



COST-BENEFIT ANALYSIS IN DAIRY FARMING: A CASE STUDY OF LUCKNOW DISTRICT

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Abstract

Lucknow, the capital of Uttar Pradesh is named after the city of Lucknow. Only 33.6% or only one third populations are working population means (14-65 yrs) In agriculture sector share increases till 2017-18 with some fluctuations but after that it will decrease. According to decadal growth rate, agriculture sector shares' decreases from 2011-12 to 2019-20. Number of cows livestock (280140) is highest in Lucknow district following by buffaloes (274625) and Goats (182769). It means number of milch livestock is higher than other livestock. there are many fluctuations in stock of milch livestock during 1993 to 2014. In 1993, it was 701928 while it was 512570 after decline but it was found 737534 in 2012 after increasing. Further it declined in 2014 and reached at 300873. It is noted from the study, that the accounting profit of the dairy farmers on a per day basis shows a positive profit and the economic profit is showing a negative profit, which is mainly because of the existence of implicit cost in the calculation of economic profit. Whenever the accounting profit is positive, the economic profit will show negative due to the presence of imputed cost. Dairy Farmers can reach high profit, if the inputs are effectively utilised in their dairy farms.

Keywords-Dairy Farming, Cost-Benefit Analysis, Milch Livestocks

Lucknow, the capital of Uttar Pradesh is named after the city of Lucknow. It is state headquarter of Uttar Pradesh Government. Lucknow is popularly known as the the City of Nawabs. It is also known as the Golden City of the East, Shiraz-i-Hind and The Constantinople of India. Lucknow district is divided into 4 tehsils: Lucknow, Malihabad, Mohanlalganj, and Bakshi Ka Talab. These tehsils are then divided into 8 community development blocks (vikas khand). total population of Lucknow district is 4589838 in which Male population 2394476 is higher than female population 2195362 therefore sex ratio is 917 over 1000 male. Same features have been seen in rural area and urban area too. But urban sex ratio 923 is greater than rural sex ratio 906 and total (lucknow district) sex ration i.e. 917. Geographical range is only 2528 sq km therefore population density 1816 per sq km is very high. High density shows that large population lives in a very small area. 77.29% are literate in overall population in which male literacy rate 82.6% is higher than female literacy rate 71.5% and urban 81.9% mostly male urban literacy rate 85.6% is highest in Lucknow district.

Only 33.6% or only one third populations are working population means (14-65 yrs). It can be said that dependent population is higher than independent population or population dividend is very low in Lucknow district in which agricultural labours are higher than cultivators.

The sectorial value of GDDP and share of various sectors in GDDP in Lucknow District is shown in table-1. The value of all sectors increase during 2011-12 to 2019-20 and service sector share also increases during the same period. Reverse situation can be seen in Industrial sector. In agriculture sector share increases till 2017-18 with some fluctuations but after that it will decrease. According to decadal growth rate, agriculture sector shares' decreases from 2011-12 to 2019-20.

Table-1: Share of Various Sectors in GDP of Lucknow District (at current Price 2011-12)

Year	Value of Various Sectors in Crore Rs.			GDP	Share of Various Sectors in GDP* (in %)		
	Agriculture Sector	Industrial Sector	service Sector		Agriculture Sector Share in GDP	Industrial Sector Share in GDP	Service Sector Share in GDP
2011-12	2444.27	11087.78	13690.82	28905.84	8.46	38.36	47.36
2012-13	2632.60	12396.31	16203.77	33048.57	7.97	37.51	49.03
2013-14	2801.96	12733.52	16613.85	34138.46	8.21	37.30	48.67
2014-15	3220.24	13438.82	17458.17	36374.81	8.85	36.95	48.00
2015-16	4087.57	14060.50	19996.60	41037.19	9.96	34.26	48.73
2016-17	4441.13	14597.49	21927.26	44246.01	10.04	32.99	49.56
2017-18	5417.38	16350.78	24916.53	50474.08	10.73	32.39	49.37
2018-19	4670.88	17787.01	29237.39	56875.20	8.21	31.27	51.41
2019-20	4933.53	17053.89	32829.62	60364.25	8.17	28.25	54.39
DGR					-3.35	-26.35	14.83

Source: updes.up.nic.in, * Share is calculated by Researcher

Animal husbandry has special place in the national economy. It is an integral part of the rural economy. Keeping in view of the growing importance of the animal husbandry, live-stock Census is under-taken in every five years. In order to increase production of animals, The district administration has implemented programmes, of healthcare and improvement in breeds etc. To improve the health and progeny of animals, the district had the services of many Veterinary dispensaries, many animal development centres, and artificial insemination centre. There are running for prevention and treatment of various animal diseases and development of livestock. Besides these some pig development center pigri units are also working in the district. After the establishment of milk Co-operatives emphasis is being given on increasing of milk production in the district. There are many milk Co-operative societies in the district. Population of Livestock of Lucknow District are showing in Table 2.

