Effects of Biosecurity Strategies on Technical Efficiency of Egg Production in Bono Region, Ghana

Desmond Ayertey, Freda Asem, Charles Yaw Okyere, Dolapo Enahoro

Introduction

- Poultry industry growth in Ghana is hampered by production challenges including spread of viral diseases.

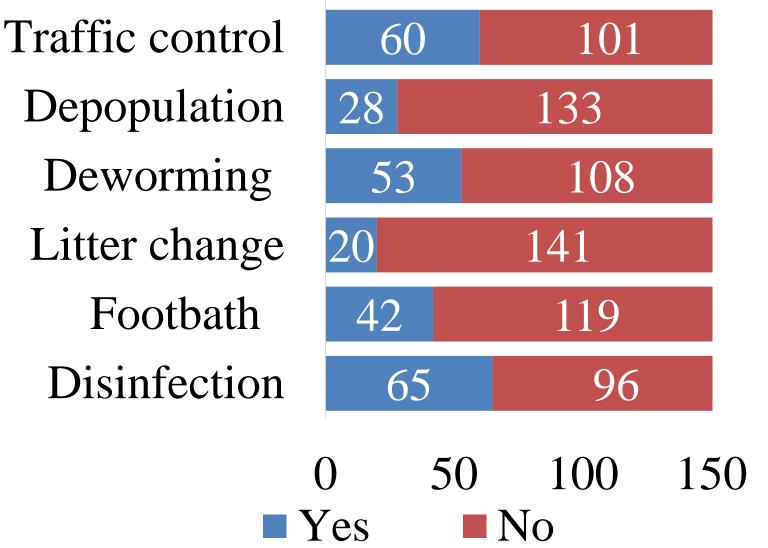- Lax adherence to biosecurity practices may be leading to disease outbreaks and low efficiency of production.

Objectives

- This study identified and ranked viral diseases affecting farms, the biosecurity measures practiced, and their effects on technical efficiency of egg production.

- Study was conducted in Dormaa East and Dormaa Central districts in the Bono Region of Ghana.

Methods

- A total of 161 owners/managers of layer-chicken farms with 500 to 10,000 birds were interviewed using multiple stage sampling technique.

- The Stochastic Frontier Model was applied using the Cobb-Douglas functional form to estimate the technical efficiency (TE) levels and factors affecting the TE.

- Descriptive statistics and Kendall's coefficient of concordance were used, respectively, in identifying the biosecurity practices and ranking the viral diseases.

Results

Table 1: Ranking of the Viral Diseases

Viral Diseases	Mean Rank	Ranking
Infectious Bronchitis	1.53	1st
IBV (Gumboro)	2.55	2nd
New Castle	3.28	3rd
Fowl pox	3.49	4th
Avian Influenza	4.17	5th
Marek Disease	5.97	6th
N		161
Kendall's W[a]		.653
Chi-Square		525.535
df		5
Asymp. Sig.		.000

Figure 1: Numbers of farmers practicing biosecurity measure

Table 2 : Stochastic Frontier Model

Quantity of eggs (crates)	Coefficient	p-value
Total feed consumed	0.294 ***	0.000
Total vaccination	0.345**	0.035
Total water consumed	-0.057***	0.002
Dewormers and other drugs	0.217***	0.000
Labour	0.012	0.342
Constant	0.078***	0.000

Table 3: Technical Efficiency Levels

TE Level (%)	Frequency	Percentage (%)
50-60	1	0.62
61-70	2	1.24
71-80	8	4.97
81-90	31	19.25
91 and above	119	73.91
Mean TE = 92.40%		

Table 4: Factors affecting Technical Efficiency Levels

Variable	Coefficient
District of farmer	-0.621
Age of farmer	-0.0003
Gender of farmer	-0.543
Traffic control	-0.342
Footbath	0.209
Depopulation	-0.684
Litter change	-2.436
Deworming	-1.319
Disinfection	-2.602**
In-house cleaning	1.409
Other birds	1.700**
Protective clothing	-0.518
Constant	-3.987**

Pseudo R-sq	0.218	Obs	161
Chi-sq	46.292	Prob > chi2	0.000

Highlights of Results

- All farms surveyed had experienced at least one outbreak of a viral poultry disease.

- Most of the farmers wore some form of protective clothing on the farm.

- Farmers rearing other birds (e.g., turkeys, ducks) had a significant negative association with technical efficiency of egg production in Dormaa East and Dormaa Central.

- Regular disinfection improved the technical efficiency of egg layer production.

Recommendation

- Findings suggest that farmer education on biosecurity, currently provided by the Veterinary Services and Animal Health departments, should be done more routinely.

- To reduce risks of viral poultry disease outbreaks, research could further explore the challenges and incentives of farmers regarding the adoption of strict biosecurity practices.

Acknowledgement

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