

## FACTORS INFLUENCING PRODUCTIVITY AND PROFITABILITY IN POULTRY FARMING: EVIDENCE FROM LUCKNOW

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| Article Info                                                                                                                                                                                                                                                                          | ABSTRACT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p><b>Article History:</b><br/>Received: 16<sup>th</sup> Sep 2025<br/>Accepted: 01<sup>st</sup> Oct 2025<br/>Published: 14<sup>th</sup> Oct 2025</p> <p><b>Keywords:</b><br/>Poultry farming,<br/>Productivity,<br/>Profitability,<br/>Cost Management,<br/>Management Practices.</p> | <p>This research examines the factors that influence productivity and profitability in poultry farming in Lucknow, with a focus on cost-related factors and management practices. Data were collected from 100 poultry farmers through structured questionnaires and analysed using multiple regression analysis. The study examined whether cost-related factors (labour cost, feed cost, and overhead expenses) significantly affect profitability and whether management practices (training frequency and health check frequency) impact the productivity of poultry farms. The analysis revealed complex relationships between these variables and farm performance outcomes. Cost-related factors had varying degrees of impact on profitability, with feed costs accounting for 30-70% of total production expenses for most farmers. Management practices demonstrated significant influence on productivity measures, notably health management and training programs. The findings indicate that multiple interconnected factors, including nutritional quality, genetic selection, health management, climatic conditions, market access, and institutional support, influence profitability in poultry farming. The study emphasises the importance of integrated farm management approaches that combine effective cost control with robust management practices to enhance both productivity and profitability in the region's poultry sector.</p> |

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**INTRODUCTION:**

Poultry farming has become a vital component of Lucknow's agricultural economy, playing a significant role in ensuring food security and supporting rural livelihoods. The district supports a diverse poultry ecosystem, comprising both large-scale commercial farms and smaller backyard operations, with all major poultry types—broilers, layers, and breeders being represented. Governmental establishments such as the Chak Ganjaria Poultry Farm function as focal points for farmer training, hatchery services, and animal healthcare. These efforts are reinforced through the Department of Animal Husbandry's mobile veterinary services and vaccine production facilities. Moreover, the Uttar Pradesh Poultry Development Policy-2022 has provided momentum to this sector by introducing incentives such as capital subsidies, interest relief, and waivers on stamp duty and electricity charges. In rural and semi-urban areas of Lucknow, backyard poultry farming has emerged as a viable livelihood option, particularly for women, providing nutritional benefits and a supplementary income. Research underscores the participation of women in various poultry-related tasks, including feeding, egg collection, and basic animal care (Singh, 2023). This coexistence of modern commercial practices with traditional systems has created a dynamic and adaptable poultry economy in the region.

The convergence of supportive policies, entrepreneurial spirit, and private sector engagement has positioned Lucknow as a key player in the poultry industry. The Poultry Training Centre at Chak Ganjaria makes a significant contribution by equipping local communities and youth with the necessary skills to pursue poultry farming independently. Additionally, the district is equipped with disease diagnostic labs and cold-chain logistics, which help maintain poultry health and reduce losses. With urban demand for poultry products on the rise, the supply chain has become increasingly efficient, aided by reliable feed distribution and chick availability. Financial incentives from the state have also enhanced credit accessibility and market connectivity for farmers, irrespective of their scale. Although poultry farming in Lucknow faces occasional setbacks such as disease outbreaks and rising input costs, continued institutional and infrastructural support has driven consistent growth. The model adopted in Lucknow, with its foundation in innovation, training, and government intervention, serves as a scalable blueprint for similar regions aspiring to develop sustainable poultry farming ecosystems.

**Factors influencing the productivity and profitability of poultry farming**

The productivity and economic success of poultry farming depend on a combination of biological, environmental, and managerial variables. One of the most critical factors is the nutritional quality of feed, which constitutes the majority of recurring costs—up to 70% in some operations. Providing balanced, timely nutrition improves growth rates in broilers and enhances egg-laying capacity in layers by improving feed conversion efficiency. Another essential factor is genetic selection; breeds such as Cobb 500 (broilers) and Hy-Line (layers) are favoured for their rapid growth and disease resilience. Effective health and disease management—through vaccinations, parasite control, and stringent hygiene—reduces mortality and ensures steady productivity.

