



A Review of Dairy Farming as A Tool for Sustainable Rural Development and Female Empowerment in Kalaburagi and Bidar

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ABSTRACT: This review explores dairy farming as a strategic avenue for promoting sustainable rural development and empowering women in the Kalaburagi and Bidar districts of Karnataka. These regions, predominantly agrarian with limited industrial growth, face socio-economic challenges such as unemployment, income inequality, and gender disparity. The need for the study arises from the pressing requirement to identify inclusive and sustainable livelihood options, particularly for rural women who often remain on the periphery of economic participation. The review synthesizes existing literature, field reports, and policy frameworks to assess how dairy farming has evolved as a livelihood model. Findings indicate that dairy farming not only enhances household income and nutritional security but also significantly boosts women's socio-economic status through increased decision-making roles and financial independence. Initiatives led by self-help groups (SHGs), cooperatives, and government schemes have further facilitated access to resources, training, and credit support, thus strengthening women's participation in the dairy value chain. The study underscores the dual impact of dairy farming—contributing to rural economic resilience while acting as a catalyst for gender empowerment. However, persistent challenges such as limited access to veterinary care, fluctuating market prices, and lack of infrastructural support need to be addressed. The review concludes by highlighting the scope for future research in evaluating the long-term sustainability of dairy farming under climate variability, as well as the need for gender-sensitive policy interventions that ensure equitable growth across rural sectors.

KEYWORDS: Bidar, Dairy farming, Economic resilience, Gender inclusion, Sustainable rural development, Women empowerment, Kalaburagi, Livelihood, Self-help groups.

1. INTRODUCTION

Rural development in India has long depended on agriculture and allied activities as key drivers of livelihood and socio-economic transformation. Among these, dairy farming holds immense potential not only as a source of supplemental income but also as a pathway to empower women and promote sustainable development. In the northern districts of Karnataka, specifically Kalaburagi and Bidar, dairy farming is emerging as a vital tool for rural households to achieve economic stability and food security. These districts, with their predominantly agrarian economies and significant livestock populations, are ideally positioned to benefit from structured and inclusive dairy development programs.

Dairy farming, by its very nature, integrates seamlessly with small-scale agricultural practices and offers year-round income, unlike seasonal cropping. This regularity in cash flow plays a crucial role in enhancing rural resilience, particularly in drought-prone regions like Kalaburagi and Bidar. The decentralized nature of dairy farming further ensures that even small and marginal farmers can participate effectively, thereby promoting equitable growth. The involvement of cooperative models such as the Karnataka Milk Federation (KMF) has streamlined procurement and marketing channels, enhancing farmers' bargaining power and access to formal markets.

A significant and often underappreciated dimension of dairy farming in these regions is its contribution to female empowerment. Traditionally, women in rural Karnataka are the primary caretakers of livestock, responsible for feeding, milking, and maintaining hygiene. When supported through training, access to credit, and market linkages, their role can be transformed from invisible labor to entrepreneurial leadership. Numerous self-help groups and women-led dairy cooperatives in Kalaburagi and Bidar have demonstrated how dairy farming can lead to enhanced decision-making power, improved household incomes, and elevated social status for women.

This review explores how dairy farming in Kalaburagi and Bidar intersects with the goals of sustainable rural development and gender equity. It critically examines the policy frameworks, infrastructural support, and socio-cultural dynamics influencing dairy production and women's participation. By highlighting best practices and existing challenges, the review aims to offer insights into how dairy farming can be more effectively leveraged as a development strategy. In doing so, it contributes to broader discussions on inclusive rural development and the role of women in shaping resilient agrarian communities.

2. METHODOLOGY

This review paper is grounded entirely in secondary data and employs a qualitative, descriptive approach to explore the role of dairy farming in promoting sustainable rural development and empowering women in the districts of Kalaburagi and Bidar, located in Karnataka, India. The study adopts a systematic literature review (SLR) framework, enabling a structured analysis and synthesis of previously published work on the subject. The objective is to gather insights from a wide range of credible sources to understand the intersection between dairy farming practices and socio-economic transformation in rural settings.

