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Cost Control and Benefit Evaluation of Poultry Breeding Technology: Exploring New Financial Integration Models in the Global Livestock Industry

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ABSTRACT

While the global livestock industry meets population demands, it also faces challenges such as high costs and inefficient resource utilization. Poultry breeding technology, as a critical part of the livestock sector, plays a key role in optimizing resource allocation and reducing production costs. This paper explores cost control strategies and benefit evaluation methods for poultry breeding technology, aiming to integrate technology with financial management to maximize economic, social, and environmental benefits. The study finds that measures such as feed formula optimization, investment in automated facilities, and precision breeding technologies can effectively reduce breeding costs while improving economic efficiency and environmental sustainability. The introduction of new financial integration models, such as data-driven cost monitoring and innovative financial support, further enhances the global competitiveness of the poultry breeding industry. This study provides practical references for the sustainable development of the livestock industry.

KEYWORDS

Poultry Breeding Technology; Cost Control; Benefit Evaluation; Livestock Industry; Promotion of Xianghuang Chicken; Global Model1. Cost Control Stra

1 Cost Control Strategies of Poultry Breeding Technology

1.1 Feed Cost Optimization

Feed costs account for the majority of total production costs in poultry breeding, making feed formula optimization a priority for cost control. Precision feed formulation technology is one of the most widely applied solutions. By considering the nutritional needs, health conditions, and breeding goals of chickens at different growth stages, this technology tailors nutrition plans for each stage, reducing unnecessary feed waste. For example, a livestock enterprise used scientific algorithms and big data analysis to lower the excess proportion of protein and energy by 15%, significantly reducing feed waste and production costs. Within a year, the enterprise saved over 1 million yuan through feed cost optimization, highlighting the economic value of scientific feed management[1]. Many livestock enterprises also use by-products from brewing, plant waste, and other secondary materials to partially replace expensive traditional feed ingredients. This approach not only significantly reduces production costs but also aligns with environmental requirements for green farming. For instance, by using brewing by-products to replace part of the protein ingredients, one enterprise successfully lowered feed costs by 12%. This optimization strategy not only provides direct economic benefits but also improves resource utilization efficiency, offering a reference model for global sustainable farming.

1.2 Management of Investment and Maintenance Costs in Breeding Facilities

The modernization of breeding facilities is a key guarantee for improving the efficiency of poultry breeding technology. The introduction of intelligent equipment can effectively reduce labor costs while improving the precision and automation of production processes. For example, intelligent temperature control systems monitor changes in temperature and humidity in real time and automatically adjust the environmental conditions in poultry houses. This ensures optimal growth environments for chickens, reducing disease risks caused by temperature fluctuations and minimizing production losses. The application of automatic feed delivery systems and environmental monitoring equipment further enhances breeding efficiency. Although these automated systems require significant initial investment, a detailed return-on-investment analysis showed that the long-term benefits far exceeded the initial costs, with the enterprise achieving full payback within three years. The reduction in maintenance costs and improved operational efficiency also alleviate the operational burden, enabling the expansion of production scales[2].

1.3 Optimization of Labor Costs

The traditional livestock industry relies heavily on manual labor, leading to rising costs and inefficient labor allocation. With the implementation of scientific planning and technological tools, labor cost optimization has become feasible. For

example, a livestock enterprise implemented a digital management platform, reducing the workforce needed for production monitoring and record-keeping from 10 to 2 people, while reallocating the remaining personnel to more efficient roles.

The use of video monitoring and sensor networks significantly reduces the need for manual supervision. These intelligent management tools not only improve the transparency of production processes but also minimize issues caused by human error. At the same time, employee safety and satisfaction are enhanced, enabling enterprises to attract and retain more professional technical personnel. This technology-centered labor optimization strategy not only achieves cost control goals but also lays a solid foundation for the long-term development of livestock enterprises.

