



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(7): 1255-1259
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www.thepharmajournal.com

Received: 22-04-2022

Accepted: 04-06-2022

Maina Kumari

Ph.D. Scholar, Division of Extension Education, IVRI, Izatnagar, Bareilly, Uttar Pradesh, India

Kamlesh Kumar Dhawal

Veterinary Officer, Animal Husbandry Department, Rajasthan, India

MP Sagar

Senior Scientist, Central Avian Research Institute, Izatnagar, Bareilly, Uttar Pradesh, India

Pratikshya Panda

Assistant Professor, (VAHEE) COVS, Rampura phul, GADVASU, Ludhiana, Punjab, India

Manisha Mehra

Assistant Professor, Department of Veterinary Pathology, College of Veterinary and Animal Science, Bikaner, Rajasthan, India

Economic analysis of income in layer farms of Uttar Pradesh state

Maina Kumari, Kamlesh Kumar Dhawal, MP Sagar, Pratikshya Panda and Manisha Mehra

Abstract

The objective of this study was economic analysis of income and employment in layer farms of Uttar Pradesh state. Total 108 respondents were selected, in which 54 were trainee and 54 were non-trainee layer farmers. Out of these 54 trainees, 30 were adopters and 24 were non-adopters. Data were collected through structured mailed questionnaires and telephonic survey. The results show that the total average variable costs incurred as rearing of birds for 82 weeks (per cycle) were Rs. 1076.30 and Rs. 1094.98 for trainee and non-trainee layer farmers, respectively. Among variable cost feeds alone account for 93.00 per cent and next highest cost incurred for chicks followed by vaccination charges. The average total cost was Rs. 1592.91 in case of trainee and Rs. 1588.25 for non-trainee layer farmers. Revenue generation from selling of eggs was Rs.1297.91 and Rs. 1277.90 for trainee and non-trainee layer farmers, respectively. Revenue from eggs was the major source of income and accounted for 95% of the average revenue generation. Net return received was Rs. 148.26 for trainee and Rs. 105.90 for non-trainee layer farmers per bird. The t-test analysis revealed that there was highly significant difference between net return among trainee and non-trainee layer farmers at 1 per cent of level of significance. Study results indicate that trainee layer farmers had more net return than non-trainee layer farmers.

Keywords: Cost, egg, feed, income, poultry, revenue

Introduction

Today, poultry is one of the fastest developing segments of the agricultural economy in India. The total poultry population in the country is 851.81 million numbers in 2019 which shows an increase of 16.80 per cent over the previous census (20th Livestock Census). The poultry farming plays an important role in the rural economy of India. As an important sub-sector of livestock production, however, the poultry plays a crucial role in economic growth that creates numerous employment opportunities (Islam *et al.*, 2012) ^[7]. The production of agriculture has been rising at a rate of 1.5 to 2 percent per annum while eggs and broilers production has been raising at a rate of 8 to 10 percent per annum. Poultry is one of the most structured sectors in animal husbandry which has worth rupees one lakh Crores (Annual Report, DAHD&F, GoI, 2017-18). The rapid growth of the poultry industry has been encouraging many farmers to adopt poultry farming as the main source of their income. There are few segments of the poultry industry, comprising layers, broilers and others. The egg production layers are kept in cages during their production cycle of 72 weeks. Once their productivity declines, they are sold in the market for consumption. Income from layer farm poultry products includes the sale of eggs, cull birds, gunny bags and manure (Dinesh and Sharma, 2019) ^[6].

The total egg production in the country was 1.8 billion in the year 1950-51 since then the production of eggs continues to rise over the period and the egg production in the country has increased from around 103.32 billion in 2018-19 to 122 billion in 2019-20 registering a growth of about 8.5 per cent. The per capita availability of eggs has increased from 79 in 2018-19 to 91 in 2019-20 (BAHS, 2020). The country has exported 3,50,817.80 MT of Poultry products to the world for the worth of Rs. 574.61 Crores/ 80.34 USD millions during the year 2019-20 (APEDA Report, 2019-20).

The poultry industry in India has been increasing; however, the poultry enterprise is facing various problems in its expansion. Farmers fail to realize a substantial return from their poultry enterprises on account of high production costs, lack of technical knowledge and efficient management practices (Osti *et al.*, 2016) ^[9]. On account of the rising cost of chicks, feed and other inputs, the cost of production is proportionately higher than the prices of poultry products. Regarding the cost of production, the cost of feed is 71%, chicks 24%, medicines and vaccines 5% (Joshi *et al.*, 2014) ^[8].

