THE ECONOMICS OF EGG PRODUCTION IN LEBANON

by

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ABSTRACT

The underlying objectives of this study were to determine (a) the costs and returns from producing eggs on commercial poultry farms in Lebanon, and (b) the major factors responsible for the profitable operation of layer farms. The study also sought to analyze the competitive situation of Lebanese producers of eggs in relation to countries exporting eggs into Lebanon, to ascertain the relative situation of commercial egg farms in this country regarding production costs.

Collection of data from 22 farms by questionnaires continued from September 1960 through April 1961. Additional data was obtained by interviewing people well acquainted with the poultry industry in Lebanon.

Various methods of computing farm costs and returns were evaluated in an effort to find which are adaptable to Lebanon. Through use of appropriate methods, it was found that the average net cost of producing eggs on 22 commercial poultry farms during the period September 1960 to April 1961 was 10.3 piasters per egg and ranged from 8.5 piasters to 12.3 piasters for the most and least profitable groups of farms, respectively. The net cost of producing an egg steadily decreased as flock size rose from 500 to 3000 layers. Were it not for the abnormally high investment of the largest size farms (3001-4000 layers) in land and birds and their only average egg production per bird, net costs per egg produced would have decreased as flock size increased up to 4000 layers.

It was found that certain factors other than flock size had a direct influence on egg production costs and returns. The most profitable farms were those that had moderately large flocks (1000-3000 layers) combined with higher egg production per bird kept and per kilogram of feed, lower feed prices and higher labor efficiency. They bought a lower percentage of sexed chicks at lower prices and sold their egg output at higher than average prices. Management was found to be the most important factor affecting costs and returns because its decisions influence all of these factors to varying degrees as well as the fixed costs. It also determined the production practices to be followed and how carefully the workers carried them out.

Until recently, Lebanese imports of eggs came mainly from Turkey, Syria, and Denmark. Eggs from Turkey and Syria are produced in farm-yard flocks which take a long time to reach Beirut and hence are not fresh quality. Danish producers compete with Lebanese producers on the basis of quality and efficiency of production, and give them keen competition, particularly during the spring months when prices are seasonally low. For the last two years, particularly since December 1961, Poland started "dumping" eggs at very low prices due to its need for foreign currency. These imports have forced down the prices of local eggs to a level that the average Lebanese commercial producer has very low, if any, returns to his management.

It is the writer's opinion that leaving exports of eggs free while at the same time restricting imports during the surplus production months and/or imposing an import tariff to protect producers against the "dumping" of eggs by some countries, would be best suited to Lebanon to foster an egg industry able to compete with normal imports from commercial egg farms in Europe.

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I N T R O D U C T I O N

As far as is known, there has not been any reliable and comprehensive study conducted on the costs and returns of producing eggs on commercial poultry farms in Lebanon. Only a few studies of individual farms have been made which were not accurate because they failed to include as part of the cost of production one or more of such items as the depreciation of fixed assets, charges for family labor performed without cash payment, and interest on the investment in the business. Moreover, these studies throw very little light on the over-all situation of egg production costs and the competitive situation of commercial egg producers in Lebanon.

The Poultry Producers' Syndicate claimed in 1960 that imported eggs were selling at such a low price that they had forced down the selling prices of domestically produced eggs below their cost of production and that many producers would eventually be forced out of business if this situation continued. Figures of costs and returns for individual farms were presented to the Ministry of Agriculture to substantiate this argument. However, the Ministry was interested in the analysis of the costs of production of the commercial egg production industry as a whole and not in the figures of a few producers. This was because it has concern that prices of eggs are not unreasonably high relative to consumer incomes. It needed reliable information regarding the economic position of commercial egg producers to furnish the basis for formulating future policy.

The Ministry was also interested in determining the extent to which local production of eggs and poultry meat were meeting the

consumption needs of the country. For this purpose it wanted a survey made to ascertain the number of commercial poultry farms in Lebanon, the numbers of layers kept and broilers raised on these farms. In order to formulate policy regarding imports, it sought data regarding the costs of producing both eggs and broiler meat in exporting countries. It wanted to appraise the ability of local producers to compete with imported products in Lebanon and in potential Lebanese markets such as the Persian Gulf countries.

The Ministry of Agriculture asked the Agricultural Economics and Sociology Division of the Faculty of Agricultural Sciences at the American University of Beirut to direct a survey of commercial poultry farms and to make the economic analysis of the competitive position of the industry. At that time, the writer was a graduate assistant in the Division and was assigned to work on the project. He also had a personal interest in the poultry industry and was in close contact with several producers. This led to using the part of the study dealing with the economics of egg production in Lebanon as the subject for his Master of Science thesis.

The thesis consists of three main parts. The first part considers the various methods of computing the costs and returns of the farm business and endeavors to bring out the measures which are thought to be adaptable to Lebanon. The second part ascertains the costs of producing eggs on commercial egg farms in Lebanon and the effect of flock size and the various management factors on egg production costs and returns. The third part considers the competitive situation of commercial egg producers in Lebanon in relation to eggs imported from foreign countries. This section also

points out the various alternatives that are open for government action and producers in this regard.

A word of caution suggests itself here. The figures which appear in this study are at best a crude estimate of actual cost relations. The bulk of information supplied by the respondents, in addition to being merely memory recollection, was also subject to elements of personal bias. When the information given by farmers was cross-checked it was found out that some of the respondents were not completely honest in supplying the needed information. In such instances, the average figure for the item for the group in which the particular farm belonged was taken to represent the figure for the farm giving the wrong information. Consequently, any indications or trends observed herein cannot be treated as final measures of analysis, but only as first approximations and as aids to more refined studies that might be made on the subject later on.

Chapter I

DEVELOPMENT OF THE EGG PRODUCTION INDUSTRY

This chapter was written with the intention of giving a picture of the history and development of the commercial egg production industry in Lebanon, and to give an idea about the rate at which expansion and progress have proceeded during the past eight years. It also endeavors to present some magnitudes of the industry.

Much of the information contained in this chapter comes from interviews with the pioneers of the poultry industry in Lebanon, supplemented by the writer's own knowledge of certain phases of the industry.

A. Early Days

Prior to 1954, commercial laying flocks did not exist in Lebanon. For the most part, layers kept were raised in farmyard flocks that did not exceed 100 or 200 Baladi hens. In the majority of cases, they averaged less than 50 birds.

Although some of the layers were confined, the majority were roaming around in the daytime. At night, they were crowded in a small den to protect them against wild life and cold weather.

Their diet consisted chiefly of what refuse they could graze in the fields and any household waste of food for that day. The better-fed layers were also getting some ground wheat or barley, parboiled wheat, bran, or sorghum as part of their feed. Concentrate feed and balanced rations were unheard of at the time.

Most of the layers raised were of the native or Baladi type, which is a cross of several breeds. The Baladi hens have smaller body

size and lay fewer eggs than the improved foreign breeds. Besides, many hens are broody and their rate of lay does not exceed 100 eggs annually.

These birds were raised to supply part or all of the family's consumption of eggs and poultry meat, and sell the excess or barter it for grocery goods at the village store. Or else, these eggs were sold to dealers who make regular weekly tours of these villages. These dealers, in turn, sold the eggs in the capital or big towns. Today, in addition to these middlemen who buy the production of small flocks, most of the commercial producers sell to wholesale buyers at their farm sites.

B. Period of Expansion and Progress

Not until 1953, when the Government experimental farm at Terbol and the experimental and demonstration farm of the American University of Beirut were established in the Beka'a, did interest in commercial poultry raising seriously grow. These two farms have had a great influence on raising poultry on a commercial scale and introducing some of recommended management principles for housing, brooding, feeding, and disease control, that are essential for the successful operation of any laying flock.

It is not by sheer coincidence, therefore, that the first commercial farms were started in the Beka'a. The year 1954 witnessed the birth of the first commercial poultry farm near Zahle in Lebanon with 500 layers. Today, the same farm has around 50,000 birds as breeders, layers, and replacements. It operates a hatchery with a capacity to incubate 225,000 eggs per month. The owners of the same farm are also the agents for a major brand of concentrate feed.

Shortly afterwards, or in 1955, another large poultry farm was started with 3500 birds in the Beka'a near Chtaura along the Damascus road. At present, it has 7000 layers to supply eggs for hatching both layer and broiler chicks. Eggs not needed for hatching are sold for consumption. The hatchery they operate has a capacity to hatch 68,000 broiler chicks per month. In addition the owners operate a feed mill and sell 400-500 tons per month. Since then, other big farms and hatcheries have sprung up, mainly a hatchery and breeding farm near Zahle, and another one along the coast near Beirut. Each has a capacity of nearly 100,000 eggs per month.

These and similar farms and hatcheries have had significant effects on the establishment and growth of other commercial poultry farms, mainly in the Beka'a and Mount Lebanon, but also in other parts of the country. It is interesting to note that these hatcheries contract foreign breeding establishments and import the parent stock which produce eggs for hatching. The parent stock is replaced often enough to maintain the quality of the offspring, and they are usually changed after 9-15 months of laying life.

Undoubtedly, these big hatcheries and farms have been pace setters for many local farms since they sprang up near the source of chicks. Besides supplying them with baby chicks of improved breeds, the producers could consult these hatcheries for technical guidance on raising layers.

During this period of growth and expansion of commercial laying flocks emerged several concerns for selling many brands of imported concentrate feed. At present, the country has a local feed mill with a

capacity of nearly 4 tons per hour, which only imports the pre-mix feed and incorporates it with other ingredients. It also produced pelleted feed for layers which was selling at 34 piasters per kilogram in 1960. Another feed mill has recently been established in the vicinity of Beirut. It also imports pre-mix feed and mixes it with other ingredients to sell ready-mixed feed. It has a capacity to produce 4 tons per hour, but is currently selling 400-500 tons per month. At present, there are at least three kinds of poultry rations for layers and growing replacements sold in Lebanon by the major feed companies with different levels of proteins and vitamins or minerals. These include starter rations, grower rations, and laying rations. Medicated feed with antibiotics is being sold to stimulate growth and improve the rates of production. The major feed companies also add coccidiostats in the feed.

Commercial producers vaccinate regularly against diseases, especially New Castle, and use some medicinals with the feed to reduce the incidence of diseases.

C. The Problem of Farmyard Flocks

Inspite of the tremendous advances achieved by commercial flocks during the past few years, we still find farmyard flocks. A great part of these flocks are now of the improved breeds as Leghorns, Plymouth Rocks, or Rhode Island Reds, or at least crosses of these breeds with Baladi hens.

Opinions differ as to the present size of farmyard flocks in Lebanon. Unofficial figures of the Poultry Producers' Syndicate estimate that the typical Lebanese family keeps an average of three layers, or a total of 446,500[1] birds which produce 22,325,000 eggs annually.

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1 Based on figures of the 1960 Sampling Census of Agriculture for Lebanon by J.P. Ecimovic and H. Al-Asaad of the Ministry of Agriculture, who estimate that there are 148,819 farm holders in Lebanon.

Some believe that the figure does not exceed 200,000 and that the 446,500 birds might have existed at one time in the past, but with the growth of commercial flocks and the spread of diseases to all regions, especially Newcastle, greatly reduced farmyard flocks. Another contributing factor is the presence of wild life which to some extent, preys on such birds. The same people explain that farmyard flocks exist in the greatest numbers during and shortly after the harvest season for wheat and barley, and then the birds are sold for meat in the fall due to the lack of cheap feed to carry them through the winter months.

Others maintain that rural families still keep farmyard flocks, and that as soon as the birds are eradicated by disease, they raise another batch and ask the Government Extension Service to vaccinate their birds. These people consider that the estimate of 446,500 birds is reasonable. If each bird gives 50 eggs during one year, this amounts to an annual total production of 22,325 million eggs.

D. Some Magnitudes of the Egg Production Industry

When the study was conducted, a total of 134 layer farms having over 205,000 layers[2] in the various parts of the country were surveyed, as revealed by Table 1.

Mount Lebanon had 77 farms, or 57.5 percent of the total number of farms covered by the survey, with 88,500 birds making up 43.0 percent of the total number of birds raised.

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2 The survey of commercial layer farms was not complete. It is estimated that around 90 percent of commercial farms have been covered by the survey, and nearly 10 percent have been missed.

While the Beka'a and North Lebanon had nearly the same number of farms (24 and 23 respectively), the Beka'a had twice as many birds, or 65,000 layers. Thus the Beka'a had 31.6 percent and North Lebanon 18.3 percent of the total number of birds included in the statistical survey.

South Lebanon claimed the lowest number of 7 farms having 6.1 percent of all birds kept. Three farms having a total of 2,000 birds are borderline cases which do not fit in any one region.

Table 1 - Geographic Distribution of Layer Farms in Lebanon, April 1961

Region	No. of Farms	Total No. of Layers	Average Size of Farm-Layers	Percent of Total Farms	Percent of Total Layers
Mount Lebanon	77	88,500	1150	57.5	43.0
Beka'a	24	65,000	2710	17.9	31.0
North Lebanon	23	37,700	1640	17.2	18.3
South Lebanon	7	12,500	1785	5.2	6.1
Other	3	2,000	665	2.2	1.0
Total	134	205,700	1535 av.	100.0	100.0

Thus it could safely be said that Mount Lebanon and the Beka'a valley constitute the country's major egg-producing regions, with nearly three-fourths of all birds kept. This is probably influenced by the dry climate in the Beka'a and Mount Lebanon which reduces the incidence of poultry diseases. Moreover, the Beka'a is the birth place of the poultry industry, and it is only logical to expect it to have one-fifth of the total number of farms with almost one-third of total birds. Here we have

the concentration of the country's biggest hatcheries which maintain large breeder flocks to meet local and foreign demand for Lebanese baby-chicks.

Farms in Mount Lebanon, on the other hand, are located within a short distance from the central market for eggs in Beirut. They are also nearer the source of feed, whether imported cereals and concentrates via Beirut seaport, or locally produced feed, which is manufactured in the vicinity of Beirut.

Out of a total of 134 farms, 34 farms, making up one-fourth of all farms, kept less than 500 layers each, making a total of nearly 5 percent of all birds kept, as shown in Table 2 below.

Table 2 - Distribution of Layer Farms in Lebanon According to Size, April 1961

Size of Farm-Layers	No. of Farms	Total No. of Birds	Percent of Farms	Percent of Birds
100 - 500	34[3]	10,000	25.4	4.9
501 - 1000	54	40,000	40.3	19.4
1001 - 2000	24	38,000	17.9	18.5
2001 - 3000	9	21,700	6.7	10.5
3001 - 4000	5	18,000	3.7	8.8
Over 4000	8	78,000	6.0	37.9
Total	134	205,700	100.0	100.0

Two fifths of all producers covered by the survey were keeping between 501 - 1000 layers each. Thus 40 percent of the producers had 19.4 percent of the birds. Almost one-fifth of the farms, or 24 farms

3 Not comprehensive because most farms keeping below 200 layers were not surveyed.

kept from 1001-2000 layers, representing 18.5 percent of all birds. We witness a significant drop in the number of producers keeping over 2000 layers. Thus 83.6 percent of all producers had less than 2000 layers each but kept 42.8 percent of the total number of birds. Although the number of farms with more than 4000 each was 8, or 6.0 percent of all farms, these kept 78,000 layers, or 37.8 percent of total birds. These farms include the big hatcheries with large laying flocks, as well as some of the integrated farms, which combine the laying enterprise with the broiler or hatchery enterprises, or both.

The average number of eggs laid per bird per year could not be obtained with accuracy for all farms, but it averaged around 183 eggs per bird for the farms which gave the information. On this basis, the average production of layers raised on farms in Lebanon ranged between 92,000 eggs to 103,000 eggs daily, or from 33,600,000 - 37,600,000 eggs annually.

With eggs selling at an average price of 12.7 piasters each for all farms, the gross annual receipts from eggs produced in Lebanon during the year 1960-61 amounted to between LL.4,267,000 and LL.4,775,000.

Moreover, a layer consumes an average of 38 kilos of feed in one year. In other words, the average number of 220,000 layers kept consumed 8360 tons of feed in 1960-61, after allowing 13.5 percent mortality from day old chicks till the end of laying life as reported by farmers. In addition, each pullet reared is estimated to eat around 10.5 kilograms of feed until it starts laying. Since for every layer kept a pullet must be raised to replace it, the consumption by replacements adds 2333 tons to the feed consumed annually. Over and above this, at least half, and probably much more, of the layer farms buy chicks on a straight-run basis, then these farms

raise 108,500 male chicks annually, assuming 8.5 chick mortality as reported by farmers, which are sold when weighing about 1 kilogram live weight, or two-third kilograms of dressed meat. This means over 72,330 kilograms of broiler meat are sold annually by layer farms in Lebanon. It is estimated that nearly 3 kilograms of feed are required to produce 1 kilogram of dressed meat, or that these 108,500 male chicks would consume about 217 additional tons of feed annually. This raises the total amount of feed consumed by laying flocks to 10,910 tons per year. Taking the average price per kilo of ready-mixed feed of 34 piasters, this means that the total bill for laying flocks alone in Lebanon is LL.3,709,400 annually.

As mentioned above, at least half of all farms do not buy sexed chicks. Therefore, not less than 340,500 chicks are raised annually, when allowance is made for mortality up to laying age. Half of the present laying flock was raised from 113,500 sexed chicks. To raise the other 100,000 layers a total of 227,000 chicks (straight-run), should have been started. Assuming overall mortality to be 13.5 percent then 340,500 chicks should be started. Around 113,500 sexed chicks are imported at 175 - 285 piasters each, at a total cost of not less than LL.198,625. The remaining 227,000 chicks are mostly bought from local hatcheries, but, to some extent are also imported from Holland and Denmark, at about 70 piasters each, or a total cost of LL.158,900 annually.

Aside from that, every 100 layers and their replacements are estimated to net LL.50 worth of manure and litter annually. This brings a side-income of over LL.100,000 annually for laying flocks in Lebanon.

Chapter II

METHODOLOGY

This section discusses the procedures that were followed in sampling, tabulation, and analysis of the data, and the difficulties that were encountered in so doing. It also analyzes the various methods of computing the returns of a farm business, with emphasis on the measures which fit the study best. It seeks to bring out the reasons why these methods were chosen, as well as the accuracy and limitations of such methods.

In addition, it seeks to determine an equitable basis for valuing the various assets, especially fixed assets, as well as the kinds of costs and cost relationships so that when comparing groups, any differences in net returns are a reflection of the efficiency of each group and not a result of different accounting procedures used.

A. Sampling Procedure

To get things into proper perspective right at the outset, it becomes important to emphasize that this study was conducted as one part of a more comprehensive statistical and cost-of-production survey that was jointly undertaken by the Lebanese Ministry of Agriculture and the Faculty of Agricultural Sciences at the American University of Beirut, as this fact has a bearing on the sampling procedure followed.

1. Chosing the Sample:

To start with, the only information available on the number, size, and location of commercial egg farms in Lebanon was a list of such farms which was prepared by the Poultry Producers' Syndicate in the previous year. In addition to this, local hatcheries and feed distributors were also

consulted to compile as comprehensive a list of such farms as possible. On this basis, a tentative list of producers was drawn up, which was thought to be representative of the various sizes of farms in all the regions of the country. On visiting such farms, some of the producers were unwilling to give information. Many other farms were visited several times, but people who were in possession of the needed information were away, and every effort was made to contact them either at their office or residence. When this was finally accomplished, some of the owners were unable or unwilling to give figures on costs and returns. Consequently, the tentative list of producers was abandoned, and it was decided that while making the statistical survey, all producers who were able to supply the desired information were to be interviewed.

The size of the sample was thus restricted in the first place to those producers who were willing to give the information asked for. It was found out that some producers, who even kept records, were unwilling to give information on egg production costs and returns, fearing that the information obtained would be used for personal reasons that would conflict with their own interests as producers. In the second place, it was curtailed further to those producers who kept some form of records or at least could recall the different items of receipts and expenses with a reasonable degree of accuracy.

