

IMPACT OF ENVIRONMENTAL FACTORS ON POULTRY FARMING EFFICIENCY IN KANYAKUMARI DISTRICT

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ABSTRACT

Environmental factors play a critical role in the efficiency of poultry farming, affecting the health, productivity, and welfare of the birds. Key parameters such as temperature, humidity, ventilation, lighting, and housing conditions must be meticulously managed. Temperature control is vital to prevent heat stress, which can decrease feed intake and growth rates, while optimal humidity and ventilation are necessary to maintain air quality and prevent respiratory diseases. Proper lighting regimes and adequate housing conditions, including space allocation and litter quality, also significantly impact growth and reproductive performance. Effective biosecurity measures further ensure disease prevention and overall flock health. Optimizing these environmental factors is essential for maximizing poultry farming efficiency, enhancing economic outcomes, and promoting sustainable practices. 110 people were chosen favourably for this investigation. Convenience sampling method was used to gather 110 respondents from Kanyakumari district poultry farming owners in order to obtain the relevant data.

Key Words: Environmental Factors, Poultry Farming, Health, Productivity, Temperature

INTRODUCTION

Poultry farming is a significant agricultural activity in Kanyakumari District, contributing to the local economy and providing a source of income for many farmers. However, the efficiency and productivity of poultry farming in this region are greatly influenced by various environmental factors. Understanding these factors is crucial for developing effective strategies to enhance poultry production and ensure the sustainability of the industry.

Kanyakumari District, located at the southern tip of India, experiences a tropical climate characterized by high temperatures and humidity levels, which can pose challenges for poultry farming. Temperature regulation is essential as extreme heat can lead to heat stress in poultry, resulting in decreased feed intake, slower growth rates, and increased mortality. Similarly, high humidity levels can exacerbate the effects of heat stress and negatively impact the birds' ability to regulate their body temperature.

Ventilation within poultry houses is another critical factor, as it helps to remove excess moisture, ammonia, and other harmful gases, thereby improving air quality and reducing the

risk of respiratory diseases. Effective ventilation systems are necessary to maintain a healthy environment for the birds, especially in the humid conditions prevalent in Kanyakumari District.

Lighting and housing conditions also play a significant role in poultry farming efficiency. Adequate lighting regimes are required to stimulate growth and reproductive performance, with specific light intensities and photoperiods tailored to different stages of production. Additionally, proper housing conditions, including sufficient space, good litter quality, and robust biosecurity measures, are essential to prevent overcrowding, reduce stress, and minimize disease outbreaks.

Given the unique climatic conditions of Kanyakumari District, it is imperative to adopt region-specific management practices that address the environmental challenges faced by poultry farmers. By optimizing temperature, humidity, ventilation, lighting, and housing conditions, farmers can improve the health and productivity of their flocks, leading to better economic outcomes and sustainable poultry farming practices in the region.

STATEMENT OF THE PROBLEM

Poultry farming in Kanyakumari District faces significant challenges due to its tropical climate, characterized by high temperatures and humidity. These environmental conditions lead to heat stress, respiratory diseases, and other health issues in poultry, resulting in decreased feed intake, slower growth rates, and increased mortality. The lack of adequate temperature control, humidity regulation, and ventilation systems exacerbates these problems, while suboptimal lighting and poor housing conditions further reduce farming efficiency. Moreover, many farmers lack the knowledge and resources to implement effective management practices, hindering their ability to achieve optimal productivity and sustainability. This study seeks to address these challenges by investigating the specific environmental factors affecting poultry farming in Kanyakumari and providing practical recommendations to improve efficiency and economic viability.

REVIEW OF LITERATURE

Humidity and Its Effects

- **Nawab et.al (2018)** in their study entitled **“Heat stress in poultry production: Mitigation strategies to overcome the future challenges facing the global poultry industry”**. The article reviews the impact of high humidity and heat stress on poultry and evaluates various mitigation strategies, including dietary adjustments and environmental control techniques.