Corresponding Author

Maina Kumari

Ph.D. Scholar, Division of Extension Education, IVRI, Izatnagar, Bareilly, Uttar Pradesh, India

According to Shrestha *et al.*, (1999) ^[11] there was a net return of Rs. 15 per broiler and Rs. 217 per layer but this return has been found to be decreased to Rs. 3 per broiler and Rs. 154 per layer. This has led the profitability of the poultry raising farmers in doubt. Feed alone accounts three fourth of total cost. This indicates that the cost of feed and treatment cost are the major factors attributed to expensive poultry production. Therefore, unless the farmers are aware that how efficiently they are feeding their layer, they cannot estimate their production efficiency. Keeping the above aspect in view the present study we aimed at accomplishing the following objective:

To study the income generation in layer farming

Material and methods

The study was carried out in five agro-climatic zones of Uttar Pradesh state. The respondents (Trainee layer farmers) were belonging to 5 agro-climatic zones out of 9 agro-climatic zones of the state. A total of 54 trainee layer farmers were selected for the study. An equal number (54) of trainee layer farmers were selected from the same agro-climatic zone as respondents. Thus, the total sample size was 108. Out of 54 trainees, 24 had not adopted layer farming. So, in the case of Income and employment calculation, a comparison of 30 trainee layer farmers was done with 54 non-trainee layer farmers, and the total sample size was reduced to 84.

Research methodology

Cost calculation

The total cost included fixed and variable costs. Fixed costs included interest paid on bank loan, building cost, cages cost, equipment cost, vehicle cost, staff salary, electric generator set cost and feed mill cost and cost of depreciation were calculated for farm building (5% rate), cages, equipment's (10% rate) and vehicle (15% rate). Other miscellaneous cost includes water pipe installation; electricity connection etc. The variable cost included cost of medicines, vaccines, vaccinator & veterinarian charges and disinfectants, litter cost, casual labour, transportation, chicks and electricity charges. The total cost was calculated per bird per cycle of 82 weeks.

Total Costs (TC) = TVC + TFC; TVC- Total variable cost, TFC-Total fixed cost

Average cost/bird/cycle= Total cost per year x 82 / Total No. of layers x 52

Revenue calculation: Revenue generation included selling of eggs was the major source of income and accounted for 95% of the average revenue generation. The other sources of revenue generation included spent hens, gunny bags and poultry excreta.

The net return was calculated per bird per cycle of 82 weeks by subtracting production cost from revenue generation.

Net Return (NR) = TR - PC; TR- Total Revenue, PC- Production Cost

Average revenue/bird/cycle = Net return per year x 82 / Total No. of layers x 52

Result and discussion

1. Income calculation among trainee and non-trainee layer farmers

To work out the income from layer farming the cost components viz., variable cost, fixed cost and total cost and net return were calculated per bird per cycle of 82 weeks among trainee and non-trainee layer farmers.

