Eggs - Cost of production

Farmers' Report No. 147

The Cost of Producing Eggs
A Study in 1958/59

by

EDITH WRIGHT

THE UNIVERSITY OF LEEDS
DEPARTMENT OF AGRICULTURE: ECONOMICS SECTION

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FOREWORD

This report deals with the costs of egg production in 1958-59 which is the second in a series of three consecutive years which have been studied.

The University takes this opportunity for thanking the farmers and poultry keepers who have provided the information on which these reports are based. They are warmly invited to send in questions regarding any aspects of these costs to the undersigned.

W.HARWOOD LONG

INTRODUCTION

Egg production was costed on 53 flocks in Yorkshire for the year ending 1st August 1959. This was the second year of the investigation, which is being continued for a third year. (1)

The costing method is given at the end of this report (see page 11). It should be particularly noted that homegrown foods and home-reared pullets have been charged at their estimated cost of production; that no share of general farm overheads has been charged to the laying flock; and that only a nominal rent has been charged where the layers were housed in some part of a farm building which otherwise would not have been used at all. In calculating averages in this report, each flock has been given the same weight, unless it is otherwise stated, costs per bird have been taken to the nearest penny.

The costed poultry enterprises were on holdings which ranged from a few acres to over 300 acres. Both the types of farming and the methods of keeping the poultry were very varied.

The farms were engaged almost entirely in table egg production; only one produced some eggs for hatching, and these have been entered at the corresponding packing station price for the purpose of this report.

The size of the costed flocks, and the main systems under which the birds were housed are shown in table 1.

TABLE 1.

Distribution of flock size and systems of housing

	Up to 250 birds	250-499	500-749	750-999	1000-1249	1250-1500	Total no. flocks
Battery	3	7	4	2	1	1	18
Deep Litter	12	8	3	3	1	1	28
Straw yard	-	1	-	-	-	1	2
Free range	3	1	-	1	-	-	5
Total no. of flocks	18	17	7	6	2	3	53

Table 1 shows that 35 of the 53 flocks had fewer than 500 birds, and indicates that only a comparatively small proportion of the producers in the survey depended on poultry for a large share of their income.

(1) A report for 1957-58 has already been issued, see "The Cost of Producing Eggs, a Study in 1957-58," University of Leeds, Agricultural Economics Section.

A rough grouping of the flocks has been made according to the dominant breed of bird which was used; although some flocks are difficult to classify because of the variety of breeds kept. The distribution of breed types is shown in table 2.

TABLE 2.

Distribution of breed types and systems of housing

	Battery	Deep Litter	Strawyard	Freerange	Total
"Hybrids" ¤	-	5	1	1	7
Heavy, and heavy x heavy	2	4	-	1	7
Light x heavy	6	9	-	1	16
Mainly "hybrids" with some others	2	1	-	-	3
Mainly heavies with some others	4	4	1	2	11
Mainly light x heavy with some others	2	3	-	-	5
Half heavy, half light x heavy	2	2	-	-	4
Total	18	28	2	5	53

¤ This is a general term, and does not refer to the birds from any particular breeder.

General results

The average results per bird for all the flocks are given in table 3, and the range of these costs, returns and margins in table 4. Some of the variation seen in table 4 can be ascribed to known causes; for example, an intensive method of housing the birds may make possible a stricter control of the birds and of their whole environment than would be feasible under extensive conditions. Even intensive housing systems may vary, for instance it is easier to cull poor producers (and so keep food costs per dozen down, and yield per bird up) from batteries than from deep litter houses. This, of course, may have been of more importance in the past than it will be in the future, if breeders can improve the flock performance reliability of their stock, and so reduce the need for culling. Some of the variation in yield per bird and in food conversion is also due to breed differences. These, and many other factors influence the results, but probably the most important factor in the successful poultry enterprise is the ability of the manager to combine his particular resources and skills, so as to produce eggs efficiently and market them effectively.

TABLE 3.

