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COST-BENEFIT ANALYSIS OF ENVIRONMENTAL CONTROL VERSUS TRADITIONAL LAYER HOUSES IN POULTRY FARMING

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Abstract: This prefeasibility study aimed to compare the expenditure and income differential of commercial layers reared in a conventional open-sided house and an environmental controlled (EC) housing system. Using equipment and standards from a reputed firm, a flock capacity of 40,000 birds with 6% extra chicks (42,400 chicks) was considered. The study showed that the investment cost per bird was higher in the EC housing system due to the installation of a tunnel ventilation system and control cabinet, but returns were significantly higher due to higher production standards and lower mortality. The study suggests that in tropical climate conditions, the EC housing system will be the future trend due to unpredictable climate changes. The document concludes by discussing the equipment costs, expected expenditure and returns, and the benefits of EC housing systems for layer farming.

Keywords: Layer Farm, Environmental Control, Feasibility Analysis, Tropical Climate, Production Standards, Mortalit

Introduction

Egg production systems have become subject to heightened levels of scrutiny. The housing system of laying hens determines their production performances. With the control of microenvironment in EC house, the birds show higher performances than in open house, though the cost of EC house construction and equipment are higher. At the same time, power failure backup systems should be in good working condition to regain the normal working of the control systems and other mechanical ventilation systems within the house. A prefeasibility study was conducted to compare the expenditure and income differential between commercial layers reared in a conventional open-sided house and an environmental controlled (EC) housing system. The study used equipment and standards from a reputed firm and considered a flock capacity of 40,000 birds with 6% extra chicks, making the total number of birds obtained 42,400 chicks. The prefeasibility study was conducted to ascertain expected expenditure and returns in

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both the housing systems, and the feasibility of the farm was analyzed. The study concluded by discussing the equipment costs, expected expenditure and returns, and the benefits of EC housing systems for layer farming.

MATERIALS AND METHODS

A prefeasibility study to ascertain the expenditure and income differential from commercial layers reared on conventional open sided house and environmental controlled housing system is carried out with using the equipments and standards from reputed firm.

A Controlled house is one in which inside conditions are maintained as near as to the bird's optimum requirement. A Closed Building, Longitudinally Preferably East to West, with Big Exhaust Fans on West side while Evaporative Cooling Pads on East side along with Automatic Feeding and Drinking Systems Inside.

A flock capacity of 40,000 birds with 6% extra chicks will be obtained making the total number of birds obtained is 42,400 chicks. The expected expenditure and expected returns in both the housing system were compared and feasibility of the farm were analysed.

Table 1: Technical details of open sided house

	STARTER HOUSE	LAYER
House length (in meters)	74.12	124.77
width (in meters)	16.80	11.02
Total Area in Sq. mtrs	1245.22	1374.9654
Total Area in Sq. ft	13398.52	14794.6277
Approx. Civil Cost per Sq. ft	200	200
Total Civil cost/House	26.79 lakhs	29.59 lakhs
Approx. Civil Cost per Bird/INR	63.20	72.69

Table 2: Technical details of environmental controlled house

	STARTER	LAYER
House length (in meters)	89	101
Width (in meters)	9.9	9.42

Comparative Prefeasibility Analysis for Large Scale Layer Farm

Total Area in Sq.mtrs	881.1	951.42
Total Area in Sq.ft	9480.636	10237.2792
Approx. Civil Cost per Sft	250	250
Total Civil cost/House	23.70 Lakhs	25.59 Lakhs
Approx. Civil Cost per Bird/INR	55.89	62.88

RESULTS

The results obtained from prefeasibility study to ascertain the expenditure and income differential from commercial layers reared on conventional open sided house and environmental controlled housing system is summarized below:

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Expenditure statement

The comparative analysis on the expenses involved in open sided starter and layer house is summarized in table 3 and 4 respectively.

