



Research Article

ECONOMIC ANALYSIS OF LAYER FARMING IN NAMAKKAL DISTRICT

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Abstract: This paper is attempted to analyze the economics of layer farms in Namakkal district of Tamil Nadu. The study is based on primary data collected using questionnaires from 90 layer farmers. The farmers were classified into two categories viz., Group I (Below 50000 birds) and Group II (Above 50000 birds). Cost and return analysis and Garrett ranking technique were employed to analyze the data. The results revealed that, the total investment and cost of production per 1000 birds were significantly higher in group II farms for about 3.82 lakhs and Rs. 27777. Average net income per 1000 birds was higher in group II farms for about Rs. 39436. Net return per bird was found to be significantly higher in group II which indicates the economies of scale of production. High feed cost, disease outbreak and high mortality rate were the major constraint faced by the farmers in the study area.

Keywords: Layer Farming, Investment, Cost, Returns, Constraints

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Introduction

Livestock plays a significant role in Indian economy. Livestock provided the source of livelihood to 20.5 million people. Livestock contributed 16 percent to the income of small farm households as against an average of 14 percent for all rural households. Global production of eggs reached 73 million tonnes and per capita consumption of eggs increased from 82 to 162 eggs between 1961 and 2016. India is the third-largest egg producer in the world (88.14 billion) after China (530 billions) and the USA (102 billions). The total egg production in India was 1,832 million in the year 1950-51 and increased substantially for about 88,139 million in during 2016-17. The annual per capita availability of eggs has increased from 5 eggs per annum in 1950-51 to 69 eggs per annum in 2016-17. Tamil Nadu ranks first in terms of total egg production in the country (18.9 percent) followed by Andhra Pradesh (18 percent) and Telangana (13.4 percent). Namakkal is the single largest egg producer in Tamil Nadu with a production of 1.25 lakhs accounted for 77.81 percent followed by Erode (7.45 percent) and Dharmapuri (2.38percent) during 2016-17^[1]. Per capita availability of egg during 2016-17 in Tamil Nadu was 237 eggs per annum which are higher than India's average availability^[2]. As per the recommendations of ICMR, the per capita requirement of eggs is 182 eggs per year. But the net availability of eggs in India is 69 eggs per year. To meet the demand- supply gap, special focus has been made to increase the egg production in the country. As Tamil Nadu leads in egg production, quality research in poultry sector will boost the egg production to meet the domestic demand in the country. The present day poultry is facing number of problems which includes high cost of feed^[3], persistent outbreak of disease^{[4]&[5]} and inability of the marketing system to meet the demand of the poultry producers. The monopoly control of the market by middlemen coupled with un-remunerative prices for eggs^[6] has further worsened the situation. These problems seem to occur frequently among the poultry farmers in Tamil Nadu when compared to other parts of the country. In spite of these problems, majority of poultry farmers in Namakkal district of Tamil Nadu continue to operate in the poultry industry. They are exploring all the avenues for expanding the poultry enterprise, so as to minimize the risks. They are hesitant to leave the industry in view of the lack of

alternative source of income. Poultry enterprise offers both incentives for investors and at the same time pose a risk of economics losses to the farmers. Hence, the study is intended to analyze some of the issues such as whether the poultry enterprise is viable to the poultry farmers or not in terms of generating income, employment, management of farm, efficiency. In this context, the present study was taken up with the following specific objectives.

Specific objectives of the study are,

1. to estimate the cost and returns of egg production for different size groups of layer farms in Namakkal District, and
2. to identify the constraints faced by the sample poultry farmers and to suggest suitable policy measures to overcome the constraints.

Materials and methods

Multi-stage purposive and random sampling technique was adopted for the selection of study district, block and sample respondents in the present study. Tamil Nadu forms the universe of the study and ranks second position in egg production in India (161522 lakh nos.). Of the total egg production in Tamil Nadu Namakkal district was found to be the single largest production centre (78 percent). In the second stage, two blocks viz., Namakkal and Mohanur blocks were purposively selected for the study since it has highest share of layer farms. In the third stage, 10 revenue villages in Namakkal and 5 revenue villages in Mohanur blocks, totally 15 revenue villages were selected randomly. In the last stage, list of layer farmers in selected blocks who are doing poultry farming obtained from Tamil Nadu Poultry Farmers Association, Namakkal. The respondents were selected randomly at the rate of six poultry layer farmers from each of the selected villages. Thus, the total sample respondents were 90 layerfarmers. Post stratification of sample farms were done based on total number of birds reared per farm, for further analysis the farms were categorized into two groups viz., Group I (below 50000 birds) and Group II (above 50000 birds). Figure 1 shows the sampling procedure followed in the study.