Average results per bird for all flocks

	1958-9 per cent	1958-9 Av.cost	1957-8 Av.cost
		s. d.	s. d.
Foods - purchased	58.6	30.10.	33. 1.
homegrown	2.2	1. 2.	1. 4.
total	60.8	32. 0.	34. 5.
Labour - paid	2. 6	1. 5.	1. 1.
unpaid	12. 5	6. 7.	5.11.
total	15. 1	8. 0.	7. 0.
Miscell. expenses - land rent	-	-	-
building rent	0. 4	3.	2.
equip.depcn.& repairs	3. 6	1.11.	1. 8.
horse,tractor work	0. 2	2.	3.
electricity	0. 6	3.	3.
sundries	0. 7	4.	5.
total	5. 5	2.11.	2. 9.
Flock replacement	18. 6	9. 9.	8. 2.
Total costs	100. 0	52. 8.	52. 4.
Total returns		55. 4.	63. 3.
Margin		+ 2. 8.	+ 10.11.
No.of flocks		53	34
Av.size of flock		476 birds	491 birds
Av.yield per bird		188 eggs	187 eggs
Food per bird for year		114 lbs	125 lbs
Food per bird per week		2¼ "	2½ "
Food per doz.eggs produced		7½ "	8¼ "
Cost per cwt.of food		31s.9d.	31s.2d.
Time spent per 100 birds for year		221 hrs	204 hrs
Av.sale price of birds		8s.9d.	9s.0d.
Mortality		18%	16%
		s. d.	s. d.
Total costs per doz.eggs produced		3. 5.	3. 5.
Returns " " " "		3. 6.	4. 1.
Margin " " " "		+ 1.	+ 8.

TABLE 4.

Distribution of results for all flocks, 1958-9.

Costs per bird						Total no. flocks
20 to 30s	30 to 40s	40 to 50s	50 to 60s	60 to 70s	70 to 80s	
1	8	12	19	9	4	53

Returns per bird							
10 to 20s	20 to 30s	30 to 40s	40 to 50s	50 to 60s	60 to 70s	70 to 80s	
1	-	3	9	21	18	1	53

Margin per bird							
... Loss ...			...Profit...				
30 to 20s	20 to 10s	10 to 0s	0 to 10s	10 to 20s	20 to 30s	30 to 40s	
2	7	10	18	13	2	1	53

Yield per bird							
Less than 120 eggs	120 to 140 eggs	140 to 160 eggs	160 to 180 eggs	180 to 200 eggs	200 to 220 eggs	220 to 240 eggs	
2	4	4	8	10	15	10	53

Food per bird per week							
less than 28 oz.	28-31½ oz.	31½-35 oz.	35-38½	38½-42	more than 42oz.	more than 70oz.	
6	6	11	15	8	6	1 ¤	53

Returns per dozen					
3s to 3s.2d.	3s.3d.to 3s.5d.	3s.6d.to 3s.8d.	3s.9d.to 3s.11d.	over 4s.	
5	18	22	7	1	53

¤ This flock had Tottenham pudding

The level of profit is dependant upon the yield of eggs obtained from the birds, the return for these eggs, and the costs incurred in keeping the birds. These factors do not necessarily move together, so that both their actual and their relative levels are important. It may be of interest to consider the egg production which would be necessary at various price levels to cover various levels of cost, before any profit could be made; such a theoretical calculation is given in table 5.

TABLE 5.

Quantity of eggs per bird which would cover certain given costs per bird

Cost per bird per year (shillings)	Average price received for eggs (per doz)		
	3s.	3s.6d.	4s.
30	120	103	90
40	160	137	120
50	200	171	150
60	240	206	180
70	280	240	210

The actual distribution of profits and losses at various level of yield and cost per bird, amongst the flocks in the survey is shown in table 6.

TABLE 6.

Distribution of profitable flocks at various yield and cost levels

Av.yield per bird (eggs)	Total cost per bird							
	under 44s		44s to 52s		52s to 60s		Over 60s	
	Number of flocks with a							
	profit	loss	profit	loss	profit	loss	profit	loss
Under 170	7 x	1 x	-	2	-	3	-	1
170 to 200	1	-	4	1	1	4	-	3
200 to 215	-	-	5	-	6	-	-	1
Over 215	1	-	1	-	3	-	5	3

x = 1 flock in existence for lessthan 44 weeks of the costed period.

Table 7 shows the influence which costs and yields had on profits in the flocks in the sample.

TABLE 7.

Calculated profits at given levels of total cost and yield (per bird)

Cost per bird (shillings)	Yield per bird (eggs)				
	150	170	190	210	230
	profit in shillings				
30	+ 15. 2	+ 21. 3	+ 27. 5	+ 33. 7	+ 39.8
40	+ 4. 5	+ 10. 6	+ 16. 8	+ 23. 0	+ 29.1
50	- 6. 2	- 0. 1	+ 6. 1	+ 12. 3	+ 18.4
60	- 16. 9	- 10.8	- 4. 6	+ 1. 6	+ 7.7
70	- 27.6	- 21.5	- 15. 3	- 9. 2	- 3.0

Birds which cost no more than 40s. to keep were profitable even before they produced 150 eggs per year, but at 60s per bird it was necessary to have a yield of at least 210 eggs a year to break even.

