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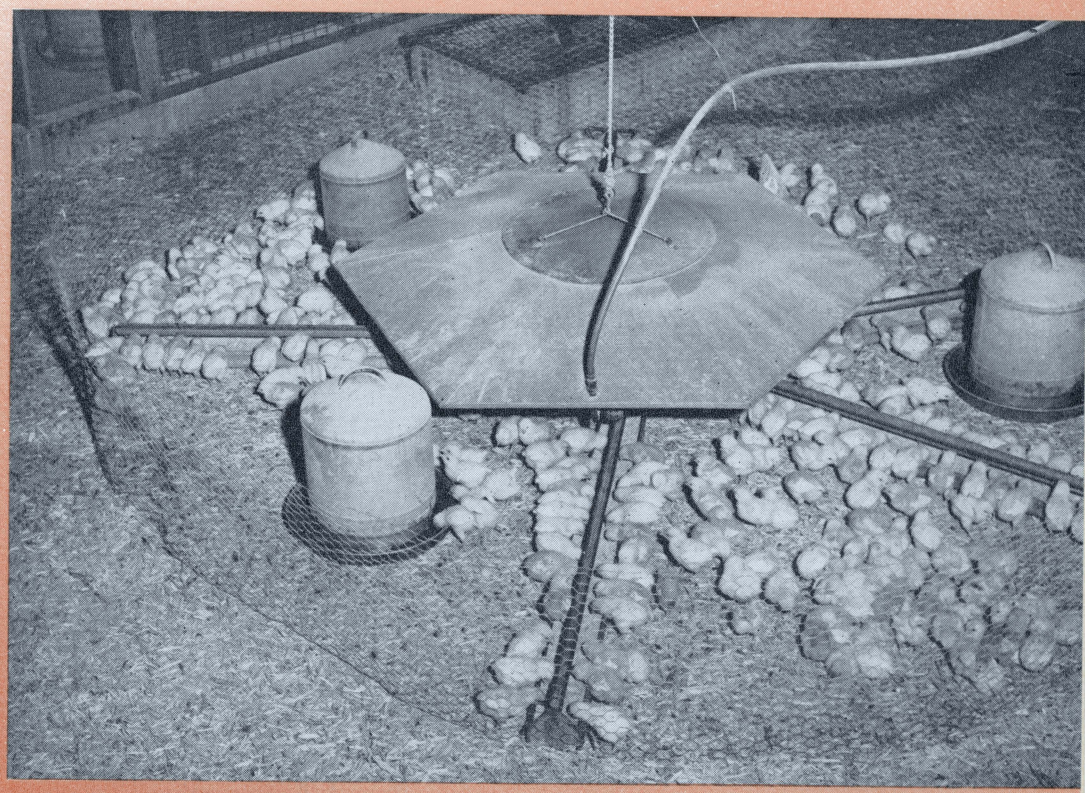
Planning for Profitable Egg Production



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Contents

Acknowledgment

This study was made possible by the cooperation of the egg producers who furnished the information which was used in developing models for various egg-laying systems.

Planning for Profitable Egg Production

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DURING THE PAST DECADE the production of eggs has changed from many small backyard flocks to fewer, larger, commercial operations. This has made possible the application of new methods and production techniques designed to improve the efficiency of the enterprise.

Large-scale commercial egg production is a relatively new enterprise on most Texas farms. Many problems of management are encountered as farmers shift from cash crops to specialized enterprises such as commercial egg production.

A study was designed to determine the management problems associated with large-scale egg production and factors contributing to an efficient and profitable poultry enterprise. The first part included a detailed study on cost and returns of commercial egg production in East Texas. Special attention was given to management practices that affected the efficiency of egg production. Data for the study were obtained during each of the four years, 1959-62.

Guidelines developed from this basic information have been used in developing models for various egg-laying systems. Budget analysis was then used to evaluate each of these systems.

Study of East Texas Flocks

PROCEDURES

The cooperation of representative commercial egg producers in Smith, Cherokee, Rusk and Upshur Counties was obtained for a detailed study of the operation and management of laying flocks.

In the beginning, the facilities and equipment associated with the laying flocks were inventoried and these inventories were checked annually. Cooperating flock owners kept detailed information concerning production and production requirements. This information included a daily record of eggs gathered, laying flock numbers, death losses among layers, culling practices and replacements of birds in each laying house. Also, detailed monthly records were kept of the amount and cost of feed used, medication, utilities, purchase of replacements, labor requirements, repair and replacement of equipment and all other production cost items. All egg sales and the sale of cull birds were listed for each month. Cooperating farms were visited several times each year to tabulate this information systematically.

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GENERAL FLOCK MANAGEMENT

Some of the 15 cooperators in 1959 were relatively inexperienced in the management of layers on a commercial scale. Management practices were not uniform and varied considerably among farms.

When the study was initiated approximately 50 percent of the layers were housed in colony cages, 40 percent in individual cages and 10 percent in floor-type houses. As a rule, each of the layers in open houses was given about 2 square feet of floor space. Colony cages varied in size, and the number of hens per colony varied from 20 to 60.

More than one type of housing was used on some farms. In such cases, production and production requirements could usually be kept separately for each house. This facilitated a comparison of the production, mortality rates and feed conversion with different kinds of housing.

During 1959, the flocks averaged 2,843 layers, Table 1. However, six flocks consisted of less than 1,000 hens and only two flocks included 4,000 or more birds. The two largest flocks averaged approximately 12,000 birds. Throughout the study, the

Recommendations

Successful poultrymen consistently keep doing a good job in every phase of the commercial egg enterprise. More specifically an effective poultryman will:

1. Keep the flock producing at a high level every day. A reasonable standard is 240 eggs per hen annually.

2. Keep the flock in good health for 99 percent livability each month. Maintain adequate sanitation, vaccination and parasite control programs.

3. Keep housing conditions adequate to protect each bird against extremes of heat and cold, wet and dust, draft and staleness.

4. Keep each bird supplied with clean water and a complete ration. Keep feed wastage to a minimum.

5. Keep the high quality of the newly laid eggs and find buyers that pay full value for them.

6. Keep production costs to the minimum. Be cost conscious in purchase of all materials, supplies and services needed for use in the enterprise.

7. Keep the profit motive uppermost in each activity of the egg production program.

trend has been to increase the number of layers per farm. Of the 16 flocks studied in 1962, all included more than 1,500 layers and half the cooperators maintained 4,500 or more birds in the laying flock. From 1959 to 1962, the two largest of the flocks studied had increased to an average of 25,000 hens, or more than double their 1959 size.

In general, laying flocks were replaced annually. Unless pullet replacements were ready to lay immediately, there was some loss in time while the birds were coming into production. With floor flocks, a few days of production were always lost when old birds were replaced. This time was used to remove litter and to perform other sanitation procedures. Throughout the study, the average annual production period for all flocks ranged from 322 to 354 days and averaged 342 days over the 4-year period.

PRODUCTION AND MANAGEMENT PRACTICES AFFECTING PRODUCTION

Annual production averaged only 179 eggs per hen in 1959. This was a production rate of 53 percent during a laying period that averaged 322 days. Five flocks produced 200 or more eggs per hen in 1959. These were in production an average of 359 days. The average annual production of 179 eggs per hen was about the same as the State average for all types of producers but was somewhat below the rate of lay generally reported for commercial egg flocks.

As producers gained experience, there was consistent improvement in the rate of egg production, Table 1. For example, the low-producing flock in 1962 averaged 176 eggs per hen. This was approximately the average level of production for all flocks in 1959. In 1962, 75 percent of the flocks averaged 200 eggs or more per hen.

