture Research Station at Terbol, tested in 1961 seven strains of broiler chicks from some of the leading breeders in the United States. At eight weeks of age he had an average live weight of 1340, grams with feed conversion of 2.39[5]. This compares with 1100 to 1150 grams and apparent feed conversion of 2.6 for the ordinary commercial broiler farmer. Mr. El Hassany's results point the way toward more efficient broiler production in Lebanon.

Feed

Commercial broiler producers along the Atlantic coast generally buy their feed delivered in bulk in truck load quantities of around 5 tons. This eliminates the cost of cloth bags and reduces substantially the labor expense for loading and unloading which is done by mechanical conveyors. The feed

1 Department of Poultry Science, University of Connecticut, unpublished data, 1950.

2 Raino K. Lanson, Maine Agricultural Experiment Station, Mimeographed Report, 1955.

3 W.S. Reed and W.C.Skoglund, Growth and Feed Standards for Broilers,1959. Agricultural Experiment Station, University of New Hampshire, Bulletin 466, 1959.

4 State of Maine Broiler Test, Summary of Three Hatches, 1961.

5 Annual Research Report of Terbol Research Station.

is mixed according to formulas recommeded by poultry nutrition scientists on the basis of broiler growing tests for rapid early growth and efficient conversion of feed into meat. High energy feeds have been developed by reducing the fiber content and increasing the proportion of corn and corn substitutes, plus the addition of an optimum economical amount of animal and/or vegetable fat. The large supply cooperatives have worked out formulas for broiler feed to give the lowest cost of feed per pound of live broiler. These feeds yield almost as low feed conversion as the scientfically formulated rations used in broiler tests conducted to determine the meat production performance of broiler chicks developed by various breeding farms.

As the scientists discovered more efficient high energy feeds that gave lower feed conversion, supply cooperatives and commercial feed companies competed to supply broiler farmers with the more productive feeds at lower cost per kilogram. The feed cost per kilogram of live broiler dropped from 123 to 70 piasters, according to the records of producers in Los Angeles County, California. [1]

Feed Conversion

Many of the better managed commercial broiler farms in New England during 1961 showed the same low feed conversion attained by poultry scientists at the University of New Hampshire In 1958–59[2] . The New Hampshire study produced broilers weighing 1620 grams at 9 weeks of age with feed conversion of 2.20. Commercial broiler farms studied in Lebanon in 1960–61 grew birds weighing around 1200–1250 grams at 9 weeks with a probable feed conversion of about 2.70–2.80[3] . The usual Lebanese broiler of approximately 1000 grams at 7–8 weeks appears on ordinary farms to give feed conversion of about 2.5 whereas the New Hampshire standard for a 1000 gram bird is 6–7 weeks with a feed conversion of around 1.90.

The current low feed conversion achieved by commercial broiler producers in United States is the outcome of many years of scientific effort in developing improved, fast growing chicks, more productive feeds, and improved management practices, particularly regarding housing and disease control.

1 Annual reports on broiler production costs by C.A. Salverson, Farm Advisor.

2 Letter from Professor W.C. Skoglund, March 8, 1962.

3 Lebanese broiler farms do not keep records from which actual feed conversion can be calculated

These efforts are reflected in the gains in broiler efficiency shown by the results of annual broiler tests in the State of Maine from 1947 through 1961 as recorded in Table 46.

Management Practices

During the decade between 1951 and 1961 as shown in Table 46, the price per kilogram of live broiler received by commercial producers in the United States dropped from 188 to 94 piasters, or by 50 percent. This halving of the price was caused by the annual production of broilers increasing from 792 to 1,935 million birds, an increase of 144 percent. At the same time, the price of broiler chicks came down from 44 to 30 piasters with the cost to producers varying from month to month according to supply and demand. Broiler feed declined from 35 to 30 piasters per kilogram. Commercial broiler farms were able to continue in production in the face of the much greater drop in the price of their product than in the cost of chicks and feed only by improving their management practices and increasing their production efficiency. In this endeavor they were aided by the poultry breeders and geneticists, poultry scientists and nutritionists as well as by the producers of feeds. All these efforts brought about the great reduction in number of kilograms of feed to produce a kilogram of broiler, namely, from 3.5 in 1950 to 2.2–2.5 kilograms in 1961. At the same time, the period to grow a 1600 gram broiler was shortened from 12 to 8–9 weeks. This meant that the number of broods of broilers that could be raised in a house during a year went up from 3.7 to 4.7 or 5. Thus, a house for 6,000 birds increased its yearly output from 22,200 (less 7–10 per cent mortality) to 28,200–30,000 (less 2-3 percent mortality). The decrease in mortality reflects improvement in management, particularly in brooding, ventilation, sanitation and disease control.

