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Animal Husbandry and Dairy Farming: Improving Animal Health, Production and Farmers' Income

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INTRODUCTION

As a core component of the agricultural sector, the animal husbandry and dairy industries provide food, employment, stable incomes, and essential nutritional security for millions of people worldwide. Animal husbandry covers all operational links across its full workflow, including scientific breeding, feeding, and farming management, while the dairy industry is a specialized sub-sector focused exclusively on producing high-quality raw milk and dairy products.

India's livestock industry has been embedded in rural life for hundreds of years. It hosts one of the world's largest livestock populations, ranks as the world's top milk producer, contributes a significant share to India's agricultural Gross Value Added (GVA), and sustains the livelihoods of tens of millions of smallholder farmers. Unlike seasonal crop farming, which faces drastic income fluctuations, the dairy industry delivers a stable year-round cash flow. At present, modern animal husbandry is undergoing upgrading by integrating scientific principles and advanced technologies. Through measures such as promoting improved breeds and rolling out balanced feeding practices, the sector is building profitable agricultural enterprises to meet growing market demand.

1.2 Importance of Animal Husbandry and Dairy Farming

This paper argues that animal husbandry carries multiple core values, and is far from merely a single category of agricultural production. At the macro level, it supplies essential agricultural products including milk, meat and eggs, which are rich in high-quality protein, vitamins and minerals. Among its sub-sectors, the dairy industry's milk is suitable for all age

groups; its high nutritional attributes support food security, and consolidate the sector's fundamental economic and public values. From an ecological perspective, animal husbandry provides organic fertilizer for crop farming to improve soil conditions. It can also absorb and process crop straw and agricultural by-products, converting these materials into high-value livestock products, to build an integrated crop-livestock system that achieves the sustainable goal of reducing waste and raising efficiency. From the livelihood and gender perspective, animal husbandry serves as a core financial asset for rural households. Income from dairy products can cover daily expenses, education costs, medical fees and agricultural investments. Women's participation in the full process of the dairy industry advances women's empowerment and economic independence.

1.3 Scope of Dairy Farming

Against the backdrop of surging demand for milk and various high value-added dairy products, the scale of dairy farming has expanded substantially. Beyond selling raw milk, dairy farmers can earn additional income by producing items including butter, ghee, paneer, curd, cheese, yogurt, ice cream, and flavored milk. Technological advancements in areas such as breeding, milking, and cold storage have made commercial dairy farming highly attractive. Cooperatives, private processing enterprises, and formal markets provide stable sales outlets, while cold chain and processing technologies have consolidated the foundation of the dairy sector. Furthermore, the industry can work in tandem with related fields including feed production, veterinary pharmaceuticals, and farming equipment to create employment across the entire value chain.

1.4 Objectives of Scientific Animal Husbandry

The authors of this paper sort out the tiered objectives and on-site implementation pathways for scientific livestock and poultry farming: The core layer prioritizes boosting enterprises' productivity and profitability, while concurrently safeguarding animal health and welfare, with this goal realized through five measures including the selective breeding of improved varieties; the operational layer takes cost reduction as its core target, achieved through actions such as raising feed conversion rates; the long-term layer works to maintain the continuity of the production system and enforce environmental protection requirements. This system ultimately outputs safe, high-quality livestock products that meet both domestic and international standards.

1.5 Role in Rural Development

Livestock farming and dairy farming are core pillars of rural development. They create jobs for farmers, laborers, transporters, processors, veterinarians, and entrepreneurs. Their stable year-round revenue can offset the seasonal risks associated with crop cultivation. This sector's low land requirements make it well-suited for small, marginalized smallholder farmers: in disaster years, these farmers can sell their livestock to raise emergency funds. The sector relies on four types of market entities to build out a full industrial chain, which drives rural entrepreneurship.

1.6 Scientific Management Practices

Modern dairy cow farming relies on scientific management of every step of livestock production. The scientific management framework built in this paper focuses on these core requirements, and lays out five core modules in sequence: First, scientific breeding, which uses technologies such as breeding

selection and artificial insemination to cultivate high-yield, disease-resistant fine breeds; second, balanced feeding, which supplies all nutrients needed for cattle growth and milk production; third, suitable housing that protects cattle from climate-induced stress; fourth, preventive health care that reduces disease incidence; fifth, regular recording and monitoring of core data, which supports farmers to adjust their management decisions in a timely manner, and improves overall farm operational efficiency.

1.7 Challenges in Animal Husbandry and Dairy Farming

The authors of this paper organize and note that while the livestock industry has made substantial progress, it still confronts a range of development challenges. Its core challenges include rising feed prices that push up production costs, climate change that drags down animal output capacity, and frequent outbreaks of four types of animal diseases that cause major losses. Additional weaknesses, such as insufficient veterinary infrastructure in remote regions, must be addressed through investment in four key areas including scientific research and farmer training.

1.8 Emerging Technologies in Dairy Farming

Recent technological innovations have transformed traditional dairy cattle farming into a highly efficient, data-driven industry. Physical farming hardware such as automatic milking systems, wearable sensors, and precision feeding systems can accurately monitor livestock production performance. Digital intelligent technologies including artificial intelligence and the Internet of Things can identify diseases and evaluate milk yield in real time, while also providing multiple types of supporting services to optimize farm decision-making. Biotechnologies such as genomic

selection can accelerate genetic improvement and enhance overall reproductive efficiency.

1.9 Sustainable Dairy Farming

Sustainability is a core, essential requirement for modern dairy farming. Sustainable dairy production must meet the unified triple goal of boosting production capacity, reducing environmental impact, and safeguarding animal welfare. To implement this goal, progress can be driven through three clearly categorized sets of practical measures, which cover all key links including manure management, climate-smart technologies, and compliant veterinary drug use, and build a clear conceptual framework for sustainable development for the entire industry.

CONCLUSION

Livestock farming, particularly dairy farming, is a core pillar underpinning sustainable agriculture and rural prosperity. Implementing the five practical, actionable measures for science-based farming can help the large community of livestock farmers improve animal health, production efficiency, and profitability. Dairy farming carries diverse socioeconomic values, and four categories of technology and management priorities will shape the future of the dairy sector. Against the current backdrop of rising demand for high-quality dairy products, science-based livestock farming is a core driver that safeguards food security, stimulates agricultural growth, and advances inclusive rural development. Only through sustained investment in four key areas can we support the robust growth of the industry, while reconciling national economic progress and long-term environmental sustainability.