Good management practices such as selecting a good pullet growing program, keeping the flock healthy and free of parasites, assuring free access to good quality feed and an ample supply of water and providing comfortable housing are among the requirements for high egg production.

TABLE 1. SUMMARY OF EGG PRODUCTION, MORTALITY RATES, EGG PRICES RECEIVED, FEED AND LABOR REQUIREMENTS AND ANNUAL COSTS FOR LAYING FLOCKS, EAST TEXAS, 1959-1962, INCLUSIVE

	Unit	1959	1960	1961	1962
Average layers per farm	Number	2843	4673	4994	6736
Average length, production period	Days	322	354	340	354
Production per hen					
High flock	Eggs	232	213	252	254
Low flock	Eggs	143	144	160	176
Average all flocks	Eggs	179	183	194	211
Average proportion, flock in daily production	Percent	53.4	51.3	57.0	58.2
Mortality rate					
High flock	Percent	42.0	49.0	38.0	40.0
Low flock	Percent	5.0	8.0	6.0	9.0
Average all flocks	Percent	13.9	13.9	16.7	18.0
Prices received for eggs sold					
Wholesale and/or retail[1]	Cents	44.8	45.4	42.8	40.0
To grading station[2]	Cents	31.0	34.8	34.7	33.0
Average, all eggs	Cents	33.0	37.0	37.1	34.8
Feed Consumption					
Per layer	Pounds	75.0	80.0	76.0	79.0
Per dozen eggs	Pounds	5.0	5.0	4.7	4.6
Labor requirements					
Per layer	Hours	.70	.70	.65	.70
Per dozen eggs	Minutes	3.0	2.4	2.4	2.4
Annual production costs per hen					
Feed	Dollars	2.82	2.95	2.81	2.91
Flock depreciation	Dollars	1.42	1.11	1.48	1.38
Miscellaneous cash costs	Dollars	.38	.30	.36	.42
Depreciation, buildings and equipment	Dollars	.18	.14	.16	.16
Interest on investment	Dollars	.16	.14	.13	.13
Total	Dollars	4.96	4.64	4.94	5.00
Production cost per dozen eggs					
Feed	Dollars	.19	.19	.17	.17
Flock depreciation	Dollars	.09	.07	.09	.08
Miscellaneous cash costs	Dollars	.02	.02	.02	.03
Depreciation, buildings and equipment	Dollars	.01	.01	.01	.01
Interest on investment	Dollars	.01	.01	.01	.01
Total	Dollars	.32	.30	.30	.30

[1]Average price by producers who sold to grocery stores, cafes and other similar outlets.
[2]Eggs sold clean but ungraded.

Each year of the study there were some poultry men who did a relatively good job in each of these phases of management throughout the year and consistently obtained a high annual rate of production. When other flock owners failed to do a good job in one or more of these phases of management, such failures adversely affected the production of their birds.

In general, the layers used by the cooperators were of well-bred strains, and with good management practices were capable of a high rate of egg production. Consequently, low egg production was seldom due primarily to the genetic potential of the bird.

Most of the flocks were kept healthy and relatively free of parasites. However, external parasites were not always well controlled and this study pointed up instances where failure in this phase of management was associated with a drop in the number of eggs gathered, but it was impossible to evaluate accurately the resulting loss in egg production.

East Texas producers have access to good quality feeds so that the feed used was seldom a factor when egg production was unsatisfactory. However, failure to provide constant access to feed occasionally adversely affected production of some flocks. With automatic feeding systems, this would occur when the system was not working properly and failed to deliver a sufficient amount of feed to the layers. Also, too long an interval between each hand feeding may have been detrimental to the production of some birds. Usually, management failures of this type were soon corrected, but not without a temporary reduction in egg production for the birds affected.

When automatic water lines were permitted to freeze during cold weather an inadequate supply of drinking water resulted. Egg production for the flocks affected was greatly reduced for several days. Failures of the water supply were not so common in summer, but when failures did occur the results on both egg production and death losses were severe, particularly during periods of high temperatures.

In properly ventilated laying houses, egg production was not greatly affected by summer heat. However, with poor ventilation, birds were exposed to extremely high temperatures during the hottest weather with a resulting drop in production. An even more serious effect on yearly production was the fact that flocks exposed to extremely high temperatures usually experienced heavy death losses during the time.

The rate of lay of flocks in East Texas was not seriously affected by cold weather when protection was provided against drafts and extremely low temperatures. However, when proper precautions were not taken, layers suffered from frozen combs or from respiratory troubles to the detriment of egg production.

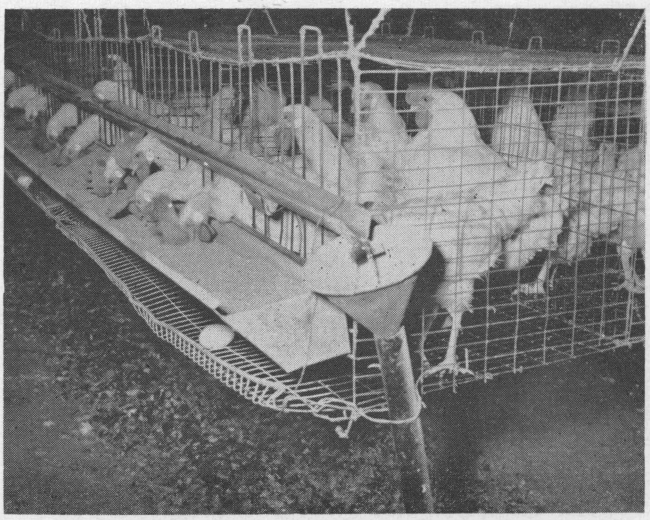

Figure 1. In East Texas, laying flocks of 5,000 birds or less are usually hand fed. However, fresh water is provided automatically, to all sizes of flocks.

As flock owners became more experienced, better overall management was practiced as reflected by the upward trend in average production per hen, Table 1.

MORTALITY RATES

Throughout the study, mortality rates tended to be high and some flocks experienced death losses ranging between 40 and 50 percent. On the other hand, unusually low mortality rates were reported for a few flocks. For all flocks, annual death losses averaged from 14 to 18 percent, Table 1. This is relatively high for commercial egg production.

A high mortality rate may reduce profits in two ways. First, unless replacements are added as death losses occur, egg production for the flock dwindles since there are fewer and fewer layers as the year progresses. This can greatly reduce the efficiency with which labor and facilities are used. On the other hand, adding new replacements from time to time as a result of high death losses increases materially the production costs. In either case, profits are reduced as mortality rates increase.

MORTALITY RATES AND HOUSING

Death losses among birds in colony cages averaged 26 percent, 10 percent higher than the average mortality rate among flocks kept in floor-type houses or in individual cages.

"Cannibalism" was sometimes severe among hens in colony cages, particularly when a relatively large number of layers were housed in each colony. Such losses occurred throughout the year and were not sufficiently prevented by the debeaking program used.

There were heavy death losses in poorly ventilated houses during periods of extremely high temperatures. In this study, many of the houses equip-

ped with colony cages were low-roofed and not well ventilated. Here the effect of high temperatures was severe and was a contributing factor to the high death losses reported.

Colony cages have the advantage of requiring a relatively low initial investment. For example, the cost of a new laying house fully equipped with individual cages was approximately $3,000 for each 1,000 layers. Similarly equipped floor-type houses cost about $2,750 per 1,000 hens. On the other hand, housing equipped with colony cages as used in this study cost only $1,600 per 1,000 hens.