With the development of automatic water troughs and electrically operated automatic feeders plus other labor saving devices, the number of broilers produced per full-time worker went up from 12,000 to 18,000 or more. At present, production specialists state that full time broiler producers have to reach 30,000 birds per man in order to achieve a moderate annual labor income from broiler production.

Efficiency in broiler production was aided by improvements in the ventilation of houses to reduce humidity and reduce to a minimum the amount of respiratory disease that retards growth and feed conversion. Chick mortality declined from 7-10 percent to 2-3 percent as bacillary diarrhea was vir-

tually eliminated by the blood testing program. Coccidiosis was brought under control by chemicals added to the feed and Newcastle by immunization programs. Improvements in brooding reduced losses from chilling of chicks. As mortality was reduced and living conditions for the birds improved, so did feed conversion.

The progressive improvement of efficiency in broiler production in the United States just described is demonstrated by figures for commercial broiler farms in Antelope Valley, California. The farm advisor, Mr. C.A. Salverson, has made an analysis of broiler production costs annually, 1952–1961.[1] His reports show that the feed cost per pound of meat dropped from 18.6 cents in 1952 to 10.6 in 1960. The price of feed changed from 5.33 cents per pound to 4.14 cents in 1960 while the number of pounds of feed to grow a pound of broiler dropped from 3.3. to 2.6 in 1960 for broilers weighing 3½ pounds (1.6 kg.). Feed conversion was helped by cutting mortality from 7.7 to 4.3 percent while the average age at marketing was reduced from 12 weeks to 9 weeks. During the eight years of Mr. Salverson's studies the cost price of broiler chicks declined from 20 cents to 13 cents (60 piasters to 39 piasters).

APPENDIX

WAYS TO LOWER PRODUCTION COST[2]

Finding ways to produce eggs and meat at lower cost is important for every poultry producer. Farms with low costs are able to survive during periods of low prices and make higher earnings when markets are favorable. Improving the organization of a farm for more economical production and finding ways to increase output per bird and per worker are functions of management which vitally affect cost and returns. As shown in preceding sections, good management is probably the most important determinant of whether poultry production is profitable. While the basic points are essentially similar, the application of good management is different for egg production and broiler raising.

In Producing Eggs

As shown in an earlier section, the most important elements of cost in producing eggs are feed, labor and fixed costs, and that these costs are influenced materially by the quality of the management of the farm and the production practices carried out by the workers. Management is concerned both with the organization of the farm for high production at low cost and with daily direction of the care of the layers and the eggs produced. Thus, in order to reduce the cost of producing an egg. careful attention needs to be given to both the organization of the farm and the following recommended production practices.

1 1961 analysis not completed when this report was written.

2 This section was prepared in consultation with Dr. Raino K. Lanson, Associate Professor of Poultry Science in the AUB Faculty of Agricultural Sciences, whose assistance is gratefully acknowledged.

Organization for Low Cost Production

Low cost per egg is achieved through judicious combination of well designed low cost housing, equipment that saves feed and labor, high producing birds, nutritious feed, and conscientious, efficient workers.

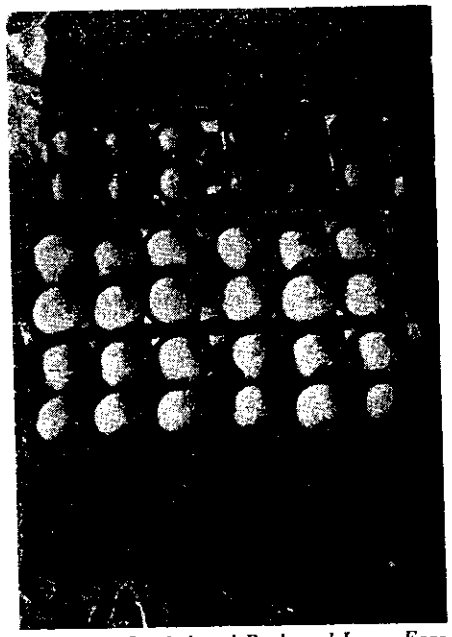
1. Housing

Open front style houses with ventilation on both sides and laid out for efficient operation can be constructed at low cost. Producers should aim at L.L. 20 per M^2. Constructing houses 10 meters wide with high ceilings and ventilators along the ridge of the roof affords a comfortable dry atmosphere and healthy environment for the birds.

