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Estimation of costs and returns of layer poultry units in West Godavari district of Andhra Pradesh

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Abstract

The present study attempts to assess the economics and profitability of layer poultry farming in West Godavari district of Andhra Pradesh, focusing on costs and returns of layer poultry units. In total, 30 farms were considered for the study with three small, eleven medium and sixteen large layer poultry units using purposive random sampling. A pretested questionnaire was used to collect data from poultry farmers. The financial feasibility analysis reveals a positive net present value and benefit- cost ratio greater than one for small, medium and large layer poultry units, indicating economic viability. The internal rate of return for small firms is 39.15 per cent, while medium firms exhibit 72.07 per cent and large firms exhibit 78.03 per cent indicating substantial profitability in layer poultry units. Based on NPV, BCR and IRR, large layer farms were most profitable followed by medium and small layer farms. The layer had to produce a minimum of 22, 21 and 20 eggs in small, medium and large farms, respectively. The margin of safety stood at 277.51, 279.80 and 283.19 for small, medium and large farms, respectively. The higher margin of safety is on large farms over medium and small farms. The study revealed that poultry layer farming is a profitable business in West Godavari district.

Keywords: Poultry, layer farms, NPV, BCR, IRR

1. Introduction

The fastest-growing segment of the livestock and agriculture industries is the poultry industry which is now playing a significant role and contributing to the overall wellbeing of people especially creating employment opportunities, improving food security, livelihood and nutrition. India is a densely populated country with predominantly an agrarian economy which ranks 3rd in egg production. During the year 2022-23, the total egg production in the country is 138.38 billion numbers. Poultry production can be divided into two categories: layer production and broiler production, produces egg and meat, respectively. The animal husbandry enterprise with the fastest pace of expansion in India is layer farming. Since many farmers own only modest amounts of land, raising poultry can be a useful way for them to supplement their income.

Layer poultry farming means raising egg-laying poultry birds for the purpose of commercial egg production. Layer chickens are such a special species of hens, which need to be raised from when they are one day old. They start laying eggs commercially from 18-19 weeks of age. They continue laying eggs continuously till their 72-78 weeks of age. They can produce about one kg of eggs by consuming about 2.25 kg of food during their egg laying period (Poultry India, 2024). The egg is the only food that humans know of that is the most comprehensive. It is rich in iron and vitamins and one of the best foods for balanced protein. As a result, layer farming has gained popularity among farmers nowadays who are drawn to the possibility of rapid and significant financial gain.

Layer farming has a greater potential for profit, but for the business to succeed, marketing and production are just as crucial. The top 5 egg producing states which include Andhra Pradesh, Tamil Nadu, Telangana, West Bengal and Karnataka. Andhra Pradesh is the top egg-producing state in India, contributing around 20 per cent of the country's total egg production. The state's four districts of East Godavari, West Godavari, Krishna and Guntur produce 75 per cent of the state's eggs. The research study on "Economic Analysis of Layer Poultry Units in West Godavari District of Andhra Pradesh" is opt at the moment. The different breeds of poultry birds that lay brown and white coloured eggs are BV-300 and Island-300. The present study is an attempt to assess the economic analysis of layer poultry units of different sizes in this district.

2. Literature review

Kumar (2017) [6] studied the economics of large scale

poultry production in Sehore district of Madhya Pradesh, revealed that the investment on chick feed was found to be on an average Rs. 2,13,333 per farm, which accounted Rs. 24.49 per bird. On the other hand, the investment on grower feed was found to be on an average Rs. 9,53,467 per farm, which accounted Rs. 117.71 per bird. The study also revealed that, investment on layer feed was found to be on an average of Rs. 24,88,800 per farm, which accounted Rs. 341.40 per bird.

Osti *et al*. (2016) [7] conducted study on economic analysis of poultry egg production in Nepal and revealed that variable and fixed cost in small, medium & large farm were Rs.161.659, Rs. 190.58, Rs. 142.58 and Rs. 13.53, Rs. 3.21, Rs. 0.48 per 100 birds, respectively, and net return were Rs. 316.22, Rs. 163.65, Rs. 640.20 per 100 birds, respectively.