All farms keeping less than 500 layers were excluded because such farms are not covered by the scope of this study of commercial egg farms for two main reasons. First, these farms, for the most part, did not confine the layers in poultry houses, nor did they buy the poultry equipment necessary to raise layers in confinement and hence they had very low, if any,

fixed costs. Secondly, part or all of the layers kept were grazing in the fields and part or all of their feed consumption, which represents the biggest item of expense in commercial poultry raising, was supplied by grazing on field refuse and household waste, the cost of which could not be estimated accurately.

Moreover, most of the farms keeping over 4000 layers were those which have integrated egg and broiler production or egg production and hatching, or all of the three enterprises together. Therefore, they were excluded from the sample because all their receipts and expenses were charged against the farm as one business unit. Any accurate breakdown of these costs among the different enterprises would not be accurate even for farms that keep records. This task becomes especially difficult for allocating fixed costs and hence any figures on the cost of production thus obtained would be a distortion of the actual figures.

B. Region and Time Period Covered

As the statistical survey entailed visiting most the poultry producing villages in Lebanon, naturally all producers in those regions who were willing to give cost and sales information were interviewed.

This means that all the regions of Lebanon, other than the capital, are represented in the sample. Out of a total of 22 commercial egg farms included in the sample, 10 farms represent Mount Lebanon, 8 farms from the Beka'a, 3 from North Lebanon, and only 1 from South Lebanon. This ratio is not in line with the actual concentration of commercial egg farms in the various regions of the country, due to the limitations of sampling procedures discussed earlier. Mount Lebanon, for instance, has the highest total number of farms as well as the

highest number of farms keeping less than 500 layers; the Beka'a and Mount Lebanon have the highest percentages of integrated farms, which also were excluded from the study.

The interviewing of farmers commenced around mid-September, 1960 and ended during the first part of April, 1961. The time period to which the data pertains covers the period from the spring of 1960 through the spring of 1961 inclusive.

The purpose of chosing this particular date was to cover the most recent time period for which data is available. This was done for two main reasons. First, since the findings are going to be used by the Ministry of Agriculture as an aid for formulating future policy, the results obtained should be as up-to-date as possible since trends of the more recent past are more likely to continue in the near future than trends of the less recent past. Secondly, this enabled the respondents to recall the most recent figures with a greater degree of accuracy than those of the more distant past.

C. Collecting the Data

1. Preparing and Pre-testing the Questionnaires

The first step in collecting the data was the preparation of a carefully prepared questionnaire, which was phrased as briefly and precisely as possible, to include all of the relevant items necessary for determining the costs and returns of commercial egg farms.[4] Such information as the size of the farm, the location, the various cash and non-cash items of expense or receipts, the average annual production of birds, and the beginning and ending inventories of the farm assets, along with many related items, were included.

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4 Copy is included in the appendix.

To enable the farmer to answer the questions accurately and with few estimates on his part, summary questions were broken down into their component parts. To get the average investment in the business, for instance, the questions were phrased to ask the farmer how much of the various assets he had at the beginning and the end of the survey period, and the price or value of each asset. Any touchy questions were left until near the end of the questionnaire because by the time they came up, the farmer would ordinarily have developed enough confidence in the interviewer to answer them as honestly as possible.

Then, six questionnaires were pre-tested on a few farms and items found to be irrelevant were deleted, while missing items were included, so that, in the final form, the questionnaire was adapted to the actual conditions of the farms being studied. The final draft was then mimeographed in sufficient number for field use.

2. Field Interviews

The farm survey method was used to collect figures for analysis. Individual producers were interviewed personally in the field. In the few cases in which farm account records were available, the figures needed were taken from the books. The interviewing was done by Sabbah al-Haj, Graduate Assistant at the Faculty of Agricultural Sciences, and the writer, with guidance by Dr. Gordon H. Ward, Professor of Agricultural Economics in the Faculty of Agricultural Sciences of the American University of Beirut.

After the general interviewing of commercial egg producers had been completed in mid-February 1961, it was found that not enough questionnaires had been collected for analyzing the data according to

size of farm. Data from additional farms was collected as late as the early part of April 1961.

The various regions of the country were visited by car and all willing producers interviewed. Some individual farms were visited more than once because persons capable of giving the desired information were away. When the second visit proved unsuccessful, the home and office addresses of owners were obtained and whenever possible, these producers were interviewed. Approximately 10-15 farms whose owners could not be interviewed were included in the statistical survey only.

To encourage the respondents to give unbiased answers, the aims and objectives of the study were carefully explained. To get honest answers, farm owners were assured that the answers given in the questionnaires would be treated with the utmost secrecy and that the results or figures for any individual farm shall not appear as such but only as averages for a group of several farms. It was further felt necessary to assure farmers that any information they gave would not be used against them in any way for matters of taxation or otherwise.

After each questionnaire was answered, a preliminary check for completeness and accuracy was made before leaving the farm. When information was tabulated later in the office, any farms whose information was still incomplete or not clear were revisited and the needed information obtained.

3. Limitations of the Farm Survey Method

The farm survey method of collecting data has certain limitations, the most important of which is that the majority of producers interviewed kept very few records. Thus, most of the figures they gave were what they could recall out of their memory.

Even when these farmers actually did keep records, these were for the most part incomplete. Some producers record only their cash receipts and expenses and figure out their "profit" on the basis of the difference between these two figures. They do not take into account such items of expense as the interest on their investment in the business or depreciation of poultry houses and equipment, nor charges for any family labor performed on a non-cash basis. At any rate, the very few records kept on production, prices of eggs sold, and the major items of feed, and the amount of labor employed, were by far better for making estimates of total costs than when all the figures were recollections from memory. While the accuracy of data collected by this method may appear questionable, it has been found to yield cost figures which are usable for most purposes.

According to Dr. Yang[5] of FAO, "People unfamiliar with this technique are usually skeptical about the reliability of the information which farmers provide from their memories... Experience in farm management surveys in various parts of the world has shown that the best estimates and the honest answers given by farmers from their memories are usually accurate enough for practical use in farm management research. Consequently, the creditability of a farm management survey depends on a capable and tactful enumerator, a congenial relationship between the farmer and the enumerator, and a well prepared questionnaire."[6]

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5 W.Y. Yang, Methods of Farm Management Investigations, p. 21.
6 Ibid.

Another limitation of the farm survey method is unintentional mistakes made by farmers. "The major portion of the errors in the Farm management surveys falls into the group known as 'compensating errors'. These are unintentional mistakes made by the farmers when making their estimates to the questions asked. They are termed compensating errors because the individual farmer in his answer to a given question... is just likely to underestimate as to over-estimate. Thus when the estimates of a large group of farmers was obtained, the over-estimates will be offset by the under-estimates, and the average will represent the true picture for the group studied".[7]

But apart from compensating errors, errors of another kind are likely to be encountered in farm business surveys. According to Efferson,[8] "non-compensating errors often occur in farm survey data if the enumerator and/or the cooperating farmers are biased". "Such errors appear when the farmer has been led to believe that his individual income or expenses will be affected by the average results obtained". Some of the farmers interviewed were definitely biased as exhibited by the tendency of some respondents either to exaggerage the figures they gave as evidence of their success as farmers and hoping that the interviewers were government officials who wanted to distribute free feed; or to give smaller figures fearing that information gathered would be used to levy taxes on them. But the approach used by the interviewers in clearly explaining to every farmer that the study was being conducted for purely academic purposes and that any information which he gives would be handled with complete

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7 J.N. Efferson, Principles of Farm Management, p. 51.
8 Ibid., p. 52.

secrecy and would not be used either in his favor or against him, should keep these non-compensating errors to a minimum. It is therefore believed that these two tendencies will not significantly affect the accuracy of the results in either direction.

At any rate, "where books have not been kept, and where some farmers are illiterate and information on farm management conditions is most urgently needed for agricultural improvement, data required for farm business surveys can be obtained only from the recesses of the farmer's memory".[9]

When any critical analysis of this study is made, or the accuracy of the results obtained evaluated, it must be kept in mind that such findings are subject to the limitations and restrictions discussed. If a greater degree of accuracy is needed, recourse should be had to the farm account method of farm management research studies. It would be good to solicit the honest cooperation of representative producers in each size group (who could be chosen from among the members of the Poultry Producers' Syndicate), and to keep reasonably accurate records and accounts to prepare a balance sheet and an operating statement. Since most producers have no experience along these lines, this could most effectively be accomplished by having a qualified person regularly visiting representative producers and teaching them how to keep accurate records and accounts, until such a time comes where they themselves can carry on this work satisfactorily. Then, another representative group of producers could be chosen for the same purpose, and so on.

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9 Yang, op.cit., p. 21.

D. Methods of Analyzing the Data

1. Separation of Producers Into Representative Groups

Data obtained in the questionnaires has little value if not properly summarized, tabulated, and analyzed. But before this could be done, the various farms included in the study had to be divided into convenient size groups and into the most and least profitable groups to facilitate comparison of these groups with one another and to find out the effect of flock size and various management factors on the costs and returns of each group.

Consequently, the farms were divided into four size groups. Farms in group A had an average between 501 and 1000 layers during the period of study; while group B farms had a range from 1001-2000 layers; group C farms from 2001-3000 layers; and group D farmers kept over 3000 layers. The division according to size was made on this basis because it was found from the statistical survey[10] that the bulk of the commercial egg farms in Lebanon fall within this over-all range. Moreover, the concentration of most farms fell within these groups, and hence such division was considered to be representative of the various size groups that actually exist in the country.

The purpose of division according to size was to ascertain any relationships that might exist between the various size farms and management factors such as rates of production, prices paid and received, the efficient use of labor, and so on.

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10 Which was jointly conducted by the Lebanese Ministry of Agriculture and the Faculty of Agricultural Sciences. For more detail refer to page 2.

The study further sought to determine if factors other than size had any influence on egg production costs and returns and to what extent. It was therefore essential to compare cost and returns figures for the most profitable 20 percent and the least profitable 20 per cent of all farms surveyed, and find out in what major areas of costs and returns they differ and, if possible, why.

On the returns side, for instance, it is important to establish why the least profitable farms have the highest returns; it could be due either to a higher rate of production of layers, or to higher prices received for eggs sold, or both. On the cost side, it becomes important to determine why the least profitable farms have the highest costs per egg produced. This could be influenced by a multitude of factors including higher feed consumption, higher prices of feed, or higher labor prices per egg produced, and so on.

2. Manual Tabulation of Results

After the farms were divided into groups, the information obtained in the questionnaires was manually tabulated for each group. Each group was represented by a different alphabet.

Each farm within a group was assigned a specific number to facilitate reference. Thus the 9 farms in group A were numbered from A1 to A9, and each item for the specific farm was entered in the proper space provided opposite each farm. The same procedure was followed for the other groups.

To facilitate summarization and analysis, data computed for individual farms was transferred to special sheets. A separate sheet was

prepared for each item of receipts and expenses, as well as related items for the various groups. Thus separate sheets were prepared for each cost and sales item, and costs and returns were recorded for the farms in each size group to get the average figure for every single item of cost or returns for each size group. Sheets were also prepared for the total value of beginning and ending inventories of farm assets as land, buildings, equipment, and the like, to facilitate the computation of interest on the average capital investment and the annual depreciation of farm assets.

3. Preparation of Tables

Before any analysis of the results could be made, it was essential to summarize the findings in tabular form, so that important figures could be obtained at a glance, and relationships more easily established.

The tabular presentation of data has several beneficial uses. First, tables represent a summary of the important findings for each size group or cost item being analyzed. They also make possible the direct comparison of such findings for the various groups, and the drawing of conclusions. Furthermore, tables enable the establishment of relationships between the various management factors and unit costs or net returns. In addition, they could show the ratios and percentages which serve as useful measures of efficiency of the various factors of production.

For this purpose, detailed tables were constructed for comparing the findings in each size group and for the most and least profitable farms. These tables were prepared to show the average capital investment per farm for each group, the average production per bird per year, farm expenses, farm receipts, and returns to management. These tables also included certain additional items for measuring the efficiency of operation of each

group. These items include the number of layers looked after by one man, the number of layers kept per square meter of floor space, the number of eggs sold per worker, the number of eggs produced per kilogram of feed,and so on.

4. Discovery of Relationships and Drawing of Conclusions

The tabular method of presenting data was used to determine the effect of several factors, especially flock size, but also the rate of production, feed consumption and prices, flock size, the rate of mortality, and the like on egg production costs and returns.

After discovery of such relationships by careful study and analysis of the findings of the various groups presented in the tables, it was possible to draw conclusions regarding the management factors which are responsible for differences in the average returns for each group.

By analyzing the relationships expressed in tables, it was feasible to determine why the returns for some groups were higher than for other groups. This could be due to one or more of several management factors including higher rates of production, higher labor or feed efficiency, higher prices received for eggs sold, or low prices paid for the variable inputs, and so on.

E. Methods of Computing the Costs and Returns of a Farm Business

Before any useful or meaningful comparison among individual farms or groups of farms can be made, the farm returns for all of these farms must be measured on a comparable or standard basis. The term 'farm returns' should carry the same meaning for all farms being compared and analyzed.

This need becomes more apparent when we realize that there are several ways of operating a commercial egg farm.

Some farms are owner-operated with or without additional hired labor; others are run with the help of labor by members of the family. A few farms are operated on a tenancy basis, the operator offering his own labor and management skill in return for a percentage share of the farm returns. This share basis is rare in poultry farming.

Some owners supply all of the capital needed for financing the business without having to borrow at all. Other owners borrow a part of the needed capital for various lengths of time. Different borrowers may be charged different rates of interest, even for loans running for the same period of time.

Some producers own the land and poultry houses belonging to the commercial egg farm, while others own the buildings only but pay rent for the use of the land. Still others may rent both the buildings and the land. Consequently, some producers pay only rent for the land and/or farm facilities. Others pay only interest on part or all of the total investment, and still others pay both rent and interest, and so on. Hence, it becomes obvious that if we want to compare the returns of commercial farms and use these returns as a criterion for measuring the success of such farms, adjustment should be made so that comparison of the returns for different farms are on a standard or comparable basis.

There is no one best measure of farm returns. There are various ways of computing returns, and the "best" measure is the one which serves the purpose on hand most effectively. The gross returns

of a farm business can be looked upon as being the composite returns for the various factors of production employed in the business, whether actually paid for or imputed. Generally, prime concern is given to the returns to the farmer in one or more of his capacities as laborer, manager, or investor enterpreneur. The different measures of farm returns differ mainly as to which one of the factors of production is treated as the residual claimant after the rewards for all the other factors have been allocated. To illustrate briefly, "farm income" is a combined measure of return to the labor, management, and capital supplied by the farmer. If the returns for the services of the farm operator's labor and his management are treated as a residual, then this residual measures the "operator's net earnings". If the returns for the use of capital are treated as a residual, then it measures the "returns to capital". When all the factors of production have been allocated the market price for their contribution and management is the residual, the returns are known as "returns to management".

Let us now examine the various measures in some detail before deciding which one serves our needs best. But to understand these measures, one should have thorough understanding of the various elements of farm receipts and farm expenses. It is on these two terms that the discussion is now focused.

"Farm receipts include the total income received or earned from all farm sources during a given period of time".[11] There are three component parts of farm receipts:[12]

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11 J.N. Efferson, op.cit., p. 73.
12 L.A. Bradford and G.L. Johnson, Farm Management Analysis, p. 43.

1. The cash or credit value of all items or products sold.
2. The increase in farm inventory (other than capital items).
3. The value of perquisites, including the use of a house or the consumption of some of the products of the farm.

"Farm expenses include all the ordinary costs of operating the farm business, with the exception of interest paid, and the value of the operator's time".[13] "Interest paid is a legitimate farm expense, but it is omitted in the computation of farm expenses for analysis purposes. If it were included, it would be impossible to compare expenses from farm to farm; some farms may operate entirely on borrowed funds, but others will use all their own capital, and the variation in interest charges will overshadow the more significant differences".[14] The value of all unpaid labor, other than that of the operator himself, whether furnished by members of the family or outside sources, should be charged as a farm expense at the prevailing rate for the same kind of work done. Farm expenses have four component parts.[15]

1. Current expenses for items which are wholly used up within the year, as feed, labor, fuel oil, etc.
2. Depreciation of property, as buildings and equipment.
3. Unpaid labor, other than that of the operator himself.
4. Decreases in farm inventories other than land, building and equipment.

We now turn attention to the measures themselves. The first such measure is farm earnings.

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13 J.N. Efferson, op.cit., p. 73.
14 Ibid., p. 74.
15 L.A. Bradford and G.L. Johnson, op.cit., p. 45.

1. Farm Earnings

Farm earnings measure the remuneration which a farmer receives for his labor and management, as well as the remuneration for the use of all the capital investment in the business. It is calculated by subtracting total farm expenses from total farm receipts,[16] as defined earlier. Efferson calls it farm income.[17] "Farm income measures the combined returns to the farmer for his labor, capital, and management. Because it is a multiple - result measure, it is of little value as a final measure of earnings. It is very useful, however, as an intermediate step in the computation of the other more important measures of farm returns".

"The farm earnings figure (farm income) can further be subdivided only by putting an arbitrary figure on either (1) the use of the investment, or, (2) the value of the operator's management and labor services".[18] If the former method is followed, the resultant measure is called "operator's net earnings" which covers returns for his labor and management. If the latter method is used, the resulting measure is "returns to capital".

Let us now consider "operator's net earnings".

2. Operator's Net Earnings

This is another method of measuring farm returns. It measures the returns to the operator for his labor and management.[19] Efferson uses the term labor earnings to measure the combined returns to the farmer for his labor and management. "The labor earnings of a farmer include the

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16 Ibid., p. 46.
17 J.N. Efferson, op.cit., p. 75.
18 L.A. Bradford and G.L. Johnson, op.cit., p. 46.
19 Ibid., p. 47.

total net returns to the operator for the year's work, considering both cash and non-cash income. Earnings are the total income a farmer receives for his labor and management, including credit for the use of the farmhouse and the value of all non-cash items furnished by the farm, after paying all farm expenses and after deducting a charge for the use of capital invested in the business".[20] In this case, capital includes both the investment of the farmer and whatever he has borrowed. The main advantage of this measure of returns is that it eliminates the effect of variable investment by different farmers and therefore compares farmers as laborers and managers rather than capitalists.[21] The disadvantage of its applicability in Lebanon is that it would not give a true picture of the actual situation, where the majority of owners of poultry farms do not perform any physical work, and hence the measure of return for their labor would not be factual.

"In the U.S. labor earnings as a measure of farm returns are most widely used in areas and in farms where a relatively small, self-sufficient farming program is predominant".[22] For the commercial farming areas where family farms of sufficient size for efficient operation by mechanical power prevail, the farmer performs much of the work himself and also the various functions of management. Under these circumstances, the term "operator's net earnings" is more appropriate. Such farmers are most concerned with what they earn as farm operators.

3. Returns to Capital

"The farmer's return to capital represents the income earned

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20 J.N. Efferson, op.cit., p. 77.
21 Ibid., p. 76.
22 Ibid., p. 78.

on the capital investment. The percent return on capital or investment represents the rate of earnings produced by capital invested in the farm business".[23]

Returns to capital are computed by first subtracting from the farm earnings (farm income) the value of the operator's labor and management services, estimated at what he could earn elsewhere if he were to perform these services for the owner of another farm.

The percent return to capital is a useful measure for Lebanese businessmen with large capital investment in a farm. They are used to thinking in terms of this measure because they are more interested in the returns on the capital invested in the business rather than the earnings for their labor.[24] Quite often businessmen who own farms devote a few hours per week to directing the workers and overlook the fact they are doing the management of the farm since it is a hobby for them.

