

Mathematical Modelling of Poultry Milling Plan for Profit Optimisation

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Introduction:

The sustainability of the poultry business depends largely on the cost of feeding at optimum nutrient requirements. Efficient utilization of limited resources is crucial in the poultry feed industry, where milling production and optimal ingredient allocation directly influence profitability. Traditional feed formulation methods often rely on intuition and heuristic approaches, leading to inefficiencies and suboptimal profit margins. As such, this study employs linear programming (LP) to model and optimize poultry feed production, to ensure optimum profit while effectively managing raw material constraints.

Materials and methods:

A mathematical model (linear programming model) was formulated to optimize the production mix of a poultry feed mill. The study focuses on five primary feed types: Chick Mash, Grower Mash, Layer Mash, Broiler Starter Mash, and Broiler Finisher Mash. Data on ingredient costs, availability, and nutritional composition were obtained from company records and incorporated into a linear programming framework. The objective function seeks to maximize profit, subject to constraints related to ingredient availability, production capacity, and nutritional balance. TORA package was used to solve the model and determine the optimal production strategy.

Results and discussion

The results indicate that the company can significantly increase profitability by streamlining its product mix. The optimal solution suggests concentrating on Chick Mash, Grower Mash and Broiler Starter Mash. Implementing this strategy leads to an 80% increase in daily profit, amounting to ₦86409.18. The study highlights that linear programming enhances decision-making by eliminating inefficiencies and identifying the most profitable production strategy.

Conclusion

This study demonstrates that linear programming is a powerful tool for optimizing poultry feed production. By shifting from heuristic-based decisions to mathematical modelling. The approach presented in this study serves as a blueprint for other manufacturing sectors seeking to enhance efficiency and profitability through quantitative optimisation methods.

Keywords: Linear programming, Optimisation, Poultry feed, Milling.