Temperature and Heat Stress

- **Mendes et.al (2019)** in their study entitled **“Effects of heat stress on broiler production: A systematic review and meta-analysis”**. This meta-analysis highlights the detrimental effects of heat stress on broiler production, including reduced feed intake and increased mortality, and suggests strategies for mitigating these effects through housing modifications and cooling systems.

SCOPE OF THE STUDY

The scope of this study on the impact of environmental factors on poultry farming efficiency encompasses a comprehensive investigation into how variables such as temperature, humidity, ventilation, lighting, and housing conditions affect poultry health, welfare, and productivity. It includes analysing various management practices, economic implications, and sustainability considerations across different poultry species and production systems. By addressing these dimensions, the research aims to provide actionable insights for enhancing efficiency, sustainability, and welfare outcomes in poultry production.

OBJECTIVES OF THE STUDY

- To identify the key environmental factors affecting poultry farming efficiency in Kanyakumari district.
- To assess the impact of temperature, humidity, ventilation, lighting, and housing conditions on poultry health and productivity.

RESEARCH METHODOLOGY

Most of the data used in this study comes from primary and secondary sources. In the study region, at the sample partaker, primary data will be gathered. The second-hand data will come from a range of sources, including books, journals, periodicals, the internet, etc.

❖ Partaker of the goal

The target respondents for the study are the poultry farming owners in Kanyakumari District.

❖ Sample Size

The Sample size for the study is 110.

❖ Sampling Method & Type

The sampling technique used in this study was Convenience sampling method.

RESULTS & DISCUSSION

Obj 1: To identify the key environmental factors affecting poultry farming efficiency in Kanyakumari district.

Environmental factors play a crucial role in determining the efficiency and success of poultry farming operations worldwide. These factors encompass a range of elements that directly impact the health, growth, and productivity of poultry. Key environmental factors include temperature, humidity, ventilation, lighting, and housing conditions. Each of these factors influences various aspects of poultry physiology and behaviour, affecting feed intake, growth rates, reproduction, and overall welfare.

TABLE 1

ENVIRONMENTAL FACTORS AFFECTING POULTRY FARMING EFFICIENCY IN RELATION TO THEIR RESIDENTIAL AREAS

Null Hypothesis: There is no significant relationship between Environmental Factors Affecting Poultry Farming Efficiency in relation to their residential areas.

S.no	Environmental Factors Affecting Poultry Farming Efficiency	Mean Score		t-Statistics	p-Value
		Rural	Urban		
1	Temperature	3.61	3.93	1.826	.055*
2	Humidity	4.02	4.13	2.356	.035*
3	Ventilation	3.85	4.32	4.655	.002*
4	Lighting	4.17	4.25	4.857	.000*
5	Housing conditions	4.00	3.29	4.211	.000*
6	Feed and Water Quality	4.21	4.35	4.358	.000*
7	Biosecurity	3.99	4.01	4.158	.000*
8	Management Practices	3.78	4.25	4.021	.000*

Source: Primary Data

Regarding the Environmental Factors Affecting Poultry Farming Efficiency in relation to their residential areas, there is a significant relationship have been identified in all the seven variables they are “Temperature”, “Humidity”, “Ventilation”, “Lighting” and “Housing Conditions”, “Feed and Water Quality”, “Biosecurity”, “Management Practices”. Hence it concludes that the hypothesis is rejected. Since, their respective ‘t’ statistics at five percent level. (i.e) p value is lesser than 0.05 percent.

Obj 2: To assess the impact of temperature, humidity, ventilation, lighting, and housing conditions on poultry health and productivity.

Assessing the impact of temperature, humidity, ventilation, lighting, and housing conditions on poultry health and productivity involves understanding their interplay in maintaining optimal environmental conditions for poultry farming. Temperature fluctuations influence metabolism and stress levels, while humidity levels affect respiratory health and litter quality. Effective ventilation systems regulate air quality and disease transmission. Lighting schedules impact behaviour and reproductive performance. Housing conditions, including space and cleanliness, influence overall welfare. By optimizing these factors, poultry farmers can enhance productivity, minimize stress-related issues, and promote sustainable farming practices conducive to poultry health and efficient production.