Returns and Prices

It can be seen from table 3 that the average costs in 1957-8 and 1958-9 were similar, but that the average returns in 1958-9 were reduced by 8s.3d. per bird, or 7d per dozen eggs produced. The most important factor determining the level of returns per bird is the egg yield per bird, and next in importance is the price received per dozen eggs. In the two costing years now being considered egg yield remained almost unchanged and the difference in average returns was due almost entirely to differences in the levels of egg prices in the two years. Within the sample, however, the results of individual farms were greatly influenced by the egg-yields obtained.

Nineteen of the flocks were costed in both 1957-8 and 1958-9, and these flocks show a similar reduction in their returns to that seen in a comparison of the full samples for the two years. (see table 8). In the identical sample there were some changes between the two years in size of flock, breeds used, method of housing, intensity of stocking, and so on, but nevertheless all the flocks except two showed reduced margins per bird, every flock having lower returns both per bird and per dozen eggs. The difference in the returns for eggs between the two years ranged from about 3d. to 1s. per dozen for the individual flocks in the identical sample.

TABLE 8.

Results for an identical sample of 19 flocks

	1958-9	1957-8
	s. d.	s. d.
Costs per bird	49. 2.	51. 2.
Returns per bird	54. 3.	64. 9.
Margin per bird	5. 1.	13. 7.
Costs per dozen	3. 4¼	3. 3.
Returns per dozen	3. 6½	4. 0½
Margin per dozen	2¼	9½
Average flock size	452 birds	399 birds
Average yield per bird	184 eggs	192 eggs
Food per bird per week	2¼ lbs	2½ lbs
Food per dozen eggs produced	7⅞ lbs	8½ lbs
Food cost per cwt	30s.6d.	30s.7½d.
Mortality	15½%	12%
Time spent per 100 birds for year	178½ hrs	187 hrs

The reduction in returns and margins was, of course, expected, as egg prices were lower all through the second costing year, and were at a relatively high level for a different and shorter time. The average egg prices paid by the British Egg Marketing Board during an August to July year in 1957-8 and 1958-9 are given in table 9. The "high priced period" was taken as the period when the standard egg price was 4s. or more in 1957-8, and 3s.8d. or more in 1958-9. This was from August 3rd 1957 to January 18th 1958, and July 5th to August 2nd 1958. i.e. 28 weeks in 1957-8, and from August 2nd 1958 to January 9th 1959. i.e. 23 weeks in 1958-9.

TABLE 9.

Averages of weekly B.E.M.B. prices, per dozen.

1. From the beginning of August 1957 to the end of July 1958.

	High priced period (28 weeks)	Low priced period (24 weeks)	Year
Premium on large eggs	8d	3¼d	5¾d
Price of standard eggs	4s.11¾d.	3s.3½d.	4s.0d.
Reduction on medium eggs	10d	3d	6¾d
Reduction on small eggs	1s. 4d.	6¾d	11¾d

2. From the beginning of August 1958 to the end of July 1959.

	High priced period (23 weeks)	Low priced period (29 weeks)	Year
Premium on large eggs	1s.0½d	5d	8½d
Price of standard eggs	4s.1½d	2s.11¼d	3s.5½d
Reduction on medium eggs	10d	5½d	7¾d
Reduction on small eggs	1s.5¼d	10½d	1s.1½d

Table 9 shows that taking an average of the weekly prices over the two years, there was a reduction in the price paid for standard eggs of 6½d per dozen. There was also an increase in the differentials between standard eggs and other grades, more being paid for large eggs, and less for medium and small eggs in 1958-9 compared with 1957-8. This increase in the differential was greatest for large eggs in the high priced period, and greatest for medium and small eggs in the low priced period.

The average price received per dozen eggs is influenced by the combined effects of the proportion of eggs produced in the high-priced months, the size of eggs produced, the proportion of the total production sold off the farm, and the proportion of eggs sold retail.

The proportion of eggs produced in the high-priced months significantly affected the returns per dozen in the 1958-9 sample. It varied from 27 to 96 per cent of the total production.

The proportion of eggs sold off the farm varied from 79 to 100 per cent of the total production, and the percentage of sales made retail varied from 0 to 78 per cent for the 43 flocks - for which this information was available. Neither the proportion sold off the farm nor the method of sale had a significant effect on the returns per dozen on the farms in the survey.