This measure is particularly useful for absentee owners who hire all labor and management for their farms. However, the percentage of such poultry farms in Lebanon is quite low, and it is for the most part restricted to the hatcheries and the integrated farms with over 4000 layers, both of which are not included in this study. The majority of poultry farms in Lebanon are run with hired labor but management is performed by the farm-owners on a non-cash basis. Hence this measure of returns would not be representative of the actual situation in Lebanon.

Moreover, the accuracy of this measure depends to a large extent on the accuracy with which the remuneration for management, which is

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23 Ibid.
24 Ibid., pp. 78-79.

most often performed without a salary and which does not have a clearly recognized market price, is allocated. Consequently, these factors render returns to capital a less useful measure than returns to management, on which the discussion is now focused.

4. Returns to Management

Another measure of farm returns is the concept of returns to management. But let us first consider what this term means and what it actually measures, and why it is considered to be a good measure of returns for Lebanese poultry farms.

Returns to management is the measure which segregates the reward to the farmer's management rather than including it with the reward to labor and capital, as in farm earnings, or with the reward to labor, as in operator's net earnings.

Net returns to management is calculated by deducting from operator's net earnings wages for the labor of the farmer valued at prevailing market rates, or what he could earn as a laborer in a similar job doing the same kind of work. They can serve as an equitable basis for comparing the returns of the various individual farms or groups of poultry farms being studied, as well as comparing poultry farming as a whole with other types of business. Its chief merit is that it is not an aggregate measure, combining the returns for labor, management, and capital, but rather measures the returns to management for various individual farms or groups of farms on a comparable basis.

Since the great majority of owners of poultry farms in Lebanon are managers of their farms and do not do any of the physical work, it is more useful to compare returns to management than any other form of returns.

This approach is often desirable to use in such instances when an official agency, as the government of a country, wishes to compare the remuneration for management which these owners of layer farms are receiving, with returns to management in other enterprises in agriculture, and possibly elsewhere, because in the light of such knowledge it would be able to decide on the best national policy to adopt for keeping returns to management in poultry in line with returns to management in other enterprises, while at the same time keeping the prices to consumers reasonably low. In short, this knowledge could guide the government in any decisions of price fixing or subsidies, and the extent to which it is desirable to afford protection to Lebanese producers of eggs. Actually, this is one of the basic reasons for undertaking this study, and hence returns to management seems to be an appropriate measure of farm returns to use in this study, because it serves the objectives best.

On the other hand, this measure of returns has certain shortcomings or disadvantages, which are also characteristic, to varying degrees, of other measures of return. For one thing, it depends in many instances on the estimates of the value of inputs, such as the cost of family labor; however, this is not a serious limitation in Lebanon because the proportion of such labor is relatively unimportant; the value of the operator's labor and the rate of interest charged on the owner's investment. "The only items which could be computed accurately are the sale of farm products, the cost of hired labor, and supplies bought. All other items have to be estimated. For this reason, the evaluation of family labor, operator's labor, and the interest on investment will

affect the magnitude of all measures except net cash income".[25] Obviously, any error made in these estimates would reduce the accuracy of returns to management, as well as the other measures of return.

The merit of returns to management as a measure of returns from egg production depends chiefly upon the degree of accuracy with which deductions can be made for interest charges, and labor utilized on a non-cash basis. Such accuracy is achieved, within limits, when comparing individual farms or groups of farms by observing uniformity in assigning values to non-cash inputs.

In this study, the measure of returns that will be used is returns to management, because they seem to have wide applicability in Lebanon. The other measures are mainly intended for use by the diversified family-type farms which prevail in the United States and where they are more interested in comparing the returns of the different farms as representing family earning enterprises rather than on the basis of comparing remunerations of poultry farm owners for their management. In Lebanon the commercial egg farms are not run by whole families who live on these farms. Rather, the majority of them are run by owners themselves who supply their management services, and sometimes their labor, to the business on a non-cash basis. In the latter case, labor earnings, which measure the return to the operator's labor and management of the farm, would be an appropriate measure. However, the majority of poultry farms in Lebanon are run by hired labor, and a few farms, especially the big and integrated farms, with even hired management. Therefore,

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25 G.W. Forster, Farm Organization and Management, p. 414.

we have no other uniform basis for comparing these returns, especially when management is not hired but supplied mostly on a non-cash basis.

Obviously the measure of returns to management reduces all these differences to one residue, which is the amount of earnings attributable to management, after deducting charges for all inputs of production used in the business, except management which is treated as the residual claimant.

Finally, it must be emphasized that whichever measure is used for computing returns, it must be consistently used for all farms or groups of farms being analyzed, and even for the same farm being studied from year to year. This is an essential part of any economic analysis, since only then will we be certain that differences in returns are due to differences in the farm management practices and differences in the efficiency of the use of the various factors employed by the farm business, and not simply due to differences in accounting procedures used.

F. Valuations, Kinds of Costs, and Cost Relationships

We often hear the question asked, "how much does it cost to produce an egg?" One producer might volunteer and give his cost of production, only to be challenged by another producer that his cost is either too "high" or too "low". But could egg production costs be very much different for the different flock sizes in the same country, or even among flocks of the same size? The answer is that they could, but probably are not. The differences of cost figures quoted, in all probability, result from the fact that the two statements were referring to two different kinds of costs. Therefore, let us now briefly consider the kinds of costs that a farmer incurs in producing eggs.

The term "cost of production" is a very ambigious one since there are several concepts of costs. One such concept is that of total costs, and here we have total costs, which includes total fixed costs and total variable costs. We also have the comparable average total costs, average fixed costs, and average variable costs. In addition we have the concept of marginal cost. Moreover, the term "cost of production", if accurately used, should refer to a certain level of production, because the cost of production per unit of product might vary with the different levels of output in the production process.[26]

There is the further complication of the time period involved, or under consideration. "In economics, it is useful to think of planning periods as being short-run or long-run periods. By the short-run is meant a period of time which is long enough to permit desired changes in output without altering the size of the plant. The long run is generally considered to be that period which is sufficiently long for output to be altered by varying either the size of the plant or by making a more intensive or less intensive utilization of the existing plant".[27]

In order to understand thoroughly the various costs that exist, especially fixed costs, it becomes imperative to know the methods of valuing the various assets, since such valuations may cause either very high or very low farm returns in accounting records.

1. Valuation of Farm Assets

"Whenever property of any kind is sold in a market place it has a price. But occasion frequently arises for an economic valuation of

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26 K.E. Boulding, Economic Analysis, pp. 455-456.
27 C.E. Bishopand W.D. Toussaint, Introduction to Agricultural Economic Analysis, p. 70.

property that is not put up for sale"[28]. Difficulties of this kind arise in taking inventories or settlement of estates and in making loans, as well as in calculating the costs of production.

Hence it becomes important to understand some of the principles involved in such valuations and how they are applied.

For computing depreciation, interest, and other charges, the problem of valuation of assets becomes an extremely important one in accounting procedure, as it can theoratically and mathematically have a significant influence on farm returns. The liquid assets of a farm can be valued with a great degree of accuracy. The majority of farm assets, however, are fixed and are not traded in the open market, and hence they do not have an exact value. In this case, one of three valuation methods could be used.

The first method values a fixed asset according to its acquisition price; the second method values it according to its current price; while the third method values a fixed asset on the basis of future replacement cost, or the estimated cost of replacing the asset after the expiration of its useful life.

Different methods of valuation have different uses. Authors are not in agreement among themselves as to which methods should be used for the valuation of farm real estate property. However, it will be briefly attempted here to consider the method which is believed to be justifiable yet practical to use in this study.

Valuation of buildings and equipment was made on the basis of the acquisition cost of these assets when the poultry farm was started for figuring annual depreciation charges. From the acquisition cost of buildings

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28 J.D. Black, Introduction to Economics for Agriculture, p. 551.

and equipment annual depreciation charges were deducted to arrive at the depreciated value of such assets. Investment in buildings and equipment was then figured on the average depreciated value when the survey was conducted, because that was nearly how much the owner would have had to pay to buy similar buildings or equipment.

The valuation of poultry farm land deserves special consideration. Ordinarily farm land is valued on the normal value of a class of land in a certain region based on a 10-12 years' average. A yet better method is valuation on the basis of a weighted moving average, whereby the last year included in the average is dropped out and the latest year is included, which is also given more weight than the previous years. But this method is very laborious and impractical for this study, and land was valued at its market price when the farm was started. Hence, the investment in land could not be figured on the acquisition cost, because some people might have inherited their land in the distant past when price relationships were completely different, and then kept the same land for a long time before the poultry farm was started. This system of valuing land is believed to be justifiable to use in this study, since that was what the owner should have paid to get the land to build the poultry house on it when the farm was started. Moreover, it is useful in this study since the majority of layer farms were started in the latter part of 1959 and in 1960, when land values did not change greatly as to have reflected significant effects on the findings.

However, once the value of real estate property has been established for a farm, this same value, less depreciation, if any, should be used from year to year for figuring investment, except when new buildings are erected or permanent improvements have been made, in which case the value of the

farm real estate would increase by how much these additions have cost. This practice is followed to exclude any severe and temporary fluctuations in real estate values from one time period to another. "A farm is ordinarily a life-time investment, and any paper profits or losses because of temporary changes in land and other real estate property values should not confuse the record of the net return or loss on the farm as an operating unit for the year ".[29] This situation is particularly true in Lebanon where land and farm sites have greatly appreciated in value up till 1958. Due to the civil strife in that year, land values witnessed a significant drop in value, after which they have now recovered. Hence, if the market value of land at the beginning and end of each year was used, some of the farms started prior to the civil strife might have shown unreasonably high returns, although they might have actually lost on the year's operation. These same farms could have shown big losses in 1958 and right after when land values declined, simply due to a temporary change in land values. Hence the necessity for establishing values for farm assets and maintaining these values, becomes obvious.

The method of valuation used in this study which is a modification of the method of valuation according to the acquisition value of buildings and equipment, and the market value of land when the farm was established, has several advantages. First, this method is more equitable for determining the value of fixed assets since some assets have no price of acquisition because they have been inherited, or their value might have been out of line when purchased and before the farm was started. In addition, valuation of buildings and equipment on current prices necessitates a detailed study of numerous factors including the cost of steel, concrete, labor and several other factors which renders the work very laborious and the major

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29 J.N. Efferson, op.cit., p. 97.

attention would shift from the costs of producing and returns from selling eggs, to that of valuation. Moreover, valuation according to the cost of reproduction involves not only a detailed knowledge of the present but also an accurate projection into the future, which can not be accomplished with any reasonable degree of ease and accuracy. Not only this, but land, a major farm asset, has no cost of reproduction .

2. Kinds of Costs and Cost Relationships

For simplicity, costs can be divided into two general categories, namely fixed costs, and variable costs.

a. Fixed costs

"Fixed costs are those costs that have to be paid whether any production is carried or not".[30] Once buildings are constructed and equipment bought, fixed costs exist and must be paid even though the layers are never put in the buildings or the equipment never used.[31]

The components of fixed costs are depreciation, interest on investment, taxes and insurance, if any.

(i) Depreciation: buildings and equipment decrease in value with the passage of time due to normal wear and tear and due to obsolescence and, hence, if they are sold they can not redeem their full acquisition cost. After expiration of the normal life of an asset it has to be replaced by another similar asset for nearly the same price. Thus, by charging each year as an expense the percentage of the original cost representing the number of years of normal life divided into 100, provides

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30 C.E. Bishop and W.D. Toussaint, op.cit., p. 70.
31 A.P. Stemberger, "Egg Production Costs, What Are They ?", Egg Producer, v. 92, Jan. 1961, pp. 10-11.

for this replacement. The annual depreciation charges are accumulated in a reserve for depreciation to provide the money to pay for the replacement, when needed.

There are several methods of computing depreciation charges but the simplest is the straight line method. According to this method, the salvage price of an asset is subtracted from its acquisition price, and the difference divided by the normal length of life of the asset to get the annual depreciation of that asset. In using this method equal yearly charges are deducted. Although actually assets depreciate more during the first years and less toward the end of the estimated useful life of an asset, the straight line averages out such yearly differences and facilitates computation on the basis of the acquisition price.

The method followed in this study for calculating depreciation is a modification of the straight line method. Depreciation charges for buildings and equipment are calculated as a percentage after taking into account the original price, the salvage price, and the useful life of the asset as well as obsolescence. For instance, if the acquisition price of an asset is LL.1000, its scrap value is LL.200, and it is expected to be used for eight years, then the normal rate of depreciation would be 10% of the acquisition price. But because of obsolescence the rate tends to be somewhat higher, or around 12% annually.

Almost all poultry houses are made out of concrete-block walls and concrete floors, with either eternite or aluminum roofing. The estimated useful life of such houses is nearly thirty years. Taking into account the salvage price of such houses, if any, and the effect of obsolescence, a 4% annual depreciation charge on the original cost of construction or

purchase price was deducted. The different kinds of poultry houses were fairly well distributed among the various groups so that the same percentage charge was deducted for all groups.

For poultry equipment, generally speaking, the useful life is estimated to be over eight years, and possibly ten. Again, allowing for scrap value and obsolescence, a 12% annual depreciation charge was used for poultry equipment.

There are no depreciation charges on land since it does not decrease in value due to wear and tear or obsolescence. No depreciation charges are figured for the laying flock, because the layers are assumed to be sold at the end of the laying year and their value credited against the enterprise.

(ii) Interest on Investment. This is another fixed cost because interest on any loan or borrowed money should be paid on due date, regardless of whether we have any production or not.

This item of fixed expense could be looked at from another view point. If a farmer's capital had not been invested in his farm, it could have been put aside in a bank and earn a percentage return on the money. This forsaken return is roughly equivalent to the cost of using capital in a farm, or the rate of interest.

Farm management practice is to calculate interest on the farmer's investment at the rate he would pay a bank because his capital is mingled with the borrowed money. Some producers provide all of the capital needed for the business; others borrow only a small part, and still others borrow a greater part. Hence, when we want to compare farms for efficiency factors

as reflected in returns to management, we must charge a uniform rate of interest on the average investment in the business, regardless of whether all or none of the invested capital was borrowed. This provides a uniform basis for comparing the effect of various factors upon returns to management.

A uniform rate of interest was charged for the use of capital for all groups, since some farmers in each group did not borrow any money at all and hence any interest charges that would have to be made should be based on the comparable rates that other producers would have to pay for the use of capital. The rate of interest should be computed on the average investment in the business, as explained earlier. The assets on which interest is charged include the buildings for the poultry farm, poultry equipment, the birds (including both layers and replacement stock), the average amount of operating capital used, and land. The use of a uniform rate of interest on the average investment in the business is essential so that differences in the rates of interest charged and the proportion of borrowed capital will not shadow the more important factors responsible for differences in costs and returns.

Interest on poultry houses and equipment was computed as a flat percentage rate of the average of the depreciated value of the assets. The investment in the layers on which interest was charged included the cost of chicks started plus the value of feed consumed till laying which is estimated to be between 10-11[32] kilograms per pullet, since this is the value that is tied up in the layers throughout the year. Since for every layer kept a replacement pullet should be started nearly six months before the end of the laying year so that by the time the layer is replaced

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32 Based on D.R. Marble and F.P. Jeffrey, Commercial Poultry Production, p. 115.

the pullet would become of laying age, then interest was calculated on the replacement chick cost for six months only.

The investment per 100 layers and their replacements for each group of farms is based on allowing the percent mortality of chicks belonging to each group from the time they are day old till the end of laying life. If chicks are bought on a straight-run basis, it becomes necessary to double this figure, since it is expected that only half the stock bought will be females. If sexed chicks are bought only, the investment in birds would be equal to the price of the number of chicks started, allowing for usual mortality, so as to have the laying house still full when the laying year is half over.

Thus, assuming that 100 sexed day-old chicks are bought at LL.1.00 each, and assuming 15% mortality from day old chicks till the end of laying life, then the investment per 100 layers and the 115 pullet chicks to replace them will be figured on LL.115.00 for one year and LL.115.00 for only six months. If the chicks are bought straight-run at 50 piasters each, and assuming the same rate of mortality, then the investment in 100 layers will be LL.115.00 for a whole year, since 230 mixed chicks have to be started to end up with 100 layers. Interest on investment in replacement chicks is charged on the basis that 115 chicks are needed to be raised for six months to have 100 layers at the end of the laying year. Thus interest on replacements is calculated for six months on the cost of the replacement chicks started.

Operating capital always available on hand is estimated to be roughly equal to one twelvth of the total amount of variable costs, less

the value of the feed consumed by the replacement chicks till laying age, which was included with the value of the layers. This estimate is justifiable if we assume that enough liquid capital is always available on hand to pay the variable expenses of the farm for one month since accounts for eggs sold are generally settled monthly.

Interest is charged at the going rate of 7 per cent per annum. Banque de Credit Agricole, Industriel et Foncier extends loans to individual farmers at the rate of 5.5 per cent annually, but grants loans limited to 35 percent of the appraised value of real estate property, or about 25 percent of the current value. Thus, Banque de Credit Agricole, Industriel et Foncier does not extend agricultural credit in sufficient amounts to meet the needs of most poultry producers. Such farmers have to take recourse to other sources of funds.

The only other reasonable source of credit is commercial banks. These banks charge rates of interest that range from 6-9 per cent per annum, depending on the credit worthiness of the borrower, his financial status, and the amount and type of real estate security which he can pledge as collateral. An average interest rate of 7 percent per annum is, therefore, considered to be appropriate to use as the cost of using funds.

(iii) Taxes, if any, on the value of land, buildings, equipment and machinery are a part of fixed costs too, since they conform to the general definition of fixed costs. So are insurance costs. For the present and near future, agricultural land, and equipment are exempt from paying any form of taxes. Taxes on poultry houses cost less than LL.0.10 per layer kept, and have therefore been neglected. Insurance charges have also been found negligible. Hence taxes and insurance charges are now ommitted when

considering fixed costs. If at any time in the future there is a revision of government policy to increase taxes on any or all of these items, or farm owners pay insurance charges, in more than negligible amounts, then these two items of expense should be considered part of the fixed costs.

b. Variable Costs

Variable costs are those costs which are incurred only if production is carried on. If we have no production, in the economic sense, then our variable costs are reduced to zero.[33]

Variable costs for egg production include such items as feed, labor (both hired and imputed), chick costs, etc. The value of the time of any unpaid laborers should be charged against the enterprise. Wages are computed on the basis of what each laborer could earn elsewhere if he were to do the same kind of work. Variable costs also include the cost of chicks, bedding, vaccines and medical supplies, electricity for lighting and running the machinery or equipment, fuel for brooding, water for drinking and cleaning, repairs, and marketing expenses, if any.

Repair costs are calculated as 2% of the original value of buildings and equipment and not on the present value because repairs usually increase when the asset becomes older. So if we calculate repairs on the basis of the average depreciated value, they would decrease in every succeeding year, which is not true. However, when we use a flat rate of the original value, this would even out the yearly differences because repair costs are much lower when the asset is first purchased.

"In making production decisions as to the quantities of variable inputs to use to maximize net revenue, therefore, the variable costs are

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33 Based on A.P. Stemberger, op.cit., p. 10.

the relevant costs".[34]

"Total variable costs represent the sum total of expenditures on the variable inputs for any level of output. They are short-run costs. The inputs included are those inputs which are variable in the length of run under consideration. Because the manager has control of all the variable inputs, total variable costs must be covered in their entirely in the short run or the manager will not incur the expenditure".[35]

"In the short run some costs are fixed and others can be varied. After the long run, however, all costs become variable, and costs which were fixed in the short run influence decisions to cease production or to alter the level of output".[36] "During the long run, all inputs are considered variable. Thus for the long run there are no fixed costs".[37]

c. Total Costs

Total costs are the sum total of both the total fixed costs and the total variable costs. The computation of total costs is an important intermediate step for calculating the net returns of a farm business. The net returns are equal to total or gross revenue less total costs.