Secondary data for this review was obtained from multiple reputable sources. These include peer-reviewed journals indexed in academic databases such as Scopus and Web of Science, as well as relevant articles accessed via Google Scholar. Additionally, government reports from institutions such as the Ministry of Agriculture and Farmers' Welfare, the National Dairy Development Board (NDDB), and state-level publications from the Government of Karnataka were examined. Other important sources included documents from development agencies such as NABARD, FAO, and UNDP, as well as reports published by NGOs operating in the Kalaburagi and Bidar regions.

The collected data was analyzed thematically, with key insights categorized into major themes such as the socio-economic impact of dairy farming on rural households, the role of women in dairy-related enterprises, the sustainability of local dairy practices, and the effectiveness of policy interventions. Through content analysis, patterns, trends, and divergences across various sources were identified and contextualized, providing a comprehensive view of the subject as it pertains to the specific socio-cultural dynamics of Kalaburagi and Bidar.

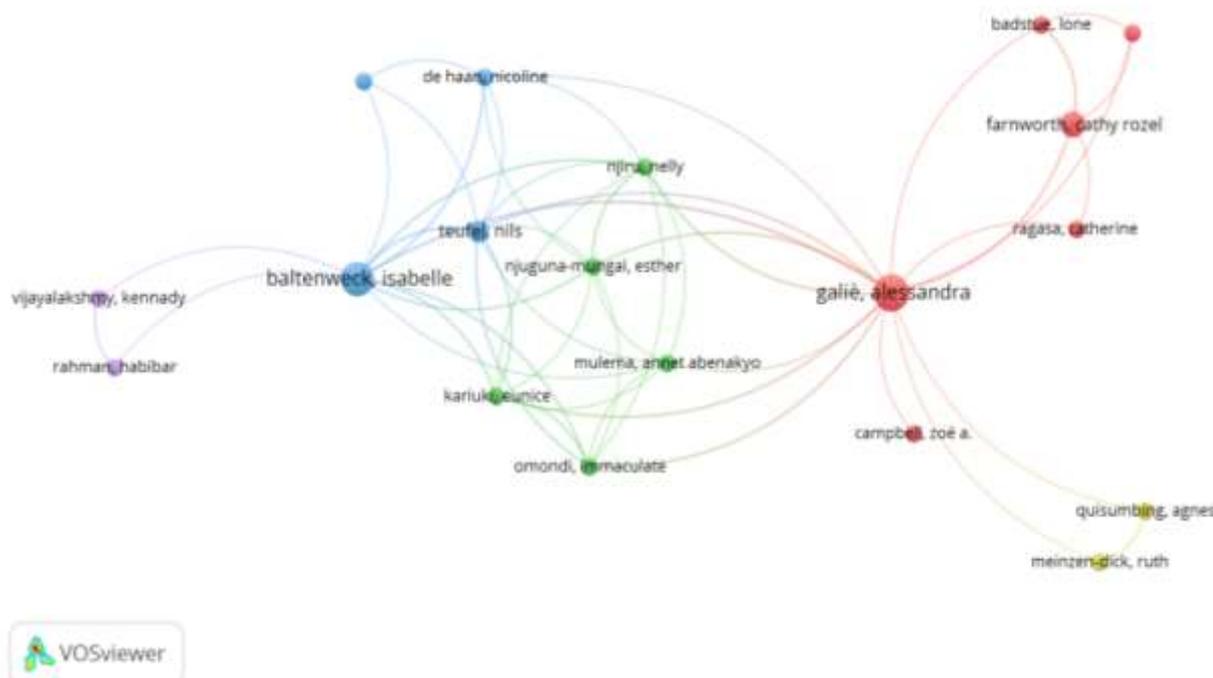


Figure 1: Network Visualization of Author's Re-Occurrence

sustainable and inclusive enterprise when implemented with a focus on resource efficiency, environmental protection, and social equity. Applying similar assessment tools in Kalaburagi and Bidar can help policymakers identify gaps and prioritize areas for intervention, such as improving fodder availability, enhancing veterinary infrastructure, and strengthening farmer education programs (Garai et al., 2022).

