Factors Contributing the Transformation in Animal Husbandry in India: With Special Reference to Mysuru District in Karnataka

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ABSTRACT:

India, the world's largest milk producer and second-largest producer of fruits and vegetables, has been progressively strengthening its agricultural and animal husbandry sectors to meet both domestic and global demands. The animal husbandry sector has undergone a notable transformation in recent decades, driven by increased production of milk, eggs, and meat, adoption of modern technologies, and supportive government initiatives. Modernizing the sector is crucial to overcoming challenges such as low productivity, poor animal health, and limited market access, which have traditionally constrained rural livelihoods. This study focuses on examining the status and trends in animal husbandry in India and analyzing the key factors contributing to its transformation. Primary data were collected from 60 livestock farmers in Mysore district through structured questionnaires and interviews.

KEYWORDS:

Animal Husbandry, Transformation, Rural Livelihood.

Introduction

India, as the world's largest producer of milk and the second–largest producer of fruits and vegetables, continues to strengthen its agricultural and animal husbandry sectors to meet global and domestic demands. With increasing global interest in organic produce, value–added dairy products, and sustainable farming systems, the Indian government has intensified efforts to boost productivity, enhance infrastructure, and improve market linkages for farmers. The transformation of India's animal husbandry sector from traditional to modern systems is essential to address the challenges of low productivity, poor animal health, and limited market access that have long constrained rural livelihoods. Traditional livestock practices, while sustainable and culturally rooted, rely heavily on indigenous knowledge and low–input methods that cannot meet the growing demand for milk, meat, eggs, and other animal–based products. With India's population and consumption patterns rapidly increasing, modernization has become a necessity to ensure food and nutritional security.

Modern animal husbandry emphasizes the adoption of scientific breeding, advanced veterinary care, balanced nutrition, and efficient farm management practices. Through genetic improvement, artificial insemination, and disease control programs, productivity and quality of livestock can be significantly enhanced. Additionally, modern feeding systems, climate–resilient practices, and digital technologies like artificial intelligence and data–driven monitoring help improve efficiency and sustainability. These innovations also support the development of value–added products, better processing facilities, and stronger market linkages, leading to higher farmer incomes.

Government initiatives such as the National Livestock Mission, Rashtriya Gokul Mission, and Dairy Infrastructure Development Fund have accelerated this transformation by promoting innovation and entrepreneurship in the livestock sector. Furthermore, modernization ensures better animal welfare, reduces environmental degradation, and enhances export potential. In essence, shifting from traditional to modern animal husbandry is not just about technology adoption—it represents a strategic move toward sustainable growth, rural empowerment, and global competitiveness for India's agricultural economy.

Objectives of the study

1. To study the status and trends in animal husbandry In India.

2. To identify and analyze the key factors influencing the transformation of animal husbandry in study area.

Hypothesis of the study

- There is a significant relationship between the identified factors (technology adoption, government support, infrastructure, training, market access) and the transformation of animal husbandry.

Methodology

This study adopts a descriptive and analytical research design to examine the factors contributing to the transformation of animal husbandry it is purely based on primary and secondary data. a stratified random sampling method has been used for survey. Primary data were collected using a structured questionnaire and personal interviews from 60 livestock farmers. The study is conducted in Mysore district, Karnataka, selected due to its active livestock farming community and adoption of modern animal husbandry practices. The survey has been conducted by taking 60 rural farmers in in Mysore district through structured questionnaires and interviews. Respondents, selected using stratified random sampling, are engaged professionally in animal husbandry and have adopted modern technologies. Secondary data regarding livestock population and sectoral trends were obtained from Government of India reports, National Sample Surveys, and Department of Animal Husbandry publications. Data were analyzed using descriptive statistics to summarize trends and patterns, and multiple regression analysis to identify the relative influence of each factor on the transformation of animal husbandry. Regression coefficients were used to determine the magnitude and significance of each factor, while goodness-of-fit statistics assessed the overall model performance.