So it becomes obvious that when we use the term cost of production we should be careful in indicating which concept of cost we are referring to. In this study, costs have been calculated or divided into fixed costs and variable costs, which are added to obtain total costs. Unless otherwise indicated, the term cost of production when used in the discussion shall refer to the net total cost of production, which is equal to the total costs

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34 C.E. Bishop and W.D. Toussaint, op.cit., p. 70.
35 L.A. Bradford and G.L. Johnson, op.cit., p. 184.
36 C.E. Bishop and W.D. Toussaint, op.cit., p. 70
37 Ibid.

less the miscellaneous credit items as the sales value of the hens, the cockerels sold for meat, and the value of the litter and manure produced.

3. Cost Relationships

The question now suggests itself, "How can the producer tell if he is making a net profit, just breaking even, or incurring a loss?"

Well, if gross returns, say per 100 eggs produced, are higher than the total costs required to produce those 100 eggs, including interest on the average investment and an imputed wage for the operator's own labor, then the producer is evidently making a net profit, which is considered to be the remuneration for his management.

If, however, gross returns and total costs are equal after allocating to each factor of production employed in the business its average or market price, then the producer will be breaking even or just covering his expenses including those actually paid for as well as those imputed, except management. But in this case the producer who is performing the labor services on his farm will be receiving an income from the farm business because he is receiving a return to his labor at the wage rate he has assigned, plus a return on that part of the capital that is debt-free at whatever rate he has chosen as equal to the current interest charged by banks. In this case,the owner of the poultry farm does not receive any returns or earnings for his management of the poultry farm.

When the gross returns do not cover the total costs as calculated above, then the producer is definitely operating at a loss. In this case he can view the situation in either of two ways. First, he can say that he is receiving the wage rate he has chosen for his own labor performed on the farm, but no remuneration for his management, and he is not covering

all of his fixed costs. Here he is said to be living partially on depreciation. Or, secondly, he can say that he is covering all of his fixed costs, but he had to take a lower wage rate for the labor services done on the farm than was originally chosen,[38] but no returns to management at all.

In the short run, the producer may go on operating when he does not cover all of his total costs, provided he is covering all of his variable costs, and he is anticipating the advent of a more favorable situation that later will compensate him for the temporary loss on his variable costs. Otherwise, it will not be worth incurring the expenditures on the variable inputs, and in that case it pays him to cease operation or production because then he will be incurring fixed costs only without having to lose on the variable expenses, and he can thereby minimize his loss. This is the case in egg production because fixed costs constitute only 13.6 percent of total net costs.

In the long run, however, the producer will go out of business eventually if he can not cover all of his total costs. He will be unable to replace buildings and equipment when they are worn out.

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38 A.P. Stemberger, op.cit., p. 11.

Chapter III

FACTORS AFFECTING EGG PRODUCTION COSTS AND RETURNS

Data collected, covering the period April 1960 to April 1961 from 22 specialized commercial layer farms in Lebanon ranging in size from 500 to 4000 layers per farm, revealed that the net cost of producing an egg was approximately 10.3 piasters, as shown in Table 3.

The average selling price per egg was 12.7 piasters, and each bird laid, on the average, 183 eggs annually. Returns to management averaged 2.4 piasters per egg sold, or LL.440.20 per 100 layers kept.

As indicated earlier, these costs include those of rearing the pullets or replacements because the data collected did not permit the separation of costs between the two enterprises. The major items of expense in the cost of producing eggs were, in the order of importance, those of feed, fixed costs, labor, and chicks, which accounted for over 95 percent of the total gross costs of production. Feed alone made up 66.8 percent of total gross costs, followed by fixed costs, which made up 10.4 percent of these costs, labor 9.2 percent, and chicks, 8.8 percent. All the remaining items of expense made up less than 5 percent of the total gross costs of producing eggs.

A. Effect of Flock Size on Egg Production Costs and Returns

The exact relationship between the size of the layer enterprise and cost structure is not fully known. One of the main objectives of undertaking this study was to ascertain if any relationships exist between flock size and egg production costs and returns. Consequently, the 22 farms from which data was collected were divided into four size-groups, which were thought to be fairly representative of the various sizes of

Table 3 - Costs and Returns[39] Per 100 Layers According to Flock Size, 1960-61

Item		Average all farms	500-1000 Layers	1001-2000 Layers	2001-3000 Layers	3001-4000 Layers
No. of farms		22	7	9	3	3
No. layers per farm[40]		1565	793	1400	2100	3325
RECEIPTS:						
No. eggs per 100 birds		18320	19220	17667	19150	18300
Prices - pts. per egg		12.7	12.7	12.7	12.6	12.8
Value -	LL.	2326.65	2440.95	2243.70	2412.90	2342.40
EXPENSES:						
VARIABLE						
Feed	LL.	1658.05	1760.45	1670.20	1685.35	1532.80
Labor[41]	LL.	227.35	325.00	236.00	160.00	171.00
Chicks	LL.	218.00	213.00	172.00	220.00	307.00
Medicines	LL.	37.00	70.25	35.45	26.80	18.35
Repairs[42]	LL.	31.00	32.80	25.00	32.40	40.00
Electricity	LL.	19.55	23.80	14.10	22.90	24.35
Litter	LL.	11.55	17.70	12.35	9.90	6.00
Brooding	LL.	14.95	11.95	15.95	16.05	14.35
Water	LL.	4.40	6.25	3.70	6.10	3.15
Total Variable Costs	LL.	2221.85	2461.20	2184.75	2179.50	2117.50
FIXED						
Depreciation: Bldgs.[43]	LL.	48.05	59.60	43.20	48.50	47.35
Eqpt.[44]	LL.	16.60	18.50	14.40	21.35	16.25
Interest on investment[45]	LL.	192.85	210.70	167.00	161.85	252.75
Total Fixed Costs	LL.	257.45	288.80	224.60	231.70	316.30
TOTAL COSTS	LL.	2479.30	2750.00	2409.35	2411.20	2433.80
MISCELLANEOUS CREDITS:						
Sale of hens	LL.	443.35	466.65	444.90	425.60	431.95
Cockerels	LL.	99.55	86.00	139.70	97.55	36.10
Manure	LL.	49.95	45.60	54.55	65.25	35.35
Total Misc. Credits	LL.	592.85	598.25	639.15	588.40	503.40
NET TOTAL COSTS	LL.	1886.45	2151.75	1770.20	1822.80	1930.40
Net cost per egg-pts.		10.3	11.2	10.00	9.5	10.5
Returns to management:						
Per egg - pts.		2.4	1.5	2.7	3.1	2.3
Per 100 layers	LL.	440.20	289.20	473.50	590.10	412.00

39 Rounded to the nearest five piasters.
40 Average number of layers kept throughout the year.
41 Includes the value of unpaid labor, including that of the owner himself, if any, but excluding the value of management.
42 Calculated at the uniform rate of 2 percent of the acquisition cost of buildings and equipment.
43 Computed at the uniform rate of 4 percent of the acquisition cost of new buildings and the deprec.price of old buildings when the farm was started.
44 Calculated at the uniform rate of 12 percent of the acquisition cost of equipment.
45 Calculated at the uniform rate of 7 percent of the average investment in land, buildings, equipment, layers, replacements, and operating capital. For further detail see Table 9.

specialized layer farms in Lebanon, namely, farms keeping 500-1000 layers, 1001-2000 layers, 2001-3000 layers, and 3001-4000 layers respectively. The costs and returns of each flock size were studied to find out in what ways the various sizes affect these costs and returns, and discover possible trends that might exist.

Analysis of the data presented in Table 3 reveals that total variable costs per 100 layers decreased steadily from LL.2461.20 to LL.2117.50 as flock size increased from 500 to 4000 layers. Flock size, however, did not have any observable effects on fixed costs which varied erratically among the various flock sizes. It was highest for the largest size flocks, and lowest for the second-smallest size flocks.

Total cost was highest, or LL.2750.00, for the smallest flocks, but did not vary appreciably between the other flock sizes. There was no evident increase or decrease in total net cost with changes in flock size. Receipts from the sales of miscellaneous credit items are subtracted from total costs to obtain the total net cost of producing eggs.

The net cost of producing an egg decreased steadily from 11.2 piasters to 9.5 piasters as flock size increased from 500 to 3000 layers, but not beyond, mainly because of the abnormally high investment of the largest size flocks in farm assets, especially land and birds. Returns to management per egg produced and per 100 layers gradually increased from 1.5 piasters per egg sold and LL.289.20 per 100 layers raised for flocks with 500-1000 layers to 3.1 piasters per egg and LL.590.10 per 100 layers for flocks with 2001-3000 layers.

After the presentation of this general view, let us now consider separately the returns and the major items of costs.

1. Returns from the Sale of Eggs

The returns from the sale of eggs varied widely and inconsistently for the different flock sizes. Such returns are a function of the number of eggs produced per bird per year and the selling prices of eggs. Egg prices for the different flock sizes did not deviate by more than 0.1 piasters from the average price for all farms of 12.7 piasters.

Therefore, egg production per bird per year was the major factor affecting farm returns. The annual production per bird kept was not affected by flock size and did not deviate widely from the average of 183, as can be seen in Table 4.

Table 4 - Relationship Between Size of Farm, Annual Production, and Egg Prices, 1960-61

Size of farm	Average all farms	500-1000 Layers	1001-2000 Layers	2001-3000 Layers	3001-4000 Layers
No. of farms	22	7	9	3	3
No. of eggs laid per bird	183	192	177	192	183
Egg prices - pts. per egg	12.7	12.7	12.7	12.6	12.8

2. Variable Costs

There was a general tendency for the costs of feed, labor, medicines, and litter to decrease as size of flock increased from 500 to 4000 layers. One of the major items of expense, chick cost, exhibited a wide variation among the various flock sizes, and was mainly affected by the percentage of chicks bought sexed, which cost substantially more than mixed chicks.

Other cost items as repairs, electricity, and brooding varied inconsistently, and were affected mainly by management decisions and local prices.

We shall now discuss in some detail the major constituents of variable costs.

a. Feed Consumption and Prices

Feed cost gradually decreased with increasing flock size. It was highest, or LL.1760.45 for the smallest flocks, and lowest, or LL.1532.80, for the largest flocks. These figures, however, are somewhat distorted by the different percentages of mixed sex chicks started by each group as the cockerels consumed substantial quantities of feed before they were sold for meat. When feed consumption per layer was analyzed, a somewhat different picture emerged. Feed consumption did not decrease with increasing flock size, but rather showed inconsistent variation. It averaged 38.0 kilos per hen annually, as revealed by Table 5 below.

Table 5 - Feed Consumption, Prices, and Efficiency in Relation to Flock Size, 1960-61

Item	Average all farms	500-1000 Layers	1001-2000 Layers	2001-3000 Layers	3001-4000 Layers
No. of farms	22	7	9	3	3
No. eggs per layer	183	192	177	192	183
Feed costs - LL (including replacements)	1658.05	1760.45	1760.20	1685.35	1532.80
Price per kg. feed-pts.	34.1	35.0	34.1	32.5	32.0
Kgs. feed per layer[46]	38.0	39.0	37.1	40.4	37.1
Eggs produced per kg.feed	4.8	4.9	4.8	4.8	4.9

46 Estimated after allowing 10-11 kilograms of feed per pullet raised, and 3 kilograms of feed per kilogram of dressed meat of cockerels.

The figures on feed consumption presented in this study are only estimates and do not indicate the actual amounts consumed since independent figures on the feed consumed by the layers alone were not obtainable. They were arrived at by assuming that every pullet consumed 10-11 kilograms of feed from the time it was day old till laying age, and also that male chicks marketed for meat each consumed an average of 3 kilograms of feed for every kilogram of meat, regardless of flock size. The quantity of feed consumed per layer during one year was calculated by subtracting the amount of feed consumed by the replacements and the cockerels from the total quantity of feed consumed during the year, and dividing the balance by the average number of layers kept.

Egg production was found to vary directly with the average amount of feed consumed per layer in each group. This is the normal relationship of feed to production, but it need not always be so, as some feed wastage may occur to offset this normal situation. Feed prices, however, exhibited a definite tendency to decrease from 35.0 piasters a kilogram for the smallest flocks to 32.0 piasters a kilogram for the largest flocks. This is probably due to the discount on the larger volume of feed bought by the larger farms. There was practically no difference in the percentage of concentrate in the feed among the different size-groups.

There was no substantial difference among groups in the efficiency of feed conversion, which did not vary by more than one tenth of an egg for every kilogram of feed consumed. On the average, every kilogram of feed was converted into 4.8 eggs.

b. Labor Cost and Efficiency

Labor cost per 100 layers decreased considerably from LL.325.00

to LL.171.00 with increasing flock size in the limit of 500 to 4000 layers, as revealed by Table 6. Labor cost for the 2001-3000 group is out-of-line due to the sub-normal wage rate.

Table 6 - Labor Cost and Efficiency in Relation to Flock Size, 1960-61.

Item	Average all farms	500-1000 Layers	1001-2000 Layers	2001-3000 Layers	3001-4000 Layers
No. of farms	22	7	9	3	3
Annual wages per 100 layers LL.	227.35	325.00	236.00	160.00	171.00
Layers per worker	803	529	813	1025	1108
Wage per worker per month LL.	152.00	143.00	160.00	135.00	158.00
Labor cost per egg-pts.	1.24	1.69	1.34	0.84	0.93
Dozen eggs sold per man	12246	8464	11992	16400	16897

These figures on labor cost do not furnish evidence that labor efficiency, as measured by the number of layers looked after by one man, decreased for flocks with 3001-4000 layers. To be more precise, labor efficiency increased in this range, and every worker on the largest size farms was looking after more layers (1108 layers per man) than the worker on the next-largest size farms (1025 layers per man).

We can safely conclude that labor efficiency exhibited a definite tendency to increase with larger flock sizes in the range of 500 to 4000 layers. Laborers on the largest farms were looking after more than double the number of layers looked after by laborers on the smallest farms.

Labor cost per egg produced, which is a function of labor cost and efficiency as well as annual production, fell from 1.69 piasters for

farms with 500-1000 layers to 0.84 piasters for farms with 2001-3000 layers, but again rose to 0.93 for farms with 3001-4000 layers. Although the largest farms had a higher labor efficiency, they also paid higher wages per worker and their layers produced less eggs than the next-largest size farms. Consequently, they averaged a higher labor cost per egg produced.

Labor productivity, which is measured by the number of eggs sold per worker, excludes the effect of wages. The increase in labor efficiency as flock size increased more than offset the effect of varying annual production for the different flock sizes.

Consequently, the number of eggs sold per man rose from 8464 dozen eggs to 16897 dozen eggs as flock size increased from 500 to 4000 layers.

In a study of 47 farms in Indiana, Eisgruber and co-workers found out that "the amount of labor required to care for a layer and to produce a dozen eggs was considerably lower for large flocks than for small flocks".[47] Labor cost per 100 layers decreased as flock size increased from 250 to 1000 layers. It rose slightly for flocks with 1000-1500 layers.

For 14 Florida farms, it was found out that on farms with less than 6000 layers, every worker looked after 1,850 layers, and 31,642 dozen eggs were sold per man, in contrast to 3399 layers kept and 61508 dozen eggs sold per worker on farms with over 6000 layers.[48]

The foregoing discussion suggests that labor efficiency increases with flock size from 250 to over 6000 layers, which is probably influenced

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47 L.M. Eisgruber, E.W. Kehrberg, and J.W. Sicer, Effect of Flock Size on Egg Production Costs and Returns, p. 4., Purdue Univ. Res. Bull. No. 688.

48 Based on Univ. of Florids, Business Analysis 1959, p. 7, Agr. Ext. Serv. Econ. Series 60-4.

by use of more labor-saving equipment in these states. It is not known at what flock size labor efficiency stops increasing.

c. Chick Costs

Chick cost varied haphazardly and inconsistently among the different size groups as revealed by Table 7 below. It was mainly determined by what proportion of chicks started were bought sexed.

Table 7 - Factors Affecting the Cost of Replacements Per 100 Layers, 1960-61

Item	Average all farms	500-1000 Layers	1001-2000 Layers	2001-3000 Layers	3001-4000 Layers
No. of farms	22	7	9	3	3
Cost of chicks started-LL.	218.00	213.00	172.00	220.00	307.00
Price of sexed chicks-pts.	233.0	205.0	183.0	225.0	285.0
Price of mixed chicks-pts.	70.1	73.8	69.3	70.0	70.0
Percent sexed chicks	34	62	29	51	82
Percent mixed chicks	66	38	71	49	18
Percent mortality	13.5	13.9	11.7	16.0	15.1

Chick cost per 100 layers was highest, or LL.307.00 for the largest size flocks, who bought the highest percentage of 82 percent of the chicks started sexed and paid the highest price of LL.2.85 for every sexed chick bought. It was a minimum, or LL.172.00 for the second-smallest size farms who bought the lowest percentage, or 29 percent, of chicks started sexed, at a lower price of LL.1.83 per sexed chick purchased. The former farms were paying 155 percent more for every sexed chick bought. The prices of

mixed chicks did not change either appreciably or consistently, and varied by less than 7 percent per chick among the various groups.

Chick cost per replacement pullet was also somewhat affected by the rate mortality till the end of the laying life of birds, which was highest, or 16.0 percent, for the second-largest flocks, and lowest, or 11.7 percent, for the next-smallest size flocks.

d. Miscellaneous Cost Items

Medicine and litter expenses generally decreased as flock size increased. This could be due to the bigger discounts for the larger farms which bought more of these items, or to the fact that the smaller farms were more liberal in buying medicinals and litter, which reconcile with the lower rate of mortality reported by the smaller farms.

There was a wide variation in the cost of other expense items as electricity, water, and brooding between different flock sizes. Differences in the cost of electricity and water are due to variations in the amounts of electricity and water used by every size group, and the prices paid for them. Brooding cost varied mainly because of the varying lengths of time for which chicks in the various groups were brooded.

3. Fixed Costs

Flock size had no significant effect on total fixed costs, which did not vary in any specific pattern with changes in flock size. On the average, interest charged on the average investment of the farm inventory constituted over 75 percent of the total fixed costs, and also varied inconsistently. It was mainly affected by varying investments in land and birds. The prices paid for land were decided by the owners of the farms without regard to

the size. Moreover, the manager had much to say on the price of birds, by deciding to buy sexed or mixed chicks.

