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Dairy Farming In India And Abroad: A Study On Exploratory Review Of Literatures

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1.0. Abstract:

The dairy sector in India is contributing significantly to the national economy. India is the largest producer and consumer of milk in the world. Dairy farming is becoming more possible because of data-driven approaches used in Dairy sector. Dairy farming is one of the leading component of agricultural activities in almost all parts of the world including India. India is the world's largest producer of dairy products by volume and has the world's largest dairy animal population. Demand of milk is continuously increasing due to increasing population of the world. Dairy farming has been an important part of the agricultural scenario for thousands of years. India being a predominantly agrarian economy has about 70 per cent of its population living in villages, where livestock play a crucial role in the socio-economic life. Livestock provide high-quality foods such as milk, cheese, butter, ghee, etc. India is not only one of the top producers of milk in the world, but also the largest consumer of milk and milk products in the world. Due to the shortfall in supply, we have to import significant amounts of milk products to meet internal demand. Dairy farming is a form of agriculture that is dedicated to the production of milk and dairy products from the care and feeding of cattle, mainly dairy cows. Dairy farmers focus on managing the health, welfare, and milk production of animals to obtain the highest quantity and quality of milk possible.

1.1. Key words: Dairy Farming in India and Abroad, Dairy Sector, Animal Husbandry, Specific Guidelines, Review of Literature, Findings and Suggestions.

1.2. Introduction:

The dairy sector in India is contributing significantly to the national economy. India is the largest producer and consumer of milk in the world. There is immense scope of dairy farming in India. The demand for milk & milk product is increasing rapidly. It provides employment and supplementary income to a large number of farmers in India. It provides an excellent opportunity for self-employment of unemployed youth. It is an important source of income generation for small and marginal farmers and agricultural laborers in the rural area. Small-scale dairy farming in India is no doubt playing an important role in the total milk production and economy of our country. Most of the dairy farmers in India are raising animals in small-scale traditional methods. Around 70 per cent of small farmers in India are dependent on the rearing of livestock and dairying to supplement their farm income. Most of the milk procurement and sale in the country is through local private traders. The participation of cooperative society in the procurement of milk is varied across regions. Dairy cooperatives in Gujarat, Karnataka,

Tamil Nadu and Maharashtra account for more than a half of cooperative milk procurement in India. The total quantum of milk produced in the county during 2015-16 is 155.5 million tonnes, and the presently production milk production is 230 million tons per capita availability of milk is 459 grams per day (according to Basic Animal Husbandry Statistics Mo FAHD, DAHD, Government of India.

1.3. Meaning of Dairy Farming:

Dairy farming refers to the agricultural practice of raising livestock such as cows and buffaloes for the purpose of milk production, which plays a significant role in the economic activities of smallholder farmers in various regions. Dairy farming is the process of raising mother animals like cows, goats, donkeys, and other livestock to use their milk for humans. The most common dairy wholesale products include milk, cheese, budder, and creams. If you are wondering "are eggs dairy" the answer is no. Dairy farming also produces many common non-edible byproducts. Paint and colored paper are two examples of dairy farming byproducts.

1.4. Definitions of Dairy Farming:

1. Dairy farming can be defined as a form of agriculture that is dedicated to the production of milk and dairy products from the care and feeding of cattle, mainly dairy cows. Dairy farmers focus on managing the health, welfare, and milk production of animals to obtain the highest quantity and quality of milk possible. **2. Dairy farming can be defined as** the agricultural technique concerned with the long-term production of milk, which is then processed to obtain dairy products such as curd, cheese, yoghurt, butter, cream, etc. It involves the management of dairy animals such as cows, buffaloes, sheep, goat, etc.

1.5. Objectives of the Study:

The study shall have been the following specific objectives.

1. To study the Specific Guidelines for Good Dairy Farming Practices.

2. To study the Dairy Farming in Karnataka, India and Abroad.

3. To study the Findings and Suggestions of Dairy Farming.

1.6. Research Methodology:

This study is based on secondary data only; data will collect from such as E-book, Research Articles and Govt of Karnataka and Govt of India official websites. Basic Animal Husbandry Statistics MoFAHD, DAHD, Govt of India. Annual Report of National Dairy Development Board (NDDB). The above objectives are achieved by using secondary data collected from the various published reports, books and internet source.