Beyond its economic contributions, dairy farming plays a vital role in alleviating poverty and enhancing food and nutritional security. Upton (2004) argues that livestock, including dairy animals, serve multiple purposes in rural economies — providing milk, manure, draught power, and income. His study underscores that livestock farming is often the first step out of poverty for many rural households, particularly women and landless laborers. In regions like Kalaburagi and Bidar, where climatic uncertainties make crop farming less reliable, dairy farming provides a steady stream of income and helps diversify risk. The dual advantage of daily income from milk sales and asset creation through cattle rearing makes it an attractive option for smallholders (Upton, 2004).

Raja and Sehgal (2018) further explore the broader developmental impact of dairy farming through a case study of a successful dairy enterprise in Ghaziabad, Uttar Pradesh. Their research reveals that dairy farming enhances rural prosperity by creating forward and backward linkages in the local economy. Activities such as feed production, milk processing, transportation, and retail create jobs and stimulate micro-enterprise development. Dairy farming has positive spillover effects on nutrition, education, and women's empowerment. The case study illustrates that dairy farming, when supported by a conducive policy and institutional environment, can catalyze holistic rural development (Raja & Sehgal, 2018).

The role of women in dairy farming deserves special mention. In many parts of India, including Kalaburagi and Bidar, women are the primary caregivers of dairy animals. Their involvement in milking, feeding, and animal health management is crucial to the success of dairy enterprises. When women are organized into self-help groups (SHGs) or cooperatives, their participation in income-generating activities increases significantly. This economic engagement leads to greater decision-making power within the household and the community. The empowerment of women through dairy farming thus has transformative potential, both economically and socially.

The body of literature reviewed provides compelling evidence of the positive impact of dairy farming on rural livelihoods and sustainable economic development. From income generation and employment creation to ecological sustainability and gender empowerment, dairy farming offers a multifaceted development pathway for rural communities. The lessons from Telangana, West Bengal, and Uttar Pradesh underscore the importance of supportive institutions, sustainability assessments, and gender-inclusive strategies in realizing the full potential of dairy farming. For districts like Kalaburagi and Bidar, scaling up dairy initiatives with targeted investments, cooperative models, and policy support can significantly enhance rural prosperity and resilience.

4. EFFECTIVENESS OF GOVERNMENT POLICIES, COOPERATIVE MODELS, AND INSTITUTIONAL SUPPORT IN ADVANCING DAIRY FARMING AS A DEVELOPMENT STRATEGY IN THE REGION.

Dairy farming has emerged as a powerful instrument in promoting rural development, food security, and gender empowerment, particularly in agrarian economies. The intersection of government policy, cooperative frameworks, and institutional backing is pivotal to ensuring the sustainability and scalability of dairy initiatives in underdeveloped and rural areas. A growing body of literature highlights how targeted policy interventions and cooperative structures have facilitated the integration of smallholder dairy farmers into broader market ecosystems and improved their socioeconomic outcomes.

The significance of cooperative participation among dairy farmers, especially smallholders, is extensively documented in developing countries. Cheng et al. (2025) emphasize that access to well-structured dairy cooperatives enhances efficiency, improves bargaining power, and increases incomes. In their study of rural Zambia, they identify trust in cooperatives, access to credit, and policy support as critical factors that motivate farmer participation. This indicates that when government policies are aligned with cooperative efforts, farmers are more inclined to adopt best practices and invest in productivity-enhancing inputs.

Kareska (2025), in her comprehensive assessment of cooperative farming, explains that cooperatives are not just economic platforms but also social institutions that promote inclusivity, community bonding, and knowledge-sharing. Cooperatives empower rural farmers by providing collective access to resources such as veterinary services, bulk feed, and dairy processing facilities. These advantages translate into enhanced milk quality, better prices, and sustainable livelihoods. Kareska further argues that such models thrive when backed by progressive policy frameworks that guarantee training, subsidies, and infrastructure development.