Depreciation charges for buildings and equipment constituted the remaining 25 percent of fixed costs.

a. Depreciation Charges

Depreciation charges for buildings and equipment which are related to the investment as decided by the owner rather than flock size, varied inconsistently among flock sizes. Building depreciation charges were highest, or LL.59.60 for the smallest flocks, which kept the least number of layers and replacements and had the second-highest construction cost per square meter of floor space as shown in Table 8. Equipment depreciation charges were highest, or LL.21.35, for the second-largest flocks, and were 28 percent higher than the average for all farms.

b. Interest Charges

Interest was charged at the rate of 7 percent per annum on the average investment of the farm in land, poultry buildings and equipment, layers, replacements, and operating capital, as explained earlier. The combined investment in these items decreased from LL.3010.00 to LL.2312.00 as flock size increased from 500 to 3000 layers, but not beyond. Thereafter it rose sharply due to the sharply rising investment in land, as revealed by Table 9, and was highest, or LL.3611.00 for the largest flocks. This is 56 percent more than the average investment for the second-largest flocks, and 31 percent more than the average investment for all farms. Investment in land varied nearly ten-fold among groups. It ranged from a minimum of LL.161.00 for flocks with 2000-3000 layers, to LL.1429.00 for the largest flocks. The difference was not mainly due to variations

Table 8 - Depreciation of Buildings and Equipment Per 100 Layers, 1960-61

Flock size	No. of farms	Buildings				Equipment	
		Acquisition cost - LL.	Annual[49] depreciation LL.	Layers per square meter	Cost per square meter LL.	Acquisition cost - LL.	Annual[50] depreciation LL.
Average all farms	22	1201.00	48.05	3.1	36.60	138.00	16.55
500 - 1000 layers	7	1490.00	59.60	2.5	36.10	154.00	18.50
1001 - 2000 layers	9	1080.00	43.20	3.3	34.40	120.00	14.40
2001 - 3000 layers	3	1212.00	48.50	2.7	33.10	178.00	21.35
3001 - 4000 layers	3	1184.00	47.35	3.8	45.00	135.00	16.20

49 Charged at the uniform rate of 4 percent per annum for all flock sizes on the acquisition cost of buildings.

50 Charged at the uniform rate of 12 percent per annum for all flock sizes on the acquisition cost of equipment.

Table 9 - Investment Per 100 Layers in Relation to Flock Size, 1960-61

Item	Average all farms	500-1000 Layers	1001-2000 Layers	2001-3000 Layers	3001-4000 Layers
No. of farms	22	7	9	3	3
Land[51] - LL.	655.00	582.00	441.00	161.00	1429.00
Buildings[52] - LL.	1129.00	1400.00	1015.00	1140.00	1113.00
Layers[53] - LL.	580.00	608.00	577.00	592.00	653.00
Replacements[54] - LL.	109.00	107.00	86.00	110.00	154.00
Equipment[55] - LL.	115.00	129.00	99.00	146.00	111.00
Operating capital[56] - LL.	167.00	187.00	168.00	163.00	151.00
Total investment - LL.	2755.00	3010.00	2386.00	2312.00	3611.00
Interest at 7 percent LL.	192.85	210.70	167.00	161.85	252.75[57]

in the area of land utilized which averaged 77 square meters, for 100 layers and replacements. It was rather determined by the price of land which was LL.1.38 per square meter of land for the former, and LL.17.90 for the latter, which were mainly located along the main high-ways.

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51 Valued at the current market price when the farm was started.
52 Computed on the basis of the average depreciated value of buildings at the time of the survey.
53 Equals the chick cost plus the value of feed consumed till laying age.
54 Calculated on the replacement chicks cost for 6 months, which is equal to half the chick cost charged for one year.
55 Computed on the basis of the average depreciated value of equipment at the time of the survey.
56 Equals one twelvth the variable costs less the feed consumed by the replacement chicks till laying age.
57 Would be LL.184.25 if investment in land were LL.450.00.

Investment in buildings was highest, or LL.1400, for the smallest size farms, and lowest, or LL.1015, for the next-smallest size farms. It did not vary substantially between the remaining two groups. The differences are due to the number of layers raised, and the cost of construction per unit area. The smallest size farms were raising only 2.5 layers and their replacements per square meter of floor space, as compared with 3.8 layers and replacements for the largest size farms. Construction cost was highest, or LL.45.00 per square meter of floor space, for the largest size farms, and lowest, or LL.33.10 for the second-largest size flocks, as revealed by Table 8. It averaged LL.36.60 for all flocks One reason for the high cost of construction is that some of the poultry houses were built so they can readily be converted into dwelling houses should the poultry farm business prove unsuccessful.

Investment in layers and replacements was highest for the largest flocks for the reasons explained in the section on chicks. Investment in chicks was primarily determined by the decision of the manager regarding the purchase of sexed chicks rather than flock size.

Investment in equipment showed a great variation among the various size farms and did not follow any definite pattern.

Operating capital exhibited a definite tendency to decrease with flock size.

On the whole, it can be said that total investment decreased with flock size. The only exception was the 3001-4000 size group, which had abnormal investment in land, and also had a higher investment in layers and replacements in relation to the other groups. This seems to suggest that if allowance is made for this situation, then larger farms would show

a tendency toward lower investment and, consequently, lower fixed costs than smaller farms.

4. Total Costs

Total costs were highest for the smallest size flocks, which had the highest costs of feed, labor, medicines, and litter. It was appreciably lower for the 1001-2000 and 2001-3000 layer groups, but rose thereafter for the 3001-4000 layer group.

If due allowance is made for the abnormally high fixed costs of the largest size group, which were primarily determined by the unusually high investment in land and birds, then total costs would decrease with increasing flock size in the range of 500 to 4000 layers analyzed.

5. Miscellaneous Credit Items

Comparison of total costs for the different size groups to judge the efficiency with which these farms are run may be misleading, because the various flock sizes were starting different percentages of sexed and mixed chicks, and hence, some of the differences in total cost may be attributed to this single factor. A more equitable measure for comparing aggregate costs is total net cost, which is computed by deducting the miscellaneous receipts of the farm business, as the sales value of the hens which are assumed to be sold at the end of the year, the receipts from selling the cockerels for meat, and the value of the manure and litter.

To some extent, this measure compensates the effect of the varying percentages of sexed chicks bought on total costs, by crediting to each enterprise the proceeds from the sale of male chicks which have cost additional feed, labor, etc.

Total credit from miscellaneous receipts was not affected by flock size. It was primarily determined by the percent of mixed chicks started. It was highest, or LL.639.15 for flocks with 1001-2000 layers, who bought the highest percentage, (71 percent) of mixed chicks, even though they had the second-highest selling price of LL.2.19 per kilogram of live weight. It was lowest for the largest flocks flocks who bought only 18 percent of chicks started on a straight-run basis, and had the lowest selling price of LL.2.00 per kilogram of live weight. Differences in the sales value of hens and manure are primarily a reflection of the local prices of these items. Accurate estimates on the weight of hens at 18 months of age, when they are usually replaced, could not be obtained and hence it was estimated to be 2 kilos live weight for all farms alike. Therefore, any differences in the sales value of hens are mainly due to the different selling prices of hens sold for meat in each category. It was highest, or LL.2.35 per kilogram of live weight, for the smallest farms, and lowest, or LL.2.15 per kilogram, for the second-largest farms.

6. Total Net Costs

The total net cost of producing eggs was computed by subtracting non-egg income from the total costs. Non-egg income includes miscellaneous receipts from the sale of hens and cockerels, and the value of the manure sold, which are credited against the layer enterprise.

Since we are interested in comparing the costs and returns of the layer enterprise over the span of one year, then, by necessity, we should take into account the value of the remaining layers, after mortality, at

the end of the laying year as part of the farm receipts. We should exclude from this figure the value of all hens culled and sold during the course of the year, and which have been included in the value of miscellaneous farm receipts. In this study, for lack of records, we have not included the value of culls sold under the receipts. However, the meat value of layers remaining after mortality is taken to include the value of the culls as well.

All cockerels raised, which are a by-product of the layer enterprise, are sold for meat at various ages from 6-14 weeks of age. The value of these birds adds to the receipts of the layer enterprise, and so does the value of the manure sold from the layers and cockerels. However, since we are determining the cost of producing an egg, these receipts are treated as credits against total costs.

The net cost per 100 layers kept evidently was not affected by flock size and varied widely among the various flock sizes. This was due to the variations in miscellaneous receipts among the various size groups.

On the other hand, the net cost of producing an egg, which is a function of the total net costs per 100 layers as well as the annual production of birds, manifested a tendency to decrease from 11.2 piasters to 9.5 piasters per egg produced as flock size increased from 500 to 3000 layers. They increased again for the largest-size flocks on account of their abnormally high fixed and chick costs and average production of birds. It was lowest, or 9.5 piasters per egg for flocks with 2001-3000 layers who had the second-lowest total net cost per 100 layers, coupled with the highest annual production of 192 eggs per hen. Since total variable

costs decreased through the 3001-4000 layer size group, it is probable that when fixed and chick costs for this group are in line and the annual production per bird is also similar to that of the next-smaller size group, the net cost per egg would be lowest for the 3001-4000 layer group.

7. Returns to Management

Returns to management per egg produced and per 100 layers increased with flock size up to 3000 layers. It was highest, or +3.1 piasters per egg and LL.590.10 per 100 layers for flocks with 2001-3000 layers. This group averaged the highest returns to management because it had the highest annual production per bird and the second lowest net costs.

It seems that the lower returns to management for the largest flocks was primarily influenced by the unreasonably high fixed costs, the reasons for which have been explained earlier, the lower production of birds, and the unusually high chick prices. If fixed costs for this size group had been normal, and if they were starting a higher percentage of mixed chicks (that are cheaper in price and add to the value of miscellaneous credits), and had higher than average annual production of birds, both of which are determined by management practices and managerial ability rather than flock size, then this group would have had the highest returns to management.

8. Conclusion

The only positive conclusions to make about the effect of flock size are that variable costs per 100 layers decreased steadily as flock size rose from 500 to 4000 layers, and that labor efficiency increased

with increasing flock size within this range.

The observed tendency for total net costs to decrease as flock size increased up through 3000 layers indicates that when the fixed costs and the percentage of mixed-chicks started are normal, and annual production per bird is not less than that of the 2000-3000 layer farms then larger flocks up to 4000 layers would have lower total net costs and higher returns to management.

B. Other Factors Affecting Costs and Returns

The study further sought to determine if factors other than flock size influenced egg production costs and returns. Therefore, the costs and returns of the five most profitable and five least profitable farms were analyzed to determine those factors which had a significant bearing on costs and returns. It is interesting to note that very small as well as relatively big farms were found in both the most and the least profitable groups. This clearly indicates that factors other than size affect egg production costs and returns. Most notable among these factors are the number of eggs laid per bird and the selling prices of eggs, feed and labor costs, and the percentage as well as the price of sexed chicks started, in addition to investment. Management ability and practices should be given special importance when considering factors affecting costs and returns.

The discussion will now briefly consider egg production costs and returns to the high income and the low income farms, before taking up the important factors separately.

The net cost of producing an egg varied from a low 8.5 piasters for the most profitable farms, to a high 12.3 piasters for the least profitable farms, or 45 percent more, as is evident in Table 10.

Table 10 - Costs and Returns[58] Per 100 Layers for the Most vs. Least Profitable Farms, 1960-61

Item		Most Profitable Farms	Least Profitable Farms
No. of farms		5	5
No. of layers per farm[59]		1620	1110
RECEIPTS:			
No. of eggs per 100 birds		19300	17100
Price per egg - pts.		12.7	12.1
Receipts from eggs - LL.		2451.10	2069.10
EXPENSES:			
VARIABLE			
Feed	LL.	1617.95	1776.55
Labor[60]	LL.	201.50	318.90
Chicks	LL.	188.80	194.30
Medicines	LL.	37.75	37.85
Repairs[61]	LL.	26.85	46.70
Electricity	LL.	12.75	22.60
Litter	LL.	11.65	9.05
Brooding	LL.	18.25	12.85
Water	LL.	4.45	5.05
Total Variable Costs	LL.	2119.95	2423.85
FIXED			
Depreciation: Bldgs.[62]	LL.	42.05	54.20
Eqpt.[63]	LL.	17.10	20.30
Interest on investment[64]	LL.	154.20	225.05
Total Fixed Costs -	LL.	213.35	299.55
TOTAL COSTS	LL.	2333.30	2723.40
MISCELLANEOUS CREDITS:			
Sale of hens	LL.	460.50	445.20
Cockerels	LL.	152.10	118.90
Manure	LL.	72.35	50.35
Total Misc. Credits	LL.	684.95	614.45
NET TOTAL COSTS	LL.	1648.35	2108.95
Net cost per egg - pts.		8.5	12.3
Returns to management:			
Per egg - pts.		+4.2	-0.2
Per 100 layers -	LL.	+802.75	-39.85

58 Rounded to the nearest five piasters.
59 Average number of layers kept throughout the year.
60 Includes the value of unpaid labor, including that of the owner himself, if any, but excluding the value of management.
61 Calculated at the uniform rate of 2 percent of the acquisition cost of buildings and equipment.
62 Computed at the uniform rate of 4 percent of the acquisition cost of new buildings and the deprec. price of old buildings when the farm was started.
63 Calculated at the uniform rate of 12 percent of the acquisition cost of equipment.
64 Calculated at the uniform rate of 7 percent of the average investment in land, buildings, equipment, layers, replacements, and operating capital.

The most profitable farms were, on the average, larger in size and raised 1620 layers, while the least profitable farms kept an average of 1110 layers each. The income from eggs was 18 percent higher for the high income farms than for the low income farms because the former had higher annual production per bird and higher selling prices of eggs.

The low income farms averaged 14.3 percent higher variable costs than the high income farms. Such costs were primarily determined by higher feed and labor costs, which alone made up over 86 percent of the total variable costs for the low income farms.

Total fixed costs were 40.2 percent higher for the least than for the most profitable farms. This was mainly affected by the substantially higher investment which the former group carried in land and buildings.

Receipts from miscellaneous credit items were considerably higher for the high income farms, which averaged 25.9 percent of sexed chicks started as compared to 45.0 percent for the low income farms, even though they purchased them at higher prices. They also averaged higher selling prices of hens and manure. As a result, total net costs per 100 layers were 21.8 percent lower for the most profitable farms, and 31 percent lower per egg produced. Returns to management per 100 layers were over 2000 percent more, or + LL.802.75 for the most profitable farms than for the least profitable farms, which averaged LL.-39.85.

Let us now consider separately the major factors responsible for these very wide variations in egg production costs and returns between the high and the low income farms.

1. Sales Prices of Eggs

The value of eggs sold was 18.4 percent more or LL.382.00 higher per 100 layers for the most profitable farms than for the low income farms, as can be seen in Table 11.

Table 11 - Flock Size, Egg Production and Prices for the Most vs. Least Profitable Farms, 1960-61

Item	Most profitable farms	Least profitable farms
No. of farms	5	5
No. layers per farm	1620	1110
Sales value of eggs per 100 layers - LL.	2451.10	2069.10
No. eggs per layer	193	171
Egg prices - pts. per egg	12.7	12.1
Net cost per egg - pts.	8.5	12.3
Returns to management per egg-pts.	+4.2	-0.2
Returns to management per 100 layers - LL.	+802.75	-39.85

This was due to both a higher price received per egg sold as well as higher annual production of the birds. The former farms averaged a 5.0 percent higher sales price of eggs, or 12.7 piasters per egg and had 12.9 percent higher annual production per layer kept, or 193 eggs. Consequently, they had more returns per 100 layers raised. Translated into monetary units, this meant a difference of at least LL.102.60[65] per 100 layers kept, assuming the same annual production per bird.

65 Taking production per bird to be equal to that of the least profitable farms, or 171 eggs per layer.

Egg prices are affected by managerial ability in chosing the best outlet for marketing eggs produced at the highest possible prices. Broadly speaking, the most profitable farms were selling eggs at their farm sites to one of the big exporters of eggs on a verbal agreement basis, and sometimes on a contract basis. The effect of production per layer will be treated in greater detail under the section with the same heading.

2. Production Per Layer

The average number of eggs laid per bird annually is a major factor affecting costs and returns. It affects the efficiency of feed and labor utilization and the success of the laying flock for three main reasons (a) it results in lower or higher per unit cost of production by spreading the total net costs over a bigger or a smaller number of eggs, and (b) increases or decreases the output of the farm without changing the physical size of the enterprise by having either more or less eggs to sell per layer kept and (c) it increases or lowers the labor productivity and feed utilization efficiency of the farm, by having more or less eggs produced per worker and per kilogram of feed consumed. This affects the labor and feed costs per egg produced, which are the major items of egg production costs.

The number of eggs laid per bird during the year is influenced by the ability of the manager in chosing the particular breed or strain of layers kept on the farm, the kind and amount of concentrate and cereals used in the ration, or ready-mixed feed. It is also influenced by such management practices as the amount of floor space per layer kept, window, feeder, and waterer space provided; the kind and depth of litter

used, which affect not only the annual production per bird, but also mortality.

Due to the interaction of the effect of these factors on one another and due to the infeasibility of studying the effect of every one separately, only some of the more important ones as feed and floor space are discussed.

The most profitable farms had 21 more eggs produced per bird annually, or LL.266.70[66] more income per 100 layers, than the least profitable farms, inspite of the fact that the former were feeding 2.1 kilograms less feed per bird than the latter, as revealed by Table 12. Although, generally speaking, greater feed consumption results in higher annual production, yet this general statement did not apply in the case of the least profitable farms in Lebanon, probably on account of a more inefficient strain of layers in converting feed into eggs, or due to feed wastage, or both, which are affected by production practices and managerial ability.

Moreover, the most profitable farms required less floor space for raising layers and replacements. They were raising more birds, or 3.1 layers and their replacements per square meter of floor space, than the least profitable farms, which were raising 2.9 layers and replacements in the same area. Obviously, larger housing space per bird kept as reported by the low income farms, does not necessarily result in higher production. It needs to be supplemented by the other recommended management practices as window, feeder, and water space provided, the

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66 Taking the sales price of an egg to be equal to that of the most profitable farms, or 12.7 piasters.

necessary sanitary measures for the prevention of diseases etc., which most probably, the low income farms were lacking to a greater degree than the high income farms. Consequently, the high income farms had lower net total cost and higher returns to management per egg produced.

Hence, it can be concluded that the combined, or overall effect, of all of these factors, which are influenced to a great degree by the farm management practices followed, and managerial ability, result in either higher or lower annual production of birds.

3. Feed Cost Per Egg

The cost of feed for every egg produced is influenced by two main factors, namely, the price of feed, and the number of eggs produced from every kilogram of feed fed. The lower the price of feed and the higher the number of eggs produced by one kilogram of feed, the lower the feed cost per egg produced.

The most profitable farms paid 6.0 percent less, or 32.2 piasters per kilogram of purchased feed, than the least profitable farms, as can be seen in Table 12 below. Moreover, layers on the most profitable

Table 12 - Feed Prices, Consumption, Efficiency, and Cost Per Egg, 1960-61

Item	Most profitable farms	Least profitable farms
No. of farms	5	5
No. eggs per layer	193	171
Annual feed cost per layer - LL.	16.18	17.77
Feed cost per egg - pts.	8.4	10.4
Kgs. feed per layer	38.2	40.3
Price per kg. feed - pts.	32.2	34.2
Eggs produced per kg. feed	5.1	4.2

farms each consumed 2.1 kilograms less feed, or 38.2 kilograms, and produced 22 more eggs, or 193 eggs, than layers on the least profitable farms. Consequently the former had nearly one more egg produced by every kilogram of feed fed. The higher feed consumption figures for the least profitable flocks were most probably due to feed wastage.

As a result of less feed required and a lower price, the most profitable farms had a 9.0 percent lower feed cost per layer kept and 19.2 percent lower cost per egg produced than the least profitable farms.

4. Labor Cost and Efficiency

Labor cost and efficiency have a direct effect on egg production costs, since the cost of labor constitutes 12.0 percent of total net costs.

In this study, labor cost varied by 0.83 piasters per egg produced, or more than 58[67] percent between the most and the least profitable farms. This difference reflects the combined effect of the number of layers looked after by one worker, and the wage paid each worker. Each worker, on the average, in the former group looked after 72 percent more layers than each worker in the latter group, as shown in Table 13.

On the other hand, workers on the high income farms were paid higher wages than workers on the low income farms. As a result of higher labor efficiency, the more profitable farms had 44.4 percent lower labor cost per egg and nearly twice the number of eggs sold per worker than the least profitable farms.

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67 Of the labor cost per egg produced for the most profitable farms.

Table 13 - Labor Cost and Efficiency for the Most and Least Profitable Farms, 1960-61

Item	Most profitable farms	Least profitable farms
No. of farms	5	5
Dozen eggs sold per worker	15,328	7,909
Wages per worker per year-LL.	1920.00	1776.00
Labor cost per egg - pts.	1.04	1.87
No. layers per farm	1620	1110
Layers per worker	953	555

5. Depreciation of Layers

It was generally observed that the lower the percentage of sexed chicks started, which cost over three-fold the price of mixed chicks, and the lower the price paid for them, the lower the chick costs per 100 layers raised, as evidenced by chick cost figures for the most profitable farms shown in Table 14.

However, this effect was somewhat offset by the higher rate of mortality of 15.6 percent of chicks started per 100 layers kept reported by the high income farms, as compared with only 9.6 percent for the low income farms, which narrowed the difference of chick cost between these two groups appreciably.