Soumya (2012) [8] studied the economic analysis of poultry farming (layers) in Chittoor district of Andhra Pradesh and revealed that the B:C ratio was highest in large farms (1.22) followed by medium (1.18) and small farms (1.14). The internal rate of return also highest in large farms (88.45) followed by medium (73.93) and small farms (59.42) showed an increasing trend with increase in farm-size. The margin of safety is highest on large farms over medium and small farms in her research on the break-even analysis of layer poultry units.

Halkatti *et al*. (2010) [3] studied economics of broiler production by trained and untrained farmers. The study conducted at Haveri district of Karnataka revealed that feed cost was the major expenditure in broiler production, which accounted for nearly 60 per cent of the total cost. The total cost of production per bird for the trained and untrained farmers was Rs. 46.57 and Rs. 54.25, respectively. The cost of feed, total variable cost and total cost was less in case of trained farmers. The total net returns was more than double in case of trained farmers compared to untrained farmers. B: C ratio was also more in case of trained farmers.

Abdul *et al*. (2008) [1] studied the profitability analysis of broiler production in Rawalpindi district. He revealed that the B:C ratio was highest in large farms (1.34) followed by medium (1.10) and small farms (0.95). The net present worth also highest in large farms (Rs. 239424) followed by medium (Rs. 115988) and small farms (Rs. 126932), showed an increasing trend with the increase in farm-size. However, the investment on all farm-sizes turned out to be an economically viable as the net present worth was positive in all the farms.

Khamdev (2006) [4] studied that total cost of production, consist the fixed and variable cost, of poultry production in Bhopal division of Madhya Pradesh. The cost of production of a bird was Rs. 398.57 for its total life span. It also shows that the highest total cost per bird was incurred in commercial scale i.e. Rs. 411.24 per bird followed by Rs. 385.90 per bird for non-commercial unit. It was also found that the net return per bird was Rs. 47.63 in their life span, which comes to Rs. 31.75 yearly income per bird. The net return per bird varied to on an average of Rs. 40.93 for commercial and Rs. 54.34 for non-commercial unit.

Varma (2004) [9] made an attempt to analyze the economics of layer farms in Indore district of Madhya Pradesh. He examined the costs and returns per year, the net return, cost of production per egg and benefit- cost ratio on small, medium and large size-groups of layer farms. The results of the study revealed the total cost of maintenance per layer per cycle on an average worked out to be Rs. 443.32. It was higher in small farms at Rs. 455.50 than in large farms Rs. 431.05 indicating decreased trend with the increase in the size of layer farms.

Kumar and Rai (2004) [5] studied the economic status of poultry farming enterprises in Andaman and Nicobar Islands. The study compared the investment patterns, labour utilization pattern, cost and returns and 14 efficiency measures of small (300 birds), medium (900 birds) and large (1500) farms. The total cost per bird was found to be Rs. 68.84, Rs. 65.85 & Rs. 63.07, respectively. The net return per bird was Rs 8.36 for small farms, Rs. 11.35 and Rs. 14.13 for medium and large farms, respectively. The study revealed that the BC ratio of all three categories was even and was 1.13, 1.19 and 1.24, respectively. The study concluded that the broiler farming was a profitable enterprise and a main source of income to a sizable number of farmers.

Farooq *et al*. (2003) [2] concluded in his study on poultry farming in Chakwal, Pakistan, that the total cost of production, gross return and net profit per layer was Rs. 393.88, Rs. 432.01 and Rs. 38.26, respectively. Mean feed cost per layer was Rs. 302.23 which included Rs. 10.27, Rs. 29.19 and Rs. 262.77 for starter, grower and layer ration, respectively. Feed cost was the major component contributing 76.73 per cent to the total cost of production. Gross return from the sale of marketable eggs, culled eggs, culled birds, empty bags and manure were Rs. 388.84, Rs. 3.85, Rs. 35.80, Rs. 2.20 and Rs. 1.45, respectively, forming 89.98, 0.89, 8.28, 0.51 and 0.34 per cent of the total returns, respectively.