Table-2: Population of livestock in the district (2012)

Crossbred Cow	41682
Indigenous Cow	238458
Total Cow	280140
Buffalo	274625
Goats	182769
Sheep	1878
Pigs	25697
Rabbits	1416
Hens	25745
Desi	18162
Improved	870
Ducks	12
Others	2190

Source:www.lucknow.ac.in

Table 3 shows that number of cows livestocks (280140) is highest in Lucknow district following by buffaloes (274625) and Goats (182769). It means number of milch livestock is higher than other livestocks.

Table-3: Population of Milch livestock in the district

Year	Indigenous Cows	Exotic/ Crossbreed Cows	Total Cows	Buffaloes	Goat	Total Milch Livestocks in Lucknow
1993	237435	66679	304114	104361	127664	701928
1997	175254	47717	222971	159427	130172	512570
2003	216793	21967	238760	220328	141937	601025
2007	249657	28790	278447	274517	167727	720691
2012	238458	41682	280140	274625	182769	737534
2014	80336	14760	95096	137346	68431	300873

Sources: <http://updes.up.nic.in/spideradmin/Hpage1.jsp> and Survey Report -2013-14, Directorate Animal Husbandary Department, Uttar Pradesh, Lucknow.

Table 3 shows that there are many fluctuations in stock of milch livestocks during 1993 to 2014. In 1993, it was 701928 while it was 512570 after decline but it was found 737534 in 2012 after increasing. Further it declined in 2014 and reached at 300873.

On the above account, it can be said that livestock has an important place in Lucknow District as for farming and there are many cooperative societies for giving a growth of livestock farming in which milk cooperative society is one. Milk cooperative society play a vital role to give growth and development to dairy farming in Lucknow District. But Some constraints are found in this field too like- Reduction in population of high yielding milch animals, Scarcity of green fodder round the year, Poor management of dairy cattle. Researcher is focusing to find the main reason of these constraints and give proper suggestion for reducing it in this study.

Review of Literature

Selvakumar M. & Ramaraj, B.G. (2017)¹ state The current size of India's dairy market is around 21 million metric tons and it is growing at 4 percent CAGR. India is the largest producer of dairy products by volume

¹ Selvakumar M. & Ramaraj, B.G. (2017). A Study on Income Generation and Employment Opportunities towards Milk and Milk Products Production in Salem District. Journal of Adv. Research in Dynamical & Control Systems, 07-Special Issue.

constituting 15 percent of the world's dairy output. The outlook for dairy in India is promising as the segment is poised for growth and expansion. Categories will evolve rapidly fuelled by consumer demand. There are plenty of job opportunities available in dairy sector and through them India's socio economical profits can be improved. This article attempts to study the income and employment opportunities in Salem district of Tamilnadu.

Selvakumar, M. aet.al. (2017)² state that the current size of India's dairy market is around 21 million metric tons and it is growing at 4 percent CAGR. India is the largest producer of dairy products by volume constituting 15 percent of the worlds dairy output. The outlook for dairy in India is promising as the segment is poised for growth and expansion. Categories will evolve rapidly fuelled by consumer demand. There are plenty of job opportunities available in dairy sector and through them India's socio economical profits can be improved. This article attempts to study the income and employment opportunities in Salem district of Tamilnadu.

Objectives of the Study

The main objectives of this study are as follows:-

- To evaluate the Production quantity and cost of dairy farming in Lucknow district.
- To calculate the price and sales of dairy farming in Lucknow district.
- To analyze the accounting and economic profit of dairy farming in Lucknow district.

Research Design

This paper is based on quantitative data that are collected from primary sources. Primary data is collected on the basis of a primary survey of Lucknow District by using multistage sampling technique. Cost-benefit analysis is used to find accounting and economic profit of unorganised sector in dairy farming.

Analysis of Data

Fig 1, exhibits the farmer classification in accordance with their milch animal holding located in different blocks of Lucknow. Here researcher considered as a small farmer who has one to four milch animals in the farm, medium farmer maintains five to six milch animals in the farm and large farmers are the ones who maintain greater than 6 milch animals in the farm. The majority of the farmers in the sample belongs to small farmer category (86.80 per cent). 5.3 per cent of the farmers are from the medium farm category and only 7.9 per cent are from the large farm category. Therefore, the majority of the dairy farmers in Lucknow consist of small farmers. The occupational status of the dairy farmers is classified into major occupation and subsidiary occupation. In Lucknow, 49.2% farmers have been doing dairy farming as major occupation while 50.8% farmers as subsidiary occupation. It shows that dairy farming is preferred by farmers in Lucknow district. Concentrate feed and fodder availability is the primary inputs products given to the cattle and it is the most expensive inputs for dairy cattle production. The milch animal in the farm consumes more of concentrate feed input. The inputs are given not only for the maintenance but for proper and good milk production. To reduce the cost, most of the farmers try to cultivate the green fodder and dry fodder depending on access to land availability. 35.4 per cent of farmers are depends on the green fodder which is being cultivated in their own land. 52.5 per cent of the farmers purchase the dry fodder for the cattle and only 30 per cent of farmers use their own cultivated hay (dry fodder) for their cattle. The cost of purchasing the dry fodder is very expensive.

