



Constraints in Intensive Commercial Goat Production - A Review

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ABSTRACT

Intensive commercial goat farming has emerged as a promising approach to enhance productivity and meet the growing demand for animal-derived protein in developing countries. Factors such as shrinking grazing resources, increasing land-use pressure, urbanization, and the need for efficient resource utilization have accelerated the adoption of intensive production systems. However, the growth and sustainability of intensive goat enterprises are constrained by several biological, managerial, financial, and environmental challenges. This review critically examines the major constraints affecting intensive commercial goat farming, including breeding and reproductive limitations, disease prevalence, inadequate veterinary services, high capital investment, feed and fodder shortages, managerial inefficiencies, labor scarcity, animal welfare concerns, marketing bottlenecks, and environmental issues. Available evidence indicates that these constraints adversely affect productivity, profitability, animal health, and overall farm sustainability. The review further highlights scientifically validated management practices, technological interventions, policy support mechanisms, and welfare-oriented approaches that can mitigate these challenges. Addressing these multifaceted constraints through integrated and sustainable strategies is essential for improving the efficiency, resilience, and long-term viability of intensive goat production systems.

Keywords: E

INTRODUCTION

Goat farming is an integral component of the rural livelihood system in India and many other developing countries. Goats are often described as the “poor man's cow” due to their adaptability, low initial investment requirements, ease of management, and ability to thrive under diverse agro-climatic conditions. They serve as mobile assets, provide regular income, and play a crucial role in nutritional and economic security of smallholders (Peacock, 2005; Devendra, 2013). India possesses one of the largest goat populations in the world, with goats contributing substantially to the livestock sector through meat, milk, fibre, and manure production. According to the 20th Livestock Census, India has a goat population of 148.88 million, representing an increase of 10.1% over the previous census (Government of India, 2019).

Intensive goat farming has emerged as an alternative in response to the progressive shrinkage of grazing lands and fodder resources, urbanization, and the need for closer monitoring of animals in confined systems. Intensification aims to improve productivity through controlled feeding, housing, breeding, and health management (ICAR, 2013). However, despite growing interest, intensive commercial goat farming accounts for only a small proportion of the total goat population in India and remains largely unorganized. Most initiatives are driven by individual entrepreneurs with limited institutional backing.

In this context, commercial goat farmers encounter several interconnected constraints that adversely affect production efficiency and sustainability. These include breeding constraints, managerial and operational challenges, disease-

related problems, inadequate veterinary services, deficiencies in technical knowledge and skills, financial limitations, animal welfare concerns, environmental issues, and marketing bottlenecks.

BREEDING CONSTRAINTS

Availability of superior breeding stock remains a major challenge in intensive goat production. High-quality animals are often sold for slaughter due to immediate financial returns, leading to scarcity of genetically superior breeding stock (Singh et al., 2007). Farmers frequently rely on middlemen for procurement, which limits selection options and prolongs the time required for flock stabilization.

The absence of organized breeding programmes and systematic performance recording systems further limits genetic improvement in commercial goat enterprises. In many developing countries, selection decisions are based primarily on phenotypic characteristics rather than objective genetic evaluation, resulting in slow genetic progress and considerable variation in productive and reproductive traits. Lack of pedigree recording, uncontrolled mating, and limited access to proven breeding males continue to constrain the development of genetically superior goat populations (Meza-Herrera et al., 2024).

Proper selection, flushing, and adjustment of breeding time improve reproductive performance. However, reproductive inefficiencies such as delayed puberty, poor estrus detection, low conception rates, prolonged kidding intervals, and reduced litter size continue to affect productivity under intensive production systems. These problems are often associated with nutritional deficiencies, inadequate breeding management, and environmental stress.

Inbreeding is another important concern in commercial goat farming. Continuous use of a limited number of breeding bucks and inadequate replacement strategies may increase inbreeding levels within herds, negatively affecting fertility, growth performance, kid survivability, and

adaptability. Planned mating systems and periodic introduction of unrelated breeding stock are therefore essential for maintaining genetic diversity and long-term productivity.

Recent breeding strategies emphasize selection not only for production traits but also for disease resistance, reproductive efficiency, heat tolerance, feed efficiency, and environmental adaptability to improve resilience under changing climatic conditions (Meza-Herrera et al., 2024). Advances in reproductive and genetic technologies, including artificial insemination, estrus synchronization, embryo transfer, genomic characterization, and marker-assisted selection, offer considerable opportunities for accelerating genetic improvement. However, their adoption remains limited due to inadequate infrastructure, high implementation costs, shortage of skilled personnel, and limited awareness among farmers.