1.7. Specific Guidelines for Good Dairy Farming Practices:

In developing individual, company or country-specific guidelines for good dairy farming practices (or on-farm quality assurance programmes), reference should be made to:

1. Codex Alimentarius: Food Hygiene and Basic Texts.
2. Codex: Recommended International Code of Practice - General Principles of Food Hygiene.
3. Codex: Draft Code of Hygienic Practice for Milk and Milk Products.
4. Codex Code of Practice on Good Animal Feeding.
5. FAO: Food Quality and Safety Systems - A training manual on food hygiene and the Hazard Analysis and Critical Control Point (HACCP) system.
6. IDF GMP Code for Milking with Automatic Milking Systems (if relevant).
7. OIE Code of Animal Health.

1.8. Review of Literatures:

A review of literature is the past research helps in identifying the conceptual and methodological issues relevant to the study area. This will enable to the researcher to collect relevant primary data and subject them to sound reasoning and meaningful interpretation. This chapter attempts a brief review of the relevant research literature related to the present study. Keeping in view, the objectives of the study area, reviews are presented under the following headings.

A. Dairy Farming in Karnataka.
B. Dairy Farming in India.
C. Dairy Farming in Other Countries.

A. Dairy Farming in Karnataka:

1. Ajit Basaragi and Kadam (2024), "Problems and Prospects of Dairy Farming in India: An Analysis of Karnataka State" The dairy sector is a key contributor to India's economy, providing employment, supplementary income, and self-employment opportunities, especially for small and marginal farmers. India is the largest producer and consumer of milk, with production reaching 230.6 million tons in 2023. While Uttar Pradesh leads in milk production, Karnataka ranks ninth, contributing 5.34% to the total. Despite the sector's potential, it faces challenges such as unorganized production, low productivity, inadequate feed, and poor veterinary care. Most dairy farmers operate on a small scale using traditional practices, with limited access to modern technology, credit, and insurance. Organized dairy plants process only 10% of milk, while local traders handle the majority. Climate change, inefficient supply chains, and animal diseases further affect dairy farming.

2. Pramod and Shankarappa (2024), "A Study on Operational Performance and Growth of Milk Federation in Karnataka" A Trend Analysis: The present study aims to analyze the performance and growth of milk federation in Karnataka state. Karnataka Cooperative Milk Producers' Federation Limited (KMF) is the apex body for the dairy co-operative movement in Karnataka. It is the second largest dairy co-operative amongst the dairy cooperatives in the country. In South India, it stands first in terms of procurement as well as sales. One of the core functions of the Federation is the marketing of Milk and Milk Products. The Brand 'Nandini' is the household name for pure and fresh milk and milk products. In Karnataka, as of 2023, there were 14 district milk unions covering all the districts of the state with 17550 dairy co-operatives registered, out of which, 15453 primary dairy cooperative societies are functioning under 16 district milk unions with an enrolment of 26 lakh milk producers under DCSs. The study focuses and majorly three major objectives are- to study the historical background and performance of KMF in Karnataka, to evaluate the trends in the growth and functioning of milk federation in Karnataka, and to analyze the DCSs, memberships, and milk production of KMF in the state.

3. Munishami Gowda and Yogish (2024), "An Economic Analysis of Dairy Sector in India with Special Reference to Milk Dairy Co-Operatives in Karnataka" Dairy activities play a predominate role in the Indian economy. Due to fail in agricultural crops the farmers not only depending upon cropping pattern alone, indeed they depend on other allied agricultural activities like poultry farming, fishing, agro based activities, family enterprises, food products. Among the allied agricultural activities, dairy is one of the prominent activities to the farmers. Dairying is not only cheap but also yield more returns. This is especially where more of woman are engaged in this activity. Due to various constraints in this dairy activity, cooperative sector play a very important role in not only protecting the dairy activities but also promote it with various polices and packages of cooperative sector. With this background, the present study is more relevant as well to identify various issues of the cooperative dairy sector both in Karnataka and in Tamilnadu.

4. Sathisha Rupasi Tiwari and Rakesh Roy (2018), "Performance of dairy animals in commercial dairy farms in Karnataka" Karnataka has been purposively selected due to its status as leading producer of milk and commercial dairy farming is in developing stage as compared to other states of the Southern India. In all, 135 respondents from 3 districts form the total sample size for the study having equal representation of small (10-20 milk animals), medium (21-40 milk animals) and large (>40 milk animals) commercial dairy farmers. The study shows that majority of respondents' dairy animals had good health score even though mastitis had a high incidence in majority of respondents' animals followed by Foot and Mouth Disease and Haemorrhagic septicaemia in the past two years. Majority (94.81%) of the respondents had adopted timely colostrum feeding followed by timely deworming (77.78%) among calf management practices. Mortality rate of calves was about 9 per cent during the preceding two years. The average milk yield, average peak yield, lactation length and dry period of commercial dairy farms were 10.25±2.52 litres, 13.48±2.80 litres, 295.51 days and 3.05±0.59 months respectively. The average age at first calving, average service period, average service / conception and calving interval of commercial dairy farm animals were 2.74±0.47 years, 119.59±13.45days, 2.62±0.58 months and 17.02±1.74 months respectively.