Variable cost: The variable cost per bird under different heads presented in table 1, shows that in case of trainee layer farmers, average cost of feed was Rs.1001.52 which contributes about 93 per cent to total variable cost. The percentage of feed costs in production costs occupies the largest percentage when compared with other cost components which reach 84.61 per cent (Agus, *et al.*, 2020) ^[1]. The variable cost is high compared to fixed cost in layer farms. The high variable cost is due to large amount spend on feeds, feeds alone account for more than 90.00 per cent and next highest cost incurred for chicks followed by vaccination charges and cost incurred for labours (Dinesh and Sharma 2019) ^[6]. Table further reveals that cost of medicines, vaccines, vaccinator & veterinarian charges and disinfectants cost were Rs. 2.84, 8.03, 4.34 and 2.26, respectively. Cost of litter, casual labour, transportation, chicks and electricity were Rs. 1.05, 1.91, 3.19, 40.11 and 7.49, respectively. Another miscellaneous cost was Rs. 3.83. The total average variable cost incurred for rearing of birds for 82 weeks was Rs. 1076.30 only. Table further reveals that the total variable cost was Rs. 1094.98 for non-trainee layer farmers, which constitute different components of variable cost viz. feed cost (Rs. 1019.36), cost of medicines (Rs. 2.58), vaccines (Rs. 7.70), vaccinator & veterinarian charges (Rs. 3.65), disinfectants cost (Rs. 2.24), litter (Rs. 0.18), casual labour (Rs. 2.05), transportation (Rs. 3.85), chicks (Rs. 40.82) and electricity (Rs. 7.99). Other miscellaneous cost includes watering, plumber, electrician etc. charges were Rs. 4.40 only. It clearly indicates that feed cost was higher in the case non-trainee layer farmers as compared to trainee layer farmers. This might be due to the fact that trainee layer farmers were purchasing feed grains directly from farmers without any middleman, mostly during in off season (at comparatively low price) and they also stored the raw feed material. The higher average cost of medicine and vaccine for trainee layer farmers shows the higher concern about health care practices as they were adding medicinal supplements (eg. multivitamins, liver tonic) with medicines and they were also following complete vaccination schedule. High vaccinator and veterinary charges for trainee layer farmers may be because they were taken services of mostly qualified veterinarians rather than para-veterinarian as called by non-trainee layer farmers. The trainee layer farmers were expending more on litter as compared to non-trainee layer farmers because trainee layer farmers were using deep litter system for brooding. Transportation cost was lower for trainees as most of them were utilizing their vehicles. Lower electric charges for trainee layer farmers because some trainee layer farmers had farms equipped with solar panels. The independent sample t-test analysis reveals that there was significant difference between trainee and non-trainee layer farmers with respect to average variable cost.

Table 1: Average variable cost amongst the trainee and non-trainee layer farmers per bird per cycle of 82 weeks

Sl. No.	Variable cost component	Average cost / bird (in Rs)		
		Trainee(n=30)	Non-trainee (n=54)	Pooled (n=84)
1.	Feed cost	1001.52	1019.36	1012.99
2.	Medicine cost	2.84	2.58	2.67
3.	Vaccine cost	8.03	7.70	7.82
4.	Vaccinator and veterinarian charges	4.34	3.65	3.89
5.	Disinfectant cost	2.26	2.24	2.25
6.	Litter cost	1.05	0.18	0.49
7.	Casual labour cost	1.91	2.05	2.00
8.	Transportation cost	3.19	3.83	3.60
9.	Chicks cost	40.11	40.82	40.57
10.	Electricity charges	7.49	7.99	7.81
11.	Miscellaneous charges	3.83	4.40	4.20
12.	Total variable cost	1076.30	1094.98	1088.31
t-test=1.97*				

Fixed cost

Average fixed cost per bird per cycle of 82 weeks presented in table 2, shows that in case of trainee layer farmers, interest paid on bank loan, building cost, cages cost, equipment cost, vehicle cost, staff salary, electric generator set cost and feed mill cost were Rs. 69.1, 208.45, 112.34, 12.63, 20.93, 41.34, 3.54 and 20.22, respectively. The various depreciation charges on building (5% rate), cages, equipment (10% rate) and vehicle (15% rate) were Rs. 9.06, 9.88, 1.22 and 2.49, respectively. Other miscellaneous cost includes water pipe installation; electricity connection etc. was Rs. 3.12. So, the total average fixed cost was Rs. 516.61 per bird for trainee layer farmers. On the other hand, for non-trainee layer farmers, cost paid as interest on bank loan was Rs. 77.43. Cost on building, cages, equipment, vehicle, staff salary, electric generator set and feed mill average cost was Rs. 182.10, 107.61, 11.51, 16.95, 41.34, 4.20 and 22.29, respectively. Depreciation charges on building (5% rate), cages, equipment (10% rate) and vehicle (15% rate) were Rs. 10.31, 10.65, 1.41 and 3.21, respectively. Other miscellaneous

cost was Rs. 3.78. Total fixed cost accounted for Rs. 493.27 for non-trainee layer farmers. Non-trainee layer farmers were paying more interest on bank loan than trainee layer farmers. It might be due to the fact that trainee layer farmers have taken benefit from state poultry development scheme, which provided loan at low rate of interest. High cost of building among trainee layer farmers might be due to the fact that scientific orientation and construction of buildings after training which cost them more and they had comparatively new buildings. Low expenditure on permanent staff salary being paid by trainee layer farmers might be due to the reason that they were supervising their layer farm themselves and maintaining the financial record which reduced the number of supervisory staff and curtailed the cost on staff salary. High depreciation cost on account of non-trainees may be due to the fact that their building and other assets were older than trainees, which have more depreciation charges. The independent sample t-test analysis reveals that there was highly significant difference between trainee and non-trainee layer farmers with respect to average fixed cost.