There was no substantial difference in the prices of mixed chicks bought.

The percentage of sexed chicks started, along with the selling prices of meat and the rates of mortality, also influenced the returns from cockerels. This was higher for the high-income farms which started a

Table 14 - Chick Cost Per 100 Layers for the Most and Least Profitable Farms, 1960-61

Item	Most profitable farms	Least profitable farms
No. of farms	5	5
No. layers per farm	1620	1110
Cost of chicks started - LL.	188.80	194.30
Percent sexed chicks[68]	25.9	45.0
Percent mixed chicks[68]	74.1	55.0
Prices of sexed chicks - pts.	225.0	216.5
Prices of mixed chicks - pts.	67.7	71.1
Percent mortality[68]	15.6	9.6

higher percentage of mixed chicks, and therefore had more cockerels to sell, and who were getting higher prices, or LL.2.32 per kilogram of live weight, as compared with LL.2.26 per kilogram for the low income farms. But the former group reported higher rate of mortality.

Annual chick cost is determined by the management practice followed, either of starting a lower or a higher proportion of sexed chicks, and the manager's ability in buying these chicks and then selling the cockerels as broilers at lower or higher prices respectively.

Ordinarily, depreciation of layers is one of the main items of producing eggs. It is equal to the net cost of the pullets when they first enter the laying house, less their sales value for meat at the end of laying.

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68 Of the total number of chicks started. The reported mortality is much below normal, which is 20-25 percent.

Logically, depreciation of layers can be treated as a variable cost because it is much less fixed than, say, depreciation or interest charges. It may vary considerably from year to year due to changes in chick and feed costs, sales prices for hens, as well as the rate of mortality. For these reasons, it is considered justifiable to treat it as a variable cost. This cost, however, does not appear as a separate item in this analysis, but it is rather reflected in chick and feed costs, less the value of cockerels sold for meat and the sales returns for the hens at the end of the laying year. Generally speaking, the higher the depreciation of layers, the higher the net cost of producing eggs.

Analysis of the figures reported in this study revealed that depreciation cost for the least profitable farms was practically negligible, or LL.0.06 per layer for the year covered by the study, while the layers on the most profitable farms brought LL.0.64 more per bird than their net cost when they entered the laying house as shown in Table 15.

This situation is unusual, and actual depreciation is considered to be higher under normal conditions. The inaccuracy was mainly caused by the omission of important costs of rearing pullets, the high price for old hens, and the unusually low rates of mortality of 7.0 percent and 2.1 percent of the laying flocks reported by the most and least profitable farms respectively, as will be explained in greater detail under the section headed flock mortality. Discussions with people acquainted with the situation led to the belief that these results were due not only to the very low mortality reported, but also to the unusually high sales prices of poultry meat at the time of the survey (LL.2.32 and LL.2.26 per kilogram of live weight for the high and low income farms respectively),

Table 15 - Depreciation Per 100 Layers, 1960-61

Item	Most profitable farms	Least profitable farms
No. of farms	5	5
No. layers per farm	1620	1110
Cost of chicks started - LL.	188.80	194.30
Cost of chick feed[69] - LL.	341.30	362.50
Cost of chick brooding - LL.	18.25	12.85
Total cost of 100 pullets[70] - LL.	548.35	569.65
Less sale of cockerels - LL.	152.10	118.90
Reported net cost of pullets-LL.	396.20	450.75
Receipts from sale of layers-LL.	460.50	445.20
Depreciation or appreciation per 100 layers - LL.	+64.30	-5.55
Depreciation or appreciation per layer - LL.	+0.64	-0.06

as well as the tendency at that time to raise heavier strains of layers which weighed nearly 2 kilograms at the end of one laying year. However, these people indicate that the prices of culled hens for meat have dropped considerably to LL.2.00 per kilogram or lower. Moreover, the present tendency is to raise the lighter strains of Leghorns which weigh 1.75 kilograms or less at the end of one laying year. Assuming that chicks are started sexed at LL.1.50 each, chick mortality to be 12 percent,

69 Estimated at 10.6 kilograms of feed per pullet for both groups.
70 Excluding all joint costs which were not allocated to the replacements separately.

and flock mortality 10 percent, the weight of the culled hens to be 1.75 kilograms and the price per kilogram LL.2.00 then, the depreciation cost per layer raised would be LL.2.00 annually on the basis of calculating the cost of pullets used in this study where only the cost of the chicks, feed, and brooding are separated from the costs of operating the farm. If all the costs of rearing a pullet are recorded, the total is about LL.6.00, according to unpublished data of the A.U.B. Division of Agricultural Economics and Sociology. The analysis of the cost of producing eggs on farms with 3,000 layers submitted to the Ministry of Agriculture in April 1962 by Samir Abou Joudi and Mousa Freiji showed the net cost of a Leghorn pullet to be LL.6.67 and the sales returns from the old hens equivalent to LL.1.81 per pullet housed. Thus, the depreciation per layer amounted to LL.4.86.

6. Flock Mortality

Contrary to expectation, the high income farms reported a higher rate of flock mortality of 7.0 percent, in contrast to only 2.1 percent for the low income farms. Most probably, both groups of farms were biased in reporting flock mortality, as can be seen by comparing these rates with other countries. Darrah estimates normal mortality at 16[71] percent of the laying flock annually. Eisgruber, and co-workers report an average of 13.6[72] percent flock mortality for 47 flocks in north-eastern Indiana. The University of California reported 12.4[73] percent hen mortality for Riverside County in 1960.

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71 L.B. Darrah, Business Aspects of Commercial Poultry Farming, p. 117.
72 L.M. Eisgruber et.al., op.cit., p. 9.
73 Univ. of Calif. Agr. Ext. Serv., Poultry Management Cost Study, p. 7.

Under normal relationships, "high mortality reduces production rates (on the basis of layers housed.) It also causes idle over-head in the form of houses, labor, and equipment, and reduces the size of the poultry operation if layers are not replaced as fast as deaths occur"[74]. This, however, was not applicable to the situation in Lebanon, most probably due to errors in reporting flock mortality. However, the high income farms averaged higher returns to management inspite of the considerably higher rate of flock mortality. Had the rates of mortality for both groups been similar, the returns to management for the high income farms would have been more pronounced.

7. Investment

The average investment in farm assets was 31.4 percent lower for the most profitable farms than for the least profitable farms, as inspection of Table16 reveals. This was mainly caused by the substantially lower investment of the former group in buildings and land, which accounted for nearly 60 percent of the total investment.

Investment has a direct influence on the cost per 100 layers kept and per egg produced through the fixed depreciation and interest charges, calculated on the amount of investment in the farm. The lower the investment and the higher the annual production of birds, the lower is the fixed cost per egg produced.

The high income farms had a 26.5 percent lower investment in buildings than the low income farms, on account of a greater number of birds raised per unit area of floor space and a lower cost of construction

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74 Univ. of Florida, op.cit., pp. 6-7.

Table 16 - Investment Per 100 Layers for the Most and Least Profitable Farms, 1960-61

Item	Most profitable farms	Least profitable farms
No. of farms	5	5
No. layers per farm	1620	1110
Buildings - LL.[75]	997.00	1356.00
Land - LL.[76]	256.00	845.00
Layers - LL.[77]	117.00	139.00
Replacements - LL.[78]	577.00	592.00
Equipment - LL.[79]	95.00	97.00
Operating capital - LL.[80]	161.00	186.00
Total investment - LL.	2203.00	3215.00
Interest @7percent per annum-LL.	154.20	225.05
Interest cost per egg - pts.	0.79	1.32

The former kept 7 percent more birds, or 3.1 layers and their replacements per square meter of floor space than the latter, who averaged only 2.9 layers and replacements. In addition, building construction cost was lower, or LL.31.30 per square meter of floor space for the high income farms, and higher, or LL.39.20, for the low income farms.

75 Valued on the depreciated value at the time of the survey.
76 Valued at the current or market price when the farm was started.
77 Equals the cost of chicks, allowing for mortality, plus the value of feed till laying age.
78 Equals the value of layer chicks for six months, or half their value for one year.
79 Valued on the depreciated value at the time of the survey.
80 Estimated to be equal one-twelvth the variable costs, excluding the value of feed for pullets, which was included with layers.

The most profitable farms invested nearly one third the amount of the least profitable farms in land, even though both groups raised nearly an equal number of birds per unit area. The least profitable farms, however, paid over three times as much, or LL.6.70 per square meter, for land.

As a result of their appreciably lower investment in farm assets, especially buildings and land, and the higher annual production per bird kept, the high income farms had considerably lower fixed costs per egg produced.

All the foregoing factors are influenced, to varying degrees, by the management practices followed on the farm, as well as the manager's ability to operate the poultry farm successfully. Let us briefly consider each separately.

8. Management Practices

Management practices followed have marked direct as well as indirect effects on egg production costs and returns. Layer space, window, feeder, waterer, and nesting space provided, the sanitary measures followed on the farm for the prevention and control of disease outbreaks, the kind and depth of litter used, and brooding time, all affect not only the annual egg production of the birds, but also feed, labor, and chick costs as well as fixed costs, through investment.

Therefore, the importance of management practices followed should not be overlooked in any economic analysis of egg production costs and returns. Generally speaking, it can be said that the most profitable farms were those which adhered more closely to the recommended farm management practices.

9. Managerial Ability

The ability of the manager is of prime importance for the successful operation of a poultry farm. Manifestations of the quality of management lie in the ability of the manager to chose the best strain of layers available, employing more efficient workers, starting a higher percentage of mixed chicks when the prices of sexed chicks are unreasonably high, deciding on the most economical and efficient kind and amount of concentrates, cereals, or ready-mixed feed to use in the ration, as well as finding the best market outlets, and the like. All of these factors enter within the domain of a capable farm manager.

Since management was not hired but rather performed by the farm owners in the majority of cases, then, broadly speaking, management was a reflection of the farm owners themselves. Managers of the most profitable farms most probably possessed a greater degree of management ability and skill. The common proverb that "the more expensive management is really the cheapest in the long run", can not hold more properly than in the poultry industry.

C. Conclusion

It seems that size alone does not guarantee profitable operation of a layer farm. In general, the most profitable farms were those which had relatively large flocks combined with high egg production per bird, and sold their eggs at high prices, more efficient feed and labor utilization, lower costs of replacements, and low fixed costs due to a reasonably low investment in land,buildings, and layers, which are manifestations of good production practices and managerial ability.

Chapter IV

THE COMPETITIVE POSITION OF COMMERCIAL EGG PRODUCERS IN LEBANON

After figures on costs and returns of commercial egg producers in Lebanon have been presented and analyzed, an important question imposes itself at this stage. "In what position do these costs place the Lebanese producers in relation to competition with distributors who import eggs from foreign countries ?"

In order to answer this question adequately, it becomes essential to know the cost of producing eggs in the respective countries of origin, the cost of such eggs C.I.F. Beirut, the seasonality of egg production, the selling price in Lebanon of both imported and local eggs, and any quality differentials that might exist between imported and locally produced eggs.

A. Comparative Costs and Returns for Lebanon and Selected Countries

During the past five to seven years, Lebanon has been importing sizable amounts of table eggs, mainly from Syria, Denmark, Holland, and Turkey, and recently from Poland, and to some extent Bulgaria as shown in Table 17.

Up to 1957, Lebanon imported increasing amounts of eggs annually because up to that time Lebanon had very few commercial farms and very low domestic production. However, as shown in Table 18, since 1958 and 1959 through November 1961, there was an observable decrease in the number of table eggs imported into Lebanon, in response to the substantial increase of domestic production on commercial farms. During this period, exports of eggs from Lebanon, which are mostly produced locally, have been

Table 17 - Sources of Imports Into Lebanon of Eggs and Egg Yolks, Fresh, Dried, or Canned, 1955-60[81]
In Kilograms

Country of Origin	1960[82]	1959	1958	1957	1956	1955
Turkey	1,275,567	1,066,040	32,000			
Poland	281,739	121,161				
Syria	272,110	1,069,585	1,683,015	2,283,442	1,738,364	1,627,367
Denmark	247,791	292,667	8,908	8,214	855	10
Bulgaria	162,600	101,400				
Belgium	40,680					
Sweden	10,987					
Rumania	10,700					
Australia	105					
Egypt		20,260		1,500	65	
Holland		12,262	606	370	13	
Jordan		2,794		600	15,110	1,426
Ethiopia		1,100			1,000	
Germany				662	20	
France					13	5
Great Britain					2	5
Total	2,302,279	2,687,279	1,724,529	2,294,770	1,755,429	1,628,826

Table 18 - Imports of Table Eggs Into Lebanon, 1959-61[83]
In Million Eggs

Year	1961	1960	1959
Imports	35.418	14.407	27.560

81 Statistiques du Commerce Exterieur, Annees 1955-60, Conseil Superieur des Douanes, Republique Libanaise.
82 1961 data not yet available.
83 Compiled from unpublished data by the Lebanese Ministry of Agriculture.

increasing, as shown in Table 23 , but Lebanon remained a net importer of eggs. Since December 1961, a new and very important factor has emerged, which must be given special consideration. From 1959 and onwards, Poland started dumping eggs in Lebanon at extremely low prices, whenever its need for foreign exchange was great. However, the quantities were not large enough to have serious effects until December 1961 when Poland exported into Lebanon nearly 15 million eggs. This was the main reason for the big increase over the previous year. Similar large shipments arrived from Poland during the first four months of 1962.

The future regarding Polish and east European exports of table eggs is highly unpredictible, depending on the severity of Poland's and other east European countries' need for foreign exchange, and the policy of the Lebanese Government in this regard. It is entirely possible that this situation may continue for the next several years, and the discussion that follows is mainly based on this assumption.

As Table 17 indicates, the bulk of Lebanon's imports of eggs in 1960 came, in the order of importance, from Turkey, Poland, Syria, Denmark, and Bulgaria.

Turkish and Syrian eggs are mainly produced by farmyard flocks, and generally are of lower quality than eggs produced on commercial farms. This is due to the marketing system for the former which involves a considerably longer time for assembling and the other phases of marketing so that by the time they reach the final consumers, they have become of much inferior quality. Data on the cost of producing eggs in Turkey and Syria was not available. However, Turkey and Syria have been able to

export eggs into Lebanon at low prices due to the fact that such eggs are produced in small farmyard flocks, which have very low feed and labor costs and no significant overhead costs. Such producers employ existing housing facilities, plus labor and feed which have very limited, if any, alternative uses. Even in countries like the United States where the size of commercial laying flocks runs into several thousand birds, "not only will they (large producers) not be able to squeeze small operators[84] out of business, but they will not even be able to prevent small flock owners from establishing themselves.... They (small producers) will be able to compete with large operators as long as they find an adequate market for their eggs".[85] This situation holds true in Lebanon as well. However, the 22.325 million eggs[86] estimated to be produced annually in farmyard flocks in Lebanon, are a little bit more than the country's imports of eggs from Turkey alone in 1960, and they give commercial producers some competition, especially during the surplus months of production in the spring.

Examination of Table 17 also reveals that Holland, which used to export eggs into Lebanon, stopped doing so in 1960, because the net cost of producing eggs on Dutch poultry farms in the same year was 10.8 piasters per egg, or higher than in Lebanon (10.3 piasters). If no major changes in cost relationship in Holland take place, it can safely be said that Dutch producers will not give local producers in the Lebanon any competition at all.

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84 A small operator, as defined by Eisgruber and coworkers, is one raising from 100-500 layers.
85 L.M. Eisgruber, et al., op.cit., p. 11.
86 For details see foot note 1.

Denmark, the fourth largest exporter of eggs to Lebanon has an advanced poultry industry which is efficiently run along scientific lines. The net cost of producing an egg in Denmark in 1960 was 8.2 piasters, or 20 percent lower than Lebanon's 10.3 piasters. Danish producers are keenly competing with Lebanese producers inside Lebanon, especially during the spring months when there is a production surplus in Denmark and egg prices on the farms drop to 7.6 piasters, so they are shipped to Lebanon and either sold or kept in cold storage pending for sale when egg prices rise seasonally. This explains the import data in Table 17, which shows that Danish exports of eggs into Lebanon during the last couple of years have mounted considerably, inspite of the increasingly keen competition from Turkey, Poland, and Bulgaria.

Import data also reveals that the east European countries of Poland, Bulgaria, and Rumania have emerged since 1959 or 1960, as major exporters of eggs into Lebanon and they afford very serious competition to Lebanese producers. Had cost-of-production figures for these countries been available, it would have been extremely interesting to ascertain if the governments subsidize poultry producers, or if these farmers are simply more efficient producers of eggs.

A study conducted by the writer over a year ago revealed that imported eggs, expecially from the east European countries, cost anywhere from 5.5-7.5 piasters each C.I.F. Beirut depending on the country of origin and season of the year. These are low prices, considering that this figure includes costs of assembling eggs from individual farms to the central market and possibly some charges for keeping eggs in cold

stores in the exporting country until they are shipped, as well as freight and insurance charges.

It is well established, however, that Poland, Bulgaria, and Rumania are in great need of foreign exchange. Since the governments of these countries are in control of the exports of eggs, they would not be unwilling to buy from native producers and then sell the same eggs at prices lower than those paid for them. This belief is substantiated by comparing costs in Lebanon with those in Denmark, Holland, and the United States. This practice enables the east European countries to get the foreign currency in exchange for which they could buy other goods of which they are in need. Since data was not available for these countries, it was not possible to determine whether the cost of producing eggs was actually lower or not.

Consequently, the writer had to analyze cost figures for some of the countries which export eggs to Lebanon, like Denmark and Holland, and some that do not, like the United States, on which such data was available, to find out the major factors responsible for the differences in costs and returns.

But this is not all. Even for countries on which data was available, the methods of computing costs differ from one country to another. Some cost items are not given in detail to ascertain what they actually cover. In Holland, for instance, depreciation of and interest on poultry houses is figured on the basis of the replacement value of the houses. Comparable figures in Lebanon were computed on the acquisition cost and average depreciated value respectively. As for Denmark, labor

costs were not included, and they had to be approximated. Moreover, data was not available for the same year as in Lebanon.

All these factors render direct comparisons of composite measures as total net costs with Lebanon extremely difficult. So the comparisons which appear here are estimates, and do not present exact figures.

Except for Holland, the net total cost of keeping 100 layers and rearing their replacements, varied by less than 5 percent between Lebanon, Denmark and the United States (as indicated by data for New Jersey, and Florida). The high labor wages in Holland accounted for most of the difference of higher net total costs for that country. However, the net cost of producing an egg was lowest, or 8.2 piasters for Denmark, followed by 8.5 piasters for Florida, 9.6 for New Jersey, and 10.3 piasters for Lebanon as shown in Table 19.

The differences in cost per egg were determined primarily by the differences in annual egg production per bird in these places. Denmark had 21.3 percent higher annual production than Lebanon, 4.2 percent higher than Florida, and 14.3 percent higher than New Jersey.