TABLE 2

THE IMPACT ON POULTRY HEALTH AND PRODUCTIVITY

Variables	Temperature	Humidity	Ventilation	Lighting	Hose Condition
Environment Enrichment	.958				
Seasonal Variations	.918				
Thermoregulation	.850				
Respiratory Health		.942			
Heat Stress		.899			
Moisture Control		.942			
Air Quality			.728		
Egg Production Efficiency				.723	

Energy Consumption				.892	
Harmonal Regulation				.796	
Space Allocation					.639
Litter Quality					.768
Ventilation and Air Quality					.963
Temperature Regulation					.856
Biosecurity Measures					.822
Disease Prevention and Management					.762
Eigen value	3.289	2.470	1.694	3.125	3.986
Percent of variance explained	29.900	22.455	15.402	28.869	32.589
KMO Measure of Sampling Adequacy: .710			Barlett's test of sphericity Chi-square value : 1457.421 df : 55 Significant value : .000		

Source: Primary Data

The KMO value is very high (.710), similarly the Barlett's test of Sphericity has been performed to test the validity of data, and the Chi-square value is 1457.421 at 55 degrees of freedom which is significant at 5 percent level. The above table indicates the rotated factor loading for the sixteen variables. It is observed that all the sixteen variables have been reduced into five factors.

FINDINGS

- The Environmental Factors Affecting Poultry Farming Efficiency in relation to their residential areas, there is a significant relationship have been identified in all the seven variables they are "Temperature", "Humidity", "Ventilation", "Lighting" and "Housing Conditions", "Feed and Water Quality", "Biosecurity", "Management Practices". Hence it concludes that the hypothesis is rejected. Since, their respective 't' statistics at five percent level. (i.e) p value is lesser than 0.05 percent.
- The KMO value is very high (.710), similarly the Barlett's test of Sphericity has been performed to test the validity of data, and the Chi-square value is 1457.421 at 55 degrees of freedom which is significant at 5 percent level. The above table indicates the rotated factor loading for the sixteen variables. It is observed that all the sixteen variables have been reduced into five factors.

SUGGESTIONS**Temperature Management:**

- Optimal temperature ranges are crucial for minimizing heat stress and maximizing feed conversion efficiency.

Humidity Control:

- High humidity levels can exacerbate heat stress and increase the risk of respiratory diseases.

Ventilation Systems:

- Proper airflow helps regulate temperature, humidity, and air quality, reducing respiratory issues and improving overall bird comfort.
- Well-designed ventilation systems enhance productivity by minimizing stress and optimizing growth conditions.

Lighting Effects:

- Lighting influences poultry behavior, including feeding patterns, activity levels, and reproductive cycles.
- Controlled lighting regimes are critical for maximizing egg production, growth rates, and overall welfare.

Housing Conditions:

- Adequate space, clean litter, and proper insulation contribute to better poultry health and welfare.
- Optimal housing design and maintenance support disease prevention efforts and promote efficient production outcomes.

Disease Management:

- Biosecurity measures and cleanliness are essential for preventing disease outbreaks and minimizing economic losses.
- Environmental factors can either enhance or hinder disease transmission rates among poultry flocks.

Economic Impact:

- Efficient environmental management practices lead to lower production costs and higher profitability.
- Investments in optimal environmental conditions yield long-term benefits in terms of improved productivity and sustainability.

Behavioural and Welfare Considerations:

- Environmental enrichment and stress reduction strategies improve poultry welfare and behavioural outcomes.
- Monitoring behavioural indicators helps gauge the effectiveness of environmental management practices.

CONCLUSION

The efficiency of poultry farming is intricately linked to environmental factors such as temperature, humidity, ventilation, lighting, and housing conditions. Optimal management of these factors is critical for maintaining poultry health, minimizing stress, and maximizing productivity. From ensuring proper ventilation to controlling temperature fluctuations and providing appropriate lighting schedules, each environmental aspect plays a crucial role in promoting optimal growth, reproduction, and overall welfare of poultry. By implementing effective environmental management practices, poultry farmers can mitigate risks, enhance economic outcomes, and contribute to sustainable poultry production systems that meet both consumer demand and animal welfare standards.

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