Strengthening organized breeding programmes, performance recording systems, dissemination of superior germplasm, and farmer participation in breeding initiatives will be crucial for improving the productivity, profitability, and sustainability of intensive goat production systems.

MANAGERIAL AND OPERATIONAL CONSTRAINTS

Effective management practices are essential for achieving optimal productivity and profitability in intensive goat production systems. Pregnant does should be provided with adequate housing, sufficient floor space, and a stress-free environment to support fetal development and successful kidding. Goats maintained under intensive systems require balanced nutrition and continuous access to clean drinking water to sustain growth, reproduction, and overall health. Regular vaccination and strategic deworming programmes are crucial for preventing infectious and parasitic diseases. In addition, supplementation of vitamins and minerals during late gestation has been reported to improve colostrum quality, neonatal vigor, and kid survivability (Sikka and Lal, 2005).

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Nutritional management remains one of the most critical operational challenges in commercial goat farming. Feed constitutes a major portion of production costs, and deficiencies in ration formulation can adversely affect growth performance, reproductive efficiency, and disease resistance. Sudden dietary changes, poor-quality feed resources, and inadequate nutrient supplementation may lead to digestive disturbances, reduced feed utilization, and economic losses (Devendra, 2001). Therefore, scientific feeding strategies and efficient feed resource management are essential for maintaining productivity under intensive production conditions.

Housing management also plays a vital role in ensuring animal health and welfare. Inadequate floor space, poor ventilation, overcrowding, and inefficient drainage systems increase the risk of disease transmission and environmental stress. Such conditions may predispose animals to respiratory disorders, foot problems, heat stress, and reduced productive performance. Proper housing design, sanitation, and waste management are therefore fundamental components of successful intensive goat farming.

Health-related management deficiencies further compromise farm performance. Improper dosing and indiscriminate use of anthelmintics may accelerate the development of anthelmintic resistance, reducing the effectiveness of parasite control programmes. Likewise, neglect of routine husbandry practices such as hoof trimming can result in lameness, reduced feed intake, and lower productivity. Effective biosecurity measures, regular health monitoring, and timely veterinary interventions are essential for maintaining herd health and minimizing production losses.

In addition to on-farm management challenges, the non-availability of adequate grazing land, limited access to quality breeding stock, and inadequate water resources continue to affect the sustainability of goat enterprises, particularly in resource-constrained regions (Kumar, 2013). Addressing these managerial and operational constraints through improved farmer training, scientific management practices, and

efficient resource utilization is essential for enhancing the productivity and long-term sustainability of intensive commercial goat production systems.

DISEASE RELATED CONSTRAINTS

Intensive livestock production systems are associated with several environmental challenges that may affect the sustainability of animal agriculture. Although goats generally have a lower environmental footprint than many other livestock species, intensive production systems can contribute to environmental degradation when not managed appropriately. Major environmental concerns include greenhouse gas emissions, accumulation of animal waste, water contamination, odor generation, and increased pressure on natural resources. Emissions of ammonia, methane, and nitrous oxide from manure and feeding systems contribute to air pollution and climate change, while particulate matter and unpleasant odors may adversely affect the surrounding environment and nearby communities (Roland et al., 2009; Iqbal, 2013).

Improper disposal and management of manure represent significant environmental risks in intensive goat farming. Accumulation of untreated waste may result in nutrient leaching, contamination of surface and groundwater resources, and deterioration of soil quality. Excessive concentrations of nitrogen and phosphorus in agricultural lands receiving manure can contribute to eutrophication of water bodies and disruption of local ecosystems. Furthermore, confined production environments may facilitate the accumulation and persistence of pathogenic microorganisms, thereby increasing the risk of disease transmission within and between farms (Roland et al., 2009).

Intensive production systems also require substantial inputs of feed, water, energy, and infrastructure. Dependence on externally sourced feed ingredients may increase the environmental burden associated with feed production, transportation, and processing. Inefficient utilization of feed resources not only reduces profitability but also increases the quantity of

waste generated per unit of animal product produced. Consequently, improving feed efficiency and nutrient utilization is considered an important strategy for reducing the environmental footprint of intensive livestock systems.