5. Parameswaranaik*, A.P. Verma and M.N. Sawant (2017), "Adaptation Strategies of Dairy Farmers to Combat Climate Variability in Karnataka State, India" Dairy farming plays a prominent role in strengthening India's rural economy. It has the potential to act as an instrument to bring about socio-economic transformation, but in recent days climate variability affects the dairy farming and it became the serious consideration. Climate

variability refers to the way climate fluctuates yearly above or below a long-term average value. It has been considered as one of the most serious long-term challenge faced by dairy farmers, in this context it is important to know about the adaptation strategies followed by the dairy farmers in combating the climate variability vagaries. The present study was conducted in purposively selected Northern dry zone of Karnataka with 120 dairy farmers, the major findings of the study were, Majority of the respondents were following adaptation strategies like keeping, promoting and interested in local breeds (60.83%), About 42.50 percent of dairy farmers made Changes in micro-climate in cattle shed/stall and 47.50 percent of respondents were providing extra concentrate, minerals supplementation and feed additives to their livestock etc. It was also found that all the adaptation techniques are local specific, require no external help and are inherently scientific. Dairy farmers used to follow the cost effective adaption strategies. Documentation and validation of such practices and techniques should be done and it can be used for further capacity building programmes.

B. Dairy Farming in India:

1. Subash Nallamuthu Saran Arul and Shanmugam Palanisamy (2024), "Formulation of Paneer from Coconut Milk Incorporated with Cow Milk" Coconut, Cocos nucifera L., is a tree that is cultivated for its multiple utilities, mainly for its nutritional and medicinal values. Coconut milk paneer is a good source of essential nutrients, including healthy fats, vitamins, and minerals. Coconut milk paneer is believed to have potential health benefits, including promoting heart health, boosting the immune system, and supporting healthy digestion. Coconut milk paneer also contains important vitamins and minerals that contribute to overall health and well-being. The objectives is to develop paneer using coconut milk and cow milk with different ratio. Physiochemical analysis are carried out by prepared paneer.

2. Gayathri, Bhakat and Mohanty (2023), "An outlook on commercial dairy farming in India: A review" The most coveted title of The largest producer of milk in the world" is persistent in the hands of India for several decades. The said title is made possible through the constant efforts made by the Government of India through the implementation of productivity enhancement and development programmes from time to time to upsurge milk production. This paradigm shift in milk production has been contributed by many factors viz., ART with semen of high yielders; awareness of farmers regarding scientific feeding and management; disease control and prevention by vaccination and shifting farmers from traditional rearing to commercial farming etc. Commercial dairy farming is entirely different from the commonly practiced farming activities followed by the villagers who rear few cows. Commercial production is an organized and well-planned venture that provides scientific inputs in breeding, housing, feeding, management, and marketing. Focus on critical analysis regarding the requirements for commercial dairy farming, constraints faced by the commercial farmers, threats and opportunities in the industry and all other relevant aspects are covered in the review for future planning by policy makers.

3. Jasdeep Singh Toor and Napinder Kaur (2022), "Extent of Indebtedness among Dairy Farmers of Rural Punjab" Aiming to analyses the indebtedness among the dairy farmers of rural Punjab, the present study has revealed that around two-fifth of the sampled households are under debt. The average amount of debt per sampled household is ₹321725. The average amount of debt per indebted households is ₹814003. A majority of the indebted households have borrowed for agricultural purposes, followed by for domestic needs, social ceremonies, dairying related requirements and repayment of past loans. Most of the indebted households have taken credit at the rate less than 6 per cent per annum, followed by in the range of 6 to 12 per cent per annum. Furthermost of the indebted households have taken loans from Commercial Banks, while the rest of them have approached Cooperative Societies, Regional Rural Banks, moneylenders and private finance companies.

4. Lyngkhoi R. Dipriya, Singh Basanta S., Singh Ram, Tyngkan Hehlangki (2022). "Trend Analysis of Milk Production in India" Dairy sector is a thriving enterprise in Indian agriculture showing colossal growth responsible for placing the country at the top position worldwide in milk production. This sector has seen a rising growth; however, there seems to be demand supply gap over the next few years. Under this backdrop, the study has been taken with the twin objectives of studying the trend and growth rate of production and per capita availability of milk and to forecast the production of milk through ARIMA modelling. The study is based on secondary data of milk production from 1989 to 2019. The growth was examined by estimating compound annual growth rate and the Autoregressive integrated moving average (ARIMA) methodology was applied for modeling and forecasting of milk production of India. Augmented dickey-fuller (ADF) test was used to determine the stationarity of the model after which it was used to forecast the future production. The CAGR of milk production

was higher in comparison to per capita availability (4.34 and 2.71 per cent per annum respectively). The forecast from the fitted ARIMA model show that the milk production is expected to be 244.7 million tonnes in 2024.