These differences in investment were extremely important to persons with limited capital going into the poultry business. However, housing makes up only a small proportion of the total cost of producing eggs. For the flocks studied, savings in depreciation and in interest on the lower investment associated with colony cages as compared with individual cages amounted to only 10 cents per bird annually or about ½ cent per dozen eggs. Heavy mortality rates among colony flocks more than offset this advantage.

FEED CONSUMPTION

Flock owners used either a ground or a pelleted complete laying ration and kept feed before their birds at all times. In winter, when daylight was limited, electric lights were used to give hens a longer day of light stimulation and more time for consuming feed.

Feed consumption per hen for 12 months averaged approximately 85 pounds. Among individual flocks the range was from 75 to 98 pounds. Evidence of feed wastage was usually noted among flocks for which an especially large consumption of feed was reported.

Hens that produced at a high level usually consumed average or above average quantities of feed. However, unless feed was wasted, high producing birds were more efficient in the rate in which feed was converted into eggs than were low producers.

During the first year of the study, 1959, the amount of feed used per dozen eggs ranged from 4.3 to 6.6 pounds and averaged 5.0 pounds. The flock that averaged 4.3 pounds of feed per dozen eggs reported an average of 232 eggs per hen and was the high producing flock that year. During subsequent years most producers improved the feed efficiency of their laying flocks. This was due in part to practices that reduced feed waste. Improvement in the rate of lay was a factor, also.

During 1962, an average of 4.6 pounds of feed were used per dozen eggs with a range from 4.0 to 5.2 pounds. Again the flock that reported the high production per hen reported the lowest feed requirements per dozen eggs.

SOURCES OF FEED

In 1959, all but one of the flock owners used commercially mixed feeds. Later other producers, particularly those with relatively large numbers of layers, purchased equipment and mixed their own laying ration. Here a commercially prepared, high-protein concentrate was combined with ground grains such as corn and grain sorghum and other ingredients in preparing the laying ration. As far as could be determined, similar results were obtained with both the commercially prepared and the farm-mixed feeds.

In 1962, cooperating poultrymen paid an average of $3.69 per hundredweight for feed used by the laying flock. For individual flocks the average cost per hundredweight ranged from $3.19 to $4.01. In general, commercially mixed laying feeds cost about 70 cents more per hundredweight than did the ingredients used in preparing a farm-mixed laying ration of similar protein content.

Producers who used farm-mixed feeds had the cost of owning and operating suitable grinding and mixing equipment and the necessary feed storage. The investments for such equipment differed greatly. For example, the owner of one relatively small flock purchased a small grinder and mixer and a 25-ton storage bin for less than $1,000.

Another cooperating producer with 25,000 layers installed feed mixing and storage equipment that cost approximately $9,000. This was push-button type, automatically set equipment with a processing capacity of 3 tons of feed per hour.

LABOR REQUIREMENTS

The labor used per hen with flocks of less than 1,000 layers tended to be somewhat higher than with larger flocks. However, in 1962 when all flocks included more than 1,500 hens, no clear-cut labor savings were reported with increased numbers of layers.

Throughout the study, an average of approximately 0.7 hour was required annually per hen for all labor associated with commercial egg production. This involved the time spent cleaning, grading and packing eggs for market.

When eggs were marketed wholesale, one man with some help from his wife or other member of the family could take care of a 5,000-layer enterprise. However, labor-requirement data indicate that when eggs were delivered retail on an egg route, a man and wife were kept busy with 3,000 layers.

Hand feeding has been common among all but the relatively large flocks. Owners of large flocks have had trouble keeping suitable labor and some have used automatic feeding equipment. It is estimated that a daily saving of one hour per 1,000 hens can be made by using automatic feeding. Observa-

tions were limited but the cost of upkeep on automatic feeding equipment was relatively high for the farms studied.

PRODUCTION COSTS

The production costs shown in Table 1 include all cash costs plus a charge for depreciation and interest. The cost of hired labor is included as a miscellaneous expense, but there is not a charge for the labor of the operator or his family.

Feed made up about 60 percent of the cost of keeping a laying flock and, together with the expense of flock replacement, was about 85 percent of the cost of producing eggs.

As flocks increased in size, some producers hired additional labor. This largely explains why miscellaneous costs averaged more in 1962 than in previous years.

The average annual cost of keeping a hen in the laying flock ranged from $4.64 to $5 and was approximately $5 during 3 of the 4 study years. On the basis of eggs produced, the cost was about 30 cents per dozen each year. The labor of the farm family was not included in calculating either of these costs.

EGG-HANDLING PRACTICES, MERCHANDISING AND PRICES

Eggs were gathered regularly, usually three or more times daily. With the exception of one flock, all eggs were gathered by hand. Eggs that did not go immediately to market were cooled when cooling was needed.

East Texas poultrymen had the alternative of delivering eggs to a grading station or looking for a higher price through some other outlet. Producers have shown increasing interest in the latter alternative as production costs have increased more rapidly than egg prices.

The price-making mechanism for eggs sold by East Texas producers is not clearly defined. As the production of eggs has become commercialized, there have been numerous marketing problems. All the individual egg producer has been able to do to improve the price received for eggs at any specific time has been to take advantage of opportunities to market high-quality eggs at higher prices.

The development of a sufficient volume of eggs to provide an operating and selling profit for egg merchants would undoubtedly attract qualified egg dealers. In the meantime, supermarkets, other grocery retailers, hotels and cafes have been substantial buyers from local producers.

In 1959 and 1960, more than 75 percent of the production on cooperating farms was delivered to a grading station. Eggs for this market were put in ordinary 30-dozen crates before cooling. Deliveries

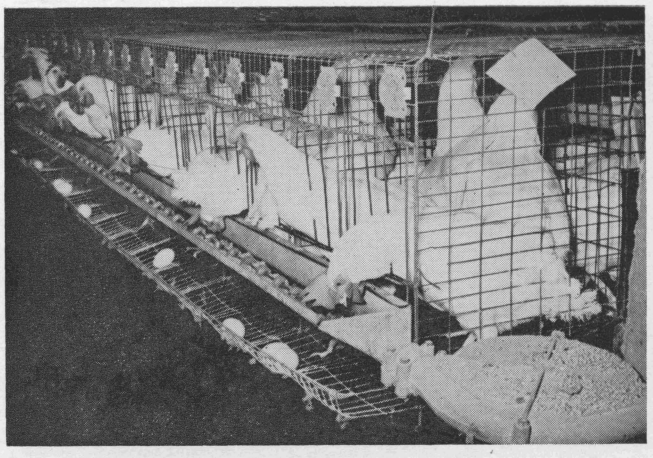

Figure 2. Forty percent of the flocks studied were housed in individual cages. Mechanical feeders and waterers were commonly used by flock owners of 10,000 or more layers. The cost, new, of the house, cages and facilities for mechanical feeding and watering was $1.75 per hen capacity.

to the grading station were usually made two or three times each week.

Four producers made a special effort to find a better than average market in 1959. These men arranged to furnish grocery stores and cafes, and, in some instances, to retail eggs to individuals customers. Eggs for this market were cleaned, candled, graded and put in either cartons for retail sale or in case lots for the hotel and cafe trade.

Eggs going to a grading station during 1959 brought an average of 31 cents per dozen, Table 1. This price approximated the production costs of eggs on these farms. At the same time, four producers who prepared eggs for retail sale received an average of 44.8 cents per dozen for their entire output.

In 1960, the price spread between these two outlets for eggs averaged more than 10 cents per dozen. As a result, the proportion of eggs going to a grading station dropped in 1961-62. Even so, eggs going to a retail or other special outlet continued to average 7 cents per dozen above grading station prices during these years.