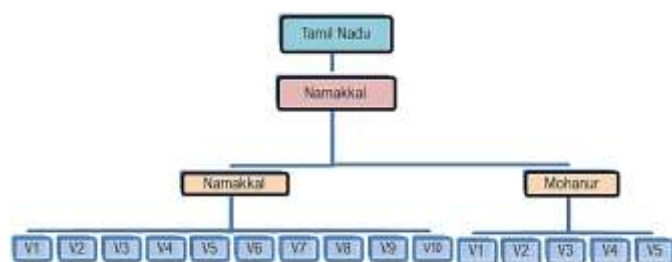


Fig-1 Sampling procedure of the study

The primary data was collected through personal interview method using well-structured interview schedule specially designed for this study. The secondary information related to the price of egg was collected from NECC (National Egg Coordination Committee). The conventional analysis such as percentage and average analysis were used to examine the socio-economic characteristics of the sample farm respondents.

Estimation of Cost and Net Income

In the present study, the cost of production, gross income and net income for egg production was worked out for 1000 birds per annum separately for different size groups. Cost of production was arrived by adding fixed cost and variable cost of production. Fixed cost was arrived by adding depreciation on building and equipment's @ 10 percent, interest on fixed capital investments at 9 percent, land tax and insurance on birds. Variable cost was arrived by adding the cost incurred in the purchase of chicks, feed, labour, medicine, and miscellaneous expenses on electricity, fuel, water, telephone, litter, stationery, bulb, crate, plastic etc) and interest on working capital at 7 percent. Income Measures such as Gross income, Gross margin and net income were calculated as follows.

Gross Income = Total No. of eggs produced * Price of Egg

Net Income = Gross Income – Total Cost

Garrett Ranking Technique

Garrett ranking technique was used to analyze the constraints perceived by poultry entrepreneurs. Poultry farmers were asked to rank the factors that were limiting poultry production. These were then transformed into units of scores by using the following formula:

$$\text{Percent Position} = 100 (R_{ij} - 0.50) / N_j$$

Where,

R_{ij} = Rank given for the i th factor by j th individual

N_j = Number of factors ranked by j th individual

The percent position was converted into scores by referring to the table given by Garrett and Woodworth (1969). Then for each factor, the scores of the individual respondents were added together and divided by the total number of respondents for whom scores were added. These mean scores for all the factors were arranged in descending order and the most influencing factors were identified through the ranks assigned.

Results and Discussion

Profile of the Poultry Farmers

The analysis of socio-economic characteristics of the layer farmers in Namakkal district [Table-1] revealed that majority of the sample layer farmers were in the age group of 40-62 years with an average age of 51 years. Overall, 17 percent of the sample farmers were illiterates. Nearly 56 percent of the sample farmers were studied upto school education whereas 27 percent of them were graduated. Majority (60 percent) of the respondents had 3-5 persons in the household while 30 percent had less than 3 household members. The mean household size was around 4.0. This implies that respondents with family size above 4 people would have more hands to work in their poultry farms which could aid increase in their output. The mean years of farming experience were approximately 22 years and majority of them had (77 percent) 11-33 years of experience. The mean

experience of the poultry farmer as a enterprise is about 14 years and majority of them had 6-25 years of experience (66 percent). Of the sample layer farmers, majority of them was (51.11 percent) doing layer farming as self-employment, followed by ancestry business (24.44 percent) and government influence (15.56 percent). Majority (74 percent) of the respondents in group I made investment from own sources and only 26 percent were borrowed from banks may be small scale farmers, they may not have enough collateral to avail loan from credit and also involves less investment. Where as in group II farms, Majority of them borrowed capital from banking institutions (84 percent) which showed that as the farm size increase, they seek finance from banks since their investment is high. Most of the farmers (52 percent) are attended formal training for new technology adoption in poultry farming and 48 percent of the farmers was not attended any formal training. The details of selected layer farms of Namakkal district revealed that the sample layer farms were classified into two groups viz., group I (below 50,000 birds) and group II (above 50,000 birds). Of the sample layer farms nearly 64 percent of them were having less than 50000 birds and around 36 percent of them were having more than 50000 birds with an average number of 25260 and 125656 layer birds per farm, respectively which is five times higher than group I. The average number of birds per batch in layer stage in group I and group II was 10129 and 25491 for the reference period. Overall, the average layer birds' capacity of farm is 1.51 lakhs whereas the average number of birds in laying period was 35260.