Variables

- Dependent Variable: Y (Scale 1–10): Level of transformation in animal husbandry (measured through productivity, livestock health, adoption of modern practices, income increase).
- Independent Variables: (Scale 1–10)
    1. X1: Technology adoption (e.g., Modern Feeding, Breeding, Digital tools)
    2. X2: Government support (Policies, Subsidies, Schemes)
    3. X3: Infrastructure development (Sheds, Storage, Transport)

4. X4: Education/training of farmers
5. X5: Market access and value addition opportunities

Status and Trends in Animal Husbandry in India

Animal husbandry has long been a cornerstone of India's rural economy, providing livelihood, food, and nutritional security to millions of households. It plays a vital role in supplementing income for small and marginal farmers, ensuring employment, and contributing significantly about 30% to the agricultural GDP and nearly 5% to the national GDP, offering stability against the uncertainties of crop production. and agri-cultural output. Over the past six decades, the sector has witnessed re-markable changes in its structure, composition, and growth patterns, re-flecting both modernization and diversification within rural agricultural systems.

The dairy sector is the largest component, making India the world's leading milk producer, while poultry and meat production have shown rapid growth, ensuring affordable sources of protein for the population. Livestock provides employment to over 8% of the population, particularly empowering rural women who play a key role in animal rearing and dairy management. It also supplies draught power, organic manure, leather, and wool, strengthening both agriculture and allied industries.

Export of buffalo meat, leather goods, and dairy products contrib-utes substantially to foreign exchange earnings. Government initiatives such as Operation Flood, National Livestock Mission, and Rashtriya Gokul Mission have modernized the sector through breed improvement, disease control, and infrastructure development.

Table 1: Livestock & Poultry Population During 1956–2019 – All India (In Million Numbers)

Source: Livestock Census, Directorate of Economics & Statistics and Animal Husbandry Statistics Division, Department of Animal Husbandry & Dairying, Government of India.

Species	1956	1961	1966	1972	1977	1982	1987	1992	1997	2003	2007	2012	2019	Absolute Change	% Change (1956–2019)	Trend Summary
Cattle	158.70	175.60	176.20	178.30	180.00	192.45	199.69	204.58	198.88	185.18	199.08	190.90	193.46	+34.76	+21.9	Moderate increase
Buffaloes	44.90	51.20	53.00	57.40	62.00	69.78	75.97	84.21	89.92	97.92	105.34	108.70	109.85	+64.95	+144	Strong increase
Sheep	39.30	40.20	42.40	40.00	41.00	48.76	45.70	50.78	57.49	61.47	71.56	65.07	74.26	+34.96	+89	Steady increase
Goats	55.40	60.90	64.60	67.50	75.60	95.25	110.21	115.28	122.72	124.36	140.54	135.17	148.88	+93.48	+168.6	Strong increase
Horses & Ponies	1.50	1.30	1.10	0.90	0.90	0.93	1.03	1.01	0.83	0.65	0.61	0.43	0.34	–1.16	–77.3	Sharp decline
Camels	0.80	0.90	1.00	1.10	1.10	1.08	1.03	0.91	0.63	0.63	0.52	0.40	0.25	–0.55	–68.7	Decline
Pigs	4.90	5.20	5.00	6.90	6.90	9.06	9.03	10.29	13.52	11.13	10.29	9.06	9.06	+4.16	+85.3	Moderate increase
Mules	0.04	0.05	0.08	0.08	0.09	0.13	0.17	0.22	0.18	0.14	0.12	0.10	0.08	+0.04	+100	Slight increase
Donkeys	1.00	1.10	1.10	1.00	1.00	1.03	1.06	1.07	0.83	0.62	0.44	0.32	0.12	–0.88	–88.0	Sharp decline
Yaks	NC	0.02	0.03	0.04	0.13	0.14	0.14	0.14	0.13	0.14	0.13	0.13	0.06	—	—	Stable small number
Total Livestock	**306.60**	**335.40**	**344.10**	**353.60**	**369.00**	**419.59**	**445.29**	**470.86**	**485.39**	**485.00**	**529.70**	**512.06**	**536.76**		**+75.1**	
Poultry	94.80	114.20	115.40	138.50	159.20	207.74	275.30	307.07	347.61	489.01	648.83	729.21	851.81	+757.01	+798.5	Explosive growth
Dogs	NC	NC	NC	NC	18.54	17.95	21.77	25.48	16.51	19.09	11.67	9.43		—	—	Growing
Rabbits	NC	NC	NC	NC	NC	NC	NC	NC	0.48	0.42	0.49	0.55	0.55	—	—	Stable

The analysis of livestock census data from 1956 to 2019 reveals significant structural and compositional changes in India's livestock population, reflecting economic development, changing agricultural systems, and evolving consumer demand. Overall, the total livestock population increased from 306.6 million in 1956 to 536.76 million in 2019, showing a growth of about 75 percent over the period. This expansion highlights the continued importance of the livestock sector in supporting rural livelihoods and contributing to the national economy, even as traditional roles of animals in agriculture and transport have diminished.

