

Dairy Farming as a Sustainable Means of Livelihood: A Case Study of Imphal Dairy Farmers

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Abstract.

Dairy products are a substantial contributor to Manipur's food and protein supply. Many indigenous small farmers in Manipur are rearing dairy cattle. Manipur is considered one of the most suitable countries in the world for dairy farming. Dairy development has generated considerable employment by producing and marketing dairy products. This paper aims to determine whether small and medium scale dairy farming can be considered an alternative income-generating activity for the rural and urban poor in developing Manipur. The present study was conducted to learn about the practices of dairy farmers in the Imphal district of Manipur State. A simple random sampling technique was used to select dairy farmers. The total sample of 150 questionnaires was from dairy farms, and 85 were randomly collected from selected dairy farmers. The selected respondents were personally interviewed using a pre-tested, well-structured interview schedule to elicit information. They were actively involved in various aspects of dairy farming.

Keywords: Livelihood, dairy farmers, socio-economic, employability.

1. Introduction

Dairying is an important source of subsidiary income for small/marginal farmers and agricultural labourers. In addition to milk, animal manure provides a good source of organic matter for improving soil fertility and crop yields. The dung's go-bar gas is used as domestic fuel and to run engines for water from the wells. Dairy farming has been essential to agriculture for thousands of years. India's predominantly agrarian economy has about 70 per cent of its population living in villages, where livestock plays a crucial role in the socio-economic life. Livestock provide high-quality foods such as milk, cheese, butter, ghee, etc. India is one of the world's top milk producers and the largest consumer of milk and milk products. Due to a supply shortfall, we have to import significant amounts of milk products to meet internal demand. Agriculture and animal husbandry have a symbiotic relationship in which the agricultural sector provides feed and fodder for livestock, and livestock provide milk, manure, and draught power for various farm operations. The dairy sector is instrumental in bringing socio-economic transformation in India. It has created many employment opportunities and provides improved nutritional benefits.

Dairy farming has been considered a profitable venture in India. India has been the leading producer and consumer of dairy products worldwide. Since 1998, the dairy industry has continued to witness growth in the availability of milk and milk products. The demand for milk and milk products in India is driven by a growing population, rapid urbanisation, rising incomes, and the inclination of younger demographics to consume more milk. The Indian government has implemented policies to promote dairy farming and has allowed 100% foreign direct investment (FDI) in animal husbandry, food processing, and trading of food

products. However, it is essential to note that profitability in dairy farming can vary depending on various factors such as management practices, market conditions, and input costs. Large-scale dairy farms with several hundred cows are more profitable than small-scale farms. In 1970, India was a milk-deficient country with a mere 20 million tonnes of production. It has now become the world's largest milk producer, accounting for 18.5% of global milk production with more than 160 million tonnes. Milk production increased significantly from 137.7 million tonnes in 2013-2014 to 164 million tonnes in 2016-2017. During 2011 – 2014, the annual growth rate of milk production was 4%, which improved to 6% during 2014-2017, whereas global milk production grew by only 2% during the same period. Further, it was estimated that India's milk production would outpace global production at a 4.2% compounded annual growth rate, reaching around 185 million tonnes annually. It is expected to surpass the European Union and become the largest producer by 2020.

Dairy farming's profitability is not confined to financial gains alone. It extends to nurturing the rural economy, providing employment opportunities and contributing to food security. As the global population continues to burgeon, the demand for high-quality dairy products shows no signs of abating, making Dairy farming an industry of immense significance. The development of Next-Generation Sequencing techniques and low-cost, high-throughput SNP genotyping devices revolutionised dairy cattle breeding. Whole-genome selection in dairy cattle has led to the development of dozens of methods and algorithms. The first barrier in genomic selection was the statistical analysis of massive datasets of Single Nucleotide Polymorphism (SNP) effects and their correlation with phenotypes. However, improvements in bioinformatics, greater computing power, and the development of robust statistical methods made the process easier. Sustainability is “a process that helps create a vibrant economy and a high quality of life while respecting the need to sustain natural resources and protect the environment. Sustainable development has three components: environment, society, and economy.

2. Review of literature

Aisolia et al. (2021) conducted a case study on Manipur's Friendship Dairy and Agro Product Unit on dairy entrepreneurship development in northeast India. From the study, it can be stated that, though the significant products of Friendship Dairy are available in the markets of the Imphal East and Imphal West districts of Manipur and are known to consumers, the market share is comparatively low, mainly because milk is available in the Dairy daily in limited quantities.

A study by Mazwan et al. (2021) conducted a financial analysis of dairy cattle farming in Sukomulyo Village, Pujon District, Indonesia. The study suggested three factors influencing the rural youths in agriculture: prestige factors that have the same honour as other jobs, future guarantees, and parental land area. The study further highlights that each family, on average, has 3.5 dairy cattle with lactation. The volume of milk production continues to increase from the 1st lactation to its peak at the time of the 4th and 5th lactations.