Table 3: Expenditure statement for open sided and environmental controlled STARTER house

Equipment	Open house	EC house
Univent Starter UV-S680	104.279,46	88.997,40
Lighting	9.755,14	9.366,33
Feed storage	4.529,30	4.108,25
Feed supply	1.142,10	4.680,76
Combi Tunnel ventilation	-	40.940,21
Feeding Control	5.776,56	-
Heating – JetMaster	7.677,96	8.716,72
Fresh air curtains	5.027,34	6.916,24
Main Control	-	9.428,40
Manure removal	8.857,25	7.583,71
Climax Fans	4.557,02	-
Service	15.500,00	19.450,00
total cost	167.102,13	200.188,02
Exchange rate INR	72	72
Total equipment cost (Starter)	120.31 Lakhs	144.14 Lakhs

Table 4: Expenditure statement for open sided and environmental controlled LAYER house

	Open house	EC house
Univent UV600	99.958,68	102.114,25
Lighting	10.829,57	6.054,72
egg collection - EC (EggCellent)	11.270,34	14.091,18
Egg collection	-	1.450,80
Feed storage	4.613,06	3.969,50
Feed supply	4.849,26	4.588,09
Tunnel ventilation	-	21.969,12
Fresh air curtains	6.824,20	7.584,08
Manure removal	7.943,70	7.450,32
Control Cabinet	-	9.805,54
Egg cross collection	28.185,34	14.900,00
Climax Fans	5.486,83	-
Fresh air curtains	-	-
Feeding Control	4.332,42	-
Service	15.900,00	14.900,00
total cost	200.193,40	193.977,6
exchange rate INR	72	72

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Total equipment cost (layer)	144.14 Lakhs	139.66 Lakhs
Equipment cost for starter & layer	264.45 Lakhs	283.79 Lakhs
Equipment cost / bird (Starter + Layer house)	623.71 lakhs	669.31 Lakhs

Briefly the cost of equipments for starter house for rearing 40000 birds was 120.31 lakhs and 144.14 lakhs with respect to open and EC house whereas the cost in a layer house was 144.14 lakhs and 139.66 lakhs. Altogether the cost was 264.45 and 283.79 lakhs for open sided and EC house respectively. The equipment cost per bird was 623.71 lakhs and 669.31 lakhs respectively. The higher cost involved was mainly due to ventilation control provided in EC house.

4.2. Returns statement

The comparative analysis on the returns from open sided starter and layer house is summarized in table 5 and 6 respectively.

Briefly, the mortality inside EC housing system was lower by 2% which in turn results in higher production and sale thereby higher returns. The average income expected from open sided and EC house will be approximately 405.14 and 431.59 Lakhs respectively.

Table 5: Income statement for open sided and environmental controlled **LAYER** house

	Open house	EC house
Mortality in layer House	6%	4%
no of birds mortalized	2442	1628
Total No. of Birds after Mortality	38862	39076
Average feed price/kg	18	18
Average feed intake/bird/day (gms)	110	108
Average egg price	3.1	3.1
Average power cost /KWH	7	7
Market Cull Bird/Price	128	128
Interest Rate	12%	12%
Feed Cost/Egg	1.98	1.9
Birds Uniformity	70 - 75 %	85 - 90 %
Total eggs produced per bird	295	315
Total eggs produced per flock	11464290	12308940
Revenue generated from eggs	355.39 lakhs	381.58 lakhs
Sale of spent hen	49.74 lakhs	50.02 lakhs
Income	405.14 lakhs	431.59 Lakhs

Table 6: Statement showing the savings under environmental controlled housing system

Difference in Mortality	814	birds
Total eggs produced from Mortality Difference	256410	Eggs
Revenue generated from eggs	794871	INR
Revenue generated on mortality (at Culling)	104192	INR
Total revenue generated from Mortality (Difference)	899063	INR

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Feed saving per day	0.0848	Tonnes
Feed saving in a flock (72 weeks)	42.7392	Tonnes
AVG Cost of Feed/ton	18000	INR
Total Saving on feed / flock	769305.6	INR
EC house total income	44058505	INR

DISCUSSION

The equipment cost per bird for open house is Rs. 623.70 whereas for EC house it is Rs. 669.33. Cost in EC house is higher than open house due to the installation of tunnel ventilation system and control cabinet in EC house. Total number of eggs produced per flock in EC house is 1,23,08,940 eggs and in open house is 1,14,64,290 eggs. Therefore about 8,44,650 extra eggs will be produced from the EC house reared hens with same capacity. **This is due to 2% lower mortality in EC house.** And so the sale of spent hen is also generates higher revenue in EC house. The higher investment due to ventilation control inside open sided house will be compensated within 2 production cycles due to higher returns.

VI. CONCLUSION

The investment cost per bird though higher in EC housing system the returns are significantly higher on a long run due to higher standards of production and lower mortality. Also, in tropical climatic conditions EC will be future trend in due to unpredictable climatic changes.

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