Healthy Layers in Cross Ventilated Inexpensive House

2. Equipment

Ample space for every layer to eat from a feeder constructed to prevent birds billing out the feed. Since eggs are more than half water, layers require plenty of clean water close to the feeders. Automatically controlled flow water troughs contribute to low cost production. Medium and large size farms need refrigerated cooling and holding equipment in order to market high quality eggs. Higher prices generally are obtained for eggs that have been mechanically cleaned, graded and sized.



Carefully Graded and Packaged Large Eggs

3. High Producing Layers

Investing a few piasters more in pullet chicks from high producing strains of small size birds pays big dividends in low cost eggs. Individual producers should aim at 225 eggs per bird per year; 240–250 are attainable on commercial poultry farms.

4. Nutritious Feed

Since a pullet is essentially a mechanism for transforming feed into eggs, she has to have a feed which provides all the important nutrients for

turning out a maximum number of eggs from her daily intake. Since feed constitutes about 65 percent of the cost of producing eggs, buying it wisely to obtain quality at low net cost is essential for lower cost of production.

5. Careful Workers

Careful, conscientious workers who care for the layers observantly are important for low cost eggs. They watch for disease symptoms to take prompt control measures while avoiding waste of feed by careful filling of hoppers.

Efficient Farm Operation

For low cost per egg sold, a poultry farmer has to get high output at minimum expense while at the same time selling a quality product at top market prices.

1. High Daily Production

Production has to be maintained at 60 percent or higher through careful daily management of the flock, observing feed consumption to take steps to correct any signs of reduced intake or initial appearance of disease.

2. High Egg Output Per Kilogram of Feed

Low feed cost per egg sold is achieved by careful filling of the hoppers to avoid waste and attention to maintaining the birds in good health. Producers should aim at 6 eggs per kilogram of feed.

3. Efficient Labor

Workers who get high annual egg production from layers have to be paid above average wages. For the labor cost per egg to be low, they have to care for a large number of birds per man. Poultrymen should aim at 2000 layers per man.

4. Careful Handling of Eggs

Only high quality eggs are saleable at top prices. In order to preserve new-laid quality, eggs must be gathered at frequent intervals during the day from nests that turn out clean shells, cooled promptly, and kept cool until marketed. High quality, clean eggs which give satisfaction to comsumers foster greater sales and profits.

IN PRODUCING A KILOGRAM OF BROILER MEAT

With the decline in prices of broiler meat, it is important for commercial broiler producers to reduce their cost of production per kilogram of meat

sold. Evaluation of costs for broiler production in the United States and Lebanon indicates several ways to do this.

1. *Market at 9–10 Weeks*

Table 52 shows the cost per kilogram of a broiler sold at 9–10 weeks of age weighing 1600 grams to be 20 to 25 piasters less than for the 1000 gram broiler commonly marketed in Lebanon at 7–8 weeks. As mentioned earlier, this is because the constant and fixed costs per bird are spread over a larger number of grams.

The market for the larger size broilers will have to be expanded. Doing so would relieve the pressure on the prices of the smaller sizes commonly sold to the restaurants and rotisseries by diverting more production to the home-cooked market. Experience in other countries with market development has demonstrated that through educational and sales promotion programs emphasizing the higher proportion of edible meat on the larger birds and the better value for consumers, house-wives can be interested in buying more of them. It may be necessary to offer the larger birds at a slight reduction in price to attract consumers but even so these older broilers should be more profitable for the producer on account of their substantially lower cost per kilogram.

2. *Better Feed Conversion*

Since feed constitutes roughly half the cost of producing a kilogram of broiler meat in Lebanon, lowering the feed cost per bird is essential for reduced production cost. The most important way of doing this is to improve feed conversion, as indicated by the data in Tables 52 and 53. In Table 52 it is shown that with feed conversion of 2.9, the cost per kilogram of a 10 week old broiler weighing 1600 grams is L.L. 1.62. With feed conversion of 2.5, the cost is reduced to L.L. 1.52, as seen in Table 53. If the live weight of 7–8 week old broilers was increased to 1250 grams and feed conversion was reduced to 2.4, the cost per kilogram of live broiler would decline from L.L. 1.79 to L.L .1.58.

More grams of meat can be obtained from each kilogram of feed through integration of several factors. The chick has to have the inherited ability to convert high energy feed into meat efficiently. It has to live in an environment favorable for survival and rapid growth during the first 10 weeks. Thus, chicks, feed and production practices require most careful attention.

Table 52

Estimated Cost of Production of Broilers in Lebanon, 1961, Birds Sold at 6 to 10 Weeks of Age.