Yadeta et al. (2020) investigated dairy farm record keeping, including accounts of various activities, events, and materials related to farm activities. The study identifies common types of records in dairy farms, including cattle identification, financial records, production records, health records, records of agricultural inputs, records of animal feeds, daily farm records, records of farm implements and equipment, and Workers and vehicle records. The study further identifies the importance of record keeping for financial planning decisions, for providing data for government administrative and extension purposes, for assisting in livestock management decisions, and for evaluating overall dairy farm activities.

Cwalina et al. (2020) investigated the factors influencing milk production development in agricultural holdings. Their investigation found that many factors influence profitable milk production, such as the price of sold milk, the balance of nutrition, the quality of herds, the genetic characteristics of cows and the proper rearing of calves. The study further shows the influence of modern techniques and methods on the production and development of milk products.

In a study on dairy farmers' participation behaviour in dairy cooperative societies in Manipur, Priscilla et al. (2017) used the double-hurdle approach to assess the factors influencing dairy farmers' participation in Dairy Cooperative Societies (DCS) and the intensity of their involvement in Manipur. Their study suggested the utmost need for heavy investment in road infrastructure to link dairy farmers to the market effectively, increased awareness of improving technical efficiency on their farms, and training in milk processing activities, among other measures.

3. Government Initiatives

The Indian government has implemented various initiatives and policies to support the dairy sector. Operation Flood, a dairy farming policy, has played a significant role in increasing milk production. The government has also established the National Dairy Development Board to promote the dairy industry. Programs such as the National Dairy Plan, Dairy Entrepreneurship Development Scheme, Rashtriya Gokul Mission, Pradhan Mantri Kisan Samman Nidhi Yojana, Dairy Processing and Infrastructure Development Fund (DIDF), and Animal Husbandry Infrastructure Development Fund (AHIDF). 100% FDI through the automatic route is permitted for the Animal Husbandry sector.

4. Challenges in Dairying

4.1. Lack of Quality Feed and Fodder

One of the primary challenges dairy farmers face is the availability of quality feed and fodder for their livestock. Insufficient access to nutritious feed affects milk production and overall animal health. India faces shortages of 23.4 per cent in dry fodder, 11.24 per cent in green fodder, and 28.9 per cent in concentrates. The country produces fodder on only 5 per cent of its cultivable land. With the increasing popularity of high-breed animals, there is a massive demand for good-quality feed and fodder to meet the dietary requirements of milking animals. Many unproductive dairy animals compete with productive dairy animals for feed and fodder. Small and marginal farmers and agricultural labourers engaged in dairy farming cannot afford adequate feed and fodder. Therefore, their animals remain underfed. In standard dairy production systems, feed costs account for up to 70% of total costs. Consequently, dairy farming profitability is affected by high-cost feeding.

4.2. Unorganised Indian Dairy Sector

The most fundamental feature of the Indian dairy industry is that it is still primarily unorganised. Only 18-20% of India's total milk production is handled in the organised sector. The unorganised sector has not yet been integrated into modern processing infrastructure. Due to the perishable nature of milk, it is impossible to procure milk beyond a 200 km radius. Cold storage and supply chain difficulties affect India's dairy industry.

4.3. Inefficient Supply Chain and Infrastructure

The challenges related to supply chain management include inefficient logistics, a lack of proper cold storage facilities, and inadequate transportation infrastructure. These challenges result in post-harvest losses and quality degradation. Investment in cold chain facilities, milk collection centres, and

transportation networks is essential to improve supply chain efficiency and reduce wastage. According to Assoc Ham, about 3% of the milk produced gets wasted annually.

4.4. Low Milk Processing Capacity

Despite being the largest milk producer, India's milk processing industry is relatively small, with only 10% of the total milk processed in dairy plants. The unorganised sector, including milkmen and vendors, handles a significant portion of the milk production, leading to inefficiencies in processing and distribution.

4.5. Limited Access to Credit and Insurance

Small-scale dairy farmers often face difficulties accessing formal credit and insurance facilities, limiting their ability to invest in better animal husbandry practices and expand their operations. Providing financial support and insurance schemes tailored to dairy farmers' needs can enhance their resilience and productivity.

4.6. Low Productivity and Quality Standards

The average milk yield of cows in India is lower than that of their US counterparts, 1,248 kgs per cow per year, compared with ~10,000 kgs of milk per year. While India has the most enormous milk production volume, its productivity per animal remains relatively low. Additionally, ensuring consistent quality standards throughout the supply chain is crucial for acceptance in both domestic and international markets. Investing in research and development, promoting best practices, and implementing quality control measures are essential to improve productivity and meet global standards. Ensuring quality and safety standards throughout the dairy value chain remains challenging. Issues such as adulteration, poor hygiene practices, and inadequate testing facilities can erode consumer confidence and undermine market competitiveness.