Cleaning, grading and packaging eggs for customers willing to pay a premium price required extra labor and special equipment. Other added costs included egg cartons and the extra mileage for the truck or pickup used for egg delivery.

The usual practice in processing eggs was to substitute machinery for hand labor whenever feasible. One producer with approximately 10,000 hens bought cleaning and grading equipment that cost $2,600. Four persons with this equipment could clean, candle, grade and carton 360 dozen eggs per hour. At this rate, the peak production of 50,000 hens could be processed in an 8-hour day by four workers.

Owners of small flocks reported less expensive equipment used to process market eggs. For ex-

ample, equipment costing about $600 was used to good advantage with flocks numbering 5,000 layers or less.

In general, average prices received for eggs during 1959-62 did not permit large profits. Some producers who followed good practices in the management of their flocks did little more than meet production expenses because egg prices were low. Although all flock owners were hurt by low egg prices, inefficient producers were more severely affected.

Before a new egg enterprise is started, it is important that the poultryman explore and arrive at a marketing outlet that will provide a price which warrants the risk involved in the enterprise.

HANDLING LOSSES

About 97 percent of the eggs gathered were sold. This difference of 3 percent included eggs broken or badly cracked, either in gathering or during subsequent handling, and eggs that were not saleable because of blood spots or for some other reason. Although breakage was reduced by careful handling, all of the producers reported some loss in the number of eggs marketed as compared with the number gathered.

Evaluation of Various Systems of Egg Production

PROCEDURES

The results of the study of East Texas laying flocks were used as a basis for setting up model systems of production for various poultry situations. These models involved differences in systems of management and in management practices. A budget analysis was then used to evaluate each production model. Budgeting is a systematic method of estimating the profitability of different management situations. Data obtained from producers were utilized in calculating feed, flock replacement, labor and other costs associated with the various situations for which models were prepared.

It was evident from the first phase of the study that poultry earnings were greatly influenced by the size of the laying flock. To better evaluate this effect, complete farm budgets were prepared for flocks of 3,000, 5,000, 10,000, 30,000 and 60,000 layers.

During 1959-62 the average annual rate of lay for the highest-producing flocks was 240 eggs per hen per year. On the other hand, relatively low-producing flocks averaged only 180 eggs per hen. The 4-year average for all flocks was 206 eggs per hen annually. These three levels of production were used in the models included in this analysis. Feed requirements and other inputs for each level of production were based on producer experience.

With good flock management, death losses should not run over 12 percent annually. However, wide extremes in the mortality rates were reported by individual flocks. The flocks studied were grouped into three categories, those reporting annual death losses averaging approximately 12, 24 and 36 percent. Consequently all three categories were used in setting up situations for evaluation.

The trend is for more and more poultrymen to make arrangements for supplying regular buyers with graded eggs. In 1962, the price received through this outlet averaged approximately 40 cents per dozen, Table 3. A few owners of small flocks made regular house-to-house delivery or retailed eggs at home. This market outlet required extra work and was not used by large producers. During 1962 the price for eggs sold to individual customers averaged 45 cents per dozen. These two prices together with an average price received for ungraded eggs in 1962 (33 cents per dozen) were used in making an evaluation of the various systems of egg production.

Flock owners have the alternative of buying all commercially mixed feeds or purchasing equipment with which to prepare the laying ration by grinding and mixing grain with a high protein concentrate. The costs associated with each alternative as reported by flock owners were used to evaluate the two practices.

In summary, the model situations for which budgets were prepared included:

1. Five sizes of flocks, namely 3,000, 5,000, 10,000, 30,000 and 60,000 layers.

2. Production for each flock calculated on the basis of 240, 206 and 180 eggs per hen per year.

3. Feed required calculated according to egg production.

4. Annual mortality rates equal to 12, 24 and 36 percent of the total flock.

5. Two sources of feed, commercially mixed and farm-mixed.

6. Egg receipts based on an average price of 45, 40 and 33 cents per dozen.

REQUIREMENTS FOR COMMERCIAL EGG ENTERPRISE

Requirements for laying flocks include items of investment capital as well as items of annual cost. Capital needs for land, improvement, equipment and laying hens were considered.

LAND. The land requirements for a modern commercial egg enterprise are relatively small. Only the acreage used for poultry and for the farmstead were included in this study. Parts of the farm used for other purposes were not considered. The land investment was figured at $100 per acre and the acre-

age ranged from 5 acres for the 3,000-hen flock to 25 acres for 60,000 layers, Table 2.

IMPROVEMENTS AND EQUIPMENT. Brooder houses and other facilities for raising flock replacements were not considered in this study. Consequently, the laying houses and the egg storage room made up the major investment in buildings. The cost of a new laying house for birds in floor-type houses or where individual cages were used was $2 per layer capacity.

The investment for laying-house equipment as shown in Table 2 includes individual cages with automatic waterers. The figures in Table 2 are based on hand-feeding equipment for flocks of 3,000 and 5,000 hens but for 10,000 or more birds, automatic feeding equipment is included. The cost of new automatic feeding facilities was figured at 33 cents per bird capacity. A tank for storing bulk feed cost about $300 and is a part of the equipment figured for each laying house.

The operator with floor-type housing does not have to invest in the individual wire cages included in Table 2. However, this saving is largely offset by the investment in the nests, feeders, waterers and litter necessary in floor-type houses.

Equipment for cleaning and grading eggs was usually in the same building where eggs were cooled and stored. The investment for these combined facilities was usually small when eggs were sold to a grading station. The investment shown in Table 2 is for the facilities needed to provide cool storage and space and equipment to clean, grade and package eggs for the retail trade. The cost of suitable new facilities for grading and storing eggs from a 10,000 and a 60,000-hen flock was about $4,200 and $14,000, respectively. This investment on a per-hen capacity basis amounts to 42 and 23 cents, respectively.

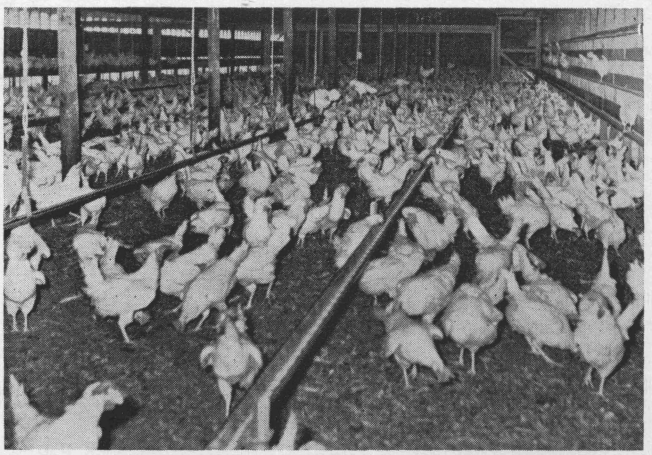

Figure 3. The investment for a floor-type house with nests was about the same as a similar capacity house equipped with individual cages. This floor-type house is equipped with mechanical feeders and waterers.