Capital Investment

The details of capital investment made indifferent size group of layer farms are presented in [Table-3]. The total investment on buildings and equipments 557525 per 1000 birds was Rs. for group I farms and Rs. 939584 for group II farms and hence the overall investment was Rs. 693368. Of the, total investment amount spent on buildings alone accounted for 85 percent in group I farms whereas group II farms it was 55 percent. Investment on building includes chick shed, grower shed, layer shed, office room, overhead tank and bore well. However, investment on equipments was found to be high in case of group II farms (45 percent) than in group I farms where it was only 15 percent. Nearly 78 percent of them had own feed mills in group II farms where as in group I farms 100 percent of them purchasing feed only from commercial feed manufacturers. The investment made between group I and Group II farms were significant at 1 percent level for about Rs. 3.82 lakhs. per 1000 birds higher in group II farms than group I farms. The results are in agreement with the findings of [7] who also reported that building cost contributes to major share of investment.

Cost of production

The details of cost incurred in production of eggs in sample layer farms are presented in [Table-4]. The total cost of production per 1000 birds was estimated to be Rs. 11.73 lakhs for group I farms and it was Rs.12.00 lakhs for group II farms. Of the total cost, variable cost accounted for 94.80 percent in group I farms and 91.35 percent in group II farms respectively. The overall total variable cost was estimated to be 93.59 percent to the total cost. The variable cost of production was significantly higher in group I farms than group II farms for about Rs. 15099. Of the variable cost, feed cost was the major component in rearing of poultry layers, it accounted for 83.38 percent in group I farms and 80.61 percent in group II farms with an overall cost of 82.32 percent, followed by cost of chicks (i.e.) 2.81 percent in group I farms and 2.88 percent in group II farms.

Total variable cost was lower in Group II farms because of following reasons.

- Due to lower feed cost since they have own feed mill but in case of group I farms, they purchase feed from only commercial manufacturers with higher price.
- Vaccine and medicine expenses also lower and found to be significant at 5 percent because vaccination and medicine feeding is given by existing labours in the farm not by company personal on cost.

The results of the present study is in accordance with the findings of [8] and [9] who also reported that feed cost constitutes the major share in cost of production followed by chick cost.

Table-1 Socio-Economic Profile of the Sample Respondents

Variables	Characteristics	Group I (N=58)		Group II (N=32)		Overall (N=90)	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Age (Years)	< 40	10	17.24	4	12.50	14	15.56
	40-62	38	65.52	24	75.00	62	68.88
	>62	10	17.24	4	12.50	14	15.54
	Mean	50		52		51	
Education	Illiterate	7	12.07	8	25.00	15	16.67
	Primary	24	41.38	9	28.13	33	36.66
	Secondary	10	17.24	8	25.00	18	20.00
	Graduates	17	29.31	7	21.87	24	26.67
Family size (Nos.)	< 3	21	36.22	6	18.75	27	30.00
	3-5	33	56.89	21	65.63	54	60.00
	> 5	4	6.89	5	15.63	9	10.00
	Mean	3.95		3.97		4	
Farming experience (Years)	<11	5	8.62	6	18.75	11	12.22
	11-33	46	79.31	23	71.88	69	76.67
	>33	7	12.07	3	9.37	10	11.11
	Mean	23.22		20.86		22	
Poultry farming experience (Years)	<6	13	22.41	1	3.13	14	15.56
	6-25	34	58.62	25	78.13	59	65.55
	>25	11	18.97	6	18.75	17	18.89
	Mean	13		16		14	
Reason for choosing layer farm	Self-employment	35	60.34	11	34.38	46	51.11
	Family business	5	8.62	17	53.13	22	24.44
	Easy to start	6	10.34	2	6.25	8	8.89
	Govt. encouragement	12	20.68	2	6.25	14	15.56
Source of capital	Own source	43	74.14	5	15.63	48	53.33
	Own + bank	15	25.86	27	84.37	42	46.67
Formal training	Attended	35	60.34	12	37.50	47	52.22
	Not attended	23	39.66	20	62.50	43	47.78

Cost and Returns of Layer Farms

Table-2 Classification of Layer Farms

Farm size	No.	No. of farms	Mean Layers' capacity	Mean layers (Nos.)
		Percent to total farms	Nos.	
Group I (Below 50,000 birds)	58	64.44	25620.69	10129
Group II (Above 50,000 birds)	32	35.56	125656.25	25491
Total	90	100.00	151276.94	35620

