

Article Review

Animal Farming and Entrepreneurship Ventures

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Abstract

Animal farming is transforming from subsistence-oriented conventional practices to wards market-driven entrepreneurial enterprises. The current review integrates peer-reviewed studies and experiential knowledge on economic factors, business models, uptake of digital technology, finance, gender, sustainability, and policy impacts encapsulating livestock entrepreneurship in various income contexts. Based on global and national data, it offers practical tools such as business model charts, unit economics charts, technology solutions, finance options, and risk management techniques available to entrepreneurs, cooperatives, investors, and policymakers. Some of the most important findings are: (i) profitability depends on feed quality, animal productivity, market access, and business skills; (ii) the application of digital technologies accelerates herd management and disease surveillance; (iii) there are still financing gaps despite value-chain financial products under development; (iv) gender participation and benefits are shaped by inclusive business operations; and (v) considerations for sustainability increasingly connect climate change, animal welfare, antimicrobial resistance, and market advantage. A forward agenda is outlined for developing "enterprise-ready" animal agriculture that combines technical efficiency, entrepreneurial capability, risk finance, and open sustainability.

Keywords: *Animal Farming; Sustainable Development; Entrepreneurship.*

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Introduction

Animal husbandry is a large business that supports global food sands and contributes to sustainable development. Integration of business into animal husbandry encourages sustainable business models. Exploration of the interface between entrepreneurial activities and animal husbandry shows new opportunities. Animal husbandry has long been among the most important pillars of human society, supplying food, apparel, draft power, and merchandisable products that underpinned early economies. In the last century, the industry has shifted fundamentally, from subsistence-based systems to enterprise-based, market-oriented systems [1], [2]. Livestock systems worldwide produce nearly one-third of total human-consumed proteins, generate about 40% of global agricultural GDP, and are tasked with supporting the livelihoods of over 1.3 billion individuals, primarily in rural and peri-urban regions. They are also key contributors to ensuring food security because livestock products not only provide protein but also major micronutrients such as iron, zinc, and vitamin B12 that are not readily provided by plant-based diets. In contrast,

the livestock sector is under increasing scrutiny for its environmental impacts in greenhouse gas (GHG) emissions, land use pressures, and water consumption, and animal welfare and human health concerns. Therefore, the emphasis on animal farming as entrepreneurial endeavor has increased relevance in that it stresses efficiency, innovation, market sensitivity, and sustainability in addition to traditional productivity objectives. Livestock entrepreneurship is not simply big-scale production. It is positioning and realizing opportunities in the marketplace, building resources, coping with uncertainty, and instituting business models that are resilient to biological, economic, and environmental risks. In this entrepreneurial vision, farmers are turned into innovators, service providers, and market actors who engage with technology, finance, and policy regimes to build competitive and sustainable businesses. The entrepreneurial approach enables livestock systems to be defined by opportunity recognition, resource utilization, diversification of income, and risk management, thereby linking them to universal entrepreneurship and sustainable development theory [3–5]. It is necessary to put weight on both Entrepreneurship and Animal Farming and view things in their entirety, since placing weight on one without the other might lead to an uncompetitive poultry animal production system with respect to other industries.

Materials and Methods

The review maps the various areas, including the Conceptual Framework of Livestock Entrepreneurship, Demand, Sustainability, and Regulation; Unit Economics and Profitability Drivers; Digitalization and Intelligent Livestock Management; Finance, Investment, and Value-Chain Cooperation; Gender, Inclusion, and Youth; Environmental Sustainability, Animal Welfare, and One Health; and Entrepreneurial Competences and Learning. Meanwhile, a critical analysis of these combined is necessary in order to have a comprehensive overview of these concepts. An exhaustive and methodical search was conducted via notable scholarly databases, utilizing properly chosen keywords related to food security, climate resilience, and rural livelihoods. Along with the scholarly literature, the corresponding gray literature from the major organizations was also integrated. The gathered materials were filtered out methodically by themes and perused and examined meticulously. A careful and systematic review was done on reputable academic databases like Scopus, JSTOR, Web of Science, and Google Scholar through pre-specified keywords such as Animal Farming and Entrepreneurship Ventures.