With prices prevailing during 1962, poultrymen could make a substantial saving in feed cost by combining corn and grain sorghum with a high protein concentrate as the main ingredients of the laying ration. However, not all poultrymen followed this

TABLE 2. CALCULATED INVESTMENT ASSOCIATED WITH LAYING FLOCKS OF VARIOUS SIZES

	3,000 Layers Using		5,000 Layers Using		10,000 Layers Using		30,000 Layers Using		60,000 Layers Using	
	Commercially mixed feed	Farm mixed feed	Commercially mixed feed	Farm mixed feed	Commercially mixed feed	Farm mixed feed	Commercially mixed feed	Farm mixed feed	Commercially mixed feed	Farm mixed feed
	Dollars									
Land[1]	500	500	700	700	1,000	1,000	2,000	2,000	2,500	2,500
Laying houses[2]	3,000	3,000	5,000	5,000	10,000	10,000	30,000	30,000	60,000	60,000
Laying house equipment[2,3]	1,175	1,175	2,420	2,420	5,325	5,325	14,775	14,775	29,500	29,500
Egg room, cleaner and grader[2,4]	700	700	700	700	2,100	2,100	6,500	6,500	7,000	7,000
Feed mixing equipment[2]		450		450		850		4,500		5,000
Miscellaneous equipment[2,5]	175	175	290	290	580	580	1,740	1,740	3,480	3,480
Pickup, other trucks[2]	900	900	900	900	900	900	3,400	3,400	6,100	6,100
Hens[6]	5,250	5,250	8,750	8,750	17,500	17,500	52,500	52,500	105,000	105,000
Total	11,700	12,150	18,760	19,210	37,405	38,255	110,915	115,415	213,580	218,580
Average per hen capacity	3.90	4.05	3.75	3.84	3.74	3.82	3.70	3.85	3.56	3.64

[1]Valued at $100 per acre.
[2]Investment calculated at 50 percent of current cost, new.
[3]Includes wire cages and automatic waterers in all instances. Automatic feeding equipment for flocks of 10,000 or more birds.
[4]Includes equipment to clean, grade and prepare eggs for retail.
[5]Egg baskets, clocks, sprayers, etc.
[6]Cost of replacement pullets at $1.75 each.

TABLE 3. AVERAGE PRICES RECEIVED FOR PRODUCTS SOLD AND AVERAGE PRICES OF ITEMS USED IN PRODUCTION, 1962

	Unit	Dollars
Products sold		
Eggs—retail—individual customers (cartoned)	Dozen	.45
Eggs—grocery stores and/or cafes (cartoned)	Dozen	.40
Eggs—delivered clean but ungraded (loose)	Dozen	.33
Cull hens	Head	.25
Production requirements		
Commercially mixed laying feed	cwt.	3.85
Ingredients for farm-mixed laying feed		
41 percent protein concentrate	cwt.	5.50
Grain Sorghum	cwt.	2.12
Corn	cwt.	2.70
Oyster shell[1]	cwt.	.90
Pullet replacements	Head	1.75
Egg cartons for retail eggs	100	2.30
Egg flats for delivering eggs in cases	100	1.30
Regular hired labor	Week	35.00
Irregular hired labor	Hour	.75

[1]Oyster shell purchased in small quantities was at a somewhat higher price.

practice. Consequently, the investment information for various-sized flocks, both with and without equipment suitable for grinding and mixing feed is shown in Table 2. Such equipment comes in sizes ranging in capacity from less than a ton to more than 3 tons per hour. High-capacity mills for grinding and mixing operate automatically with minimum labor. The poultryman can select the capacity best suited to his needs.

Other investment items include baskets for gathering eggs, time clocks for turning on lights, spraying equipment and numerous other miscellaneous items. The total new cost of these relatively small items is approximately 6 cents per hen.

A pickup truck is included as part of the investment for the laying enterprise. Additional trucks are in common use with large flocks for handling both eggs and feed. Here a truck equipped to deliver bulk feed from the feed mixer to each house is a great labor saver. The mileage covered for this purpose is low and secondhand bulk trucks that are unloaded automatically have been used successfully for this job.

THE LAYING FLOCK. The hens in the laying flock are a major item of investment. This is true whether the poultryman raises his own replacements or buys pullets to go directly into the laying house. By the time pullets were in 50-percent production, their total cost was approximately $1.75 per bird in 1962, regardless of the method of replacement, Table 3. This figure is used throughout the study.

For a person just starting a commercial egg enterprise, about 30 percent of his investment will be for the laying flock. Because the laying flock is replaced about every 12 months, established producers usually consider this an annual expense.

Data in Table 2 do not include facilities for brooding chicks and raising pullets.

The total average investment per hen capacity, including feed grinding and mixing facilities, ranges from $3.64 for 60,000 layers to $4.05 for a 3,000 hen flock, Table 2.

This total average investment is based on 50 percent of the new cost for all improvements, equipment and facilities. Consequently, the average investment shown in Table 2 should not be confused with the investment required to start a new commercial egg enterprise.

The capital required to start a 60,000-layer enterprise including pullets at 50 percent production and housed in individual cages and with facilities to prepare a farm-mixed laying ration, would amount to $330,000. This is $5.50 per hen capacity. For a 10,000-bird flock the investment would be about $5.80 per hen capacity.

EGG PRODUCTION REQUIREMENTS

The amount of feed, labor, replacement pullets and other physical requirements needed with different egg-production systems were determined for budgeting purposes. All other requirements involving either cash or overhead costs were also included as presented in the following discussion.

FEED REQUIREMENTS. Unless feed wastage was a factor, feed consumption tended to vary with the level of egg production. For example, high-producing flocks (averaging 240 eggs per hen) consumed approximately 90 pounds of feed annually per hen. Birds laying at an intermediate level of 206 eggs per hen utilized 86 pounds each. On the other hand, hens averaging only 180 eggs annually were fed 82½ pounds of laying ration.

These feed requirements were used in preparing budgets for egg-laying systems with flocks producing at these respective levels. The 1962 prices of purchased feeds are shown in Table 3.

LABOR. Among the farms studied, a large proportion of the labor was provided by the farm family. In the evaluation of different egg-production systems, it was considered that both the 3,000 and 5,000-bird flocks could be taken care of by the farm family. As budgeted, eggs from the 3,000 hen flock were retailed through house-to-house delivery to individual customers. House-to-house delivery was time-consuming; consequently, about the same labor was required with this system as was needed to care for a 5,000-hen enterprise with eggs marketed through other outlets.

A flock of 10,000 hens was calculated to require one full-time worker in addition to the time of the operator and his family. Hired labor for 30,000 layers included 5 full-time men caring for the birds

and 6 persons working part-time in the egg house where eggs were cleaned, graded and packaged for market.

A flock of 60,000 birds was calculated to require the full-time help of 10 men caring for the birds and 6 persons working full-time in the egg house. Both men and women were usually employed for cleaning, grading and packaging. These labor costs do not include the time necessary to raise pullet replacements. Producers who raised their own pullets had added labor requirements. Prices paid in East Texas for hired labor used in 1962 are shown in Table 4.

FLOCK REPLACEMENTS. Most East Texas poultrymen did not cull laying flocks periodically. A more usual practice was to replace the birds in each house about every 12 months and to make all the replacements for a particular house at one time. Seldom were more birds added to a house during the production year. The 1962 replacement cost of $1.75 per pullet was budgeted as an annual expense.

MARKET SUPPLIES. These consisted primarily of containers in which eggs were delivered to buyers. In most instances ordinary cartons each holding 1 dozen eggs and costing $2.30 per hundred were used in packaging eggs furnished to grocery stores. Brightly colored or specially made cartons were more expensive. Containers (filler flats) for eggs delivered to a grading station cost $1.30 per hundred, Table 3. The cases (30-dozen size) were returned and reused.

TRUCK EXPENSE. This item included the operating costs for all forms of transportation used on a commercial egg farm. Owners of small flocks used a pickup to deliver eggs and for other light hauling. Here commercially mixed feeds were delivered to each laying house. Those who prepared a home-mixed ration usually purchased grain and other ingredients delivered to the farm.