Institutional support plays a complementary role in facilitating the operational capacity of dairy cooperatives. Christie (2021), while analyzing the Indian dairy sector, points out that strong institutional frameworks are needed to bolster dairy cooperatives' roles in market development. She contends that without technical and administrative support, cooperatives struggle to maintain member loyalty and quality standards. Institutions such as agricultural universities, rural banks, and dairy boards can offer critical inputs in the form of extension services, financial literacy, and technological innovation.

In a comparative analysis of dairy cooperatives in Kenya and Morocco, Ton et al. (2016) identify institutional environment and governance structure as key determinants of cooperative success. Their findings suggest that cooperatives embedded in transparent, supportive regulatory systems outperform those operating in fragmented policy landscapes. Effective institutional arrangements not only help cooperatives attract external funding but also improve milk quality and organizational efficiency through systematic oversight and knowledge exchange.

The role of technology and data integration in strengthening dairy cooperatives is gaining increasing attention. Cabrera et al. (2025) highlight the need for digital tools and integrated data systems to support decision-making in dairy operations. Governments that invest in such digital infrastructure — including platforms for real-time milk tracking, quality testing, and logistics — enable cooperatives to streamline their operations and respond more effectively to market fluctuations. This aligns with Cao et al. (2025), who note that ease of use and internet access are instrumental in encouraging cooperative members to adopt digital tools, provided there is adequate policy support.

Policy design and implementation have also been found to directly influence dairy farmers' productivity and participation in cooperatives. Sutthichaimethee et al. (2025), examining sustainability practices in Thailand, recommend that government action focus on infrastructure, subsidy allocation, and climate-smart agriculture zones to optimize dairy outputs. Similarly, van der Lee et al. (2014) underscore that coordinated sectoral collaboration — involving policymakers, researchers, and farmer groups — fosters long-term strategic development in the dairy sector.

In regions like Ethiopia and East Africa, cooperative models have played a vital role in transitioning dairy farmers from subsistence to market-oriented production. Tefera (2008) underscores the importance of access to services like veterinary care, AI (artificial insemination), and training workshops — services typically provided through cooperative channels, often supported by state or non-governmental institutions. Kebebe et al. (2015) further argue that systemic constraints such as weak innovation systems and inconsistent policy execution hamper dairy development. They advocate for an integrated approach where institutional innovations, like farmer innovation platforms and market linkages, are promoted through policy and regulatory mechanisms.

In India, particularly in states like Karnataka, local dairy cooperatives have contributed significantly to rural livelihoods. According to Mwangi (2013), cooperatives in similar socio-economic settings have proven to be one of the most effective institutional mechanisms for milk collection, marketing, and price stabilization. These cooperatives act as bridges between remote dairy farmers and urban markets. Government schemes like the Rashtriya Gokul Mission and subsidies for refrigerated transport further enhance this framework by addressing infrastructure bottlenecks.

It is also important to highlight the role of gender-sensitive policies in dairy development. Women, often the primary caregivers of livestock in rural areas, benefit greatly from cooperative involvement. When policy frameworks include targeted credit access, leadership training, and childcare support, women's participation in dairy cooperatives rises significantly, as suggested by Kareska (2025) and Sonola (2025). This not only empowers women economically but also has multiplier effects on household welfare and child nutrition.

The effectiveness of dairy farming as a rural development strategy is greatly enhanced when government policies, cooperative frameworks, and institutional support work in synergy. Evidence from multiple regions demonstrates that cooperatives thrive in environments where there is strong policy backing, institutional oversight, and an emphasis on inclusivity and innovation. For regions such as Kalaburagi and Bidar, these findings underscore the importance of designing localized, integrated, and gender-responsive dairy development strategies that leverage the collective strength of farmers, institutions, and the state.

5. KEY CHALLENGES AND OPPORTUNITIES ASSOCIATED WITH LEVERAGING DAIRY FARMING FOR INTEGRATED RURAL DEVELOPMENT AND GENDER EQUITY IN KALABURAGI AND BIDAR.