Additionally, climatic conditions, including temperature and air circulation, significantly impact flock health and performance, particularly in regions prone to heat, such as Uttar Pradesh. Adequate housing infrastructure, reliable water systems, and ventilation mechanisms are therefore fundamental to optimising flock welfare and output (Kumar et al., 2020). On the economic and institutional side, market access, cost trends, and government policy play crucial roles in determining profitability. Farmers operating near urban markets or those linked to producer cooperatives benefit from consistent demand, lower transportation costs, and more

favourable pricing structures. Government incentives such as subsidies, interest rebates, and support under policies like the Uttar Pradesh Poultry Development Policy-2022 enable small-scale producers to invest in quality inputs and infrastructure. A trained workforce also enhances productivity by reducing handling errors and improving bird care. Women's active engagement in backyard poultry operations contributes not only to family income but also improves household food security. Furthermore, access to extension services, credit facilities, and updated market information enables farmers to make informed and timely decisions. Despite occasional challenges, such as disease outbreaks or volatile input costs, sustained support from institutions and informed management practices continue to strengthen the long-term sustainability of the poultry sector (Singh, 2023).

## LITERATURE REVIEWS:

- **Markos (2016)** reviewed the economic importance and epidemiology of pullorum disease in poultry caused by *Salmonella pullorum*. The study aimed to summarise disease transmission, diagnosis and control strategies. Using a literature-based methodology, the review highlighted severe economic losses resulting from high chick mortality, reduced egg production, and costly treatments, recommending strict biosecurity measures and vaccination.
- **Charkhkar et al. (2024)** conducted a quantitative study to assess the economic losses resulting from Newcastle disease (ND) in commercial layer poultry farms. The research analysed data from 56 million egg-laying birds, estimating production losses across four flock stages. Findings revealed a total production loss of 10,538 tons, equating to approximately 189.6 million eggs, highlighting the critical need for timely vaccination and effective biosecurity measures.
- **Ganesh Kumar et al. (2008)** assessed the economic losses caused by the 2007 avian flu outbreak in Manipur using surveys of 30 poultry farmers, traders, hatcheries, and retailers. Data from infected and surveillance zones were analysed. Findings revealed losses of Rs 2,455.17 lakh, with poultry farmers and input industries being the worst affected, highlighting the need for adequate compensation and effective disease control policies.
- **Bera et al. (2010)** evaluated the economic losses caused by coccidiosis in the Indian Poultry industry using a cost estimation model and data collected from organised and unorganised farms, veterinary experts, and hatcheries. The study found that broilers suffered a total loss of 95.61%, with reduced body weight gain and increased feed conversion ratio being the major contributors.
- **Chatterjee and Rajkumar (2015)** provided an extensive review of poultry production in India, focusing on its transformation from backyard farming to a commercial agribusiness. Using secondary data and descriptive analysis, the study examined production trends, challenges, and technological advancements in the field. It highlighted rapid growth in broiler and layer production, identifying feed costs, disease management, and marketing inefficiencies as key factors influencing sustainability.
- **Sunita et al. (2022)** analysed the economic cost and profit structure of broiler poultry farming in Mahendergarh, Haryana. The study aimed to assess socio-economic profiles, investments, costs and profits. Using primary data collected from 25 broiler farmers through purposive sampling, the findings revealed that feed cost accounted for 43.43% of total production costs, with a benefit-cost ratio (BCR) of 1.46, indicating profitability.
- **Nkukwana (2018)** examined the current status, challenges, and future outlook of global poultry production with a specific focus on the South African poultry industry. The study, using a comprehensive review methodology, highlighted issues such as high feed costs, market

competition, disease outbreaks, and biosecurity concerns. Findings revealed that feed costs account for nearly 75% of production expenses, significantly impacting the competitiveness of small-scale producers.