Results and Discussion

Finance, Inclusion, and Institutional Support

Another keystone of entrepreneurial livestock production is finance. Instruments for lending to agriculture generally do not adequately address livestock business because of long production cycles, biological risk, and collateral constraints. Value-chain finance (VCF), blended finance designs, microfinance, and usage-based insurance, however, are emerging solutions that reduce risk and align credit with cash flows of livestock [18]. Access to finance becomes particularly relevant for women farmers and smallholders, who are likely to face structural constraints in the credit market. Gender and youth incorporation also demonstrate the way in which livestock entrepreneurship crosses social progress. Women provide significantly to labor and decision-making within smallholder livestock systems but have limited access to markets, training, and financial services. Entrepreneurship schemes that include gender-sensitive design, governance structures, and equitable benefit sharing have been identified as increasing not only women's empowerment but also household nutrition and community resilience. Similarly, youth-based microenterprises such as veterinary service delivery, feed milling, and transport logistics generate employment and contribute to the professionalization of rural economies. Emissions, biosecurity, food safety, and animal welfare policy at both national and transnational levels is increasingly shaping business opportunity and risk in the industry. For instance, living up to carbon measurement requirements or antimicrobial resistance (AMR) standards can grant access to high-value markets and financing instruments, while non-compliance can result in exclusion

from global value chains. Hence, entrepreneurial livestock companies must be adaptable to a shifting regulatory landscape [6–8].

Sustainability, One Health, and Global Agendas

The Sustainable Development Goals can be applied across various sectors, ranging from health and medical science to agriculture, and require greater focus and attention [9], [10]. The sustainability dimension of the livestock business cannot be overstated. Livestock contributes around 14.5% of anthropogenic GHG emissions, predominantly through enteric fermentation, feed production, and manure management, according to the FAO. Industry business entrepreneurs are therefore looking towards means such as improved feed efficiency, anaerobic digestion, regenerative grazing, and methane-suppressing feed additives to maintain emissions at reduced levels while producing saleable sustainability credentials. Aside from climate change, the One Health approach that links human, animal, and environmental health is now paramount to livestock entrepreneurship. Entrepreneurs that adopt biosecurity practices, vaccination programs, residue traceability, and antimicrobial stewardship not only guard animal productivity but also advance global health goals, reducing the risk of zoonoses and enhancing market access. Animal welfare itself is also moving from being a basic ethical factor to a commodity, since welfare-labeled products tend to have a higher price and consumer confidence. Above all, livestock entrepreneurship is complementary to many of the United Nations Sustainable Development Goals (SDGs), to wit: SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action). Through productivity promotion, inclusivity, environmental reduction, and resilience of the value chain, entrepreneurial livestock projects are agents of integrated sustainable development [11–13].

Towards Enterprise-Ready Animal Farming

Over the past decades, extensive research has been conducted to enhance animal husbandry in various areas. However, it is essential to equip this sector with a new perspective that incorporates the science of marketing and entrepreneurship [14–16].

The new model of "enterprise-ready" animal agriculture positions livestock as an entrepreneurial platform that integrates technical efficiency with market sensitivity, risk finance, and sustainability performance. Entrepreneurial success in this model requires the ability to strike a balance between profitability and responsibility, driven by innovation, information, and inclusive governance. Technologies of transformation accessible through digital technologies, financial instruments, and policy schemes will have to be supplemented by the human element entrepreneurial capability, learning capacity, and risk-taking. As the industry further evolves, future practice and research will need to explore new frontiers such as carbon finance-associated value chains, IoT-enabled insurance, entrepreneurial training for young people, and measurable One Health interventions. Enhancing resilience into livestock enterprise will require interdisciplinary coordination among animal science, business administration, finance, public health, and environmental sustainability. Only by such an integrated approach can livestock entrepreneurship be able to realize its promise of offering food, livelihood, and ecological equilibrium in the 21st century [17], [18].