Lebanon had the highest income from eggs of LL.2326.65 per 100 layers inspite of the fact that it had the lowest annual production of eggs per layer. This was due to the highest selling price of eggs. Lebanon reported 12.7 piasters per egg sold, which is 40 percent higher than Denmark and New Jersey, and 27 percent higher than Holland. Consequently, Lebanon had the highest management returns per egg produced and per 100 layers kept. However, discussions with people connected with the poultry industry give reasons for believing that egg selling prices

Table 19 - Comparison of Egg Production Costs and Returns Per 100 Layers in Lebanon and Selected Countries

Item		Lebanon	Holland[87]	Denmark[88]	New Jersey[89]	Florida[90]
Year of study		1960-61	1959-60	1960	1958-59	1959
No. of farms		22	250	--	51	14
No. layers per farm		1565	1000	--	5586	5987
RECEIPTS:						
No. eggs per 100 layers		18320	20500	22200	19400	21300
Price per egg - pts.		12.7	10.0	9.1	9.9	9.0
Receipts from eggs - LL.		2326.65	2050.00	2020.00	1920.60	1917.00
EXPENSES:						
VARIABLE						
Feed cost	LL.	1658.05[91]	1686.00[91]	1065.60[92]	1279.65[91]	1137.00[91]
Labor cost	LL.	227.35	456.75	372.00[93]	200.70	225.00
Chick cost	LL.	218.00	110.50	523.20[94]	105.50	151.00[95]
Miscellaneous costs[96]	LL.	118.45	70.45	---[97]	53.40	129.00
Total Variable Costs	LL.	2221.85	2323.70	1960.80	1639.25	1642.00
FIXED						
Deprec. of bldgs. and eqpt.[98]	LL.	64.60	107.90	(144.00	87.75	93.00
Interest on investment[99]	LL.	192.85	91.70	(	199.00	105.00
Total Fixed Costs	LL.	257.45	199.60	144.00	286.75	198.00
TOTAL COSTS	LL.	2479.30	2523.30	2104.80	1926.00	1840.00
MISCELLANEOUS CREDITS[100]	LL.	592.85	304.50	276.50[101]	63.55	40.00
NET TOTAL COSTS	LL.	1886.45	2218.80	1828.30	1862.45	1800.00
Net cost per egg-pts.		10.3	10.8	8.2	9.6	8.5
Returns to management						
Per egg-pts.		+2.4	-0.8	+0.9	+0.3	+0.5
Per 100 layers	LL.	+440.20	-168.80	+191.70	+58.20	+117.00

87 Based on unpublished data by A. Mecklenberg, The Head of the Bureau for Planning and Statistical Documentation, Holland.
88 Based on unpublished data for demonstration farms supplied by the Danish Ministry of Agriculture.
89 Based on J.W. Carncross, Economic Factors Affecting Profits of 51 New Jersey Poultry Farms, New Jersey.
90 Based on Univ. of Florida Agr. Ext. Serv. Econ. Ser. 60-4, op.cit.
91 Includes the value of feed consumed by replacements.
92 Excludes the value of feed consumed by the replacements.
93 The earnings on the inferior farms were assumed to represent labor cost for all farms.
94 Includes the cost of feed and miscellaneous costs of rearing chicks till laying age.
95 Cost of sexed chicks estimated at 120 piasters, the United States average in 1959, and assuming 15 percent mortality.
96 Includes the costs of medicines, electricity, litter, brooding, water, and repairs.
97 Included with chick costs.
98 Calculated at the uniform rates of 4 and 12 percent on buildings and equipment respectively for all countries alike.
99 Calculated at the uniform rate of 7 percent annually for all countries alike.
100 Includes the sales value of hens, cockerels, and manure.
101 Includes the value of discarded hens only.

in Lebanon were somewhat exaggerated and actual returns to management are less than these figures indicate. Returns were much lower in 1961 and early 1962.

It would now be useful to compare separately the major items of expense in these countries.

1. Feed Cost, Consumption and Efficiency

Lebanon had the next-highest feed cost of LL.1295.80 per 100 layers, which is next to Holland's figure of LL.1330.00 inspite of the fact that Lebanon reported the lowest feed consumption per layer, simply because of the higher price of purchased feed, as shown in Table 20. New Jersey reported the lowest feed cost because they bought poultry feed at the cheapest price.

There was a range of nearly 10 kilograms of feed consumed per layer annually between Lebanon's 38.0 kilograms and Holland's 47.5 kilograms. Feed prices, however, were highest, or 34.1 piasters per kilogram of mixed feed, for Lebanon, and lowest, or 22.7 piasters for New Jersey. Lebanon reported 50 percent higher feed cost than New Jersey, 43.2 percent higher than Denmark, and 21.8 higher than Holland. Lebanon's figures of feed conversion efficiency were about midway between Florida's 5.2 and New Jersey's 4.2 eggs produced per kilogram of feed consumed.

2. Labor Cost and Efficiency

Lebanon's labor cost of LL.227.35 compared very favorably with Danish and Dutch figures, and even with United States' figures, where labor efficiency is much higher. This is mainly attributable to the lower wages paid to farm workers in Lebanon than elsewhere. Had wages for farm laborers been anywhere near those in Europe or the United States, Lebanese poultry producers would have been at a very serious disadvantage.

Table 20 - Comparison of Factors Affecting Egg Production Costs and Returns for Lebanon and Selected Countries

Item	Lebanon	Holland[102]	Denmark[103]	New Jersey[104]	Florida[105]
Year of study	1960-61	1959-60	1960	1958-59	1959
No. of farms	22	250	---	51	14
No. layers per farm	1565	1000	---	5586	5987
No. eggs per layer	183.2	205.0	222.0	194.0	213.0
Price per egg-pts.	12.7	10.0	9.1	9.9	9.0
Cost of feed per 100 layers[106] - LL.	1295.80	1330.00	1085.30	1041.95	---
Kgs. feed per layer[107]	38.0	47.5	45.6	45.9	41.1
Price per kg. feed-pts.	34.1	28.0	23.8	22.7	---
Eggs produced per kg. feed	4.8	4.3	4.9	4.2	5.2
Layers per worker	803	800	---	2323	2697
Monthly wage per worker LL.	152.00	445.00[108]	---	390.00	---
Dozen eggs sold per worker	12,246	13,666	---	36,948	47,976
Price of sexed chick-pts.	233.3	100.0	---	90.0	120.0[109]
Price of unsexed chick-pts.	71.1	39.2	---	---	---
Investment:					
Bldgs: birds per m^2 floor space	3.1	2.0	---	---	---
cost per m^2 floor space-LL.	36.60	25.65	---	---	---
Land: birds per m^2	1.3	0.7	---	---	---
cost per m^2	8.25	0.22	---	---	---
Equipment per layer-LL.	1.38	---	---	1.71	2.05

102 Based on unpublished data by A. Mecklenberg, the Head of the Bureau for Planning and Statistical Documentation, Holland.
103 Based on unpublished data for demonstration farms, by the Danish Ministry of Agriculture.
104 Based on J.W. Carncross, op.cit.
105 Based on Univ. of Florida Agr. Ext. Serv. Econ. Ser. 60-4, op.cit.
106 Excluding the value of feed for replacements.
107 For egg production only, excluding feed for replacements.
108 Social charges included.
109 Estimated at United States average price of sexed chicks for 1959.

Labor efficiency was about the same for both Lebanon and Holland, both of which averaged around 800 layers per man. Florida farms averaged 3.3, and New Jersey 2.9 more birds per worker. This is probably due to the greater skill of poultry farm workers, as well as the higher amount of labor saving equipment on United States farms. Figures on labor efficiency and wages in Denmark were not obtainable. The Lebanese worker was getting the lowest monthly wage of LL.152.00. Workers in Holland were getting 2.9 and in New Jersey 2.6 as much. Labor productivity, as measured by the dozen eggs sold per worker, was slightly higher for Holland than for Lebanon, mainly because of the higher annual production of egg per bird. However, output per worker was 3.9 times higher in Florida and 3.0 times higher in New Jersey, both of which had greater labor efficiency as well as higher rates of production.

3. Chick Costs

Chick cost per 100 layers was highest, or LL.218.00 for Lebanon, and lowest, or LL.105.50 for New Jersey. The substantial differences of chick costs lie mainly in the different prices of both sexed and mixed chicks. Prices of chicks in Lebanon were 2.3 times more for sexed chicks and 1.8 times more for mixed chicks than comparable prices in Holland. The average price of day-old chicks for New Jersey was 90.0 pts. The cost per sexed chick for Florida farms was estimated at 120 piasters each, the United States average in 1959.[110]

The very high figure of LL.523.20 reported by Denmark included the cost of feed and miscellaneous costs for rearing chicks to laying

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110 U.S.D.A. Agr. Mktg. Serv., Egg and Poultry Statistics, Supplement to Bull. No. 249, p. 39.

age, and hence did not reflect the actual cost of day-old chicks.

4. Fixed Costs

Depreciation and interest charges, which are a function of the average investment in farm assets, were second-highest for Lebanon, and lowest for Holland. The major difference in investment was due to the abnormally higher value of land in Lebanon, which was 38 times more than for poultry farms in Holland.

With the possible exception of Denmark, Lebanon had the lowest depreciation charges on buildings and equipment because Lebanese producers raised 1.5 as many birds per unit area of floor space as Dutch producers. Dutch figures on depreciation were much higher than those in Lebanon because they included the cost of fencing and range as well. Lebanese producers raised their birds in confinement and needed half as much land per layer as Dutch producers, some of whom were using range. However, Lebanese producers had the second-highest investment in farm assets after New Jersey, and every meter of floor space cost the Lebanese poultryman 1.42 times more than the Dutch producer to construct.

Investment in equipment and machinery was much lower for Lebanon than either New Jersey or Florida, probably because of the higher degree of mechanization in these States.

5. Conclusion

With the exception of Holland, Lebanon had the highest net cost of producing eggs which was partly due to the lower annual production per layer in Lebanon than elsewhere. Another important factor in the high cost in Lebanon was the high price of feed, which was 1.5 times the cost

in Holland. Lebanese producers had to pay nearly twice as much for chicks as Dutch producers. The higher cost of producing an egg in Lebanon was also partly due to the lower level of efficiency of the Lebanese worker at this stage of development of the poultry industry.

However, Lebanese producers are experiencing strenuous competition from eggs imported from east Europe at prices considerably lower than the cost of producing eggs on the most profitable group of farms in Lebanon, and even lower than the cost of production in the most efficient countries like Denmark and the United States. Consequently, the problem of the Lebanese egg production industry is not one of efficiency alone, but also of the economic needs of some of the exporting countries for foreign exchange regardless of the cost of producing the eggs they sell abroad.

B. Seasonality of Egg Production and Prices in Lebanon

Discussions with several persons well acquainted with the subject indicated that the production of eggs in Lebanon and the prices received for them show substantial seasonal variation. The peak of production occurs during the months of April through June. This peak usually comes about as the result of the seasonal increase in production by both commercial and farmyard flocks. The latter are estimated to give 22.325 million[111] eggs annually. Chickens have a biological response to the lengthening of the hours of sunlight during the spring and increase the number of eggs laid per month. The farmyard flocks find more feed during the spring months and so take in the raw material for producing a larger

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111 See bottom of page 7.

number of eggs. In the fall, they replace their feathers for protection against winter cold and lay few if any eggs during these months. Commercial poultry farms register less drop in egg production during the fall than do farmyard flocks because of their plan of operation. They generally buy chicks in the spring so the pullets will be in full production and laying a high percentage of large eggs during October through December when egg prices normally are highest due to low production of molting hens with many farm-flock pullets not yet in production. Many commercial farms sell off their old hens as they go into molt in the fall and re-fill their houses with pullets just starting to lay. Some carry their late molters through until Christmas in order to maintain high output from the farm during the season of high egg prices and to dispose of the old hens when their price is seasonally highest.

As shown in Table 21, the bulk of Lebanon's imports of eggs come in the spring and early summer, when they are cheapest to buy in the exporting countries. Thus, imports add to the surplus of locally produced eggs and force egg prices to the low point of the year. Syrian and Turkish eggs, which in 1960 made up 67.2 percent of Lebanon's imports of eggs, came from farmyard flocks which produce mainly during the spring and thus are shipped in largest volume during this season. During the winter of 1961-62, eastern European countries offered eggs to Beirut merchants at very low prices and the large numbers imported had a serious depressing effect on prices during the season when domestic production was increasing seasonally.

Part of the eggs imported when prices are low in the spring are

stored in refrigerators in Beirut until prices advance seasonally as current production declines during summer when they are sold gradually, depending on the market demand and supply conditions.

As shown in Table 21, the bulk of Lebanon's imports of eggs, including those from eastern Europe, also came in the spring, when they are cheapest to buy in the exporting countries, but they are also bought during late fall and winter when egg prices are seasonally highest in Lebanon, and when they can be shipped in cool weather which will not cause marked deterioration of egg quality. Such eggs are held in sold stores and rationed out according to demand.

However, "For best results, eggs should be stored in cold storage warehouses where the temperature is held at 29°F to 30°F, and the relative humidity is kept at 90-94 percent. Eggs should be stored alone as they absorb odors if stored in rooms with substances which emit odors".[112] So, unless the volume of stored eggs is large enough to justify renting a separate compartment, these eggs have to be stored in the same rooms with fruits. The temperature requirements for both fruits and eggs are about the same, and no problem exists here. The critical factor, however, is humidity. Eggs stored with fruits at relative humidity much lower than the optimum level, deteriorate rapidly in quality due to dehydration of the egg contents. The other limiting factor is that such eggs can pick up odors very easily and become unpalatable for most consumers. Consequently, local eggs which are not kept in cold stores in appreciable quantities, possess a much higher quality than imported eggs.

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112 A.R. Winter and E.M. Funk, Poultry Science and Practice, pp. 415-416.

Table 21 - Monthly Imports of Table Eggs Into Lebanon, 1959-61[113]

Month	Number of Eggs 1961	1960	1959
January	---	104,400	1,104,240
February	233,280	386,905	1,524,540
March	359,280	452,940	1,459,890
April	1,654,800	2,731,822	2,787,980
May	2,496,960	2,868,000	3,538,050
June	1,751,560	1,316,160	4,191,160
July	1,411,200	1,558,800	3,664,960
August	2,474,510	1,279,040	3,863,600
September	1,180,080	399,067	1,356,550
October	1,312,400	774,920	1,363,520
November	1,040,801	1,193,440	1,363,600
December	21,503,229	1,341,520	1,341,520
Total	35,418,100	14,407,014	27,559,610

Prices of eggs usually follow a pattern which is inversely proportional to production. Generally, the higher the production in a certain period of time, the lower the prices of eggs sold, and vice versa.

113 From unpublished data assembled by the Lebanese Ministry of Agriculture.

Thus the prices paid to producers from April to June may at times be as low as 8-10 piasters per egg, due to the surplus production as can be estimated from Table 22. These prices have risen to 13 or

Table 22 - Monthly Average Prices of Table Eggs Paid to Producers by Wholesalers in Lebanon, 1959-61[114] in Piasters per Egg[115]

Month and year	1959	1960	1961
January	13.25	12.25	13.25
February	12.75	11.25	13.00
March	12.75	11.25	12.75
April	11.75	10.75	11.50
May	11.50	10.75	10.50
June	10.75	10.75	10.50
July	11.50	10.75	12.25
August	11.75	11.25	12.75
September	13.75	11.50	13.25
October	14.50	12.50	13.25
November	14.50	12.50	13.25
December	14.50	11.75	12.00
Average[116]	12.8	11.4[117]	12.4

114 Data collected by Antoine Sayegh of the Ministry of Agriculture from Abadieh Cooperative, Malluk, Coq Rouges, Freiha, Abbas, Abella, and others.

115 Prices paid on the farms are estimated to be lower by 0.5 piasters per egg.

116 Calculated as a straight average.

117 Discussions of the writer with some of the main exporters indicated that the average prices in 1960 were similar to those in 1959 and not appreciably lower.

more piasters per egg from September to December, and the wholesale prices of eggs reach 14-15 piasters. The retail price of Lebanese eggs produced on commercial farms ranges around 15-18 piasters an egg, depending on the season of the year. Very few local eggs are carried over from the surplus months to the fall and winter months in cold stores.

Imported eggs are bought in largest numbers from April to July and cost around 5.5-7.5 piasters each C.I.F. Beirut. Turkish and Syrian eggs usually cost more to buy than eggs from eastern Europe, which may reach less than 5 piasters each. The wholesale price of imported eggs is about 6.5-8.0 piasters per egg. The retail price is between 8.0-10.0 piasters during the surplus months, and possibly higher during September to December. Usually such eggs are bought in largest numbers during the surplus months of April to July, because they are cheapest then in the respective countries of origin. They are then kept in cold stores in Beirut and are available in the market for a great part of the year. Thus imported eggs have their biggest effect on depressing prices of locally produced eggs during the surplus months, when prices are usually at their lowest. Imported eggs tend to accentuate this seasonal decline in prices. In case of excess imports, then such eggs may sell for 7 piasters.

C. Courses Open for Government Action

With such a complicated situation as that relating to the egg production industry, it is often asked by impartial outsiders who are concerned about the future of the poultry industry, "what is the best policy to safeguard the interest of poultry producers in Lebanon?"

If producers were the only party concerned, solutions would not be difficult to find. But on the other side of the picture are the consumers who, by far, make up the vast majority of the population. Hence, any measures that are aimed at preserving the interests of poultry producers may be in direct conflict with the welfare of consumers at large. Consequently, as the writer views things, the problem could not be simplified to decide on a single best measure. What is best for one party may not be so for the other party. Possiblyacombination of more than one measure may prove to be more equitable for both consumers and producers than any single measure alone.

The objective approach to the problem is to point out the alternative courses open for Government action, and possibly anticipate some of the consequences that might ensue following the adoption of each. This will provide a basis for certain conclusions. Once this point has been made clear, let us explore the various possible measures that exist and the conceivable effects of each, beginning with the present government policy regarding the import and export of eggs.

1. Laissez-Faire Policy

A laissez-faire policy would maintain the present seasonal price relationship of imported and local eggs,unless the demand for, or the supply of either imported or Lebanese eggs changes considerably. Importers of eggs would continue to import eggs into Lebanon as long as the prices of Lebanese eggs remain substantially higher than the prices of imported eggs. Many consumers are not willing to pay the price differential between local and imported eggs, which in many instances reaches 3-4 piasters per egg at the retail level.

With constant demand and supply conditions, such a policy would maintain the prices of imported eggs at about present levels. An increase in the supply of imported eggs, assuming the conditions underlying demand remain constant, would lower the prices of such eggs.

Consumers would buy more of the imported eggs and less of Lebanese eggs. The demand curve for local eggs would intersect the supply curve at a lower point and the prices of local eggs would decline.

If the supply schedule of imported eggs decreases, or shifts to the left, other things being equal, then prices would rise, but these prices can not reach anywhere near the prices of local eggs because of the difference in quality. If they do, then consumers would buy more Lebanese eggs, especially those weighing less than 50 grams, which ordinarily do not sell at prices much higher than imported eggs.

Ordinarily, if an industry were left free from any government restrictions it would expand or contract up to the level where it is in equilibrium. "An industry is said to be in equilibrium when there is no tendency for it to expand or to contract. It will be in equilibrium, therefore, if the least profitable firm is normally profitable. If the profits of the least profitable firm are less than normal, this firm and others in like case will eventually leave the industry. Their departure will lessen the total output, which will raise the price of that output, making the remaining firms more profitable. Firms will continue to leave the industry until the least profitable firm is normally profitable. In this condition the least profitable firm would gain no advantage in moving out of the industry, and the industry, therefore, will cease to decline. When the profits of the least profitable firm

are normal, the industry will cease to expand, for any new firm coming into it will probably make less than normal profits".[118] In actual practice equilibrium is never attained because prices of products and inputs are always changing. Nevertheless, there is the tendency to attain this equilibrium. Under normal price and profit relationships, a laissez-faire policy would lead to the equilibrium and the optimum size of the industry. However, it was shown that in the case of the egg production industry in Lebanon the prices of imported eggs C.I.F. Beirut were lower than the cost of producing eggs on the most profitable farms in Lebanon and even in the most efficient countries. The equilibrium price reached under this laissez-faire policy would be so low that a considerable proportion if not the majority of poultry producers would be forced to leave the poultry industry, with a subsequent substantial reduction in the output of quality eggs. After the equilibrium price is attained at a low level, producers with net costs of production less than this price would remain in business, while those with higher costs would ultimately leave the industry. In the short run, the latter may remain in business, even if they can not cover their total costs, provided that they at least cover their variable costs. In the long run, the price they receive should cover both variable and fixed costs, plus normal profit.