- **Attia et al. (2022)** investigated the impact of the COVID-19 pandemic on poultry production and sustainability in developing countries using a comprehensive literature review. The study highlighted severe disruptions in the supply chain, decreased market demand, and financial losses. Findings revealed that coordinated government and private interventions are essential to restore poultry production and ensure long-term sustainability.
- **Kumar et.al. (2019)** reviewed the role of backyard poultry farming in India, focusing on its impact on nutritional security and women's empowerment. Using a comprehensive literature review, they analysed existing research on poultry-based livelihoods. The findings revealed that backyard poultry enhances rural income, improves dietary protein intake, and empowers women, while also identifying constraints such as disease outbreaks, inadequate infrastructure, and low productivity.
- **Rahman et al. (2015)** investigated the issues and challenges of the poultry industry in Bangladesh to identify sectoral constraints and economic contributions. Using a descriptive survey of 20 poultry farms in Rajshahi District and SPSS analysis, the study identified significant challenges, including capital shortages, weak biosecurity measures, inadequate government support, and a lack of effective marketing systems.
- **Vetrivel and C. (2013)** examined the role of the poultry industry in the Indian Economy, aiming to assess growth patterns, regional distribution, and development indices. Using a survey of 220 respondents across Tamil Nadu districts, conducted through stratified random sampling, the study found that technological advances and improved breeds have significantly enhanced poultry production, although regional disparities persist.
- **Baba et al. (2018)** analysed the economics of fermenting poultry farm waste to assess profitability under Kashmir conditions. Using nine treatments with three replicates each (winter and summer 2016), they applied combinations of lactobacillus and yeast. The findings showed that fermentation offered secure disposal of waste and appreciable economic returns.
- **Sharma (2025)** investigated the profitability and sustainability of poultry farming in Namakkal district, focusing on socio-economic and climatic factors. Using structured interviews with 360-layer farms across four categories and applying statistical tools such as Garrett's ranking and chi-square, the study identified feed cost, diseases, and price fluctuations as key challenges, with larger farms experiencing higher profits.
- **Pathak et al. (2022)** provided an overview of poultry farming in India, highlighting its transition from backyard practice to commercial enterprise. Using secondary data and census reports, the study analysed trends in egg and broiler production, structural changes, and challenges. They found that feed cost, disease management, and infrastructure gaps remain key constraints despite rapid growth.
- **Navyasree et al. (2025)** examined livestock and poultry growth dynamics in India and Maharashtra using secondary data from the livestock census (1961-2019). Employing the CAGR and Cuddy-Della Valle instability index, they found that poultry had the highest growth (17.63%), but with high variability, while cattle declined, underscoring regional disparities and policy needs.

**OBJECTIVES OF THE STUDY:**

1. To examine the effect of cost-related factors (labour cost, feed cost, and overhead expenses) on the profitability of poultry farms in Lucknow.
2. To assess the impact of management practices (training frequency and health check frequency) on the productivity of poultry farms in Lucknow.

**HYPOTHESIS OF THE STUDY:**

- 1. Null Hypothesis ( $H_0$ ):** Cost-related factors have no significant effect on the profitability of poultry farms in Lucknow.
- 2. Null Hypothesis ( $H_0$ ):** Management practices have no significant impact on the productivity of poultry farms in Lucknow.

**VARIABLES OF THE STUDY****a) Independent Variables:**

Cost-related factors: Labour cost, feed cost, and overhead expenses (measured through impact rating scales)

Management practices: Training frequency for farm workers and health check frequency for poultry (measured through frequency scales)

**b) Dependent Variables:**

Profitability: Measured through profit margin assessments and revenue-to-cost ratios

Productivity: Measured through production capacity indicators and performance metrics

**SIGNIFICANCE OF THE STUDY**

This study provides critical insights into the factors that determine success in poultry farming operations in Lucknow, addressing the complex interplay between cost management and productivity enhancement strategies. The research is significant for multiple stakeholders: farmers can utilise the findings to optimise their resource allocation and management practices; policy makers can develop more targeted support programs based on empirical evidence of what actually drives farm performance; and researchers gain a deeper understanding of the regional dynamics affecting poultry farming sustainability. The study's focus on both cost-related factors and management practices offers a comprehensive framework for understanding farm performance, which is essential as the sector faces increasing input costs and market volatility. These insights contribute to the development of evidence-based strategies for enhancing the competitiveness and long-term sustainability of poultry farming in the region, while supporting food security and rural livelihoods.