Demand, Sustainability, and Regulation

Demand for animal products grows in the majority of developing countries, while richer markets impose more stringent policies regarding emissions, animal well-being, and antimicrobial resistance (AMR). FAO reports that livestock emissions come mainly from feed production, enteric fermentation, and manure. Mitigation includes enhanced feed efficiency, genetics, manure management, and energy production. Investors and retailers increasingly require verifiable emissions metrics, like methane reduction, which affects supply chains and enables premium prices for verified low-methane products [19], [20]. Table 1 presents a concise description of the

common business models used in livestock entrepreneurship. The presentation in this manner facilitates understanding of how diverse and practically relevant business strategies are between livestock businesses.

Table 1. Common Business Models in Livestock Entrepreneurship

Model	Core Offer	Key Assets	Revenue Logic	Risks	Typical Fit
Cooperative member supplier	Milk/meat to cooperative; bulk input purchase	Herd, membership share	Farm-gate price + bonuses	Governance, price pass-through	Dairy smallholders with collection centers
Integrated contract grower	Birds/hogs raised under integrator specs	Housing, labor, biosecurity	Fee per kg + performance bonuses	Dependency, compliance risk	Poultry/pork clusters
Pasture-based premium	Grass-fed, animal-welfare verified	Grazing, certification	Premium retail price	Weather/seasonality	Temperate ruminant systems
Ag-services micro-enterprise	AI, vet, feed milling, haulage	Skills, equipment	Service fees + subscriptions	Utilization risk	Youth-led rural service hubs
Digital-first “smart dairy”	Sensors/wearables; analytics	IoT stack, data	Milk yield gains + disease cost savings	Upfront capex, connectivity	Medium/large dairies

Source: PMC, MDPI

Unit Economics and Drivers of Profitability

Profitability is heavily dependent on feed prices, milk production, reproduction efficiency, and market supply. Cooperative membership can stabilize price but depends on bonuses, logistics, and governance. Poultry has high capital turnover but needs good biosecurity and energy management. Beef and small ruminant returns rely on growth rates, death loss, and finishing method (pasture or feedlot), which influence cash flows. Table 2 presents an example of monthly unit economics for smallholder dairy farms with 6 to 10 cows.

Table 2. Illustrative Monthly Unit Economics (Smallholder Dairy, 6–10 Cows)

Line Item	Baseline Case	Improved Case (IoT + Repro program)
Milk sold (L)	3,600	4,200
Avg. price (per L)	0.40	0.43
Revenue	1,440	1,806
Feed (concentrates/forage)	780	860
Vet and health (incl. sensors amort.)	70	120
Labor (family + hired)	300	320
Utilities and misc.	80	85
Operating cost	1,230	1,385
Operating margin	210 (14.6%)	421 (23.3%)

Source: PMC+1Undip E-Journal

Digitalization and Smart Livestock Management

Technologies such as IoT collars, rumen boluses, machine vision, and predictive analytics allow earlier detection of estrus, feed optimization, lameness alerting, and disease monitoring (including disease alerts such as H5N1). These technologies reduce labor and veterinary costs and improve reproduction but challenge with connectivity, data management, cooperatives' integration, and small herd ROI uncertainty [21]. Table 3 shows the digital tool stack used by livestock entrepreneurs.