Cattle population increased moderately by 21.9 percent, from 158.7 million in 1956 to 193.46 million in 2019. Although cattle continue to be central to rural life, their growth rate slowed after the 1980s. This moderation can be attributed to mechanization in agriculture, which reduced the dependence on draught animals, and changing preferences toward high-yielding buffalo breeds for milk production. However, cattle still play a vital role in dairy farming and as a source of manure and organic farming inputs.

Buffaloes exhibited a strong increase of 144 percent, growing from 44.9 million to 109.85 million. This growth reflects India's transformation into a major milk-producing nation, with buffaloes becoming preferred due to their higher milk fat content, adaptability to various climates, and suitability for smallholder systems. Buffalo population growth also corresponds with the success of programs such as Operation Flood, which revolutionized dairy production in India.

Sheep and Goats together represent the small ruminant sector, which recorded remarkable growth. Sheep numbers almost doubled (from 39.3 million to 74.26 million, an 89 percent increase), while goats showed the most rapid expansion—rising from 55.4 million to 148.88 million, a 168.6 percent increase. The sharp increase in goat population is largely due to their high adaptability, low maintenance cost, and growing demand for meat and milk. These trends suggest a shift among rural farmers toward small livestock that require lower investment and provide faster economic returns. Sheep farming benefited from enhanced demand for mutton and wool, particularly in arid and semi-arid zones.

Among non-ruminants, pigs registered a moderate rise of 85.3 percent, from 4.9 million to 9.06 million. This improvement was due to

increased meat consumption, government initiatives to promote piggery, and better breeding practices in certain states. Despite this, the overall share of pigs in total livestock remains relatively small.

On the contrary, the population of equines such as horses, ponies, donkeys, and mules has shown a drastic decline. Horses and ponies fell by 77.3 percent, while donkeys declined by 88 percent, and camels by 68.7 percent. These reductions clearly illustrate the effects of rural mechanization, improved transportation networks, and reduced dependence on animals for labor and mobility. Mules, however, showed a minor increase (100 percent) from a very small base, likely due to their continued utility in hilly and defense areas where mechanized alternatives are limited.

The yak population remained very small and geographically confined to high-altitude Himalayan regions, showing stable but negligible numbers throughout the period. Rabbits and dogs appeared in the census data only in later years, with rabbits maintaining stable populations and dogs showing moderate growth, reflecting changing rural household patterns and pet ownership.

The most striking change was observed in poultry, which expanded explosively from 94.8 million in 1956 to 851.81 million in 2019, representing an almost eightfold (798.5%) increase. This exceptional growth underlines the modernization and commercialization of India's poultry industry, driven by improved breeding, feed technology, disease control, and growing consumer demand for eggs and poultry meat. Poultry farming emerged as one of the most dynamic sub-sectors, contributing significantly to rural employment and nutritional security.

Overall, the livestock population trends between 1956 and 2019 indicate a gradual transformation from traditional to commercial livestock production systems. While animals used for draught and transport (such as cattle, horses, donkeys, and camels) declined, species associated with food production (buffaloes, goats, and poultry) experienced substantial growth. This structural shift highlights the changing priorities of livestock farming in India—from supporting agricultural labor to enhancing food production, income generation, and market-oriented livestock activities.

Factors Contributing to Transformation in Animal Husbandry

The animal husbandry sector has undergone a major transformation over the past several decades, shifting from traditional, subsistence-ori-

ented practices to commercial, technology–driven, and market–oriented systems. Several interrelated factors have contributed to this transformation:

Technological Advancements: Introduction of improved breeding techniques, artificial insemination, and cross–breeding programs has enhanced productivity in dairy, poultry, and meat sectors. Scientific feeding, disease control, and better veterinary services have increased animal health and yields.