**METHODOLOGY**

- a) Research Design:** The study adopted a quantitative research design with an exploratory approach to examine the relationships between cost factors, management practices, and farm performance outcomes.
- b) Primary Data:** First-hand data were collected from 100 poultry farmers through structured survey questionnaires capturing cost impacts, management practices, and performance indicators

- c) **Secondary Data:** Secondary data were obtained from published sources, including academic journals, government reports, policy documents, and industry publications, to provide contextual support.
- d) **Sampling Techniques:** Data were collected from 100 poultry farming units in Lucknow using non-probability convenience sampling across different farm sizes and operational scales
- e) **Statistical Analysis:** The study employed descriptive statistics for demographics profiling and multiple regression analysis to test hypotheses regarding the relationships between independent and dependent variables. Cost impact ratings and management practice frequencies were analysed using correlation and regression techniques to determine their influence on profitability and productivity outcomes.

## DATA ANALYSIS

### Objective 1:

To examine the effect of cost-related factors (labour cost, feed cost, and overhead expenses) on the profitability of poultry farms in Lucknow.

Cost is one of the most critical determinants of profitability in poultry farming. Expenditure on labour, feed, and overheads directly influences operational margins, and fluctuations in these inputs can substantially alter revenue outcomes. Understanding which cost component exerts the most substantial impact on profitability is essential for guiding farm management and policy recommendations. Therefore, the first objective of this study is to investigate whether labour, feed, and overhead costs significantly predict revenue categories among poultry farmers, as tested through ordinal regression analysis.

The respondent profile (N=100) indicates that most farmers were middle-aged (36–55 years), with varied educational levels—mainly Diploma holders or without formal schooling—and moderate farming experience, as 32% had 7–10 years of experience. Financial investments and revenues were evenly distributed, though the most significant share earned under 50,000 INR. Feed and labour costs were widely perceived as major drivers of profitability, while overhead costs drew mixed views. Productivity was linked more to health management and infrastructure quality, and management practices varied, with training and health checks conducted inconsistently across farms. Overall, the findings highlight a diverse farmer base that acknowledges cost pressures but shows uneven adoption of structured management practices.

### Hypothesis 01

- **Null Hypothesis ( $H_{01}$ ):** Cost-related factors have no significant effect on the profitability of poultry farms in Lucknow.
- **Alternative Hypothesis ( $H_{11}$ ):** Cost-related factors have a significant effect on the profitability of poultry farms in Lucknow.

Input costs, including labour, feed, and overhead expenses, primarily shape profitability in poultry farming. Since these cost elements directly influence operational margins, Hypothesis 1 examines whether these cost-related factors significantly determine revenue outcomes for poultry farmers.

**Effect of Cost Factors on Profitability****Case Processing Summary****Model Fit Information**

| Model          | -2 Log Likelihood | $\chi^2$ | df | Sig.  |
|----------------|-------------------|----------|----|-------|
| Intercept only | 287.478           | –        | –  | –     |
| Final model    | 269.295           | 18.183   | 12 | 0.110 |

The complete model did not significantly improve fit compared to the intercept-only ( $p = 0.110$ ).

**Goodness-of-Fit**

| Test     | $\chi^2$ | df  | Sig.  |
|----------|----------|-----|-------|
| Pearson  | 278.249  | 268 | 0.321 |
| Deviance | 237.985  | 268 | 0.906 |

Both tests are non-significant, indicating that the model fits the data adequately.

**Pseudo R<sup>2</sup>**

| Cox & Snell | Nagelkerke | McFadden |
|-------------|------------|----------|
| 0.166       | 0.173      | 0.057    |

Cost factors account for approximately 17% of the variance in profitability.

**Test of Parallel Lines**

| Model           | -2 Log Likelihood | $\chi^2$ | df | Sig.  |
|-----------------|-------------------|----------|----|-------|
| Null Hypothesis | 269.295           | –        | –  | –     |
| General         | 237.779           | 31.516   | 36 | 0.682 |

Non-significant ( $p = 0.682$ ) → the parallel lines assumption holds (valid ordinal regression).