Age at Slaughter	6	7	8	9	10
Normal weight in grams[1]	800	1000	1200	1400	1600
Live weight at slaughter in grams	800	1000	1150	1275	1350
Feed conversion	2.2	2.4	2.6	2.7	2.9
Feed consumed in grams	1760	2400	3000	3450	3900

	Cost Per Broiler				
	Piasters	Piasters	Piasters	Piasters	Piasters
Cost of chick	55.00	55.00	55.00	55.00	55.00
Cost of feed at 39 pts.	68.64	93.60	117.00	134.55	152.10
Labor[2]	4.50	5.50	6.20	7.30	8.00
Other direct costs[3]	16.22	18.89	21.21	25.07	27.58
Overhead costs[4]	9.84	12.07	12.86	15.20	16.70
Total cost per broiler	154.20	185.06	212.27	237.12	259.38
Cost per kg. live weight	192.75	185.06	184.58	185.98	192.13
Cost per kg., if weights were the normal ones listed above	192.75	185.06	176.89	169.37	162.11

1 Research data, Raino K. Lanson, Maine Agricultural Experiment Station, Mimeographed Report, 1955.

2 Calculated for laborer to care for 6,000 broilers throughout the year. When the broilers are sold at 6 weeks, his annual salary is distributed over 8.5 broods numbering 51,000 birds. When they are marketed at 10 weeks of age, only 5 broods are grown during the year totaling 30,000 broilers

3 Other direct costs calculated from average o 18.89 pts. for 14 farms at approximately 7 weeks of age.

4 Calculated on the basis of average size farm with capacity of 10,180 broilers having fixed costs of L.L. 8,510.64.

Table 53

Present and Possible Costs of Producing Broilers in Lebanon at 1962 Prices

	7–8 weeks[1]	7–8 weeks[2]	9–10 weeks[3]
Average age at sale	1000 Grams	1250 Grams	1600 Grams
Average live weight per bird	2.50	2.40	2.50
Feed conversion	2.50	3.00	4.00
Number of kilograms feed consumed		Cost Per Broiler	
Variable Costs	Piasters	Piasters	Piasters
Chick	55.00	55.00	55.00
Feed at 39 piasters per kg.	97.50	117.00	156.00
Labor at L.L. 150–200 per month	6.00	6.00	8.00
Fuel for brooding	4.50	4.50	4.50
Electricity	1.00	1.00	1.00
Litter (sale with manure offsets cost)	–	–	–
Medicine and vaccines	4.00	4.00	4.00
Water	.15	.15	.15
Total variable costs	168.15	187.65	228.65
Total fixed costs[4]	11.00	11.00	16.00
Total costs per broiler	179.15	198.65	244.65
Total costs per kilogram live broiler	179.15	158.92	152.88

1 Variable costs considered typical by officers of the Lebanese Poultry Syndicate

2 Based on weight of 1340 grams and feed converison of 2.39 at 8 weeks of age attained at Terbol Research Station of Ministry of Agriculture in 1961.

3 Based on U.S. commercial broiler growers weights and feed conversion for least cost per kilogram live weight in 1961.

4 See Tables 30 and 49 for details of annual fixed cost.

a. Quality Broiler Chicks

Chicks from parents that have been selected from strains specially bred for rapid growth through 10 weeks of age are the most efficient converters of good feed into broiler meat. Such chicks can give much lower cost meat than other strains. Quality of the chick is much more important than price for low cost broilers. The extra cost of the best bred broiler chicks is a good investment for low cost per kilogram of meat.

b. High Energy Nutritious Feed

A chick can eat only a limited amount of feed per day. The more calories of properly balanced nutritious food it eats, the more raw material it has for making meat. With proper biological additives for promoting growth, feeds compounded according to formulas of poultry nutritionists give superior feed conversion. The efficient broiler producer needs the feed which will produce the highest weight of broiler at 10 weeks of age at the least cost per gram of chicken.

c. Scientific Production Practices

Poultry scientists have determined through research and observation that the following practices are most essential for low-cost broiler production.

1. Ample Housing

Each broiler needs enough space for comfort and the avoiding of contagious diseases from its neighbors and from insanitary conditions caused by overcrowding. Over-crowding of more than 10 birds per square meter of floor space is a major cause of the below-normal growth of broilers in Lebanon and the consequent high cost of production. Broilers in batteries also grow better when not crowded.

2. Adequate Ventilation

Broilers do best in houses with big windows that admit an abundance of fresh air without drafts. Roof ventilators to let out the moisture given off from the lungs of the birds are essential for keeping the air in the house fresh and dry to prevent coryza and other respiratory diseases that cause chicks to lose their appetites and thereby decrease the rate of growth.