3. Methodology

The study was conducted in Tadepalligudem and Attili mandals of West Godavari district of Andhra Pradesh. The layer farms are grouped into 3 categories based on number of birds, small (below 10000 birds), medium farms (10000-20000 birds) and large farms (20000 and above birds). 3 farms are selected from small size, 11 farms are selected from medium size and 16 farms are selected from large size. Total 30 layer poultry farms are considered for the study.

3.1 Net Present Value

It is also sometimes referred as net present worth (NPW). It is the present worth of the incremental net benefits or incremental cash flow stream. Net present value (NPV) of a project is estimated using the following formula.

$$\text{NPW} = \sum_{j=1}^{n} \frac{B_j - C_j}{(1+i)^j}$$

Where B_j = Benefits in jth year
C_j = Costs in jth year
i = Discount rate
n = Number of years

The net present value (NPV) should be positive to indicate that the project investment is economically viable.

3.2 Benefit-Cost ratio (BCR)

It is the ratio of present value of costs and present value of

benefits. For any project to be viable, Benefit-Cost ratio should be more than one. The project with highest Benefit-Cost ratio must be opted for implementation among the alternative projects. Benefit-Cost ratio is calculated using the following formula.

$$BCR = \sum_{j=1}^{n} \frac{B_{j/}(1+i)^{j}}{C_{j/}(1+i)^{j}}$$

Where B_j = Benefits in rupees in jth year
C_j = Costs in rupees in jth year
I = Discount rate
n = Number of years

In the present investigation, the net present value (NPV) and benefit-cost ratio (BCR) were calculated at 15, 20 and 25 per cent discount rates.

3.3 Internal Rate of Return (IRR)

It represents the average earning capacity of an investment over the economic life period of the project. It is the discount rate at which the present values of cash flows are just equal to zero i.e., NPW = 0. In other words, the benefit cost ratio calculated at IRR is unity. Mathematically, it can be represented as

$$IRR = \sum_{j=1}^{n} \frac{B_j - C_j}{(1+i)^2} - I$$

Where B_j = Benefits in rupees in jth year
C_j = Costs in rupees in jth year
i = Discount rate
n = Number of years
I = Initial investment

When the calculated IRR is greater than the market rate of interest, then the investment in the project is considered viable and worthy.

3.4 Break- even point

The break-even quantity is that point of production where the farmers neither gain profit nor incurs loss. The break-even output in this study pertains to break- even sale number of eggs. The steps involved in finding out the break-even sale number of eggs are as follows:

$$\text{Break-even sale value of eggs} = \frac{Fixed\ cost}{Percentage\ contribution\ of\ sale\ of\ eggs} \times 100$$

$$\text{Break-even sale number of eggs} = \frac{Break\text{-}even\ sale\ value\ of\ eggs\ per\ layer \times egg\ production\ per\ layer}{Sale\ value\ of\ eggs\ per\ layer}$$

4. Results and Discussion

4.1 Economic Viability of Layer Farms

The results for economic viability of different sizes of layer poultry farms are presented in Table 1. The financial feasibility revealed that the net present value of large farms at 15% discount rate is Rs. 422,158,735 whereas for medium and small farms is Rs. 78,433,039 and Rs. 3,018,893 respectively. Even with a greater discount rate of 25 per cent, the BCR for small, medium and large farms are 1.11, 1.26 and 1.38, respectively. The net present worth of small, medium and large layer farms at 20% discount rate are Rs. 1,959,311, Rs. 8,981,592 and Rs. 32,521,136 respectively and the corresponding BC-ratios are 1.08, 1.09 and 1.20 respectively. The net present worth of small, medium and large layer farms at 25% discount rate are Rs.1,203,438, Rs.176,068,105 and Rs. 968,157,350 respectively and the corresponding BC-ratios are 1.05, 1.06 and 1.17 respectively. The Net Present Worth is highest for large farms followed by medium and small farms at three discount rates. The net present values for all the farms are positive at both 15, 20 and 25% discount rates which indicates the economic viability of farms. The Benefit-Cost Ratio was positively related with farm-size and the large farms were economically more viable. The IRR is highest for large (78.03%) farms by medium (72.07%) and small (39.15%) farms. The internal rate of return is higher than that of the discount rate for all sizes of followed farms which implies the production of layer farms was very profitable among small, medium and large units.