4.7. Product Diversification

While liquid milk dominates the Indian dairy market, there is a need for greater product diversification and value addition to cater to evolving consumer preferences. Developing and marketing value-added dairy products requires innovation and market-focused strategies

4.8. Poor Returns

Many dairy farmers in India face challenges in obtaining fair returns. Issues such as low milk prices, high input costs, and market volatility affect the profitability of dairy farming.

4.9. Lack of Education and Training

Limited access to proper education and training programs for dairy farmers and workers hinders the adoption of best practices, modern techniques, and technologies

4.10. Poor adoption of technology

The already proven high-yielding fodder varieties and technologies for feeding livestock, such as urea-molasses treatment, silage and hay making, are very poorly adopted by many farmers in most states. According to a report by the Indian Ministry of New and Renewable Energy (MNRE), India produces an average of 500 million tons of crop residue each year. Despite domestic and industrial applications of this as fodder and fuel, a surplus of 140 million tons, of which 92 million tons are burned annually, could be used as animal feed.

4.11. Climate Change and Environmental Sustainability

Climate change challenges the dairy sector, affecting feed availability, water resources, and sustainability. Developing climate-smart dairy farming practices, promoting resource conservation, and adopting renewable energy solutions can contribute to the sector's long-term sustainability. Sustainable dairy

farming practices, waste management, and minimising the carbon footprint are crucial challenges the Indian dairy industry must address. Promoting eco-friendly initiatives can ensure long-term sustainability. High economic losses of dairy farmers due to diseases.

5. Dairy farming

Dairying is an essential source of livelihood income for small or marginal farmers and agricultural labourers. India is one of the world's largest producers of dairy products. Dairy is also employed year-round. The primary beneficiaries of Dairy are small or marginal farmers and landless labourers. Eradicating farmer poverty and income inequality is one of our country's principal objectives of agricultural development policy. Subsidiary occupations aim to address the problems of poverty and inequality. Milk is a wholesome food among all animal products. It contains, in proper proportions, the various essential food ingredients the human body requires in an easily digestible form. Including milk in the human diet also increases the digestibility of other foods.

Dairy Farming is essential in the Indian agricultural sector and the economy. India is the largest producer and consumer of milk globally, contributing to 20% of global milk production. Approximately 70 million rural households in India engage in milk production, and milk production accounts for almost one-third of their gross income. For landless dairy farmers, milk production contributes nearly half of their gross income. Organised milk procurement, processing and marketing help farmers earn higher prices and empower them to achieve better social, economic and nutritional standards of living. With a vast population, India faces a significant challenge in providing each citizen with adequate food, both in quality and quantity. Most of the regions in the country are undernourished and suffer from malnutrition. Many people depend on milk and its products as the most crucial source of nourishment. Thus, dairying promises to be a vitally significant occupation for farmers.

6. Dairy farming in Manipur

Dairy farming was developed as a secondary occupation for rural Manipur people. It has been playing a vital role in uplifting socio-economic conditions. This study found that the living standards of the area's people are improved to some extent by milk sales. Milk production and its sale account for about one-third of farmers' total income. Such income has helped rural farmers fulfil their various needs. Most farmers use dairy income to cover cattle feeding, veterinary services, and other domestic expenses. Some farmers use their income to pay their children's school fees. Others have invested this income in fixed assets such as land and houses, as well as in health. Dairy products are a substantial contributor to Manipur's food and protein supply. Many indigenous small farmers in Manipur are rearing dairy cattle. Manipur is considered one of the most suitable countries in the world for dairy farming. The development of Dairy has generated considerable employment through the production and marketing of Dairy and dairy-related products. Poor people in rural and urban areas can play a significant role in the agricultural sector by emphasising the dairy subsector.

7. Objectives of the Study

The study's objectives are mainly: -

1. Dairy as an alternative income-generating activity for rural and urban poor people.
2. To become an entrepreneur through dairy farming.
3. To get a job through dairy farming.

8. Research Methodology

A questionnaire survey was used to collect primary data from dairy farmers in the Imphal East and West Districts of Manipur. The questions asked covered the breed type, feeding practices, housing, water availability, milk marketing, land available for the cultivation of fodder crops, veterinary services, etc. The districts, blocks, and villages were randomly selected using a multistage sampling design. The respondents were selected randomly using a simple random sampling without replacement. Out of four blocks in the Imphal West district and two blocks in Imphal East; Thangmeiband, Lamphlet, Eroisemba, Takel Kolom, Takyel Khonbal, Khurai and Lapham Khunou blocks were selected, and three villages were selected randomly from each selected block. A list of dairy farmers was prepared, which constituted the sampling frame.