5. Vijayan (2014), "A study on consumer preference towards fluid milk in Kerala with special reference to Thrissur district" With rising income and increased production, milk has become an important part diet of the people in Kerala. It is consumed as raw milk and pasteurized milk. Differing socio-economic factors in terms of gender, age, education, employment, income and area have greater influence on frequency of milk consumption and the preference of milk type. The study analysed the consumers' milk consumption pattern and milk choice behavior under different socio-economic and demographic variables. Milk consumed mostly once in a day and it is used in various forms. The study revealed that the socio-economic characteristics of individuals play a significant role in their milk consumption rate and consumption preference. Policy makers should support the dairy industry to increase the production and consumption of pasteurized milk.

C. Dairy Farming in Other Countries:

1. Syed H. Jafri et at all (2024), "Challenges and Solutions for Small Dairy Farms in the U.S.: A Review" Small-sized dairy farms are integral to the agricultural landscape, providing economic, social, and environmental benefits to rural communities. However, they face growing challenges, including market volatility, rising production costs, labor shortages, and complex regulatory demands. This review synthesizes the current literature on the economic and environmental obstacles confronting SSDFs and explores strategies to enhance their sustainability and competitiveness. Key barriers include limited access to capital, high feed and energy expenses, and difficulties in adopting new technologies due to financial constraints. SSDFs also struggle to compete with larger farms benefiting from economies of scale and increased market power. Potential solutions include strengthening cooperative models, implementing diversification strategies, and leveraging policy support for targeted financial assistance and technology adoption. Case studies of successful SSDFs show that transitioning to organic production, adopting climate-smart techniques, and focusing on niche markets can significantly improve profitability and resilience. This review emphasizes the need for tailored policy frameworks, innovative financial models, and collaboration among stakeholders to support SSDFs. Future research should prioritize understanding SSDF-specific financial dynamics, assessing the cost-effectiveness of technology adoption, and developing strategies to enhance market access and long-term sustainability in the U.S. dairy sector.

2. Lianne Lavrijsen-Kromwijk et at all (2024), "Impact of Automation Level of Dairy Farms in Northern and Central Germany on Dairy Cattle Welfare" An increasing number of automation technologies for dairy cattle farming, including automatic milking, feeding, manure removal and bedding, are now commercially available. The effects of these technologies on individual aspects of animal welfare have already been explored to some extent. However, as of now, there are no studies that analyze the impact of increasing farm automation through various combinations of these technologies. The objective of this study was to examine potential correlations between welfare indicators from the Welfare Quality® Assessment protocol and dairy farms with varying degrees of automation. To achieve this, 32 trial farms in Northern and Central Germany were categorized into varying automation levels using a newly developed classification system.

3. Dupontand and Franks (2008), "Diversification Activities on Dairy Farms in the South West of England" This paper examines the amount and type of diversification activities on 156 dairy farmers. About half had some diversification activity: the most common being 'accommodation and catering', 'agricultural services' and 'trading enterprises'. The types and incidence of activities reported were similar to those recorded in a large-scale study by the Centre for Rural Research at Exeter (CRR 2002) but greater than those reported by MDC (February 2007) and DEFRA (for the 2004/5 quota year). The reasons given for diversifying were, firstly, 'survival', secondly, 'government policy' and thirdly, 'personal circumstances'. This shows the importance of income pressures on business development, that many dairy farmers in the South West are reducing their dependence on the milk cheque and raises issues related to the future production base of UK milk production.

4. Maki Eguchi (2005), "Analysing Dairy Farming in Japan through the TV Drama 'Natsuzora' ('Summer Sky')" As the global concern with animal welfare grows; the roles of animals in various cultural and historical settings need to be examined. This study analyses a popular Japanese TV show, Natsuzora ('Summer Sky'), aired in 2019, that shows the life of a dairy farm in post-war Japan from the 1940s to the 1970s, when the consumption and production of meat and dairy gradually increased with technological development. This is contrasted with the present time, against the backdrop of the Tokyo Olympics 2020, and a rise in awareness regarding animal welfare. The study analyses of the story of Natsuzora and the different reactions towards it from the Ministry of

Agriculture and the Animal Rights Center. It also scrutinizes the social and historical background of the drama by referring to agricultural statistics from the 1940s to the present.

