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Editorial

Veterinary Science and Animal Nutrition in Africa: Scientific Innovation, Systems Transformation and Policy Integration for Sustainable Livestock Development

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Veterinary science and animal nutrition are increasingly recognised as strategic pillars of sustainable agricultural development, food security, public health and economic resilience in Africa. In Nigeria, livestock production contributes substantially to rural livelihoods, national gross domestic product and dietary protein supply, yet productivity remains below global benchmarks due to systemic constraints in animal health management, feed systems, infrastructure and policy implementation.

This editorial synthesises emerging scientific evidence and policy imperatives shaping veterinary and animal nutrition research in Africa, with a particular focus on Nigeria. It highlights critical research frontiers, structural gaps and transformative pathways required to reposition the livestock sector within a sustainable development framework.

Animal Health, Disease Dynamics and the One Health Imperative

Africa continues to bear a disproportionate burden of infectious and transboundary animal diseases, including African swine fever, peste des petits ruminants, Newcastle disease, contagious bovine pleuropneumonia and highly pathogenic avian influenza. In Nigeria, recurrent outbreaks of these diseases reflect weaknesses in surveillance systems, diagnostic capacity and biosecurity practices, particularly within smallholder and peri-urban production systems.

The One Health paradigm has become indispensable in addressing the complex interface between animal, human and environmental health. Zoonotic pathogens account for a significant proportion of emerging infectious diseases, necessitating integrated surveillance, molecular epidemiology and risk-based disease control strategies (FAO, WHO & WOA, 2022). Advances in genomics, metagenomics and digital epidemiology offer opportunities to enhance pathogen detection and epidemiological modelling in African livestock systems. However, their adoption is constrained by limited research infrastructure, fragmented data systems and inadequate funding.

Strengthening national and regional veterinary research networks, coupled with investment in diagnostic laboratories and data platforms, is therefore critical for improving disease preparedness and response.

Antimicrobial Resistance and Sustainable Therapeutic Strategies

Antimicrobial resistance (AMR) represents a growing threat to animal and public health in Nigeria and across Africa. Empirical studies reveal extensive misuse of antimicrobials in livestock production, driven by weak regulatory enforcement, limited veterinary supervision and the widespread practice of prophylactic medication (WOAH, 2021). The persistence of antimicrobial residues in animal products further underscores the urgency of regulatory reform.

In response, research into alternatives to antibiotic growth promoters has intensified. Phytogenic additives, probiotics, enzymes, organic acids and insect-derived proteins have demonstrated measurable improvements in growth performance, gut health and immune function in poultry and ruminant systems. Nigerian studies on phytogenic feed additives and fermented agro-industrial by-products illustrate the potential of locally adapted innovations to enhance productivity while reducing dependence on antimicrobials. Nevertheless, questions regarding scalability, cost-effectiveness and regulatory approval remain unresolved.

Effective AMR mitigation requires integrated policy frameworks that align veterinary regulation, farmer education and national livestock development strategies. Embedding AMR governance within agricultural and public health policies is essential for long-term sustainability.

Feed Systems, Nutrition Innovation and Climate-Smart Livestock Production

Feed availability and quality remain the most decisive determinants of livestock productivity in Nigeria and much of Africa. Feed costs account for up to 60–70% of total production expenses, while seasonal variability in forage availability constrains ruminant performance (FAO, 2020). Consequently, animal nutrition research has increasingly focused on optimising local feed resources and improving nutrient utilisation.

Key research directions include the utilisation of agro-industrial by-products such as cassava peels, palm oil sludge, rice bran and brewery waste; the development of fermented and biologically treated feed materials; the exploration of novel protein sources including black soldier fly larvae; and the application of precision nutrition and modelling tools to optimise feed conversion efficiency.

Empirical evidence from Nigeria demonstrates that locally sourced feed resources and functional additives can significantly improve growth performance, carcass characteristics and nutrient digestibility in poultry and ruminants. However, the translation of experimental findings into commercial practice remains limited by weak extension systems, fragmented industry–academia collaboration and inadequate private sector investment.

Climate change further amplifies feed and health challenges through its effects on pasture productivity, water availability and disease ecology. Climate-smart feeding strategies, such as methane-reducing diets, improved forage management and enhanced feed efficiency, are therefore integral to sustainable livestock intensification in Nigeria and across Africa.

Research Integration and Evidence-Based Policy

Despite increasing research output in African veterinary and animal nutrition sciences, persistent gaps exist in research integration, methodological rigour and policy uptake. Many studies remain descriptive, with limited emphasis on systems-level analysis, economic modelling and long-term environmental impact. Addressing these limitations requires multidisciplinary research frameworks that integrate animal health, nutrition, economics and environmental science.

Priority areas include longitudinal studies linking nutrition, health and productivity; data-driven policy models tailored to African livestock systems; and robust metrics for evaluating socio-economic and environmental outcomes. In Nigeria, aligning livestock research with national agricultural, industrial and climate policies could significantly enhance food security, economic diversification and rural development.

Mission-oriented research funding, supported by coherent national strategies, is essential for translating scientific innovation into tangible development outcomes.

Scientific Publishing and Editorial Responsibility

Scientific journals play a critical role in shaping research agendas, methodological standards and policy discourse. The NL Journal of Veterinary and Animal Nutrition provides a strategic platform for disseminating rigorous, context-sensitive and globally relevant research. Editorial leadership must extend beyond publication to fostering innovation, promoting translational research and strengthening the interface between science and policy.

High-impact scientific publishing in Africa should prioritise methodological robustness, comparative regional analyses, open science practices and the amplification of African perspectives in global veterinary and animal nutrition debates. Such an approach is essential for repositioning African scholarship within the international scientific community.

Towards a Transformative Livestock Science Agenda

The future of veterinary science and animal nutrition in Africa lies in the convergence of scientific innovation, technological advancement and policy integration. Transformative change will require sustained investment in research infrastructure, human capital development, digital technologies and institutional reform.

Nigeria, as Africa's most populous nation and one of its leading economies, is uniquely positioned to spearhead this transformation. By leveraging indigenous knowledge, scientific innovation and coherent policy frameworks, the country can reposition its livestock sector as a driver of sustainable development, public health resilience and economic growth.

This issue of the NL Journal of Veterinary and Animal Nutrition reflects the increasing maturity and relevance of veterinary and animal nutrition research in Africa. The contributions presented herein are expected not only to advance scientific understanding but also to inform policy, stimulate innovation and catalyse systemic change. In an era of rapid global transformation, the veterinary and animal nutrition community must respond with scientific excellence, policy foresight and visionary leadership, recognising that the sustainability of Africa's livestock systems is inseparable from global food security and environmental resilience.