Government Initiatives and Policies: Programs such as Operation Flood, National Livestock Mission, Rashtriya Gokul Mission, and National Dairy Plan have modernized livestock production, promoted dairy cooperatives, and improved indigenous breeds.

Growing Demand for Animal Products: Rising population, urbanization, and changing dietary habits have increased the demand for milk, meat, and eggs, driving commercialization and large–scale production.

Private Sector and Cooperative Development: Expansion of organized dairy cooperatives (like Amul) and private poultry enterprises has enhanced efficiency, processing, and marketing infrastructure.

Export Opportunities: Growth in international demand for buffalo meat, leather, and dairy products has encouraged modernization and adherence to quality standards.

Women and Rural Employment: Women's participation in dairy, goat rearing, and poultry has led to income diversification and empowerment, making livestock a key livelihood source.

Infrastructure and Market Support: Development of cold chains, veterinary facilities, rural roads, and dairy collection centers has supported market integration and rural growth.

Research and Education: Establishment of veterinary universities, research institutes, and training programs has improved farmers' technical knowledge and productivity.

These factors collectively transformed Indian animal husbandry from a traditional activity into a dynamic, technology–driven sector contributing significantly to food security, employment generation, and rural economic development.

Table 2: Factors Influenced to Engaged in Animal Husbandry. (N=60)

Characteristics		Respondents	Rank
Distribution of Gender	Male	52	01
	Female	08	02
Distribution of Age	25 to 30	10	03
	30 to35	17	02
	35 to40	25	01
	40 and above	08	04
Education Qualification	Illiterate	06	04
	Primary and Higher Primary	16	03
	PUC and above	20	01
	Degree and above	18	03
Occupation	Agriculture	30	01
	Agriculture and Business	20	02
	Only Goat and Sheep rearing	10	03
Farmer Group (Farm Size)	Small	15	02
	Medium	35	01
	Large	10	03
Years of experience in Animal husbandry	Up to 5year	10	04
	5 to 10 years	16	02
	10 to 15 years	20	01
	Above 15year	14	03
Species	Cattle	23	01
	Sheep	12	03
	Goats	15	02
	Poultry	10	04
Share of Income from Animal Husbandry	Less than 2.5 lakhs	12	03
	2.5 to 5 lakhs	22	02
	5 lakhs and above	26	01
Factor Influence to involved in Animal Husbandry	Family Profession	12	03
	For Additional Income	10	04
	Influenced by Succeed Farmers	23	01
	Guaranteed Regular Income	15	02
Factors Contributing the Transformation in Animal Husbandry	Technology Adoption	82	01
	Government Support	72	02
	Infrastructure Development	32	05
	Farmer Training	41	04
	Market Access	53	03

(Source: field survey)

Table 2 explore that the detailed Explanation of Respondent Characteristics and Transformation Factors in Animal Husbandry

Gender: The majority of livestock farmers in the study are male (52), while only 8 are female, highlighting that animal husbandry in Mysore district is predominantly a male-dominated profession. This may reflect cultural norms, physical demands of livestock management, or limited participation of women in commercial livestock farming.

Age: The age distribution shows that most respondents belong to the 35–40 years age group (25), followed by 30–35 years (17), 40 and above (8), and 25–30 years (10). This indicates that middle–aged farmers are the most active and experienced in animal husbandry, combining physical capability with accumulated knowledge, while younger and older farmers represent smaller proportions.

Education: In terms of educational qualifications, PUC and above (20) is the largest group, followed closely by degree and above (18), primary and higher primary (16), and illiterate (6). This suggests that a significant proportion of farmers are educated enough to understand and adopt modern technologies and training programs, which may contribute to the sector's transformation.

Occupation: Most respondents primarily practice agriculture (30), followed by agriculture combined with business (20), and only goat and sheep rearing (10). This indicates that livestock farming is often integrated with broader agricultural activities, providing multiple sources of income.

Farmer Group (Farm Size): Medium–sized farms (35) dominate, followed by small farms (15) and large farms (10). The prevalence of medium–scale farms suggests that a balance of manageable livestock numbers and investment capacity facilitates better adoption of modern practices.

Experience in Animal Husbandry: The majority of respondents have 10–15 years of experience (20), followed by 5–10 years (16), above 15 years (14), and up to 5 years (10). This indicates that farmers with longer experience are more likely to adopt improved practices and contribute to the transformation of the sector.