Costs

The main factors in the costs are food, flock replacement and labour costs, and of these food costs account for just over half the variation in total costs.

Food costs

Food is the most important item in the costs, forming approximately 60 per cent of the total. The range in the quantity of food fed per bird per week is given in table 4. Efficiency in the use of food, which may be measured by food cost per dozen eggs produced, is as important as total production per bird.

There was a tendency in this sample for food cost per dozen eggs to decrease as yield per bird increased. This may be due to heavy layers being better converters of food, or merely to the reduced ratio between production and maintenance requirements as production rises.

Flock replacement costs

Flock replacement is the second largest item of cost, forming 18½ per cent of the total costs on the average.

The flock replacement cost measures the cost of maintaining the laying flock; it is the difference between the opening valuation plus any purchases and transfers in of stock, and the sales of stock plus the closing valuation. The distribution of the flock replacement costs is shown in table 10.

TABLE 10.

The distribution of flock replacement costs per bird

	Under 4s	4s to 8s	8s to 12s	12s to 16s	16s to 20s	20s to 24s	Total no. flocks
All flocks	6	15	15	8	8	1	53
Battery flocks	2	3	6	2	4	1	18
Deep litter "	3	10	7	5	3	-	28

Any change in flock size during the year affects the flock replacement cost to a certain extent; an increase in size will reduce the replacement cost per bird, and a reduction in size will increase it, for the particular year in which the change takes place. The average change in flock size during 1958-9 was small (less than 5 per cent of the average size); about half the flocks decreased and half increased in size during the year.

The turnover of birds in the flock also affects the replacement cost. It is difficult to get a satisfactory measure of turnover, but it would seem that in both 1958-9, and 1957-8, the turnover of birds in the battery flocks was a little higher than in the deep litter flocks.

The important factors in replacement cost are normally the initial cost of the birds, and the difference between this cost and their sale price when they are culled. Mortality is less important except in cases of actual epidemics. The relative importance of these factors can be seen in table 11. Sale prices and mortality had much the same range in each group.

TABLE 11.

Factors affecting flock replacement costs per bird

Replacement cost per bird	Incoming cost (1)	Sale price (2)	Diff. between (1)&(2)	Mortality	Av.No.times flock culled per year	No.flocks
	s.d.	s. d.	s. d.	%		
2s to 6s	13.3.	9. 7.	3. 8.	10	19	13
6s to 10s	15.4.	9. 2.	6. 2.	17	28	18
10s to 14s	16.5.	8. 5.	8. 0.	21	11	8
14s to 18s	17.3.	8. 9.	8. 6.	26	4	11
18s to 21s	18. 9.	8. 5.	10. 4.	22	3	3

The cost of a pullet at point-of-lay varied from 10s.2d. to 21s.11d. in the 35 flocks for which detailed rearing costs were available; the distribution is shown in table 12.

TABLE 12.

Distribution of the cost of a pullet at P.O.L.

Cost per bird at P.O.L.	10s to 12s	12s to 14s	14s to 16s	16s to 18s	18s to 20s	20s to 22s	Total no. flocks
No.flocks	5	9	8	8	2	3	35

Percentage structure of 35 rearing costs, 1958-9,
(calculated on the total costs)

	per cent
Purchased food	75
Homegrown food	2
Total food	77
Labour	15
Miscell: rent, equip depcn. repairs	5
other costs	3
	100

The average cost of a day old chick was 3s.2½d. The mortality during the rearing period was 10½ per cent. The average cost of a pullet at point-of-lay for these 35 flocks was 15s.2d, including 3s.6½d for the cost of the chick.

Mortality in the laying flock varied from 3 to 79 per cent. In some flocks a high mortality was associated with a specific disease, but in other flocks it reached 30 per cent without any record of disease to account for the deaths.

Labour costs

The time spent on the poultry enterprise varied greatly, from less than ¼ hour to over 1 hour per 100 birds per day. Although this wide range occurred in both deep litter and battery flocks, the battery flocks took more time on average.

This item of cost was the only one which showed any tendency to decrease, per bird, as the size of flock increased.

It should be remembered that most of the labour in these costs was unpaid labour, which was charged at the corresponding rate for paid labour of similar type, so that any profit which is made on the enterprise may be regarded as a return for the management and capital involved, after an appropriate amount has been deducted as a contribution from the enterprise to general farm overheads.