Table 2: Average fixed cost amongst the trainee and non-trainee layer farmers per bird per cycle of 82 weeks

Sl. No.	Fixed cost components	Average cost / bird (in Rs)		
		Trainee (n=30)	Non-trainee (n=54)	Pooled (n=84)
1.	Bank loan interest	69.19	77.43	74.49
2.	Building cost	208.45	182.10	191.51
3.	Cages cost	112.34	107.61	109.30
4.	Equipment cost	12.63	11.51	11.91
5.	Vehicle cost	20.93	16.95	18.38
6.	Building depreciation charges	9.06	10.31	9.50
7.	Cages depreciation charges	9.88	10.65	10.37
8.	Equipment depreciation charges	1.22	1.41	1.29
9.	Vehicle depreciation charges	2.49	3.21	2.75
10.	Permanent staff salary expenditure	41.34	45.30	43.88
11.	Generator set cost	3.54	4.20	3.96
12.	Feed mill cost	20.22	22.29	21.54
13.	Miscellaneous cost	3.12	3.78	3.54
14.	Total fixed cost	516.61	493.27	501.61
t-test=2.57**				

** Significant at 1% level of significance

Total cost

The total cost is the sum of total variable (TVC) and total fixed cost (TFC). The data presented in table 3 reveals that total variable cost was Rs.1076.30 per bird for cycle of 82 weeks among trainees and Rs. 1094.98 for non-trainee layer farmers. The total fixed cost was Rs. 516.61 in case trainee

and Rs. 493.27 for non-trainee layer farmers. The average total cost was Rs. 1592.91 in case of trainee and Rs. 1588.25 for non-trainee layer farmers. It was little bit higher on the part of trainee layer farmers, but difference was non-significant.

Table 3: Total cost among trainee and non-trainee layer farmers per bird per cycle of 82 weeks

Cost	Average cost/bird (in Rs)		
	Trainee (n=30)	Non-trainee (n=54)	Pooled (n=84)
Total variable cost (TVC)	1076.30	1094.98	1088.31
Total fixed cost (TFC)	516.61	493.27	501.61
Total cost (TVC+TFC)	1592.91	1588.25	1589.92
t-test=0.35 ^{NS}			

Revenue generation

Revenue generation out of layer farming presented in table 4 reveals that in case of trainee layer farmers, revenue generation from selling of eggs (Rs.1297.91) was the major source of income and accounted for 95 per cent of the average revenue generation. According to Pawariya (2015) ^[10] the revenue from the sale of eggs was Rs 718.03 per bird constituting 92.35 per cent of the total revenue in layer farms and (Demircan *et al.*, 2010) ^[5] the revenue from the sale of from the sale of eggs per bird constituting 97.32 per cent of the total revenue. The other sources of revenue generation include sell of spent hens, gunny bags and poultry excreta and these were accounted for Rs. 44.37, 3.83 and 11.63 per bird, respectively. For non-trainee layer farmers, revenue generation from selling of eggs was Rs. 1277.90 while revenue generation by selling of spent hens, gunny bags and

poultry excreta were Rs. 42.27, 4.20 and 13.08 per bird, respectively. The higher revenue generation from eggs for trainees might be due to the better egg price and efficient production by them. Total average revenue generation for trainee and non-trainee layer farmers were Rs. 1357.74 and 1337.45 per bird, respectively. The higher selling price of spent hen for trainees might be due to proper selection of marketing channel. The non-trainee layer farmers were selling gunny bags and poultry excreta at better price than trainees due to their old rapport with the farmers having sugarcane, banana farms and fisheries at their vicinity. The independent sample t-test analysis reveals that there was significant difference between trainee and non-trainee layer farmers with respect to revenue generation at 5 per cent level of significance.