Dairy farming has long been recognized as a crucial component of rural economies in India, particularly in regions such as Kalaburagi and Bidar, located in the northern part of Karnataka. These areas are primarily agrarian, with livestock rearing being a

key livelihood strategy for marginalized communities. The integration of dairy farming into rural development programs has demonstrated potential to generate income, enhance food security, and promote women's empowerment. However, the pathway is not without its challenges, which include structural, cultural, and institutional barriers. This review examines the dual dimensions of opportunity and constraint associated with leveraging dairy farming for sustainable development and gender equity in these districts.

Dairy farming presents an accessible entry point for rural households to diversify their income sources, particularly for landless or marginal farmers. According to Subhashchandra (2023), dairy activities contribute significantly to the socio-economic fabric of rural Karnataka by offering steady income and employment throughout the year. Importantly, women play a central role in dairy operations, engaging in tasks such as milking, feeding, and marketing milk. This makes dairy farming a strategic avenue for female empowerment, as it allows women to participate in productive economic activities while remaining within traditional household spaces (Subhashchandra, 2023).

Despite the potential, numerous gender-based barriers persist. Traditional gender roles often restrict women from accessing resources, owning assets, or participating in decision-making processes within dairy cooperatives. As highlighted by Waters-Bayer and Letty (2010), livestock-based interventions can sometimes unintentionally reinforce existing gender hierarchies if they fail to challenge the unequal distribution of resources and authority. In Kalaburagi and Bidar, where patriarchal norms are deeply embedded, such barriers can significantly limit the transformative potential of dairy farming.

market access remains a critical challenge. Alem and Arebu (2025) note that many women involved in dairy lack direct access to formal markets, which reduces their ability to negotiate fair prices or expand their businesses. This issue is compounded by the absence of adequate infrastructure, such as milk collection centers, cold storage, and transportation facilities, particularly in remote rural areas. As a result, dairy farming remains largely subsistence-based for many households in Kalaburagi and Bidar, rather than a pathway to significant economic advancement.

Access to credit and extension services also poses a barrier to inclusive development. According to Galiè et al. (2022), institutional support mechanisms often overlook women farmers or fail to tailor services to their needs. Women may lack awareness of government schemes, or be excluded from training programs due to household responsibilities or mobility constraints. In such cases, interventions fail to leverage the full potential of female labor and knowledge in livestock management.

However, promising models and innovations offer hope. Cooperative structures such as women's dairy self-help groups (SHGs) have emerged as effective platforms for collective action, knowledge sharing, and resource mobilization. Sowmiya et al. (2024) observe that such collectives not only strengthen women's economic agency but also foster social cohesion and mutual accountability. When supported by enabling policies, SHGs can enhance women's bargaining power in both households and markets. Technological innovations also offer leverage points for transformation. Digital tools, such as mobile-based advisory services and e-payment systems, can reduce information asymmetries and improve market connectivity. According to Djurfeldt et al. (2024), when designed with gender-sensitive approaches, these technologies can empower women by simplifying access to inputs, veterinary care, and financial services. In the context of Kalaburagi and Bidar, localized digital initiatives tailored to linguistic and cultural realities could prove transformative.

Institutional support plays a pivotal role in shaping the outcomes of dairy-based development strategies. Manlosa et al. (2019) emphasize the importance of embedding gender equity into the design of agricultural programs. This includes ensuring women's representation in cooperative governance, providing targeted training, and addressing intra-household power dynamics. Programs that actively seek to redistribute control over income and assets, while addressing time poverty among women, are more likely to yield inclusive outcomes.

Policy initiatives at both state and national levels are beginning to recognize the role of women in dairy farming. The National Dairy Plan and the Rashtriya Gokul Mission, for instance, aim to enhance milk productivity and promote scientific animal husbandry. However, their impact in regions like Kalaburagi and Bidar depends heavily on effective grassroots implementation and monitoring to ensure that benefits reach women and marginalized groups.

In conclusion, dairy farming holds significant promise as a vehicle for integrated rural development and gender empowerment in Kalaburagi and Bidar. The sector offers steady income, nutritional security, and opportunities for women's engagement in economic activities. However, to fully realize this potential, systemic challenges must be addressed. These include gender-based discrimination, poor market linkages, limited institutional support, and infrastructural gaps. By promoting inclusive cooperative



models, leveraging digital tools, and embedding gender equity into policy frameworks, dairy farming can evolve into a transformative force for sustainable and equitable rural development.