Table 1: Economic viability of layer farms of different sizes (In ₹)

Particulars	Discount rates (%)		
	15	20	25
Small farms			
NPV(Rs.)	3,018,893	1,959,311	1,203,438
B-C ratio	1.11	1.08	1.05
IRR (%)	39.15		
Medium farms			
NPV(Rs.)	78,433,039	8,981,592	176,068,105
B-C Ratio	1.26	1.09	1.06
IRR (%)	72.07		
Large farms			
NPV(Rs.)	422,158,735	32,521,136	968,157,350
B-C Ratio	1.38	1.20	1.17
IRR (%)	78.03		

Abdul *et al*. (2008) [1] reported similar results that the net present worth also highest in large farms (Rs. 2,39,424) followed by medium (Rs. 1,15,988) and small farms (Rs. 1,26,932), showed an increasing trend with the increase in farm-size.

Soumya (2012) [8] reported the similar results that the internal rate of return is highest for large farms followed by medium and small farms in her research on layer poultry units in Chittoor district of Andhra Pradesh.

4.2 Break even analysis

Break-even analysis was carried out with a view to find out the minimum number of eggs produced per layer so as to make the enterprise to run on no loss – no profit basis. From

the Table 2, it is noticed that the layer had to produce a minimum of 22, 21 and 20 eggs in small, medium and large farms, respectively. The margin of safety stood at 277.51, 279.80 and 283.19 for small, medium and large farms, respectively. The higher margin of safety is on large farms over medium and small farms. The above analysis clearly indicated the profitable nature of layer farming.

Table 2: Break-even analysis of layer farming (per layer)

Particulars	Farm Size		
	Small	Medium	Large
Sale value of eggs (Rs)	1142	1222	1183
Total variable cost (Rs)	923.6	961.8	844.89
Net variable cost (Rs)	859.28	906.57	787.68
Percentage of net variable cost to sale value	75.24	74.19	66.58
Fixed cost (Rs)	21.19	22.22	25.85
Break-even sale value of eggs (Rs)	85.59	86.08	77.35
Break-even number of eggs	22.49	21.20	19.81
Average egg production (in number)	300	301	303
Margin of safety	277.51	279.80	283.19

Soumya (2012) [8] got similar results that margin of safety is highest on large farms over medium and small farms in her research on the break-even analysis of layer poultry units in Chittoor district of Andhra Pradesh.

5. Conclusion

The financial feasibility analysis revealed that, per farm NPV at 15 per cent, 20 per cent, and 25 per cent discount rates in small, medium and large units was positive. Hence, layer poultry units proved economically viable, indicated by the large positive net present value. At 15 per cent, 20 per cent, 25 per cent of the discount rates, the benefit- cost ratio was greater than 1. Even with a greater discount rate of 25 per cent, it was still 1.05 (small) and 1.06 (medium) and 1.17 (large) poultry units which demonstrates the profitability of layer poultry farming and it was economically feasible to invest in the production of layer poultry farms. The internal rate of return was estimated to be 39.15 per cent for small units, 72.07 per cent for medium units and 78.03 per cent for large units. Thus, the production of layer farms is very profitable among small, medium and large units. The overall break- even output of the production, layer had to produce a minimum of 22, 21 and 20 eggs in small, medium and large farms, respectively. The higher margin of safety is on large farms over medium and small farms. Thus, the layer poultry farming clearly indicated the profitable nature of layer farming.

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