The indiscriminate use of veterinary drugs, antibiotics, and chemical parasiticides may further contribute to environmental contamination through residues in manure and wastewater. Such residues may affect soil microbial communities and contribute indirectly to the development of antimicrobial resistance, which is increasingly recognized as a global public health concern.

Sustainable environmental management in intensive goat farming requires the adoption of appropriate waste treatment and resource conservation strategies. Composting, biogas production, manure recycling, rainwater harvesting, efficient water use, and integrated crop–livestock production systems can significantly reduce environmental impacts while improving resource-use efficiency. In addition, climate-smart livestock management practices aimed at reducing greenhouse gas emissions, improving feed conversion efficiency, and enhancing resilience to climate variability are increasingly being promoted for sustainable goat production.

Without effective waste management, environmental monitoring, and resource conservation measures, intensive goat farming may compromise environmental sustainability and social acceptance, thereby limiting its long-term viability. Therefore, environmentally responsible production practices should be integrated into intensive goat farming systems to ensure sustainable livestock development and environmental protection.

VETERINARY SERVICE RELATED CONSTRAINTS

Veterinary support services play a critical role in maintaining the health, productivity, and profitability of intensive goat production systems. However, inadequate veterinary infrastructure and limited access to specialized small-ruminant

healthcare services remain major constraints in many developing countries. Veterinary support services are often insufficient, with limited availability of vaccines, inadequate disease surveillance programmes, and restricted access to diagnostic facilities. These constraints negatively affect reproductive efficiency, genetic improvement, disease control, and overall farm productivity (Kumar and Kavithaa, 2014).

Timely disease diagnosis is essential for preventing production losses in intensive goat enterprises. However, many goat farmers face difficulties in accessing laboratory-based diagnostic services, resulting in delayed detection and treatment of infectious and parasitic diseases. Lack of rapid diagnostic facilities often leads to inappropriate treatment decisions, increased mortality, and economic losses.

Inadequate vaccination coverage represents another important challenge. Although effective vaccines are available for several economically important diseases, including Peste des Petits Ruminants (PPR), enterotoxaemia, goat pox, and foot-and-mouth disease, inconsistent vaccine availability and poor implementation of vaccination programmes continue to hinder disease prevention efforts. Inadequate cold-chain facilities and limited awareness among farmers further reduce vaccine effectiveness.

Shortage of trained veterinarians and para-veterinary personnel with expertise in small-ruminant medicine also affects the quality of animal healthcare services. Many veterinary extension programmes primarily focus on large ruminants, resulting in limited technical support for goat farmers. Consequently, reproductive disorders, nutritional deficiencies, kid mortality, and disease outbreaks are often inadequately managed.

Disease surveillance and biosecurity programmes remain weak in many goat-producing regions. Insufficient monitoring of disease outbreaks and delayed reporting mechanisms increase the risk of rapid disease spread within intensive production systems. Strengthening surveillance networks, improving

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diagnostic infrastructure, and promoting routine herd health monitoring are therefore essential for effective disease control (Silva et al., 2022).

Furthermore, indiscriminate use of antibiotics and anthelmintics due to inadequate veterinary supervision may contribute to antimicrobial resistance and anthelmintic resistance, posing significant challenges for future disease management. Regular veterinary consultation, strategic health planning, and farmer education programmes are necessary to ensure sustainable healthcare practices in intensive goat production systems.

Overall, strengthening veterinary infrastructure, expanding vaccine accessibility, improving diagnostic capabilities, enhancing disease surveillance systems, and increasing the availability of trained veterinary professionals are critical for improving animal health, productivity, and sustainability in intensive commercial goat farming.

KNOWLEDGE AND SKILL-BASED CONSTRAINTS

Lack of technical knowledge and inadequate managerial skills are among the major constraints affecting the success of intensive goat production systems, particularly during the establishment and expansion phases of commercial farms. Intensive goat farming requires scientific understanding of nutrition, breeding, housing, health care, biosecurity, and record management. Deficiencies in these areas often result in poor productivity, increased mortality, and reduced profitability.

High mortality rates in intensive goat farms are frequently associated with inadequate knowledge of disease prevention, improper vaccination schedules, poor biosecurity practices, and delayed detection of health disorders. Limited availability of vaccines and restricted access to veterinarians with expertise in small-ruminant production further aggravate these challenges (ESGPIP, 2008). Inadequate technical guidance during critical stages of farm establishment may

lead to management errors that adversely affect animal health and production performance.