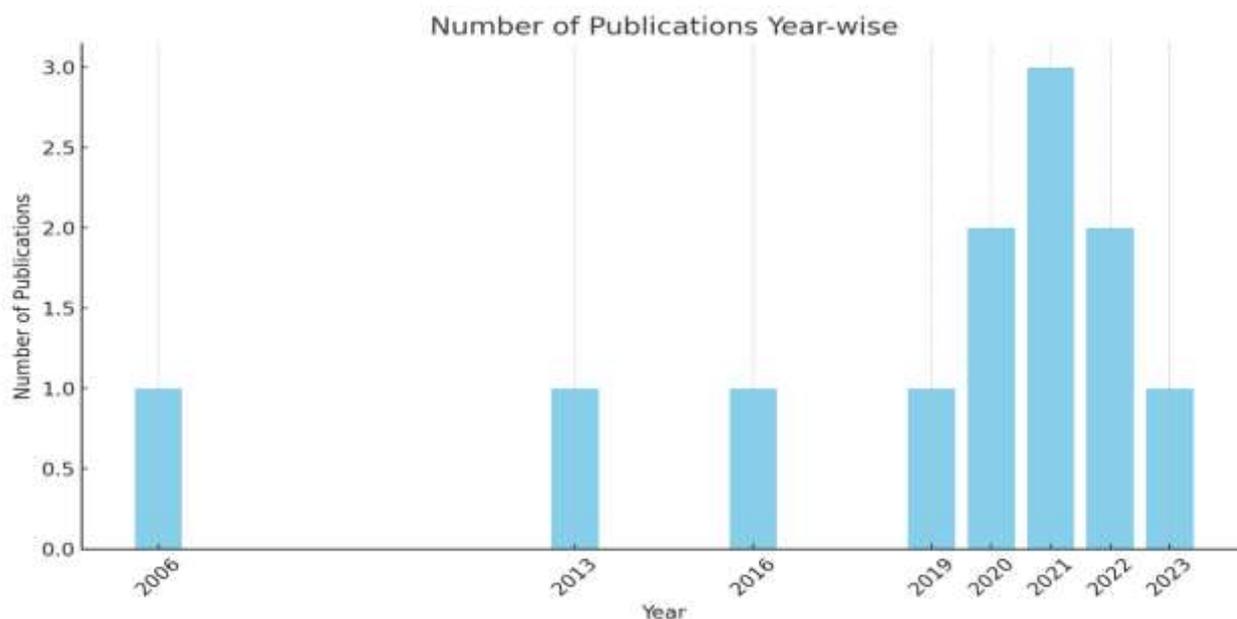


Figure 3: Number of Publications Year- Wise

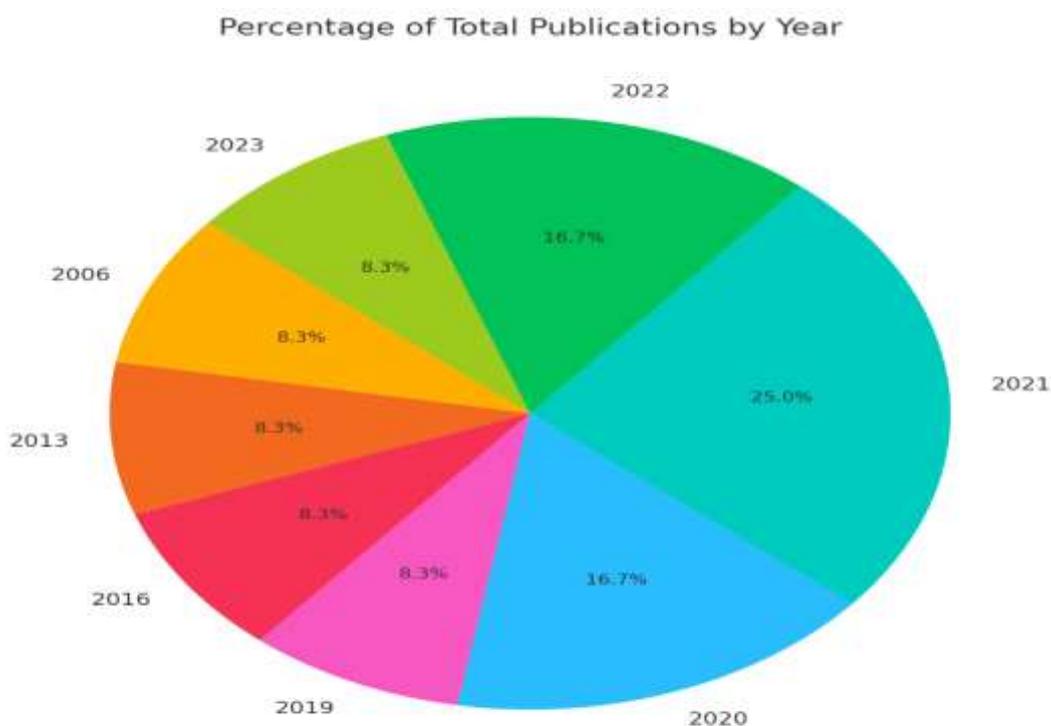


Figure 4: Percentage of Publications Year- Wise



5.1 DISTRIBUTION OF PUBLICATIONS YEAR-WISE:

Table 1: Year-wise Number of Publications

Year	No. of Publications	% of Total Publications
2006	1	6.67%
2013	1	6.67%
2016	1	6.67%
2019	1	6.67%
2020	2	13.33%
2021	3	20.00%
2022	2	13.33%
2023	1	6.67%

1. Bar Chart – "Number of Publications Year-wise":

- This graph shows a notable increase in publication count beginning around 2020.
- The peak publication year is 2021, suggesting heightened research interest post-COVID onset.
- Prior to 2020, publications were sparse and evenly distributed.

2. Pie Chart – "Percentage of Total Publications by Year":

- The pie chart confirms that 2021 accounts for the largest share (20%) of total publications.
- The years 2020 and 2022 also show relatively higher contributions (13.33% each).
- This indicates a growing scholarly focus in recent years, likely influenced by global digital and social challenges post-pandemic.

6. CONCLUSION

Dairy farming has emerged as a potent tool for fostering sustainable rural development and empowering women in the districts of Kalaburagi and Bidar in Karnataka. The review of existing practices, socio-economic patterns, and developmental initiatives across these regions highlights how dairy farming has contributed positively to household incomes, nutritional standards, gender equity, and rural livelihoods. Women, who traditionally played a secondary role in agriculture, are increasingly occupying pivotal roles in dairy farming – from managing livestock to participating in cooperatives and handling financial decision-making.