Table 3. Digital Tool Stack for Livestock Entrepreneurs

Layer	Examples	Entrepreneurial Benefit	Adoption Barrier
Sensing and wearables	Cow activity collars, boluses	Early disease/estrus detection → higher milk/offspring	Device cost; rural broadband [20]
Edge devices and gateways	Smart feeders, parlor meters	Feed conversion, yield tracking	Power and maintenance
Analytics and alerts	Mobile dashboards, AI scoring	Faster decisions; labor savings	Data literacy; vendor lock-in [18]
Traceability and QA	EID tags, blockchain pilots	Premiums for verified quality	Interoperability; auditor cost
Finance linkages	Usage-based insurance, pay-as-you-grow	Lower collateral needs	Risk modeling maturity

Source: MDPI, PMC

Finance, Investments, and Value-Chain Collaboration

Livestock credit is risky due to biological cycles, disease links, and limited collateral. Blended finance and value-chain finance (VCF) are growing stronger, however. Microfinance institutions and value-chain players use input credits, invoice discounting, and insurance to bridge gaps, though finance needs remain high for smallholders. Ecosystem practices emphasize shared data, risk-sharing, and anchor-buyer contracts [22].

Table 4. Financing Instruments for Livestock SMEs

Instrument	How It Works	Pros	Cons	Best Use-Case
Working-capital loans	Seasonal feed/inputs	Simple, scalable	Collateral requirements	Dairy w/ steady cashflow
Input credit via cooperative	Inputs deducted from milk check	Low friction; aligned incentives	Governance risk	Cooperative ecosystems
Asset finance (pay-as-you-milk)	Equipment or cows secured by output	Matches cashflows	Repossession complexity	Milking systems, cooling
Invoice/receivables finance	Advance against processor invoice	Off-balance-sheet liquidity	Buyer dependency	Contract growers
Index insurance	Weather/disease indices	Stabilizes shocks	Basis risk	Pastoralist systems
Blended finance	Public guarantees + private capital	Crowd-in effect	Design complexity	First-loss on new markets

World Bank Open Knowledge Repository

Gender, Inclusion, and Youth

Gender-mainstreamed livestock business models such as localized marketplaces, time-saving services, and women-centered cooperatives enhance participation and empowerment if they are complemented with governance and monitoring systems. Women's empowerment in livestock has been linked with better child nutrition within the framework of income regulation and decision power. Youth micro-enterprises in AI, veterinary, and transport services play a role in diversifying incomes and professionalizing local markets [23]. Table 4 presents the financing instruments available for livestock SMEs.

Environmental Sustainability, Animal Welfare, and One Health

Businesses increasingly monetize sustainability with methane-reducing feed ingredients, power from anaerobic digestion, upgraded manure management, and welfare accreditation to which price premiums are attached. FAO global reports establish species-and-region-specific baselines for emissions and mitigation potential. Sector-level emission reductions at a national level correspond to smaller herd sizes and land use change, although precise attribution is required. Integration of One Health principles (biosecurity and AMR control) is required where quality buyers dictate procurement standards [24].

Entrepreneur Skills and Learning

Success in farming requires not just technology and capital but entrepreneurial ability like opportunity identification, market focus, and sales ability. Processor and aggregator alliances promote innovation and improve quality control and performance tracking more than traditional extension services.

Case examples with significance are [25], [26]:

- Improvement of small-scale poultry using FAO value-chain models with a focus on market research, governance, bundling of services, and gender to convert low-input systems into sustainable businesses.
- Wider profitability differences across Senegal's dairy value chain dependent on volatile feed prices and market access.
- Wearable sensors in US dairy farms monitoring animal health and reporting disease outbreaks like avian influenza, boosting productivity despite subscription costs.
- Make use of cooperative membership studies to design better incentives for smallholders.
- Enhancing women's engagement in livestock trade through value chains that are inclusive and enhanced services and local market access.