Several studies have identified lack of knowledge, inadequate training opportunities, and insufficient technical support as major constraints affecting goat farmers (Kumar, 2013). Many producers have limited awareness of scientific feeding practices, reproductive management, housing requirements, and disease control measures. Consequently, adoption of improved technologies and recommended management practices remains relatively low in many production systems.

Large flock sizes often reduce individual animal attention, resulting in poor kid growth, increased pre-weaning mortality, delayed disease detection, and inadequate monitoring of reproductive performance. Effective observation and timely intervention become increasingly difficult as herd size increases, particularly when skilled labour is unavailable.

Knowledge gaps in nutritional management represent a significant concern in commercial goat production. Lack of expertise in balanced ration formulation has been identified as a major constraint among goat farmers, resulting in nutritional deficiencies, poor growth rates, and reduced reproductive efficiency (Senthil et al., 2018; Ombase et al., 2023). Similarly, inadequate awareness of scientific housing systems, environmental management, and welfare-oriented production practices continues to limit productivity and animal well-being (Gurjar et al., 2008; Ombase et al., 2023).

Recent developments in digital extension services, mobile-based advisory systems, and precision livestock farming technologies provide new opportunities for knowledge dissemination and farmer capacity building (Nguyen et al., 2023). However, limited access to training programmes, insufficient extension support, and low adoption of information technologies continue to restrict the transfer of scientific knowledge to farmers. Strengthening farmer

education programmes, vocational training, extension services, and technical advisory support is therefore essential for improving management efficiency and ensuring the long-term sustainability of intensive commercial goat farming.

FINANCIAL CONSTRAINTS

Financial limitations represent one of the most significant barriers to the establishment and sustainability of intensive commercial goat production systems. Compared to traditional extensive and semi-intensive systems, intensive goat farming requires substantial initial capital investment for housing infrastructure, feeding equipment, water supply systems, fencing, waste management facilities, and procurement of quality breeding stock. Fixed costs associated with housing and farm infrastructure often constitute a major proportion of the total investment and may exceed expenditure on the purchase of animals. Consequently, the high capital requirement acts as a major deterrent for small and marginal farmers seeking to adopt intensive production systems (Kumar, 2007).

Access to institutional credit remains a major challenge for many goat farmers. Limited collateral security, complex loan procedures, inadequate awareness of financial support schemes, and high interest rates often restrict access to formal credit. As a result, many farmers depend on private lenders, which may increase financial burden and reduce enterprise profitability. Inadequate access to affordable finance further limits investment in improved housing, breeding stock, feeding systems, and disease prevention programmes.

Operational expenses constitute another major financial constraint in intensive goat farming. Feed and fodder costs account for the largest share of recurring expenditure, often representing nearly 60% of the total variable cost of production. Dependence on purchased feed ingredients, fodder, concentrates, and nutritional supplements makes intensive systems highly vulnerable to fluctuations in feed prices. Rising costs of feed ingredients and seasonal shortages of

quality fodder can substantially reduce profit margins and affect enterprise sustainability (Kumar, 2007).

Labour expenditure also contributes significantly to production costs. Intensive production systems require continuous labour inputs for feeding, cleaning, health monitoring, breeding management, record keeping, and sanitation. Shortage of skilled labour and increasing wage rates have further increased the operational costs associated with commercial goat enterprises. In addition, expenses related to electricity, water supply, veterinary care, vaccination, deworming, and waste management add considerably to the overall cost of production.

Disease outbreaks pose a substantial financial risk in intensive production systems. Mortality losses, treatment costs, reduced growth rates, reproductive failures, and market restrictions can significantly affect farm income. Furthermore, inadequate veterinary infrastructure and limited insurance coverage increase the vulnerability of farmers to unexpected economic losses. Livestock insurance schemes have the potential to reduce financial risk; however, their adoption remains relatively low due to limited awareness, complicated claim procedures, and insufficient policy coverage.

Market-related uncertainties further influence the economic viability of intensive goat farming. Fluctuations in the prices of live animals, feed resources, and production inputs can affect profitability. Dependence on intermediaries, lack of organized marketing systems, and limited access to market information often reduce farmers' bargaining power and income.