9. Data analysis and interpretation

Table 1: Total no of respondents of dairy farmers

Total no of Responded	Yes	No
85	85	Nil
Percentage%	100%	Nil

Sources: Field report/Data

Table 1 revealed that 100% of respondents agreed that dairy farmers contribute to economic development for many urban people in the study area. This is a significant contribution of the dairy sector to the growth of the urban economy in Manipur and, more generally, in the study area. Dairy farming can fulfil basic human needs. So, it became necessary in daily life.

Table 2: Marital status.

Responded	Yes	No
85	70	15
Percentage%	82.35%	17.64%

Sources: Field report/Data

Most dairy farmers were married and began earning a living. It can be earned quickly without proper training. Dairy products are very useful in daily life activities. The data shows 82.35% of the farmers were married, and the remaining 17.64% were unmarried. Dairy farming is often family-based, with multiple generations involved in a built-in support system, allowing dairy farmers to share responsibilities and workload. Being married can give dairy farmers a strong support system, helping them navigate the challenges and rewards of dairy farming.

Table 3: Increase in Income Level

Increase in income level	Yes	No
Total no of responses	80	5
Percentage%	94.11%	5.89%

Sources: Field report/Data

Dairy farming can be profitable, and many farmers have experienced increased income for various reasons. It increased its income by selling dairy products, such as milk and increasing its production. Global milk demand and supply fluctuations can increase milk prices, increasing dairy farmers' income. It can increase its income by producing value-added products such as cheese, butter, and yoghurt, which often command higher prices than raw milk. Other income-generation activities, such as agritourism or livestock breeding, can increase overall income. Government initiatives, such as subsidies and supports, can help dairy farmers increase their income by reducing costs and improving efficiency.

Table 4: How far does that enhance your chances of employment?

Impact on employability	Agree	Strongly Agree
Total no of responses	35	50
Percentage%	41.18%	58.82%

Sources: Field data/report

Dairy farmers have various employment opportunities within and outside the dairy industry. Oversee daily farm operations, including milk production, animals' health, and staff management. If they have health, breeding, and nutrition, they can get jobs to treat other farmers, Supervise the milk production process, ensuring quality and safety standards are met. Dairy farm technician assist with farm operation, including milking, feeding, and animal care. Work with government agencies, NGOs, or private companies to promote rural development and provide extension services to farmers. Work in the food processing and manufacturing industry, applying knowledge of dairy farming to roles such as quality control, production management or research and development. Dairy farmers possess valuable skills that are transferable to other industries. Some are: - Business Management: Dairy farmers have experience managing finances, staff, and resources. Mechanical skills: -Dairy farmers are familiar with farm equipment and machinery. Problem-solving: Dairy farmers are skilled at troubleshooting and resolving problems. Communication: Dairy farmers have experience communicating with suppliers, customs, and other stakeholders. Time management: Dairy farmers are adept at managing time and prioritising tasks. These transferable skills can be applied to various roles, making dairy farmers versatile candidates in the job market.

10. Conclusion

Most of respondents were keeping animals for household purposes only. Therefore, all the feedback from dairy farmers in Manipur's study area was directly proportional to those parameters. The lack of proper implementation of government schemes for dairy stakeholders was the second-most challenging issue in the state. As the dairy farmers kept a minimum number of animals, if one animal was under milking condition, it was more than sufficient for the family's consumption. Rice straw was the primary source of feed material throughout, as reported by the respondents. It was observed that the dairy sector in the study area was restricted. It could be due to the people's mindset and other traditional and cultural factors. The dairy sector would grow only if the farmers were interested in consuming milk and other milk products. For this, government institutions such as the state agriculture and animal husbandry department, central dairy-related agencies, and non-governmental organisations need to work shoulder to shoulder to uplift the dairy sector. Rural and urban poor people can play a significant role in the agricultural industry by emphasising the dairy subsector in Manipur. Development initiatives over the last few decades have clearly shown that sustained improvements in productivity and people's lives depend on recognising the

crucial role of poor farmers in production, processing, and marketing within the country's small-scale entrepreneurial sector. Dairy is one of the few essential activities that can generate more revenue than other activities for Manipur's rural and urban poor. Dairy farming in Manipur has immense potential for growth and development, given the state's rich livestock resources and favourable agro-climatic conditions, supported by the government and other organisations. Dairy farming has become a viable livelihood option for many rural households, particularly women. As a powerhouse of sports, Manipur needs to increase and encourage dairy farming, as it is a valuable and essential source of food for sportspeople in the state.

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