1.4 Balancing Technological Investment and Benefits

Technological investment is at the core of breakthroughs in poultry breeding technology, but high initial costs must be balanced with long-term benefits. Precision breeding technology, through gene screening and health management, significantly reduces breeding failure rates. For example, an enterprise adopting gene screening technology increased breeding success rates to over 95%. Although the initial investment was substantial, the company achieved payback within three years and subsequently realized stable profitability[3].

Using cost-benefit analysis models, enterprises can intuitively evaluate the actual value of technological investments and prioritize high-cost-effective technologies based on resource availability. This analysis method helps avoid blind investments while maximizing the economic benefits brought by technology. The strategy of balancing technological investment and benefits not only enhances enterprise competitiveness but also enables sustainable development under limited resources. This approach provides important practical experience for the global livestock industry, demonstrating that scientific technological investment is key to cost control.

2 Benefit Evaluation of Poultry Breeding Technology

2.1 Economic Benefit Evaluation

The economic benefits of poultry breeding technology are reflected in the optimization of costs and profits as well as the improvement of capital turnover efficiency. For instance, through feed formula optimization and the adoption of modern facilities, one enterprise improved its cost-to-profit ratio from 1:1.2 to 1:1.5. This change indicates a significant increase in profits per unit cost, providing direct economic returns for the enterprise.

Capital turnover efficiency is another important indicator of economic benefits. Efficient breeding technology shortens breeding and growth cycles, accelerating cash flow turnover. For example, after adopting precision breeding technology, a poultry farm reduced the breeding cycle by 10%, resulting in a 12% increase in annual sales volume. These achievements optimize the cash flow structure of enterprises and enhance the efficiency of capital utilization, providing a stable economic foundation for long-term development.

2.2 Social Benefit Evaluation

The social benefits of poultry breeding technology are evident in its contributions to food security and rural economic development. High-efficiency breeding technologies reduce feed consumption and improve production efficiency, supporting the rational allocation of food resources. This impact is particularly significant in regions with food shortages. For example, after the adoption of poultry breeding technology in a developing country, feed waste was reduced by 20%, effectively alleviating food resource pressure[4].

Additionally, the promotion of this technology plays a key role in improving rural economies and employment conditions. The establishment of large-scale farms not only provides employment opportunities for farmers but also drives the development of related industries. For instance, the promotion of poultry breeding technology in one region created over 500 new jobs, while logistics and feed processing industries also benefited from increased demand. These comprehensive benefits make poultry breeding technology a crucial driver of rural economic revitalization.

2.3 Environmental Benefit Evaluation

The environmental benefits of poultry breeding technology are mainly reflected in improved resource utilization efficiency and the promotion of green farming models. Improved resource utilization plays a critical role in alleviating ecological pressures. For instance, the implementation of precision feeding technology reduced feed consumption per unit output by 18% and water usage by 25% at a poultry farm. These changes not only reduce breeding costs but also decrease reliance on limited natural resources, delivering significant ecological value.

Furthermore, environmentally friendly breeding technologies achieve green farming goals by reducing waste emissions and energy consumption. For example, one enterprise adopted circular economy principles, converting chicken manure into organic fertilizer for agricultural production, saving 500,000 yuan annually in processing costs while reducing environmental pollution. These practices demonstrate that modern poultry breeding technology not only creates economic value for enterprises but also advances sustainable development principles, highlighting the importance of environmental protection.

3 Exploration of New Financial Integration Models in the Global Livestock Industry

3.1 Synergistic Development of Financial Integration and Breeding Technology

Zhengda Poultry Breeding (Beijing) Co., Ltd. has completed a Series A financing round of 500 million yuan. The funds raised will primarily be used for brand building and marketing, research and development investments, and the construction of an upstream and downstream industrial chain ecosystem. In the process of integrating technology and management within the global livestock industry, the synergy between financial management models and breeding technologies is critical for achieving sustainable development. By optimizing fund allocation and cost accounting, financial management provides strong support for technological innovation. For instance, a multinational livestock enterprise adopted a comprehensive budgeting management model combined with digital monitoring tools to focus resources on developing and promoting efficient breeding technologies, significantly reducing operational costs. This synergistic……"