MISCELLANEOUS CONSTRAINTS

In addition to nutritional, health, and housing-related challenges, several miscellaneous constraints affect the efficiency and sustainability of intensive goat production systems. Maternal behavioral problems such as mis-mothering, maternal rejection, inadequate colostrum intake, and poor mother-young bonding are frequently reported, particularly in prolific breeds and under

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intensive management conditions. Such issues often necessitate artificial rearing or bottle feeding, increasing labor requirements and production costs (Dwyer, 2008; Nowak and Poindron, 2006). Increased litter size, although beneficial for productivity, may further exacerbate competition among kids for milk and maternal care, leading to reduced growth and survivability.

Labor scarcity and the requirement for skilled personnel constitute another major constraint in intensive goat enterprises. Activities such as kidding supervision, neonatal care, disease monitoring, estrus detection, artificial rearing, and record keeping demand continuous attention and technical expertise. Inadequate labor management can adversely affect animal welfare and production performance (Lu, 1988; Hart, 2001).

Transportation and marketing of live goats also present significant challenges. Lack of standardized transport facilities, overcrowding during transit, prolonged transportation periods, and poor handling practices can induce stress, injuries, weight loss, and increased susceptibility to disease (Knowles et al., 1998; Broom, 2005). Furthermore, fluctuations in market prices, limited access to organized marketing channels, and inadequate market intelligence often reduce profitability for producers.

Biosecurity limitations represent an additional concern in intensive systems. Frequent introduction of replacement animals, high stocking density, and movement of personnel and equipment increase the risk of disease transmission within and between farms. Failure to implement appropriate quarantine and sanitation measures may result in recurring disease outbreaks and substantial economic losses (FAO, 2011).

Improper utilization of kidding pens may also decrease kid survivability. Kidding pens should be designed and customized according to breed characteristics, litter size, maternal behavior, and milk yield to ensure adequate mother-young interaction and neonatal protection (Muthukumar et al., 2020). Inadequate pen design, poor hygiene, and insufficient space can increase the incidence

of neonatal mortality, hypothermia, and infectious diseases. Therefore, adoption of standardized management protocols, adequate staff training, and welfare-oriented housing systems are essential for improving productivity and sustainability in intensive goat farming.

ANIMAL WELFARE ISSUES IN INTENSIVE GOAT FARMING

Intensive production systems often fail to provide conditions that allow the expression of natural behaviours in goats. Inadequate floor space, high stocking density, poor ventilation, and accumulation of fecal matter compromise animal welfare and productivity. Confined rearing is associated with increased aggression, behavioural abnormalities, reduced immune competence, and a higher incidence of mastitis and lameness (FAO, 2005; Sevi et al., 2009). Poor housing conditions may also predispose goats to respiratory disorders, foot lesions, heat stress, and increased disease transmission, thereby adversely affecting growth and reproductive performance. Behavioural disturbances such as excessive aggression, competition for feed and water, stereotypic behaviours, and social stress are commonly observed under overcrowded conditions. Chronic stress associated with poor welfare can suppress immune function, reduce feed intake, impair reproductive efficiency, and increase susceptibility to infectious diseases (Sevi et al., 2009).

Animal welfare is closely linked to productivity, health, and economic performance. Failure to address welfare concerns not only raises ethical issues but also increases disease susceptibility, mortality, and production losses in intensive goat farming systems. Poor welfare conditions have been associated with reduced growth rates, lower reproductive efficiency, decreased milk production, and increased veterinary expenditure, ultimately affecting farm profitability. Recent advances in animal welfare science emphasize the importance of welfare-oriented management practices, including provision of adequate space allowance, proper ventilation, effective sanitation, environmental enrichment, regular health monitoring, and

appropriate social grouping of animals. Furthermore, precision livestock farming technologies such as sensor-based behavioural monitoring and automated health assessment systems offer promising opportunities for early detection of welfare problems and improved management interventions (Silva et al., 2022). Therefore, ensuring high standards of animal welfare is essential for enhancing productivity, improving disease resistance, promoting sustainable production, and meeting increasing consumer expectations regarding ethical livestock farming practices.