In addition to one pickup, the cost of a truck to handle bulk feed was included among the expenses for flocks of 30,000 birds or more. Also on these farms, small trucks with a special-type body were used to deliver eggs in good condition to retailers.

It was estimated that these costs will run from about $120 to $180 annually per 1,000 layers.

TABLE 4. SUMMARY BUDGETS FOR 10,000-HEN LAYING FLOCK AVERAGING 240 AND 180 EGGS PER HEN PER YEAR, WITH 12 AND 36 PERCENT MORTALITY RATES AND EGGS MARKETED, UNGRADED AND AT RETAIL OUTLET PRICES, 1962[1]

	10,000-hen flock averaging 240 eggs per hen annually				10,000-hen flock averaging 180 eggs per hen annually			
	12% annual mortality rate		36% annual mortality rate		12% annual mortality rate		36% annual mortality rate	
	Eggs sold, ungraded[2]	Eggs sold, gro. & cafe[3]	Eggs sold, ungraded	Eggs sold, gro. & cafe	Eggs sold, ungraded	Eggs sold, gro. & cafe	Eggs sold, ungraded	Eggs sold, gro. & cafe
	Dollars							
Sales								
Eggs	60,412	72,944	52,548	63,632	45,135	54,708	39,372	47,724
Cull hens	2,200	2,200	1,600	1,600	2,200	2,200	1,600	1,600
Total	62,612	75,144	54,148	65,232	47,335	56,908	40,972	49,324
Expenses								
Feed–farm-mixed ration	25,380	25,380	22,140	22,140	23,265	23,265	20,295	20,295
Flock replacements	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500
Hired labor	3,600	3,600	3,600	3,600	3,600	3,600	3,600	3,600
Operating pickup and trucks	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Market supplies	664	4,194	503	3,659	411	3,146	369	2,744
Repairs and upkeep	1,246	1,340	1,246	1,340	1,246	1,340	1,246	1,340
Interest	2,272	2,350	2,272	2,350	2,272	2,350	2,272	2,350
Depreciation	3,572	3,978	3,572	3,978	3,572	3,978	3,572	3,978
Utilities and misc.	2,096	2,096	2,096	2,096	2,096	2,096	2,096	2,096
Total–all costs	57,530	61,638	54,129	57,863	55,162	58,475	52,150	55,103
Cost per dozen eggs	30.6	32.8	33.0	35.3	39.1	41.5	42.4	44.8
Returns–family labor-mgt.[4]	5,082	13,506	19	7,369	—7,827[5]	—1,567	—11,178	—5,779
Returns–family labor-mgt. using commercially mixed feed	890	7,607	—3,505	2,280	—11,829	—6,937	—14,602	—10,407

[1]Unless otherwise indicated, feed costs were calculated on the basis of farm-mixed laying ration.
[2]Thirty-three cents per dozen.
[3]Forty cents per dozen.
[4]The amount of money left for the labor and management of the farm family after all operating expenses have been paid and deductions made for depreciation and interest.
[5]Indicates a minus income or the amount that total calculated cost exceeded total calculated sales.

REPAIRS AND UPKEEP. Annual repairs for laying houses, other buildings, feeding and watering equipment, egg room equipment and feed-mixing facilities were included in repairs and upkeep cost. Rates for calculating repairs and upkeep were computed from data secured from farms studied. Land taxes were a minor item and were included as an upkeep cost. The largest items of upkeep were in connection with the laying house and with automatic feeding and watering equipment.

Total annual upkeep of improvements and equipment averaged between 3.5 and 4 percent of the original cost.

INTEREST ON INVESTMENT. This cost was calculated on the investment items listed in Table 2. Interest on land was calculated at 4 percent and all other capital at 6 percent.

DEPRECIATION. Depreciation rates for improvements, various kinds of poultry equipment and trucks were based on the experience reported by cooperating poultrymen. Laying houses, bulk feed tanks, nests, wire cages, the egg room and cooler and feed-mixing equipment were considered to have an average life of approximately 15 years. An expected life of from 5 to 10 years was reported for other facilities. No depreciation was included for land and the replacement of the laying flock was treated as an annual cost.

The total depreciation cost for the various buildings and equipment used for a commercial egg enterprise approximated 11 percent of the original cost.

MISCELLANEOUS ITEMS. The miscellaneous requirements associated with an egg enterprise included expenditures for telephone, sanitation, insurance and utilities.

Most of these costs tended to vary directly with the size of the laying flock. However, the volume of eggs marketed from the larger flocks encouraged the producer to contact distant buyers in looking for his best outlet. This was done largely by telephone. Consequently, among relatively large flocks, this cost item was much higher than for a producer with a small flock who depended primarily on near-by markets. Also, the large amount of accounting associated with the large flock encouraged hiring someone to keep up with the business records. The owners of small flocks kept their own records.

EGG AND POULTRY SALES

Egg sales for each system of production were calculated to be 97 percent of the number gathered. This was in keeping with the experience of East Texas producers as previously reported. Egg sales accounted for about 97 percent of the gross sales of all management systems studied. Sale of the cull hens made up the remainder.

Poultry manure was disregarded as a source of income for this analysis. In numerous instances manure was not sold but was given in exchange for cleaning the houses. When the flock owner used his manure on pastures or cropland, it was not feasible to estimate its full value over and above the expense of spreading.

FACTORS AFFECTING POULTRY PROFITS

The following 6 factors were found to influence greatly the earnings from a laying flock:

1. Annual egg production per hen
2. Feed efficiency
3. Mortality rates
4. Savings in feed costs
5. Merchandising practices of producers
6. Size of the laying flock

The estimated earnings and egg production costs for a 10,000-hen flock, producing at different levels and with two rates for death losses are shown in Table 4. Also included is a comparison in earnings with two prices for eggs and different costs of poultry feed. Estimated earnings for flocks of various sizes and rates of lay, and with varied mortality rates are shown in Table 5. Also shown are estimated earnings with alternative feed purchasing practices and with different market outlets. In all, the estimated returns for 180 different egg production systems are shown in Table 5.

EGG PRODUCTION PER HEN RELATED TO PROFITS

In budgeting for this study, 240 eggs per hen per year were regarded as a high level of production. Hens laying 206 and 180 eggs per year were considered respectively as intermediate and low-level producers.

Many of the production costs per hen tended to be relatively fixed. The most important exception was feed requirements which tended to vary to some extent with the level of egg production. A flock that averaged 20 dozen eggs annually required 7½ pounds more feed per hen than a flock averaging only 15 dozen eggs. Based on the 1962 costs of farm-mixed laying feed, this difference amounted to about 23 cents per hen. Also the per-hen cost of cartons for marketing eggs varied directly with egg production.

Aside from increased feed and marketing supplies, improving the average production per hen spreads approximately the same costs over more eggs, thus reducing production costs per dozen.

Calculated egg and poultry sales and expense for 10,000 hens producing at two levels and with two mortality rates associated with each rate of lay

are shown in Table 4. Budget summaries in Table 4 include two egg price situations also.

Hens averaging 240 eggs annually layed 33 percent more than the 180-egg producers; yet other things being equal, total production costs were only 4 to 5 percent more at the higher production level.

Based on eggs priced at 40 cents per dozen, gross sales from a flock averaging 240 eggs were $1.94 per hen more than sales with birds averaging only 180 eggs. Egg production costs for 10,000 birds were estimated to be approximately 9 cents and 4½ cents less per dozen, with hens averaging 240 eggs and 206 eggs respectively than with layers averaging only 180 eggs annually.