2. Ban Exports

Prior to 1960 traditional government policy regarding the export and import of eggs was one of laissez-faire. There were no restrictions of any kind on the exports or imports of eggs.

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118 K.E. Boulding, op.cit., p. 566.

In October of 1960, the Ministry of National Economy banned all exports of locally produced eggs on the pretext that the prices of eggs to consumers had risen considerably. But the Ministry of National Economy overlooked the fact that production usually drops from October to December of every year due to shorter days and molting of laying hens. This situation is not peculiar to Lebanon but is universal and production in the exporting countries also drops (and prices rise) during that same period. This situation is especially applicable to layers raised in farmyard flocks in Lebanon, which are naturally poor layers, and which receive very little balanced feed during the fall and winter months.

The effects of probibiting exports have never had the chance to manifest themselves. The major exporters each had an export quota for the year 1960. Government legislation decreed that this quota would not be renewed for 1961. But before the date of the export quota expired, the government revised its policy and restrictions on the exports of eggs were removed.

Assuming that this policy was enforced or that it might be adopted in the future, then what could be some of its consequences ?

Restriction of exports would have meant that the 11.7 million eggs exported in 1961, as shown by Table 23, would have had to be consumed locally. Since most of the exported eggs are produced locally, this means that the domestic selling prices of such eggs would have been depressed. Most of the reduction in price would have been passed on to the individual producers and would not have been borne by middlemen, as will be explained.

Table 23 - Exports of Table Eggs From Lebanon, 1959-61[119]

In Million Eggs

Year	1961	1960	1959
Exports	11.731	6.781	5.469

"The more highly perishable the commodity, other things being equal, the greater is the middleman's share of the consumer's money".[120] Quality eggs are a relatively perishable commodity, and it is expected that the middleman's share will be rather high. On the average, the individual producer received 12.7 piasters[121] for every egg sold in 1960 but there is belief that it was lower. The retail price per egg varied from 15-18 piasters mainly depending on the season of the year and the amount of imported eggs available at that time. Thus the combined middlemen's margin was at least from 2.3-5.3 piasters per egg, or not less than 14.0-32.1 percent of the consumer price.

"Marketing charges, which are determined by the supply of and demand for marketing services, rather than by the supply of and demand for commodities, usually do not change with shifts in consumer demand for products, unless the latter are also accompanied by changes in wage rates and other costs affecting the supply of marketing services. In general, therefore, the farmer's share of the consumer's money changes mostly as a reflection of changes in the retail value of his products, which fluctuate greatly with changes in consumer income

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119 Based on unpublished data assembled by the Lebanese Ministry of Agriculture.
120 F.L. Thomsen, Agricultural Marketing, p. 224.
121 Table 3.

and demand. Marketing charges, being relatively stable, generally do not initiate changes in the farmer's share of the consumer's money".[122]

Aside from losing the equivalent of LL.1,759,500[123] annually, the value of the 11.73 million eggs that were exported in 1961, many of the existing contracts between Lebanese exporters and importers in the various middle eastern countries, especially those along the Persian Gulf, would have been breached.

Importers in middle eastern countries have become rather accustomed to buying Lebanese eggs, which possess high quality. Consequently, any ban on exports would cause them to shift or transfer their orders to Poland, Turkey, Denmark, and Bulgaria, not only temporarily, but permanently. These countries are already giving the Lebanese producers rough competition in Lebanon, so it would not be difficult for them to claim the new markets abandoned by Lebanese exporters. Foreign importers would lose confidence in the ability of the Lebanese exporters to supply them with eggs when needed, even after contracts have been signed.

On the domestic level, any drop in the retail price of locally produced eggs resulting from the ban on exports and consequent increase in supply on the market, would have to be absorbed almost entirely by individual producers, as explained earlier. On the whole, only consumers would benefit from the reduced prices. Consumers who previously bought local eggs would tend to increase their purchases, the exact amount depending on the elasticity of demand for eggs. Other consumers would

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122 F.L. Thomsen, op.cit., p. 219.
123 Interviews with exporters of eggs revealed that the export price of local eggs is around 15 piasters F.O.B. Beirut airport.

shift to buying local eggs, which would be cheaper. Imports of eggs would decline.

If this policy were adopted without any restrictions on imports of eggs, the depressed price might settle at a level below the average cost of producing eggs in Lebanon, or 10.3 piasters per egg. Several producers might have to quit the industry. Local production would decrease and, assuming demand to have remained constant, then the prices of Lebanese quality eggs would rise again. But they could not rise appreciably higher than the prices of imported eggs, otherwise consumers would again shift to imported eggs. Such a policy, if adopted, would probably result in such a low price that even the efficient producers might not find it profitable to remain in business.

However, as indicated earlier, contracts were not breached, nor were domestic prices of local eggs depressed, because the ban on exports was lifted by the government before this policy actually went into effect.

3. Probibit Imports

Another course of action is to prohibit the imports of eggs produced in foreign countries.

When such a measure is adopted, it is usually with the aim of protecting an infant industry from the very severe competition of similar industries in other countries that have had an earlier start, and have developed their markets to a wide extent, and have combined their resources in such a manner as to have lower per-unit costs of production than the new local industry.

"The normal supply curve describes the quantity of a commodity which producers are willing to produce at each hypothetical price....

These quantities will depend on the costs of production of the commodity; the higher the costs of production of a commodity, the smaller will be the quantity produced at any one hypothetical price. Suppose now,that the output of an industry itself affected the costs of production of that industry's product. For instance, a large industry is presumably more efficient than a small one and consequently, merely because an industry is large, its costs of production decline... In a large industry the specialization of processes and the specialization of firms themselves may be developed to a greater extent than in a small industry. Special machines, special tools, special processes may be possible in a large industry which a small industry is not big enough to support. An expansion of such an industry will thus lower its whole schedule of costs and will itself increase the quantity of product which the industry is willing to sell at each hypothetical price. In this case, it is possible that a rise in demand, although it will at first cause an increase in the price of the product, will also cause an increase in output, a lowering of costs, and therefore a 'rise in supply' and possibly a fall in price. When a rise in demand can in this way cause a fall in price, the industry is said to be one of'decreasing cost'.[124]

Obviously the ban on imports could be applied with effectiveness only if the industry it is expected to protect is one with decreasing cost. It could not be definitely concluded from this study that the egg production industry in Lebanon is one with decreasing cost, but it is

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124 K.E. Boulding, op.cit., pp. 180-181.

highly probably. First, it did not cover as wide a range of sizes as would have been desirable. Decreasing costs could possibly be exhibited by bigger laying flocks than covered in the survey. In the second place, these costs are, to a large extent, a function of the highly subjective and variable human element of management performed by the various size groups. In other words, when we want to determine if the industry exhibits decreasing costs with increasing flock size, we have to hold the quality of management constant for all sizes under study. Only then can we make sure whether the egg production industry is one with decreasing cost or not. It should also be remembered that bad management of large farms may offset any reduction in costs due to the larger size. It was surprising for the writer to observe that the quality of management on the largest-sized farms was lower than that on the medium-sized farms. It is entirely possible that if the quality of management were the same, the largest farms would have had lower costs.

At any rate, the findings of the study seem to indicate that if the largest size farms had a normal investment in land and birds, and had higher than average egg production, then the industry would show a tendency towards decreasing per unit cost with larger flock size. Hence, it could be expected that if normal situations prevail, the larger farms would have lower costs of production, and that some degree of restriction on imports, particularly during the surplus months, would enable the small farms to survive, possibly expand and thus achieve lower per unit costs associated with larger size.

In the event that the imports of eggs are prohibited throughout

the entire year, the conceivable consequence is a rise in the prices of locally produced eggs to consumers, especially during the months of low production. This would deprive the low income households of a cheap source of eggs. If some of the buyers of low price imported eggs shift to local eggs following the ban of imports, everything remaining constant, then the prices of locally produced eggs would rise because domestic production would fall short of consumption, and producers would thrive at the expense of consumers.

However, the experience of Lebanon regarding the response to profitable prices of apples, broilers, and eggs, suggests that were egg prices to rise to profitable levels following the banning of imports, many newcomers would be attracted to egg production. Production would increase and force prices to decline again. The extent to which prices would decline would depend upon the expansion of the size of egg farms and the level of production costs prevailing among the large farms. With decreasing costs for large scale egg farms, it is possible that with the growth of the industry the size of farm might increase to the point that eggs would be profitable at the 10-11 pt. price prevailing before the millions of Polish eggs disrupted the price structure.

4. Give Subsidies to Producers

If all imported eggs came from the east European countries, things would be less complicated, and it might be safe to recommend that the government either give subsidies to poultry producers or impose a tariff on imports since these countries are probably selling eggs at prices lower than the cost of production. The subsidy would need to supplement the

prices of the imported eggs to equal the cost of production for average producers.

Under a subsidy, "the net price which the producer receives will exceed the price which the consumer pays by an amount equal to the subsidy. The result will be that producers will supply a larger quantity at each consumer's price than before, i.e., the supply will have risen. Under the warm sun of the subsidy, therefore, the total output will expand... The price paid by the consumer will fall... and the net price received by the producer will rise".[125]

Boulding thus makes it clear that subsidies will cause the output of the industry to expand when producers find the subsidy added to the local price gives them a profit over their costs. Obviously, this measure, aside from the effect of imported eggs, would have a tendency to lower the prices of locally produced eggs as production expands. This would make it rather difficult to discontinue the subsidy later on because producers would claim that to do so would force them out of business.

5. Impose an Import Tariff

If the government desires to protect all producers, including the less efficient ones, it could impose a very high protective tariff on all imports of eggs, which would raise the prices of local eggs to producers appreciably higher than the net cost of production, and the egg production industry would become abnormally profitable. However, the imposition of such a tariff is highly improbable. Rather, it is more likely that the government may be interested in protecting the efficient,

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125 Ibid., p. 145.

and even the average producer from unfair competition which is not based on a higher degree of production efficiency of foreign producers. To achieve this end, either of two methods could be followed.

First, a higher differential tariff could be imposed on eggs imported from eastern Europe, to bring their prices up to a level comparable to that of eggs imported from the most efficient countries in producing eggs, like Denmark, while leaving the imports from other countries free of duty. In this case, imports from eastern Europe, which constituted one fifth of Lebanese imports of eggs in 1960, would decrease considerably. This would probably be accompanied by an increase in the price of local eggs, and local production would expand.

If government economic policy allows no discrimination between countries, then the second method could be followed: a tariff would be imposed on eggs imported from all countries alike, so that the price of the cheapest eggs coming from eastern Europe become comparable to those of eggs imported from the most efficient countries before the tariff was imposed. The prices of eggs from the latter countries would rise considerably and imports of such eggs would be substantially reduced.

If either method is followed, Lebanese producers would be competing with foreign producers on the basis of efficiency of production, with the possible exception of the countries of eastern Europe if the latter measure is adopted. Consumers who are willing to pay the price differential to buy the higher priced quality Lebanese eggs would do so, while at the same time the low income consumers would buy imported eggs, probably at somewhat higher prices. As a result, existing farms would expand output,

new farms would be started, and the larger farms might possibly achieve lower per unit net costs of production, which would ultimately result in somewhat lower prices of local eggs to consumers.

6. Conclusion

Since the price of a sizable portion of eggs imported into Lebanon is not entirely based on the efficiency of production of the exporting countries, it seems that leaving the export of eggs free from any limitations, except possibly during the low production months, and restricting the import of eggs especially during the months of surplus production, or imposing some sort of a tariff to protect the efficient producers, would create a favorable atmosphere for the poultry industry to expand to its optimum size. Expansion of the egg industry might possibly achieve lower per unit costs that are thought to be associated with larger size, while at the same time keeping the prices of eggs to consumers reasonably low.

D. Conclusion

Comparison of costs and returns for Lebanese and foreign producers suggests that the former were getting greater returns to management during 1960-61, even though they had a high or even higher costs of production. This was because they had higher selling prices of eggs. However, egg prices reported by producers are believed to have been exaggerated, and they are apt to fluctuate more severely than costs depending on the volume of eggs imported, as well as the seasonality of production. In fact, prices have dropped substantially. It therefore seems necessary that any positive measures should be aimed at finding ways for reducing costs in order to increase returns rather than relying on higher egg prices to achieve this objective.

Lebanon had relatively higher egg production costs because the number of eggs laid per pullet was lower than in other countries, and because some of the major items of expense, as feed and chicks, cost substantially more in Lebanon.

Production costs could be reduced by better and more efficient management and by following recommended production practices. Such factors as the choice of layer breeds and strains, the proper kind of feed, the disease preventive as well as sanitary measures contribute to higher rates of production and reduce mortality. In addition, there exists a great potential for lowering initial investment (and consequently fixed costs) in land, poultry houses, and birds. Moreover cost reduction could be achieved through government legislation, eliminating the import duty on feed ingredients, since feed alone accounted for over two thirds of total costs and which was considerably higher in Lebanon than elsewhere.

The other major way of increasing returns to producers and possibly reducing the retail prices to consumers is by improving the efficiency of the marketing system. The average wholesale price of eggs to producers in 1960-61 was 12.7 piasters per egg, and it is suspected to have been lower, while the average retail price was from 15-17 piasters. This means that at least from 14.3-27.0 percent of the consumer's money, went to middlemen. If an appreciable number of producers agree among themselves to form a cooperative association for the marketing of eggs (and possibly broilers), then they could keep part of the 2.3-4.3 piasters mark-up per egg, after paying all marketing expenses, to themselves, as well as passing part of the reduction in marketing costs to final consumers. In the long range,

the lower prices to consumers will be in the interest of producers since lower prices of quality eggs would stimulate increased sales and restrain new producers from entering the industry. The marketing cooperative previously suggested could encourage and pioneer the grading of eggs. Grading will be justified by the large volume of business the cooperative could be expected to handle. Thus, it could set up at least four grades. The two best grades weighing 50 grams and above, could be sold at premium prices. The lowest grades could be sold at prices competitive with those of imported eggs. Such a cooperative could possibly help stabilize egg prices by storing the surplus eggs produced during the spring months and selling them when egg production is lowest. In the future, the marketing cooperative might be expanded to include a purchasing department which would buy feed for its members more cheaply in quantity purchases.

However, even if these measures are carried out, Lebanese producers might still find it difficult to compete, if imports of eggs were left free from any government interference, especially during the surplus production months when egg prices are usually lowest because producers would not be competing with individual producers, but with political and economic regimes, which sell eggs in order to overcome a severe shortage of foreign exchange. This difficulty could be surmounted by imposing some protective tariff to protect the efficient producers from unfair competition, and to encourage poultry farms to expand, and thereby possibly reduce per unit costs of production. Only then would Lebanese producers be competing with foreign producers on the basis of efficiency of production. The government could at least prohibit or restrict the import of eggs

during the spring months when egg prices are usually lowest, on account of production exceeding current consumption.

As indicated earlier, there does not exist any "best" single measure. A combination of some or several factors discussed may be more equitable for producers and consumers alike.

C O N C L U S I O N

Egg production in Lebanon was quite profitable for the average commercial egg producer during the period 1960-61 when the average poultry farm produced an egg for 10.3 piasters and sold it at 12.7 piasters, as indicated by a survey of 22 commercial poultry farms.

Since then, the wholesale prices of eggs have dropped considerably, to 10-11 piasters per egg, and even less, due to two main factors. The first has been the increase in the output of local farms. The second, and more important factor, has been the very substantial expansion of free imports of eggs from eastern European countries at uneconomically low prices, occasioned by the great needs of the exporting countries for foreign exchange. The prices of these imports have been appreciably lower than the cost of producing eggs in the more efficient exporting countries. Thus the Lebanese producer in 1962 is getting very little, if any, returns for his management, while some are not covering their costs.

It seems that egg production could be made profitable through the joint efforts of the government and producers. The government may levy a tariff on imported eggs to enable the better producers to compete with foreign producers on the basis of efficiency of production. A moderate duty on imported eggs could have the effect of stimulating expansion of size of commercial egg farms in order to achieve the reduction in the cost of producing an egg in keeping with the apparent decrease in cost associated with larger size. It can also restrict the import of eggs, particularly during the spring months of surplus production, but not prohibit imports throughout the year to keep prices relatively low for

the low income consumers, while protecting producers from "dumping" by countries in need of foreign exchange. The government can also lift or reduce taxes on the ingredients for poultry feed, which alone make up nearly two thirds of gross total costs.

Producers, on the other hand, have various alternatives for achieving higher returns to management. They can strive to accomplish this objective by improving their management and production practices to reduce their costs of production, and by organizing themselves into cooperative associations, particularly for egg marketing, whereby they would minimize the number of middlemen between producer and consumer and lower marketing costs through greater efficiency. They could gain part of the savings thus achieved while the other part might go to consumers in the form of lower prices.

APPENDIX

LAYERS

General Statistics

Name: _____ Date: _____

Village: _____ Interviewer _____

No. of layers in production _____ Breed _____

Source of layers _____

No. of eggs produced last month _____

No. and prices of eggs produced each month: Oct. 1959 to date

Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Average
No. of eggs:													
Price													

Are eggs graded for size _____ If yes % large _____ %medium _____ % small _____

How do prices of large eggs compare with medium and small eggs _____

No. of layers in production during last:

Fall _____ Winter _____ Spring _____

No. of pullets being reared for replacement _____

% of replacement stock usually culled _____

Date expected replacement start laying _____

Replacement stock ordered to arrive ? No. _____ when _____

Any plans for expanding present flock ? _____ to what size _____

Area of present laying houses _____ m^2 capacity: layers _____

replacement _____

Any poultry houses under construction at present _____ capacity _____ m^2

When will layers put in them start laying _____

Are you planning to construct new houses _____ when _____

capacity _____ m^2

Is financing of new construction assured _____

Date when production in new construction is expected to start _____

LAYERS

Cost of Production

Name _____ Date _____

Village _____ Interviewer _____

Area of farm premises _____ m^2 Cost/dunum _____

No. of completed layer houses _____ Total size _____ m^2 Total cost _____

Kind of construction _____

Annual rent of farm premises _____

Price of chicks at farm _____ Sexed _____ Unsexed _____

Total No. of eggs produced last month _____ Hatching eggs _____

Price of hatching eggs _____

No. and prices of table eggs produced in the following months:

Month	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept
Eggs Produced												
Price												

To whom do you sell your eggs _____ Contract basis _____ Are eggs

grades _____ What is the price for each grade _____, _____, _____

Manure and litter sold/yr _____ Price of manure _____

Sale of cockerels/yr.: No. _____ Weight _____ Price _____ Basis _____

Sale of culled hens/yr.: No. _____ Weight _____ Price _____ Basis _____

How often do you replace your laying flock _____

Total amount of feed fed last month _____ for layers only _____

Total amount and prices of feed fed in:

Month	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept
Amount												
Price												

What is the total amount of feed you usually have on hand _____

What concentrate do you use _____ Price at farm _____ ratio of conc. to grain _____

What grains or cereals do you use _____% _____% _____% _____% _____% _____%

Prices of grains or cereals _____ _____ _____ _____ _____ _____

No. of full time laborers employed on farm _____ No. of part-time laborers _____

Total monthly salaries _____

Any manager employed _____ Monthly salary _____

No. of unpaid laborers _____ full time _____ part-time _____ hrs/day

Amount of litter used per year _____ price _____

Total medical supplies bill/yr. _____

Price of cartons _____ Times used _____

Total bill for electricity/yr. _____

Water cost/yr. _____

Marketing transport cost _____

No. of weeks of which chicks are brooded _____ No. of brooders used _____

Amount of fuel consumed by each brooder _____ cost of fueld at Farm _____

Percent mortality/yr.: Chicks _____% Pullets _____% Layers _____%

Inventory of Farm Assets

	Date acquired	Units	Price	Value
Land				
Buildings				
Feeders:large,medium,small				
Waterers				
Nests				
Refrigerator				
Baskets				
Carts				
Spades				
Car				

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