Species: The dominant species reared is cattle (23), followed by goats (15), sheep (12), and poultry (10). The preference for cattle reflects traditional livestock patterns and market demand for milk, while smaller livestock like goats and sheep serve as additional income sources.

Share of Income from Animal Husbandry: A majority of respondents earn above 5 lakhs (26), followed by 2.5–5 lakhs (22), and less than 2.5 lakhs (12). This demonstrates that animal husbandry is a significant source of income and livelihood for most farmers in the study area.

Factors Influencing Participation in Animal Husbandry: The

primary reason for involvement is being influenced by successful farmers (23), followed by guaranteed regular income (15), family profession (12), and additional income (10). Social influence, income stability, and tradition are key motivators in pursuing livestock farming.

Factors Contributing to the Transformation in Animal Husbandry: Analysis of transformation factors shows that technology adoption (82) is the most influential factor, followed by government support (72), market access (53), farmer training (41), and infrastructure development (32). This indicates that modernization, facilitated by technology and supportive policies, is the primary driver of sectoral transformation. Market access and training also play important roles, while infrastructure development, though essential, currently has a relatively lower impact.

Overall, the data suggest that animal husbandry in Mysore district is predominantly practiced by educated, middle-aged male farmers with medium-sized farms and substantial experience. The sector's transformation is strongly influenced by technology adoption and government support, with secondary contributions from market access, training, and infrastructure. These insights are critical for policymakers, development agencies, and researchers aiming to enhance productivity, income, and sustainability in livestock farming.

Hypothesis Testing

Hypothesis of the Study

- There is a significant relationship between the identified factors (technology adoption, government support, infrastructure, training, market access) and the transformation of animal husbandry.

Regression Model Summary

- Dependent Variable: Transformation Level
- R-squared: 0.662 (66.2% of variation in transformation is explained by the five factors)
- F-statistic: 21.19, $p < 0.001$ (overall model is statistically significant)

Coefficients and Significance

Factor	Coefficient	p-value	Interpretation
Technology Adop-tion	0.408	0.000	Highly significant; greater adoption strongly increases transformation
Government Sup-port	0.359	0.000	Highly significant; government schemes positively impact transformation

Infrastructure De–velopment	0.161	0.009	Significant; better infrastructure con–trib–utes to modernization
Farmer Training	0.203	0.000	Highly significant; education/training improves transformation outcomes
Market Access	0.267	0.000	Highly significant; access to markets en–hances transformation
Intercept (constant)	–0.637	0.468	Not significant

The analysis confirms that all five factors technology adoption, government support, infrastructure development, farmer training, and market access have a positive and significant impact on the transformation of animal husbandry in India. Among them, technology adoption and government support are the strongest contributors. The model explains 66% of the variation in the transformation level, indicating a good fit.

Conclusion

India, the world's largest milk producer and second–largest pro–ducer of fruits and vegetables, has been progressively strengthening its agricultural and animal husbandry sectors to meet both domestic and global demands. The animal husbandry sector has undergone a notable transformation in recent decades, driven by increased production of milk, eggs, and meat, adoption of modern technologies, and supportive govern–ment initiatives. Modernizing the sector is crucial to overcoming chal–lenges such as low productivity, poor animal health, and limited market access, which have traditionally constrained rural livelihoods. This study explores that by historical data from 1956 to 2019 reveal significant struc–tural and compositional changes in India's livestock population. The total livestock population increased from 306.6 million in 1956 to 536.76 mil–lion in 2019, indicating a growth of about 75%, reflecting economic de–velopment, evolving agricultural systems, and changing consumer de–mand. Multiple regression analysis was employed to identify factors influencing transformation. Results indicate that technology adoption (β = 0.41), government support (β = 0.36), infrastructure development (β = 0.16), farmer training (β = 0.20), and market access (β = 0.27) all posi–tively and significantly contribute to the sector's transformation. The model explains 66% of the variation in the transformation level, indicating a good fit. Among these, technology adoption and government support emerged as the most significant drivers, emphasizing that modernization and policy support are critical to the continued development of India's animal husbandry sector. These findings provide valuable insights for

policymakers, researchers, and practitioners aiming to enhance productivity, sustainability, and rural livelihoods through the modernization of livestock systems.

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