ENVIRONMENTAL ISSUES IN INTENSIVE GOAT PRODUCTION

Intensive goat production systems have expanded in response to increasing demand for animal protein, but they are also associated with significant environmental externalities. One of the primary concerns is greenhouse gas (GHG) emissions, particularly methane (CH₄) from enteric fermentation and manure management, along with nitrous oxide (N₂O) emissions from nitrogen-rich waste handling systems. These emissions contribute directly to global warming potential and are recognized as key drivers of livestock-related climate impact (Gerber et al., 2013; IPCC, 2019).

In addition to climate-related impacts, intensive goat farming generates substantial quantities of concentrated manure, which, if improperly managed, can lead to ammonia volatilization and subsequent air quality degradation. Ammonia emissions also contribute to secondary particulate matter formation, posing risks to both environmental and human health (Amon et al., 2007). Furthermore, runoff from poorly managed waste systems may introduce excess nitrogen, phosphorus, and microbial contaminants into surrounding soil and water bodies, resulting in eutrophication and ecological imbalance (FAO, 2018).

Another critical issue is the increased pathogen load in confined production systems, where high animal density and limited ventilation can facilitate the persistence and transmission of

infectious agents. Such conditions may also enhance antimicrobial resistance development due to frequent therapeutic interventions and environmental contamination (FAO, 2016; Lhermie et al., 2019).

Overall, without integrated waste management strategies—such as composting, anaerobic digestion, precision feeding, and improved housing design—intensive goat production systems may compromise environmental sustainability and long-term production viability.

DISCUSSION

The constraints identified in this review are multifactorial, interconnected, and mutually reinforcing in their effects on the productivity, profitability, and sustainability of intensive commercial goat production systems. Nutritional deficiencies, inadequate housing, poor biosecurity, and disease challenges often interact synergistically, resulting in reduced growth performance, impaired reproductive efficiency, increased mortality, and substantial economic losses. Among these, the relationship between nutrition and health is particularly important, as suboptimal nutrition compromises immune competence and increases susceptibility to infectious and parasitic diseases, thereby further reducing production efficiency (Devendra, 2013).

The economic viability of intensive goat farming is influenced not only by biological and managerial factors but also by the broader market and institutional environment. High feed costs, fluctuating market prices, limited access to organized marketing channels, and inadequate availability of affordable credit often discourage investment in improved management practices and modern production technologies. Consequently, policy interventions that strengthen market linkages, promote farmer producer organizations (FPOs), facilitate access to institutional credit and livestock insurance, and support value-addition enterprises are equally important for improving farm sustainability and profitability (Peacock, 2005; FAO, 2011).

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Animal welfare has emerged as a critical component of sustainable livestock production. High stocking densities, restricted movement, social stress, and inadequate environmental enrichment in intensive systems can adversely affect animal health, behavior, and productivity. Increasing consumer awareness regarding ethical livestock production further necessitates the adoption of welfare-oriented management practices and scientifically designed housing systems (Dwyer, 2008; Berckmans, 2017).

Climate change represents an emerging cross-cutting challenge that is likely to exacerbate existing production constraints. Rising temperatures, altered rainfall patterns, increased frequency of extreme weather events, and changing disease epidemiology can negatively affect feed and water availability, reproductive performance, and animal health. Heat stress, in particular, has been recognized as a major factor limiting productivity in small ruminants under intensive production conditions. Therefore, climate-resilient housing designs, sustainable feed resource development, improved water-use efficiency, and climate-smart livestock management practices should receive greater research and policy attention in the future (FAO, 2011; Lovarelli et al., 2020).

Overall, the sustainability of intensive goat farming depends on the successful integration of scientific management, disease prevention, welfare-oriented production practices, market support systems, and technological innovations. Addressing these constraints through a holistic and multidisciplinary approach will be essential for enhancing the resilience, profitability, and long-term sustainability of commercial goat enterprises.

DIGITAL TECHNOLOGIES AND PRECISION LIVESTOCK FARMING (PLF)

The adoption of digital technologies and precision livestock farming (PLF) tools offers significant opportunities to improve the efficiency and sustainability of intensive goat production systems. Technologies such as electronic animal

identification (RFID), automated weighing systems, sensor-based health and behavior monitoring, mobile-based farm management applications, and digital record-keeping platforms enable real-time monitoring of animal performance and facilitate timely management decisions. Precision technologies can assist in early disease detection, reproductive management, feed optimization, growth monitoring, and traceability, thereby reducing production losses and improving resource-use efficiency. Furthermore, mobile advisory services, telemedicine, and digital extension platforms can enhance farmers' access to veterinary expertise, market information, and best management practices, particularly in remote areas. The integration of precision livestock technologies into commercial goat farming can improve productivity, animal welfare, biosecurity, and economic returns while supporting data-driven decision-making and sustainable livestock development (Berckmans, 2017; Lovarelli et al., 2020).