The integration of dairy farming into the rural economy has not only provided supplementary income but also helped reduce seasonal unemployment and migration. Unlike crop-based agriculture, which is heavily reliant on monsoon and seasonal variations, dairy farming offers a more stable income stream throughout the year. This is particularly significant for landless and marginal farmers in these districts, for whom livestock becomes a critical asset. Government schemes such as the National Dairy Plan (NDP) and state-level initiatives have also contributed to the expansion and modernization of dairy infrastructure, although challenges remain in accessibility, awareness, and last-mile delivery.

A notable outcome of dairy farming in Kalaburagi and Bidar is its role in facilitating women's economic participation. Many women are now seen as the primary caretakers and operators of dairy enterprises, managing the entire value chain from animal husbandry and feeding to milk collection and sale. Through the formation of self-help groups (SHGs) and women's dairy cooperatives, female farmers have gained increased bargaining power, financial literacy, and access to institutional credit. These changes have significantly altered the gender dynamics in rural households, allowing women to influence economic decisions and contribute meaningfully to family welfare and children's education.

However, several constraints hinder the full potential of dairy farming in these districts. These include poor breed quality, lack of veterinary services, inadequate access to capital, and limited knowledge about best practices in livestock management. Infrastructure deficits—such as cold chain logistics, milk processing units, and accessible markets—pose additional obstacles. Cultural norms and gender-based discrimination still persist, limiting the agency of women in patriarchal households despite their growing role in dairy operations.