The labor and management income from 10,000 high-producing hens with a 12-percent mortality was calculated to be $13,500 when farm-mixed feeds were used and eggs sold for an average of 40 cents per dozen, Table 4. Total production costs amounted to 32.8 cents per dozen eggs gathered. Under the same situation, but with hens averaging 180 eggs, the cost per dozen eggs was calculated at 41.5 cents per dozen. Here, total sales lacked more than $1,500 of paying estimated production costs. With 10,000 layers, improving the rate of lay from 180 to 206 eggs per hen increased the estimated labor-management income by $6,500, Table 5.

For a 10,000-bird flock, with a 12-percent mortality rate and averaging 180 eggs per hen annually with farm-mixed feeds, increasing production one dozen eggs per hen annually added a net increase of $3,000 to the income of the operator. In other words, for such a flock, each dozen increase in egg production adds 38.8 cents to gross receipts and adds only 8.8 cents to total production costs. Consequently an additional dozen eggs under these circumstances, adds 30 cents to the operator's labor and management return.

TABLE 5. ESTIMATED OPERATOR'S LABOR AND MANAGEMENT WAGE FROM 5 DIFFERENT SIZES OF COMMERCIAL FLOCKS, 3 LEVELS OF EGG PRODUCTION PER HEN, 3 ANNUAL MORTALITY RATES, 2 MARKET OUTLETS AND USING EITHER FARM-MIXED OR COMMERCIALLY MIXED FEEDS[1]

	3,000-bird flock		5,000-bird flock		10,000-bird flock		30,000-bird flock		60,000-bird flock	
	Eggs sold ungraded[2]	Eggs retailed individual buyer[3]	Eggs sold ungraded	Eggs sold to gro. stores, cafes, etc.[4]	Eggs sold ungraded	Eggs sold to gro. stores, cafes, etc.	Eggs sold ungraded	Eggs sold to gro. stores, cafes, etc.	Eggs sold ungraded	Eggs sold to gro. stores, cafes, etc.
	— — — — — — — — — — — — — — Dollars — — — — — — — — — — — — — —									
Flocks using farm-mixed feeds										
Averaging 240 eggs per hen										
12% annual mortality	2,536	7,653	4,633	9,050	5,082	13,506	15,735	36,032	25,432	73,543
24% annual mortality	1,794	6,780	3,389	7,516	2,480	10,437	7,929	26,825	15,630	55,478
36% annual mortality	1,044	5,685	2,146	5,982	19	7,369	120	17,621	720	37,380
Averaging 206 eggs per hen										
12% annual mortality	354	4,141	998	4,769	—2,304[5]	4,944	—6,851	10,629	—13,505	22,945
24% annual mortality	—252	3,613	—16	3,507	—4,326	2,423	—13,215	2,783	—25,934	8,120
36% annual mortality	—860	3,105	—1,025	2,248	—6,348	— 9	—19,579	—4,783	—38,362	—6,712
Averaging 180 eggs per hen										
12% annual mortality	—1,300	2,671	—1,765	1,512	—7,827	—1,567	—24,011	—9,187	—47,233	—15,527
24% annual mortality	—1,803	1,907	—2,599	461	—9,497	—3,673	—29,283	—15,505	—57,515	—27,901
36% annual mortality	—2,205	1,143	—3,433	—591	—11,178	—5,779	—34,552	—21,823	—67,791	—40,275
Flocks using commercially mixed feeds										
Averaging 240 eggs per hen										
12% annual mortality	1,205	5,996	2,371	5,877	890	7,607	—3,014	17,285	—1,132	36,049
24% annual mortality	524	5,008	1,272	4,546	—1,306	4,943	—9,603	9,293	—14,314	20,414
36% annual mortality	—139	4,025	173	3,214	—3,505	2,280	—16,197	1,304	—27,502	4,746
Averaging 206 eggs per hen										
12% annual mortality	—993	2,632	—1,246	1,743	—6,344	—631	—24,116	—6,919	—43,340	—11,585
24% annual mortality	—1,513	2,313	—2,117	674	—7,980	—2,796	—29,922	—13,924	—54,952	—25,294
36% annual mortality	—2,035	1,521	—2,982	—391	—9,816	—4,931	—35,125	—20,329	—65,358	—37,804
Averaging 180 eggs per hen										
12% annual mortality	—2,634	927	—3,990	—1,396	—11,829	—6,937	—41,171	—26,347	—77,450	—49,909
24% annual mortality	—3,053	273	—4,681	—2,261	—13,216	—8,672	—45,330	—31,552	—85,768	—59,995
36% annual mortality	—3,469	—379	—5373	—3,127	—14,602	—10,407	—49,486	—36,757	—94,080	—70,143

[1]Data is for hens housed in individual cages.
[2]Average ungraded price, 1962—33 cents per dozen.
[3]Price for eggs sold to individual buyers—45 cents per dozen.
[4]Price for eggs sold to grocery stores and cafes—40 cents per dozen.
[5]Indicates a minus income or the amount that total calculated costs exceed total calculated sales.

For a similar situation, but with eggs bringing 33 cents a dozen delivered to a grading station, the operator receives a net return of 26 cents for every dozen that production is increased above 180 eggs per hen.

Similarly, for all of the situations evaluated, the level of egg production greatly influenced earnings, Tables 4 and 5. Because of the fixed nature of so many costs associated with commercial egg production, improving the rate of lay normally added more to sales than was added to costs. At present costs and egg prices, a low level of egg production was not profitable. In this study, relatively high labor-management incomes were always associated with a high rate of lay. All of the systems with production averaging 180 eggs per hen returned a relatively low labor-management income.

Healthy birds that are free of parasites and of a high producing strain are necessary for a high rate of lay. Also, birds must be comfortably housed, must consume large amounts of properly balanced feed and have access to water at all times if they are to lay well.

FEED EFFICIENCY RELATED TO PROFITS

Feed efficiency concerns the amount of feed required for each dozen eggs gathered. A considerable part of the laying ration is needed for body maintenance of the flock and must be supplied in addition to that which is converted into eggs. Consequently, heavier layers consume a relatively large amount of feed per bird.

For relatively small flocks where no labor was hired and where a commercial mixed laying ration was used, feed expenses made up nearly 60 percent of the total cost of producing eggs. When a farm-mixed ration was used with flocks of 10,000 or more birds, feed expenses dropped to below 50 percent of the total production costs. Even so, a flock owner has more likelihood of cutting egg production costs through practices that increase feed efficiency than by any other means.

Feed efficiency of the laying flock was closely associated with the level of egg production being maintained. For example, hens that averaged 180 eggs and used 82½ pounds of the laying ration required 5.5 pounds of feed per dozen eggs. When feed was $3.15 per hundredweight, the 1962 cost of a farm-mixed ration, the feed cost per dozen eggs was 17.3 cents. On the other hand, hens averaging 20 dozen eggs per year consumed 90 pounds of feed or 4.5 pounds per dozen eggs. Here feed cost amounted to 14.2 cents per dozen eggs. This savings in production cost of more than 3 cents per dozen amounted to an increase in income of $600 per 1,000 birds.

The initial step in any effort to improve the feed efficiency among layers should be to minimize feed waste. Feeders should be checked frequently and kept in good repair. It is equally important that birds have access, at all times, to ample amounts of good-quality feed. Birds that have been debeaked often have trouble picking up laying mash unless the supply is plentiful. Automatic feeding equipment may require frequent adjustment and close attention to insure that ample feed gets to the birds.

In winter when days are short, producers used electric lights to give hens enough day length to stimulate a full rate of lay. This practice served to improve both the rate of lay and the feed efficiency of the flock.