Table 4: Revenue generation among trainee and non-trainee layer farmers per bird per cycle of 82 weeks

Sl. No.	Revenue generation	Average revenue/bird (Rs)		
		Trainee (n=30)	Non-trainee (n=54)	Pooled (n=84)
1.	Eggs	1297.91	1277.90	1285.05
2.	Spent hens	44.37	42.27	43.02
3.	Gunny bags	3.83	4.20	4.11
4.	Poultry excreta	11.63	13.08	11.91
5.	Total revenue	1357.74	1337.45	1344.09
t-test=1.80*				

* Significant at 5% level of significance

Net return

The net return was calculated per bird per cycle of 82 weeks by subtracting production cost from revenue generation. Production cost consists of total variable cost, interest on bank loan, expenditure on permanent staff salary and depreciation charges on building (5% rate), cages, equipment's (10% rate) and vehicle (15% rate). Data presented in table 5 reveals that net return received by trainee layer farmers was Rs. 148.26

per bird, while net return was Rs. 105.90 per bird for non-trainee layer farmers. The t-test analysis reveals that there was highly significant difference between net return among trainee and non-trainee layer farmers at 1 per cent of level of significance. There was higher net return for trainee layer farmers due to better utilization of resources and marketing channel, better selling price, low maintenance and depreciation cost.

Table 5: Net return among trainee and non-trainee layer farmers per bird per cycle of 82 weeks

Layer farmers	Production cost	Revenue	Net return
Trainee	1209.18	1357.74	148.26
Non-trainee	1231.55	1337.45	105.90
t-test- 4.60**			

** Significant at 1% level of significance

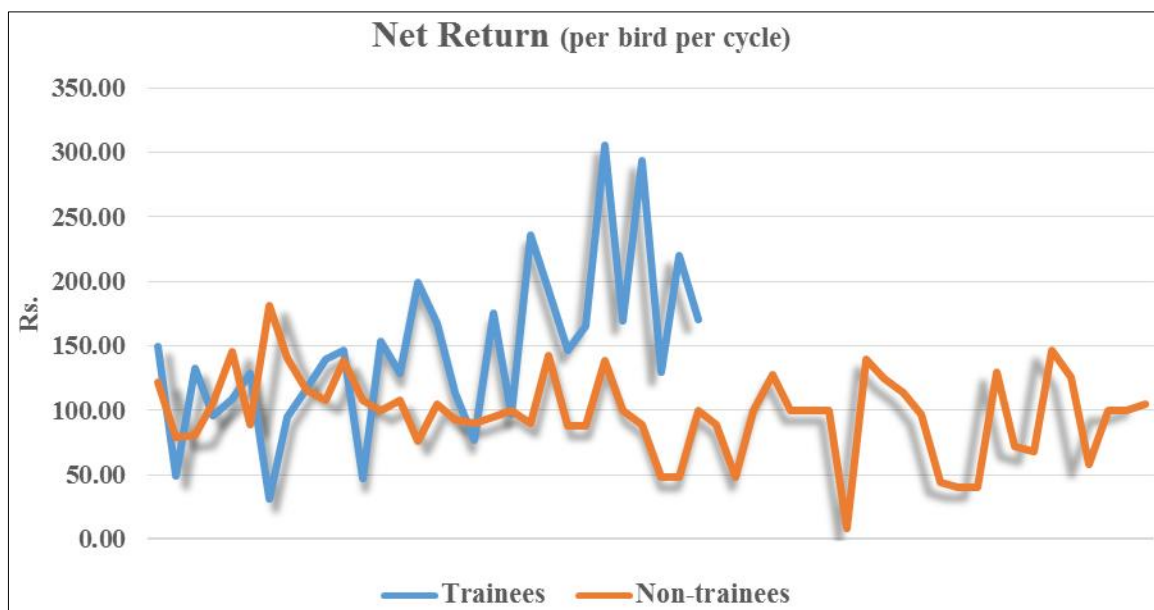


Fig 1: Graph representing distribution of trainee and non-trainee layer farmers according to net return from layer farming per bird per cycle

Conclusion

This study appears to be the first one in connection with the economic analysis of income from the layer farms of Uttar Pradesh state. Significant differences were found among trainee and non-trainee layer farms. The cost and return analysis showed that the feed cost was the major constitute in the poultry enterprise. The variable cost had a lion share. The t-test analysis revealed that there was highly significant difference between net return among trainee and non-trainee layer farmers at 1 per cent of level of significance. Study results indicate that trainee layer framers had more net return than non-trainee layer farmers. It is concluded from the above facts and profitability that the study area was enough potential to grow in the poultry sector and motivate the farmers to participate in the trainings programmes.

Acknowledgments

The authors are grateful to Director, IVRI, Bareilly for providing funds and facilities to conduct this research work.

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