3.2 Data-Driven Cost Monitoring and Financial Analysis

The application of data technologies provides livestock enterprises with new perspectives on cost control and financial analysis. By establishing data platforms, enterprises can monitor production costs in real-time and adjust resource allocation promptly. For example, a large-scale livestock farm used big data analytics to dynamically analyze feed costs and production efficiency, identifying that feed waste primarily occurred during the middle-to-late growth stages of chickens. By adjusting formulas and feeding frequencies, the farm improved feed utilization efficiency by 15%.

Data analysis also provides more detailed insights for financial decision-making, such as cost-profit analysis and input-output ratio calculations. This enables enterprises to distribute resources more scientifically and rationally. Such data-driven management not only improves the efficiency of financial operations but also provides sustainable technological support for enterprise development.

3.3 Introduction and Promotion of Innovative Financial Models

Innovative financial tools and services have provided critical funding support for the development of poultry breeding technologies. The introduction of agricultural loans and insurance products has offered safeguards for farming enterprises to address market risks and funding shortages. For instance, a specialized breeding loan introduced by a certain agricultural bank provides low-interest financial support to enterprises for the procurement of automated equipment and precision breeding technologies. This has effectively addressed the challenge faced by small and medium-sized farms in adopting new technologies due to financial constraints. Meanwhile, the widespread adoption of agricultural insurance has helped enterprises mitigate economic losses caused by uncontrollable factors such as diseases and natural disasters. For example, in Hunan Province, where the local specialty Xianghuang chicken is bred, financial support has facilitated the adoption of automated precision feeding equipment. This not only improved production efficiency but also reduced overall costs. A Xianghuang chicken farming enterprise, with the support of a specialized loan, achieved a 10% improvement in feed conversion efficiency and a 15% increase in annual net profit. Such cases, which integrate financial tools with technological applications, demonstrate the significant impact of innovative financial models in addressing real-world challenges and provide strong support for the development of the poultry breeding industry.

3.4 Learning from International Experience and Localized Practices

Different regions worldwide have accumulated extensive experience in poultry breeding technologies and cost management, offering valuable references for exploring financial integration models. Developed countries widely employ cost-sharing and risk management models in farming operations, effectively improving the efficiency of capital utilization. In contrast, developing countries emphasize flexible management models that combine local resources and market demands, making technological applications more adaptive. Taking Xianghuang chicken as an example, Hunan Province has drawn on advanced refined management concepts from Europe while leveraging local resource advantages

and labor-intensive characteristics. By introducing a dual model of digital monitoring and manual collaborative management, it has achieved a balance between cost and efficiency. This model has not only increased the production of Xianghuang chickens but also significantly reduced production costs, saving an average of 20% annually and increasing annual output to over 11 million birds, with an industrial output value of 700 million yuan.

These achievements highlight the economic benefits resulting from the deep integration of localized breeding technologies and modern financial management models. The combination of international experience and localized practices offers valuable insights for the global farming industry, enabling different regions to develop tailored financial integration models suited to their unique conditions. This promotes

the sustainable development of both technology and management practices.

4 Conclusion

The innovation in poultry breeding technology and the deep integration of financial management models provide feasible pathways for cost control and efficiency improvement in the global livestock industry. Through precision technologies, digitalized management, and scientific resource allocation, livestock enterprises can achieve green and efficient development goals amidst fierce market competition. Additionally, the combination of global experience with localized practices enriches industry solutions, offering robust support for addressing challenges related to food security, environmental protection, and economic growth. The Xianghuang chicken originates from Hengyang City in Hunan Province, China, and its innovative products, combining industry and finance integration models, are exported to markets in Hong Kong, Japan, and Europe and the United States. In the future, the livestock industry will continue advancing toward more intelligent and ecological development, driven by technology and management.

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