Miscellaneous costs

Equipment depreciation and repairs together formed the most important item in the miscellaneous costs. The average initial valuation of equipment is given in table 13. Extra items of equipment such as food mills and mixers, plucking machines, egg washers and power cleaning equipment have been excluded. The enterprises have, of course, been operating for varying periods, and in many cases the value of the equipment has now been written down much below current replacement values.

TABLE 13.

Average initial valuation

	No. flocks	Av. value per bird	Range of value per bird
Battery flocks (1 bird per single, 2 per double, cage)			
1. New houses (or equivalent), new cages, main services.	9	41s.6d.	19s.3d. to 66s.
2. Small improvements to existing buildings, main services in some cases, some new, some second-hand cages.	7	19s.	6s. to 29s.
Deep litter flocks	..... per 100 sq.ft		
1. New houses (or equivalent) furniture, main services.	20	£35.18s.	£12.5s. to £78.8s.
2. Converted premises, furniture, some main services.	11	£5.11s.	£0.4s. to £10.1s.

S U M M A R Y

The importance of the relationship of costs and returns rather than the level of either costs or returns should be emphasised. Food has been shown to be the largest and most variable factor in the costs. The yield of eggs per bird is a very important factor in determining both cost per dozen eggs and returns per bird. Thus the cost of food per dozen eggs produced, the cost of birds brought into the flock, and the egg yield per bird may be taken as measures of the likely profitability of the enterprise. The price of eggs is of equal importance but is largely beyond the control of the producer.

There was individual variation from the average in all groups, and good management and a productive strain of birds, with good food conversion, would seem to be as important as the system of housing and breed of birds used.

It should be remembered that the margins of profit shown are gross. No allowance has been made for any interest on the capital invested, nor has any allowance been made for a share of general farm overheads.

The Costing Method Used

(1) Foods No residual manurial values were deducted from the cost of foods, and no credit allowed for poultry manure, whether sold or used on the farm.

Purchased foods were entered at cost delivered on the farm, and included such items as grit, cod liver oil and so on.

Homegrown foods were entered at estimated cost of production.

(2) Labour Hired labour was charged at cost, and family labour at an hourly rate based on the corresponding cost for hired labour.

(3) Flock replacement Home-reared pullets were transferred into the laying flock at actual or estimated cost of production; all purchases were entered at their cost delivered to the farm.

(4) Miscellaneous expenses Special houses and equipment were usually depreciated at 10 per cent, and repairs to equipment were charged.

Rent was charged if farm buildings were used, and land rent if this was considered to be necessary for free-range flocks, or in the rearing costs.

Horse and tractor work was charged at standard rates per hour.

Fuel, medicines and other consumable stores were charged here.

Only direct costs were charged; no allowance was made for interest on capital, and no share of general farm overheads has been charged.

(5) Returns Eggs sold wholesale, semi-wholesale or retail were entered at the price realised. Hatching eggs were entered at the corresponding wholesale price. Eggs used on the farm were also entered at the corresponding wholesale price, if there was one, or at salvage value.

(6) The average size of flock was calculated from the average number of birds for each month during which the flock was considered to be in existence.

The average yield per bird was obtained by dividing the total production by the average size of flock.

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Standard appendix — 1st August 1958 to 31st July 1959

Laying flocks

Average costs and returns per bird and per dozen eggs

Per bird

Costs			lbs	s. d.	s. d.
(A) Foods	(a)purchased	(1)compounds	92½	27. 9.	
		(2)cereals	10¼	2. 4.	
		(3)other	3	1. 2½.	
	(b)homegrown	(1)cereals	8¼	1. 6.	
		(2)other	-	-	
	Total foods		113¾		32. 9½.
			hrs		
(B)Labour	(a)hired		½	1.10.	
	(b)family		1½	5. 5½.	
	Total Labour		2		7. 3½.
(C) Livestock depreciation					9. 0.
(D) Deadstock depreciation & repairs ¤					2. 3.
(E) Miscellaneous					9.
Total costs					52. 1.
			eggs		
Returns - eggs	(a) market		186	55.11½.	
	(b) hatching		-	2.	
	(c) used in farmhouse		5	6½.	
Total returns			191		56. 8.
Margin					4. 7.

Per dozen eggs

	s. d.
Total returns	3. 6½.
Total costs	3. 3.
Margin	3½.

Number of flocks	53
Average size of flock	476 birds
Average length of flock season	51 weeks
Average yield per bird	191 eggs

¤ includes rent for land and farm buildings