Table-3 Investment pattern in the Sample Layer Farms (Rs./1000 birds)

SN	Particulars	Group I	Group II	Difference over group I	Overall	t-stat
1	Buildings	472139.85(84.97)	516462.07(54.97)	44322.22	487898.86(70.37)	-0.512
2	Equipment's	85384.76(15.31)	423121.59(45.03)	337736.83	423121.59(29.63)	-12.92
	Total Investment	557524.61(100.00)	939583.66(100.00)	382059.05***	693367.83 (100.00)	-3.96

Returns

The results of returns from selected layer farms are presented in [Table-5]. The total egg production per 1000 birds was 3.04 lakhs in group I and 3.09 in group II farms. The sample farmers sold their eggs to traders in Namakkla, Kerala, Tenkasi and other parts of Tamil Nadu at the price (price plus or minus Rs. 0.20 per egg) fixed by NECC. The average price per egg was Rs. 3.72 in group I and Rs. 3.90 in group II farms. The major source of income from layer farm is through the sale of eggs and it accounted for 94 percent of the total income of the farms irrespective of the farm size. The next major income comes through the sale of culled birds which is around 5 percent of the total income. The average price of culled bird was Rs. 56 and majority of the birds sold in Kerala. Average net income per 1000 birds was Rs. 25556 in group I and it was 64992 in group II. It is also indicated that there was a significant difference exists between groups and it was Rs. 39436 per 1000 birds higher in group II and it is found to be statistically significant at 1 percent level. Net return per bird per annum was estimated to be Rs.26 in group I farms, Rs. 65 in group II farms and Rs. 33 in overall farms and the net return per bird was found to be significantly higher in group II which indicates the economies of scale of production. This result agrees with [10] net farm income has been highly correlated with farm size. And major revenue is from sale of eggs and followed by sale of culled birds [9].

Constraints in Layer Farming

The constraints faced by the sample layer farmers are presented in [Table-6]. High feed cost was the first and foremost constraint in Group I (69.34) and Group II

(67.88) in the study area. The disease outbreak was the next major constraint in the study area. The farmers felt that in spite of lot of innovations in rearing pattern, new medicines and vaccines, the disease outbreak occurs more frequently. High mortality rate was the next major constraint in group I (58.48) and in Group II farms (60.72) followed by availability of raw materials. The farmers also felt that the labours are not willing to do the farm work and so they are hiring people from north India and though the north Indian people are working at lower wages, language is a major constraint. When they are going back home, they will not return for a month and during such times, it becomes very difficult to manage the farm. Fluctuation in egg price was the next constraint faced by the farmer. For the past four decades the feed cost has increased by 20 folds whereas the egg price has increased only 10 folds. The results are coincide with the results of [11], [12] and [13].

Table-6 Production Constraints Faced by the Sample Layer Farmers

SN	Constraints	Group I		Group II	
		Mean score	Rank	Mean score	Rank
1	High Feed cost	69.34	I	67.88	I
2	Disease outbreak	62.43	II	60.13	III
3	High mortality rate	58.48	III	60.72	II
4	Availability of Raw Materials	56.66	IV	55.09	IV
5	Inadequate labour	48.50	V	48.69	VI
6	Low egg price	42.69	VI	48.78	V
7	Heat stress	40.00	VII	36.84	VIII
8	Lack of finance	38.28	VIII	38.78	VII
9	Water Scarcity	31.62	IX	32.09	IX

Table-4 Cost of production on different size group of Layer farms (Rs. per 1000 birds)