Broilers Raised In Batteries

3. Careful Sanitation

Preventing diseases by proper sanitation measures is much cheaper than trying to cure disease with medicines. Even though diseases do not kill the broilers, they slow down growth and increase the amount of feed required to produce a kilogram of meat. Use stands for the water fountains to keep the litter nearby dry. Stir the litter frequently so it will absorb the fresh droppings and then evaporate the moisture to keep the litter dry. Clean water fountains and troughs daily. Keep feeders free of droppings. Require all persons entering the chicken houses to step into disinfectant to prevent bringing in disease.

4. Disease Control to Reduce Mortality

The prevailing 5–10 percent mortality in broiler flocks increases the cost of production, as shown in an earlier section. It could be reduced to 2–3 percent through proper disease control measures. Inexpensive immunization is the only preventative of the costly Newcastle disease. Coccidiosis is controlled by proper sanitation and chemicals added to the feed.

5. Careful Brooding at Correct Temperatures

Chilling or over – heating are expensive because they make the

chicks easier victims of digestive troubles and diseases. Maintaining the recommended weekly temperatures until the birds are well feath ered contributes to low cost production.

6. Low Level of Feed in Feeders

High feed consumption per bird indicates that much is being wasted. When the amount of feed used weekly is more than 10 percent above normal for the age of the birds, it indicates that the workers are either spilling feed on the floor when filling the feeders or that they are putting so much in the feeders that the birds are beaking it out onto the floor.

Broilers Growing Well on the Floor

3. Labor Efficient

Labor cost per bird and kilogram of broiler on many Lebanese broiler farms is 50 to 100 percent higher than what it is on the better managed farms. The amount of work accomplished per worker on typical farms, as indicated by the number of birds per worker, is much below what well trained and supervised men do on the low cost farms. An efficient worker should care for 7, 000 to 10, 000 broilers. Quality of work relative to carefully carrying out recommended management practices is most important for producing low cost broilers. It is good economy to find a good worker and pay him enough to keep him satisfied so he will continue permanently. A bonus based on lowering the

cost of production provides a good incentive to the desirable kind of man.

4. System of Management

The Lebanese management system of having enough broods of chicks of various ages on a broiler farm to sell weekly causes higher cost of production in at least two major ways.

a. Labor Cost

Birds divided among pens for each age group take more time for a man to care for a given total number of birds.

b. Losses from Diseases

Birds of various ages on the farm continuously allow no way to break the chain of disease transmission. Young birds catch respiratory and other diseases from older neighbors in adjoining pens. Poultry specialists state that the only way to stop disease on a farm is to discontinue production periodically and have no birds in the house so that the germs have no hosts and so succumb to dissinfection.

The way to overcome these two causes of high broiler costs is to change to the single flock-system followed in the United States. Under this program the houses on a broiler farm are all filled to the rated capacity with the proper numbers of chicks on one day. When the broilers reach 9–10 weeks of age, they are all sold as a lot and trucked to a processing plant for slaughter. All the houses are thoroughly cleaned and disinfected and allowed to stand empty for about 2 weeks. Any disease usually disappears by the time the next lot of chicks fills the houses again.

In order for this system of single flock management to work, there must be a poultry processing plant to market the large flocks from various broiler farms when they reach the most economic age. A modern mechanized poultry slaughtering and eviscerating plant requires a minimum of 1, 350, 000 kilograms of broilers per year, or 26, 000 broilers per week for economical operation. For low cost marketing, such a plant must operate every week day. For this reason, the manager schedules flocks to be received on a stated date for some time in advance. Many broiler farmers in the United States have advance arrangements with a processing plant to take their broilers and pay the market price per kilogram on the day of delivery. Through such scheduling the producer has an assured market for his output and can concentrate his management on efficient production of broilers at minimum cost per kilogram.

5. Lower Prices for Chicks and Feed

The amount of the differences in the prices of these two items in Lebanon and the United States is shown by the following figures for December, 1961.

	Chick	Kilograms of Feed
Lebanon	50–55 piasters	38–39 piasters
United States	30–40 piasters	30–31 piasters

The increase in the number of chick hatcheries and total incubator capacity in Lebanon during 1961 suggests that there probably will be more future competition in the selling of broiler chicks. Prices of broiler chicks did decline about 10 piasters in 1961.

With the advent of more normal rainfall during the winter of 1961–62, the supply of cereal grains in Lebanon and neighboring countries can be expected to increase. Since corn and sorghum are major ingredients in broiler feed, lower prices of these grains should reduce the cost of broiler feed. Groups of producers buying cooperatively could probably obtain quality feed at lower prices. This has been done in Lebanon with cooperatives buying fertilizer for their members at a saving.

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(C.P.S.P.S.)