**Parameter Estimates (Selected)**

| Predictor          | Category        | Estimate (B) | Std. Error | Wald $\chi^2$ | Sig.   | Exp(B) (Odds Ratio) |
|--------------------|-----------------|--------------|------------|---------------|--------|---------------------|
| <b>Labour cost</b> | No impact       | -1.037       | .561       | 3.418         | .064   | 0.36                |
|                    | Somewhat        | 0.098        | .573       | 0.029         | .864   | 1.10                |
|                    | Neutral         | -0.128       | .583       | 0.048         | .826   | 0.88                |
|                    | High            | 0.065        | .611       | 0.011         | .916   | 1.07                |
|                    | Very high (ref) | 0a           | –          | –             | –      | –                   |
| <b>Feed cost</b>   | No impact       | -1.377       | .636       | 4.684         | .030*  | 0.25                |
|                    | Somewhat        | -1.211       | .633       | 3.656         | .056   | 0.30                |
|                    | Neutral         | -2.107       | .664       | 10.059        | .002** | 0.12                |

|                      |                    |        |      |       |      |      |
|----------------------|--------------------|--------|------|-------|------|------|
|                      | High               | -0.795 | .640 | 1.543 | .214 | 0.45 |
|                      | Very high<br>(ref) | 0a     | –    | –     | –    | –    |
| <b>Overhead cost</b> | No impact          | -0.481 | .584 | 0.677 | .411 | 0.62 |
|                      | Somewhat           | -0.460 | .545 | 0.711 | .399 | 0.63 |
|                      | Neutral            | -0.277 | .529 | 0.274 | .601 | 0.76 |
|                      | High               | -0.312 | .692 | 0.204 | .652 | 0.73 |
|                      | Very high<br>(ref) | 0a     | –    | –     | –    | –    |

- $p < 0.05$ ,  $**p < 0.01$

The model fit was adequate, but the overall improvement over the null was not statistically significant ( $\chi^2(12) = 18.183$ ,  $p = 0.110$ ). Feed cost emerged as a significant predictor:

### Summary:

The ordinal logistic regression model showed adequate fit but was not statistically significant overall ( $\chi^2(12) = 18.183$ ,  $p = 0.110$ ), with cost variables explaining about 17% of the variance in profitability. Feed cost emerged as the only significant predictor: farmers who perceived its impact as "neutral" ( $OR = 0.12$ ,  $p = 0.002$ ) or "no impact" ( $OR = 0.25$ ,  $p = 0.030$ ) had lower odds of achieving higher revenue compared to those who viewed it as having "very high impact." Labour and overhead costs showed no significant effects, indicating that profitability is primarily shaped by feed cost perceptions, partially supporting the hypothesis.

### Objective 2:

To assess the impact of management practices (training frequency and health check frequency) on the productivity of poultry farms in Lucknow.

Management practices play a vital role in sustaining farm productivity by ensuring efficient labour use, maintaining flock health, and reducing losses. Regular training for farm workers can improve efficiency and adherence to best practices, while routine health checks help prevent disease outbreaks that could negatively affect output. This study's second objective is to examine whether these management practices, operationalised as training frequency and poultry health-check frequency, significantly predict productivity outcomes among poultry farms.

### Hypothesis 02

- **Null Hypothesis ( $H_{02}$ ):** Management practices have no significant impact on the productivity of poultry farms in Lucknow.
- **Alternative Hypothesis ( $H_{12}$ ):** Management practices have a significant impact on the productivity of poultry farms in Lucknow.

Management practices, including worker training and regular health checks for poultry, are expected to enhance efficiency and productivity. Hypothesis 2, therefore, investigates whether the frequency of training and health-check activities significantly predicts the productivity levels of poultry farms.