5. Van Asseldonk et at all (1998), "Effects of Information Technology on Dairy Farms in The Netherlands: An Empirical Analysis of Milk Production Records" This study empirically quantified the effects of the adoption of an automated concentrate feeder, on-line measurement of milk production, and activity measurement on milk production and reproduction. The data comprised annual results of Dutch farms operating in a milk quota system from 1987 to 1996; data included both adopters and no adopters as well as farm results before and after adoption. The use of an automated concentrate feeder improved the annual carrier production of milk, milk protein, and milk fat (102, 4.95, and 5.52 kg per cow, respectively). In contrast, on-line measurement of milk production did not significantly affect milk production records. Calving interval was shortened by 5.7 d after the adoption of an activity measurement system but was not affected by the adoption of an automated concentrate feeder or by the measurement of on-line milk production.

1.9. Findings of the Study Area:

1. India is the largest producer and consumer of milk, with production reaching 230.6 million tons in 2023. While Uttar Pradesh leads in milk production, Karnataka ranks ninth, contributing 5.34% to the total.

2. In Karnataka, as of 2023, there were 14 district milk unions covering all the districts of the state with 17550 dairy co-operatives registered, out of which, 15453 primary dairy cooperative societies are functioning under 16 district milk unions with an enrolment of 26 lakh milk producers under DCSs.

3. Majority (94.81%) of the respondents had adopted timely colostrum feeding followed by timely deworming (77.78%) among calf management practices. Mortality rate of calves was about 9 per cent during the preceding two years.

4. Majority of the respondents were following adaptation strategies like keeping, promoting and interested in local breeds (60.83%), about 42.50 percent of dairy farmers made Changes in microclimate in cattle shed/stall and 47.50 percent of respondents were providing extra concentrate, minerals supplementation and feed additives to their livestock etc.

5. The average amount of debt per sampled household is ₹321725. The average amount of debt per indebted households is ₹814003. Most of the indebted households have taken credit at the rate less than 6 per cent per annum, followed by in the range of 6 to 12 per cent per annum.

6. The CAGR of milk production was higher in comparison to per capita availability (4.34 and 2.71 per cent per annum respectively). The forecast from the fitted ARIMA model show that the milk production is expected to be 244.7 million tonnes in 2024.

7. The use of an automated concentrate feeder improved the annual carrier production of milk, milk protein, and milk fat (102, 4.95, and 5.52 kg per cow, respectively).

8. The types and incidence of activities reported were similar to those recorded in a large-scale study by the Centre for Rural Research at Exeter (CRR 2002) but greater than those reported by MDC (February 2007) and DEFRA (for the 2004/5 quota year).

1.10. Suggestions of the Study Area:

1. FAO: Food Quality and Safety Systems - A training manual on food hygiene and the Hazard Analysis and Critical Control Point (HACCP) system.

2. Despite the sector's potential, it faces challenges such as unorganized production, low productivity, inadequate feed, and poor veterinary care.

3. Due to various constraints in this dairy activity, cooperative sector play a very important role in not only protecting the dairy activities but also promote it with various polices and packages of cooperative sector.

4. The objectives is to develop paneer using coconut milk and cow milk with different ratio. Physiochemical analysis are carried out by prepared paneer.

5. However, they face growing challenges, including market volatility, rising production costs, labor shortages, and complex regulatory demands.

6. The effects of these technologies on individual aspects of animal welfare have already been explored to some extent.

7. This review synthesizes the current literature on the economic and environmental obstacles confronting SSDFs and explores strategies to enhance their sustainability and competitiveness.

8. The dairy sector is a key contributor to India's economy, providing employment, supplementary income, and self-employment opportunities, especially for small and marginal farmers.

1.11. Concluding Remakes:

In today's milk and dairy industry, potential contamination with harmful physical, chemical, and biological hazards can occur at any stage of the milk production: on the farm, during storage and transport, in the processing plant, in the retail store, and even in the consumer's home. Therefore, actions must be taken to control microbial contamination at various points along the food chain. Practical interventions in the farm and dairy processing environments rely on the application of Food Safety Management Systems (FSMS) that allow the obtainment of milk and dairy products of acceptable quality and safety (Papademas and Bintsis, 2010). In particular, GMPs and good dairy farming practices at milking, storing and processing levels, which are the basic requirements for the application of an effective Hazard Analysis and Critical Control Points (HACCP) system at farm and dairy industry levels should be applied.

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