SUGGESTIONS AND POLICY INTERVENTIONS

Mitigation of constraints in intensive goat farming requires a comprehensive and integrated approach involving technological innovations, scientific management, veterinary support, institutional strengthening, and policy interventions. At the farm level, adoption of strategic vaccination and deworming schedules, maintenance of optimum stocking density, provision of adequate floor and feeder space, proper housing design with effective ventilation, routine sanitation, and strict biosecurity measures are essential for improving animal health and productivity. Sudden regrouping of animals should be avoided to minimize stress and social disruption, while environmental enrichment and provision of adequate exercise can improve animal welfare and behavioral well-being.

Nutritional interventions such as balanced ration formulation, periodic feed and water quality assessment, fodder resource development, and strategic supplementation during critical physiological stages can significantly enhance



Fig : 1 - Enteritis



Fig : 2 - peste des petits ruminants (PPR)



Fig 3 – Pneumonia



Fig 4- Tape worm infection



Fig 5: Intensification of goats



Fig 6: Overgrown hooves



Fig 7: Bottle feeding



Fig 8: Mastitis



Fig 9: Feed waste

growth and reproductive performance. Accurate body-weight-based drug administration, regular health monitoring, and timely veterinary intervention are necessary to reduce morbidity and mortality. Welfare-oriented practices, including adequate colostrum management, fostering of surplus kids, and proper neonatal care, can substantially improve kid survivability and growth performance.

Control of economically important diseases such as Peste des Petits Ruminants (PPR), Enterotoxaemia, Pneumonia, Coccidiosis, and Gastrointestinal parasitic infestations remains a critical prerequisite for successful intensive goat production (Dhar et al., 2002; Dhananjay et al., 2007). Vaccination of pregnant does during the late gestation period against *Clostridium perfringens* type D enhances passive transfer of maternal antibodies and improves neonatal protection and kid survivability (Muthukumar et al., 2020).

At the institutional level, improved access to affordable credit, livestock insurance, quality breeding stock, veterinary infrastructure, diagnostic facilities, and extension services is required to support commercial goat enterprises. Strengthening farmer producer organizations (FPOs), cooperatives, and organized marketing networks can enhance market access, reduce exploitation by intermediaries, and improve price realization. Furthermore, promotion of producer-owned processing and value-addition facilities can generate additional income opportunities.

Policy initiatives should focus on developing region-specific breeding programs, strengthening disease surveillance systems, supporting climate-resilient livestock production practices, and encouraging adoption of precision livestock technologies. Capacity-building programs, skill development training, and digital advisory services should be expanded to improve technical competency among goat farmers. Greater investment in research on nutrition, genetics, disease prevention, welfare assessment, and environmental sustainability will further contribute to the long-term resilience and profitability of intensive goat farming systems.

CONCLUSION

Intensive commercial goat farming represents a viable strategy for enhancing livestock productivity and meeting the growing demand for animal-derived products in regions facing shrinking grazing resources and increasing land-use pressures. Despite its potential advantages, the sustainability and profitability of intensive goat production systems are constrained by a range of interrelated challenges, including high capital investment, feed and fodder shortages, disease incidence, inadequate veterinary support, breeding limitations, managerial inefficiencies, labor scarcity, animal welfare concerns, marketing bottlenecks, and environmental issues.

The success of intensive goat enterprises depends on the adoption of scientific management practices, efficient breeding and health-care programs, welfare-oriented housing systems, improved biosecurity measures, and sustainable waste management strategies. Strengthening extension services, farmer capacity building, access to institutional credit, and organized marketing infrastructure are equally important for enhancing farm resilience and economic viability. Furthermore, the integration of precision livestock technologies, digital advisory services, and climate-smart production practices offers promising opportunities to improve productivity while minimizing environmental impacts.

A holistic approach involving farmers, veterinarians, researchers, policymakers, financial institutions, and market stakeholders is essential to address these multifaceted constraints. Such coordinated efforts will facilitate the sustainable intensification of goat production and contribute significantly to rural livelihoods, food security, and livestock sector development in the years ahead.

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Received on Accepted on