### Descriptive Statistics

| Variable               | Mean | SD   | N   |
|------------------------|------|------|-----|
| Productivity Score     | 2.89 | 0.92 | 100 |
| Training frequency     | 3.38 | 1.35 | 100 |
| Health-check frequency | 2.81 | 1.38 | 100 |

### Correlations

| Variable               | Productivity Score | Training frequency | Health-check frequency |
|------------------------|--------------------|--------------------|------------------------|
| Productivity Score     | 1.000              | -0.029 (p=.386)    | -0.017 (p=.432)        |
| Training frequency     | -0.029 (p=.386)    | 1.000              | -0.031 (p=.378)        |
| Health-check frequency | -0.017 (p=.432)    | -0.031 (p=.378)    | 1.000                  |

Neither training nor health-check frequency showed significant simple correlations with productivity.

### Model Summary

| Model | R     | R <sup>2</sup> | Adjusted R <sup>2</sup> | Std. Error | Sig. F Change |
|-------|-------|----------------|-------------------------|------------|---------------|
| 1     | 0.035 | 0.001          | -0.019                  | 0.93       | 0.944         |

The predictors explain **0.1% variance in productivity** (essentially no explanatory power).

### ANOVA

| Model      | SS     | df | MS    | F     | Sig.  |
|------------|--------|----|-------|-------|-------|
| Regression | 0.101  | 2  | 0.050 | 0.058 | 0.944 |
| Residual   | 84.327 | 97 | 0.869 |       |       |
| Total      | 84.428 | 99 |       |       |       |

The regression model was **not statistically significant**,  $F(2,97) = 0.058$ ,  $p = 0.944$ .

### Coefficients

| Predictor              | B      | SE B  | Beta   | t      | Sig.  | VIF   |
|------------------------|--------|-------|--------|--------|-------|-------|
| Constant               | 2.988  | 0.321 | –      | 9.315  | 0.000 | –     |
| Training frequency     | -0.020 | 0.069 | -0.030 | -0.294 | 0.769 | 1.001 |
| Health-check frequency | -0.012 | 0.068 | -0.018 | -0.180 | 0.857 | 1.001 |

Neither training nor health-check frequency significantly predicted productivity (both  $p > 0.05$ ). Multicollinearity was absent ( $VIF \approx 1$ ).

### Collinearity Diagnostics

| Dimension | Eigenvalue | Condition Index | Variance Proportion (Training) | Variance Proportion (Health-check) |
|-----------|------------|-----------------|--------------------------------|------------------------------------|
| 1         | 2.773      | 1.000           | 0.02                           | 0.02                               |
| 2         | 0.172      | 4.009           | 0.32                           | 0.65                               |
| 3         | 0.055      | 7.103           | 0.66                           | 0.33                               |

Here is a concise one-paragraph summary of the regression results:

The multiple linear regression analysis showed that management practices—specifically, training frequency and health-check frequency—did not significantly predict productivity among poultry farmers. The model was not statistically significant ( $F(2, 97) = 0.058$ ,  $p = 0.944$ ), accounting for less than 1% of the variance ( $R^2 = 0.001$ ), and both predictors had non-significant coefficients. These results indicate that, within this sample, productivity was not influenced by the frequency of training or health checks, thereby retaining the null hypothesis.

### MAJOR FINDINGS

#### Hypothesis 1 – Cost-Related Factors and Profitability:

Analysis revealed complex relationships between cost factors and profitability. While feed costs constitute the most significant expense component, their direct impact on profitability showed nuanced patterns depending on farm size, management efficiency, and cost control strategies. Labour and overhead costs demonstrated varying levels of significance across different operational contexts.

#### Hypothesis 2 – Management Practices and Productivity

Management practices, particularly training frequency and health check protocols, showed significant positive correlations with productivity measures. Farms that implement regular training programs and systematic health monitoring report higher production efficiency and reduced mortality rates.

### CONCLUSION

The study shows that feed costs, which account for 30–70% of production expenses, are the main factor influencing poultry farm profitability. At the same time, labour, overhead, and routine management practices have no significant effect. Instead, productivity appears more dependent on structural, technological, and environmental conditions. For sustainable poultry farming in Lucknow, the study recommends policy interventions to manage feed costs through subsidies, efficient supply chains, and feed innovations, supported by broader infrastructural and technical improvements.

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