SN	Particulars	Group I	Group II	Difference over group I	Overall	t-test
A	Fixed cost					
1	Land Tax	36.64(0.00)	51.14(0.00)	14.52***	41.81(0.00)	-2.07
2	Depreciation on building & equipment's	55752.46(4.75)	93958.37(7.82)	38205.91	50224.49(5.83)	-0.64
3	Insurance	198.69(0.02)	1377.70(0.11)	1179.01	617.89(0.05)	-8.57
4	Interest on fixed investment @ 9 %	5073.47(0.43)	8550.21(0.71)	3476.74	6309.65(0.53)	
	Total Fixed Cost	61061.26(5.20)	103937.42(8.65)	42876.16***	76306.12(6.41)	1.68
B	Variable Cost					
1	Cost of chicks	33000.00(2.81)	34531.25(2.88)	1531.25	33544.44(2.82)	-6.69
2	Feed	978163.79(83.38)	968109.38(80.61)	-10054.4	979634.38(82.32)	0.79
3	Medicine & Vaccine	14948.28(1.27)	11525.00(0.96)	-3423.28**	15222.00(1.28)	-1.98
4	Labour	5568.97(0.47)	5743.75(0.48)	174.78	5631(0.47)	-1.6
5	Electricity Charges	2324.45(0.20)	407.86(0.03)	-1916.58	1643(0.14)	11.82
6	Miscellaneous Expenses	5313.79(0.45)	4890.63(0.41)	-423.17	5163(0.43)	4.59
	Sub-total	1039319.27(88.59)	1025207.86(85.37)	-14111.4	1040838.26(87.47)	
	Interest on working capital @ 7%	72752.35(6.20)	71764.55(5.98)	-987.80	72858.68(6.12)	
	Total Variable Cost	1112071.6(94.80)	1096972.41(91.35)	-15099.2	1113696.9(93.59)	0.78
C	Total Cost of production (A+B)	1173132.8(100.00)	1200909.84(100.00)	27776.95***	1190003.1(100.00)	-3.2
	Cost of production per bird	1173.13	1200.90	-36.23***	1190.00	

(Figures in the parenthesis indicate percentage to the total), *** = significant at 1% ** = significant at 5%

Table-5 Returns from Layer Farm (Rs. / 1000 birds)

SN	Particulars	Group I	Group II	Difference over group I	Overall	t-test
1	Egg production	304725	309404	4679	308171	-5.49
2	Price (Rs. / egg)	3.72	3.90	0.18	3.82	
3	Sale of Eggs	1134234.14(94.62)	1190965.49(94.08)	56731.35	1154405(94.42)	-12.32
4	Sale of Culled birds	54913.79(4.58)	58250.00(4.60)	3336.21	56100(4.59)	-4.98
5	Sale of Manure	8637.52(0.72)	15717.63(1.24)	7080.11	11155(0.91)	-18.73
6	Sale of Gunny bags	903.45(0.08)	968.75(0.08)	65.30	927(0.08)	-4.09
	Gross Returns	1198688.90(100.00)	1265901.86(100.00)	67212.96	1222586.84(100.00)	-14.15
	Total Cost	1173132.8	1200909.8	27776.9***	1190003.1	-3.2
	Net Returns	25556.01	64992.03	39436.01***	32583.78	-2.87
	Net Return / Bird	25.56	64.99	34.27***	32.58	-2.87

(Figures in the parenthesis indicate percentage to the total), *** = significant at 1%

The marketing constraints faced by the sample farmers in the study area revealed that [Table-7] Entry of middleman (59.69) was the major constraint faced by group II farmers and price fluctuation (58.00) was the foremost constraint faced by the group I farmers. Lack of storage facility to store the raw materials and eggs and high transportation cost were the other constraints faced by the sample layer farmers in the study area.

Table-7 Marketing Constraints Faced by the Sample Farmers

SN	Constraints	Group I		Group II	
		Mean score	Rank	Mean score	Rank
1	Entry of Middleman	57.05	II	59.69	I
2	Price fluctuation	58.09	I	58.00	II
3	Lack of storage facility	44.47	III	41.84	III
4	High transportation cost	40.40	IV	40.47	IV

Conclusion

Based on the findings of the study, it is concluded that the average total cost of poultry layer farm was Rs.11.73 lakhs per 1000 birds in group I farms while in group II farms it was Rs. 12.00 lakhs per 1000 birds. Feed cost accounted for 83.38 percent for group I farms and 80.61 percent in group II farms followed by cost of chicks. Average net income per 1000 birds was Rs. 25556 in group I and it was Rs. 64992 in group II farms. It is also indicated that there was a significant difference exists between groups and it was Rs. 39436 per 1000 birds higher in group II and it is found to be statistically significant at 1 percent level. Net return per bird per annum was estimated to be Rs.26 in group I farms, Rs. 65 in group II farms and Rs. 33 in overall farms and the net return per bird was found to be significantly higher in group II which indicates the economies of scale of production. High feed cost, disease outbreak and high mortality rate were the major production constraints faced by the farmers in the study area. Similarly, Entry of middle man and price fluctuation are the major marketing constraints faced by the farmers.

Application of research: Study of cost and returns in layer farming will be helpful

to frame new policies related to layer farming. The constraints identified can be overcome by applying new policies to improve layer industry.

Research Category: Agricultural Economics- Production Economics

Abbreviations: NECC - National Egg Coordination Committee

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Research project name or number: M.Sc Thesis

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample collection: Namakkal district of Tamil Nadu

Cultivar / Variety / Breed name:

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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