Efficient utilization of feed was so closely related to a high rate of egg production that anything that reduced the rate of lay tended to lower feed efficiency and vice versa.

DIFFERENCES IN MORTALITY RATES AND EARNINGS

When old layers were replaced, laying houses were usually filled to capacity with pullets. Subsequent death losses reduced the number of layers from which to gather eggs. With heavy mortality, the poultry enterprise was operating at considerably below full capacity unless additional replacements were made.

If a mortality rate of 1 percent per month was uniform throughout the year, the average number of layers on hand during the year would be 94 percent of the original number in the laying house at the beginning of the year. In other words, there would be an average of 940 layers throughout the year for each 1,000 pullet replacements. Such an enterprise is operating at 94 percent of capacity.

With a 3 percent per month mortality rate, the average number of layers was 820 per 1,000 pullets put in the laying house at the beginning of the year. Here the enterprise is operating at 82 percent capacity. Where death losses are concentrated early in the production year, and no additional replacements are made, the average number of layers during the year is somewhat less than 820.

With egg production at 20 dozen eggs per hen, a flock that averages 280 layers during the year, produces 2,400 dozen fewer eggs than a flock averaging 940 hens. This decrease in eggs gathered during the year because of higher death losses reduced egg sales by $931 when the price was 40 cents per dozen.

There was little that the poultry operator could do in the way of reducing expenses to compensate for this loss in egg sales. Therefore as death losses increased, the cost of producing a dozen eggs increased because there were fewer eggs to absorb these costs.

The higher the death losses the fewer the number of old hens for sale when the birds were replaced. Cull hens have been cheap but even so, with a 10,000 bird flock and 12 percent annual mortality, the income from hens was $600 more than from the same size flock with a 36-percent death loss, Table 4.

The combined effect of having fewer eggs and fewer hens to sell affected earnings adversely when death losses were unusually high. For example, with 40-cent eggs and high producing hens, the estimated labor-management return from a flock of 10,000 layers with 12-percent annual death loss was $6,100 more than from a similar flock with a 36-percent death loss, Table 4. With eggs selling at 33 cents, this difference was calculated to be $5,000. Earnings from a high-producing flock were reduced more as a result of high death losses than was the case with average or low producers, Tables 4 and 5.

SAVINGS IN FEED COSTS

Since feed is the largest single item of cost in egg production, it is important that the producer procure a high quality ration at the lowest possible cost per hundredweight.

Egg producers have the choice of purchasing commercially mixed feeds or of purchasing the ingredients from which to mix the laying ration. Prices for commercial feeds vary with different brands but in 1962, good-quality ready-mixed laying rations were available for about $3.85 per hundredweight, delivered to the farm. Flock owners who mixed their own laying ration, combined a commercially prepared, high protein concentrate with corn, grain sorghum and oyster shell. The 1962 prices paid for these items are shown in Table 3. Worm treatment or other compounds were added when desired. On the basis of 1962 prices, the ingredients for 100 pounds of farm-mixed laying feed cost approximately $3.15. Added to this cost was the expense of owning and operating suitable grinding and mixing equipment and the necessary storage space.

The depreciation, upkeep, interest and operating expense for grinding and mixing equipment and storage suitable for a small or intermediate size flock was calculated to be less than 25 cents per hundredweight for the laying mash used. The cost of owning and using feed processing facilities suitable for a flock of 30,000 to 60,000 layers amounted to approximately 20 cents per hundredweight of laying feed.

With a flock of 10,000 layers, savings of from $4,000 to $5,000 were possible by using farm-mixed feeds. This saving in feed cost amounted to 40 to 50 cents annually per hen or 2 to 2½ cents per dozen in the cost of producing eggs. Savings associated with using farm-mixed feeds were about the same per hen and per dozen eggs regardless of the size of flock, Tables 4 and 5.

It is important that the capacity of equipment purchased to grind and mix feeds be in keeping with the size of the flock. More feed processing capacity than is needed adds unnecessarily to investment cost whereas insufficient capacity will not be efficient to operate.

PRODUCER MERCHANDISING AND EGG PROFITS

Results of this study emphasized the wide differences in earnings associated with the price spread between various market outlets for eggs, Tables 4 and 5. As indicated previously, the 3 prices used in budgeting were 33, 40 and 45 cents per dozen.

Cleaning, grading and packing eggs in cartons added to the cost for producers who found customers willing to pay a premium price for high-quality graded eggs.

With a flock of 10,000 hens, the annual cost of owning cleaning and grading equipment, including depreciation, upkeep and interest amounted to approximately ½ of a cent per dozen eggs. When used with a flock of 30,000 layers, this cost was reduced to 4/10 of a cent per dozen.

Preparing eggs for retail outlets required extra labor. In some instances this added to cash costs whereas in other instances unused labor that was already available was utilized. When this work was all hired, labor costs were increased about 1.4 cents per dozen eggs processed. Truck expense for delivering graded eggs within a radius of 35 miles of the farm added another 2/10 of a cent per dozen to marketing costs.

With 1962 production costs and with eggs sold ungraded, extremely efficient management was necessary for each production system studied, to provide an estimated labor-management income of $2,500 or more, Table 5. Of the management situations evaluated, only those involving a high level of production (240 eggs per hen) and the use of farm-mixed feeds were in this category. In most instances, a relatively low mortality rate was necessary also for this level of income.

SIZE OF FLOCK RELATED TO PROFITS

Of the 180 different systems evaluated, the most profitable gave an estimated labor-management return of $73,543, Table 5. At the other extreme, estimated egg and poultry sales lacked $94,000 of meeting all production costs with the least profitable situation. Both of these management systems involved flocks of 60,000 layers.

In general, for a system of management that consistently made money, the larger the enterprise the greater the income. At the same time, with management practices that lost money consistently,

the larger the volume of business the greater the loss. Not all managers who were successful with a relatively small number of hens have been efficient in handling the numerous management decisions associated with a large flock. In this study it was assumed that there are numerous persons capable of managing flocks of 30,000 to 60,000 hens. At the same time it is recognized that not all producers are in this category.

The results of this study indicated that a well-managed family-sized enterprise was profitable. Even when eggs averaged 33 cents per dozen (the average price for ungraded eggs in 1962) the estimated labor-management income from a 3,000-hen flock with superior over-all management was $2,500, Table 5. A high rate of lay, low death losses and the use of farm-mixed feeds were necessary for this level of earning.

This study indicates that 3,000 hens is the minimum size flock likely to give a labor-management return of $2,500 from eggs sold at 1962 average price for ungraded eggs.

When the eggs from this size enterprise were delivered to individual buyers at a premium of 12 cents per dozen above the ungraded price, the return to labor-management was estimated to be more than doubled.

With this 12-cent per dozen premium, a labor-management return of more than $3,000 was estimated from 3,000 layers even though egg production per hen averaged only 206 eggs and the annual mortality rates went as high as 36 percent.

The estimated labor-management income from 5,000 hens under top-level management was $0.93 and $1.81 per hen capacity, with eggs sold at 33 and at 40 cents per dozen respectively.

A well-managed flock of 10,000 hens was estimated to return a labor-management income of $13,500 or $1.35 per hen capacity from graded and cartoned eggs averaging 40 cents per dozen. With highly efficient management and 40-cent eggs, 60,000 layers were estimated to give a labor-management return of approximately $1.25 per hen capacity. Consequently, the total return to labor-management from a well-managed enterprise of 60,000 layers was about 5½ times the return from 10,000 hens that were equally well-managed.

Similarly, the loss estimated for a poorly-managed enterprise of 60,000 birds was approximately 6 times the loss calculated for 10,000 hens with equally poor management practices.

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