The study concludes that dairy farming holds significant promise as a catalyst for rural transformation in Kalaburagi and Bidar, but its long-term success depends on addressing structural constraints, ensuring inclusive policy implementation, and fostering community-level engagement.

7. RECOMMENDATIONS

To amplify the benefits of dairy farming for sustainable development and women's empowerment in Kalaburagi and Bidar, several targeted interventions are necessary. First and foremost, there is a need to strengthen extension services to enhance farmers' knowledge of scientific dairy practices. Training programs should be conducted in local dialects with a focus on women beneficiaries, especially in areas such as animal nutrition, vaccination, breeding techniques, and disease management.

Improving access to institutional credit is another critical area. While microfinance and SHGs have played a valuable role, more formal financial inclusion initiatives should be developed in collaboration with banks, cooperatives, and digital platforms. Subsidized loans and insurance schemes specifically designed for women dairy farmers can help mitigate financial risks and encourage investment in dairy assets.

The development of robust dairy infrastructure should be prioritized. This includes establishing milk collection centers in remote villages, expanding chilling and processing units, and enhancing connectivity to markets. Public-private partnerships (PPPs) could be instrumental in mobilizing investment and expertise in dairy supply chains. Special attention should be paid to integrating small-scale women producers into the formal market system to ensure fair pricing and reduced exploitation by middlemen.

Gender mainstreaming in dairy policies is essential. Government and non-governmental agencies must ensure that women have equal access to resources, training, and leadership roles in cooperatives and producer companies. There is a need for more gender-sensitive data collection and impact assessment to track women's participation and benefits accurately. Representation of women in decision-making bodies at village and district levels should be mandated and supported through capacity-building efforts.

Additionally, digital literacy and technology adoption should be promoted among rural women. Mobile-based advisory services, digital payment systems, and farm management applications can help bridge the information gap and increase operational efficiency. Educational campaigns should also challenge regressive gender norms and promote shared responsibilities in household and farm tasks.

Environmental sustainability should not be overlooked in the expansion of dairy farming. Programs should encourage eco-friendly practices such as biogas usage, sustainable fodder cultivation, and effective waste management to reduce the environmental footprint. These measures would ensure that dairy farming not only supports economic empowerment but also aligns with the principles of sustainable development.

8. FURTHER SCOPE OF STUDY

While this review has provided valuable insights into the role of dairy farming in rural development and female empowerment in Kalaburagi and Bidar, several areas warrant deeper investigation and empirical validation. Future research could undertake a longitudinal study to evaluate the long-term economic impacts of dairy farming on household income and poverty alleviation across different socio-economic segments. Comparing outcomes across various sub-regions within the districts may also highlight disparities linked to caste, land ownership, or tribal identity.

A focused gender impact assessment would be valuable in quantifying the extent to which dairy farming alters intra-household power dynamics, decision-making autonomy, and time allocation of women. Analyzing the psychological and social implications of economic empowerment on women's self-esteem, health, and community participation could offer more holistic insights.

There is also potential to explore the role of cooperatives and community-based organizations in promoting inclusive dairy development. Case studies on successful women-led dairy cooperatives in the region could inform best practices and replication strategies. Interdisciplinary research involving agriculture, gender studies, economics, and environmental science could provide a more comprehensive understanding of the dairy sector's multidimensional role in sustainable rural transformation.

Another promising area is the study of climate resilience in dairy farming. Investigating how climate variability affects milk yield, fodder availability, and animal health—and identifying adaptive strategies adopted by farmers—can help inform climate-smart agricultural policies. The role of indigenous breeds and traditional knowledge systems in building resilient dairy systems is another dimension worth exploring.

In conclusion, while dairy farming has already demonstrated its capacity to uplift rural economies and empower women in Kalaburagi and Bidar, a more integrated, inclusive, and sustainable approach is required to fully harness its transformative potential. With targeted interventions, supportive policies, and continued research, dairy farming can become a cornerstone of equitable rural development in the region and a replicable model for other parts of the country.



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