Sustainable development goals (SDGs)

Animal agriculture, entrepreneurship, and sustainable development goals (SDGs) are closely related disciplines that collectively influence environmental sustainability, economic growth, and social well-being. This abstract explores the relationships between these disciplines with the focus on how entrepreneurial initiatives in animal agriculture can assist in achieving the SDGs. Livestock production is an integral part of global food security and nutrition, providing approximately 18% of total dietary calories and 40% of world protein. Beyond basic subsistence, livestock systems are at the heart of generating incomes for millions of smallholder farmers and rural households, thus supporting economic livelihoods and poverty alleviation. The combination of improved animal welfare in agriculture with productivity opens doors out of poverty through enhanced efficiency, product quality, and market access. Healthy animals also reduce zoonotic disease risks, promote human health, and reduce antimicrobial usage, which strongly supports SDG 3 (Good Health and Well-being). Such dynamics illustrate the multifaceted gains of sustainable animal farming, for instance, towards SDGs that directly relate to hunger, health, economic growth, and responsible production. Sustainable entrepreneurship in animal farming introduces innovative business models, technology adoption, and value chain enhancement that drive sustainable development. Sustainable entrepreneurship in this venture is marked by its focus

on balancing economic gains with social equity and environmental sustainability, resonating with the overall agenda of SDGs. Entrepreneurs can induce progress in animal welfare, resource efficiency, and climate resilience through innovations such as precision livestock farming, organic and regenerative farming, and circular economy integration. These businesses contribute to SDG 8 (Decent Work and Economic Growth) through the creation of jobs and economic diversification in rural areas. The complexity and diversity of the livestock sector call for a concerted effort that is aware of its environmental, social, and economic dimensions. Sustainable livestock systems can enhance biodiversity conservation by improved grazing management, maintain genetic diversity, and mitigate climate change impacts by increasing production efficiency and reducing greenhouse gas emissions. These integrative efforts are the cornerstone of SDG 13 (Climate Action) and SDG 15 (Life on Land). Furthermore, regulatory mechanisms and public-private partnerships, upheld by entrepreneurial initiatives, are important in harmonizing animal welfare standards globally and ensuring fair trade, aligning with SDG 17 (Partnerships for the Goals). Capacity building and training in entrepreneurship and animal husbandry empower farmers and communities, particularly women, and advance social inclusion and gender equality (SDG 5). Interactive learning and awareness-raising campaigns trigger attitude change towards animal welfare and sustainable consumption, connecting with SDG 4 (Quality Education) and SDG 12 (Responsible Consumption and Production). These efforts equip the next generation of entrepreneurs and consumers with the ability to demand sustainable animal products and adopt innovative practices. In summary, incorporating entrepreneurship in animal agriculture offers a potent lever to propel several sustainable development goals in tandem. Through enhancing animal welfare, supporting economic prosperity, conserving ecosystems, and promoting health, sustainable animal farming businesses can ensure a development that is balanced to address current and future demands in an integrated manner. Multi-stakeholder and interdisciplinary partnerships will be critical to realizing these synergies and surmounting sectoral pitfalls in the future [4], [26–31].

Farzpourmachiani M and Farzpourmachiani A [32], in the article "*Attrition Entrepreneurship Theory*" acknowledges that some businesses may face difficulties. Nonetheless, this paper contends that entrepreneurship in Animal Farming is successful and holds bright future opportunities. However, resilience and profitability must harmonize technical productivity with savvy business models, digital innovation, inclusive finance, and real sustainability performance. As finance and standards evolve, successful livestock entrepreneurs will leverage data as an asset, quality as a contractual promise, and inclusion and sustainability as paths to premium markets and not ancillary considerations.

Conclusion

The article discusses livestock production as a key connection of finance, sustainability, and innovation that can improve Sustainable Development Goals. Effective livestock entrepreneurship depends on different factors including technical efficiency and market awareness, and strong financial management, as well as compliance with changing environmental and health demands. The key drivers of profitability in this industry are innovative technologies, value-chain partnerships, and good entrepreneurial skills. By incorporating One Health principles and sustainability goals, livestock entrepreneurship assures food security, rural poverty reduction, and contributes to climate mitigation, biodiversity conservation, and social equality. Finally, multi-stakeholder, synergistic, and interdisciplinary approaches are essential to best leverage livestock entrepreneurship as a sustainable development driver in the current era.

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