² Selvakumar, M. aet.al. (2017), "A Study on Income Generation and Employment Opportunities towards Milk and Milk Products Production in Salem District," Journal of Adv. Research in Dynamical & Control Systems, 07-Special Issue, July 2017 Special Issue on Management Studies. ISSN 1943-023X

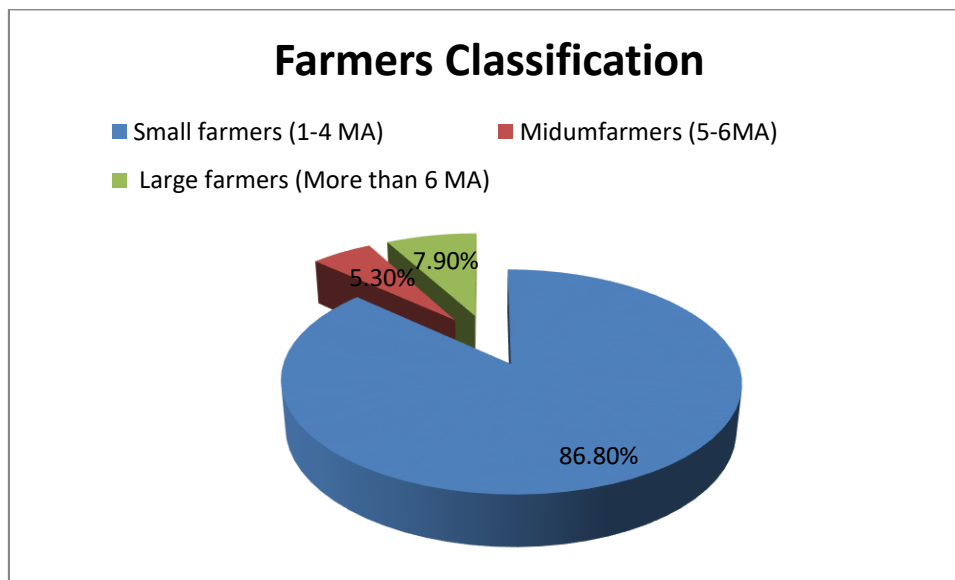


Fig-1: Farmers Classification

Economic Factors in Dairy Farming

Concentrate feed and fodder availability is the primary inputs products given to the cattle and it is the most expensive inputs for dairy cattle production. The milch animal in the farm consumes more of concentrate feed input. The inputs are given not only for the maintenance but for proper and good milk production. To reduce the cost, most of the farmers try to cultivate the green fodder and dry fodder depending on access to land availability. 35.4 per cent of farmers are depends on the green fodder which is being cultivated in their own land. 52.5 per cent of the farmers purchase the dry fodder for the cattle and only 30 per cent of farmers use their own cultivated hay (dry fodder) for their cattle. The cost of purchasing the dry fodder is very expensive.

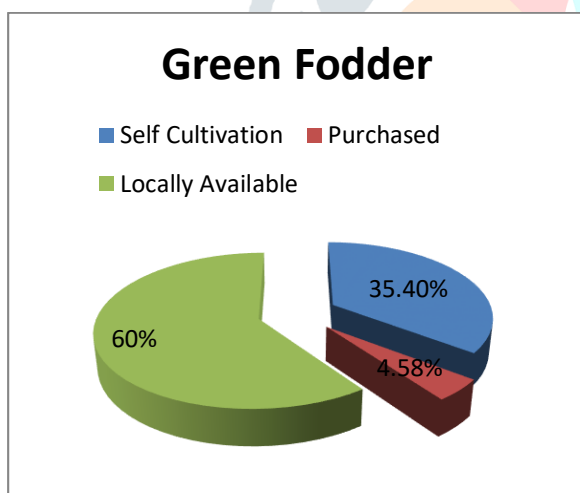


Fig-2: Green Fodder

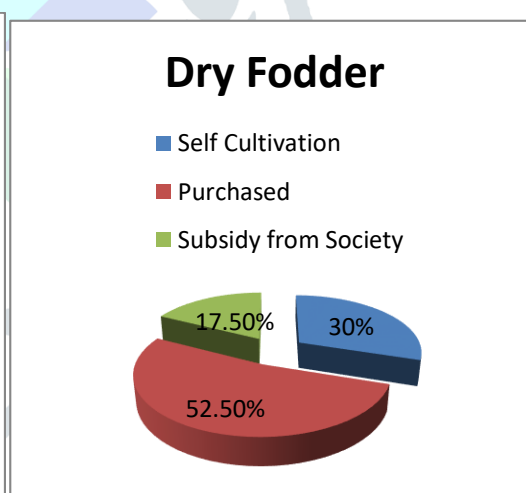


Fig-3: Dry Fodder

The cost of labour is second to the cost of feed. . It can either be family owned or hired or a combination of both. The reason why the cost of milk production is high is due to the inefficient utilisation of manpower. Fig 6 depicts that, the majority of the farms use family owned labours (86.3 per cent), followed by 11.3 per cent of the farms employs the combination of both family labour and hired labour. The cost of production decrease when family owned labour is employed. The reason why the farmers go for both family owned and hired, is due to the unavailability of family members and high wages for the paid labours.

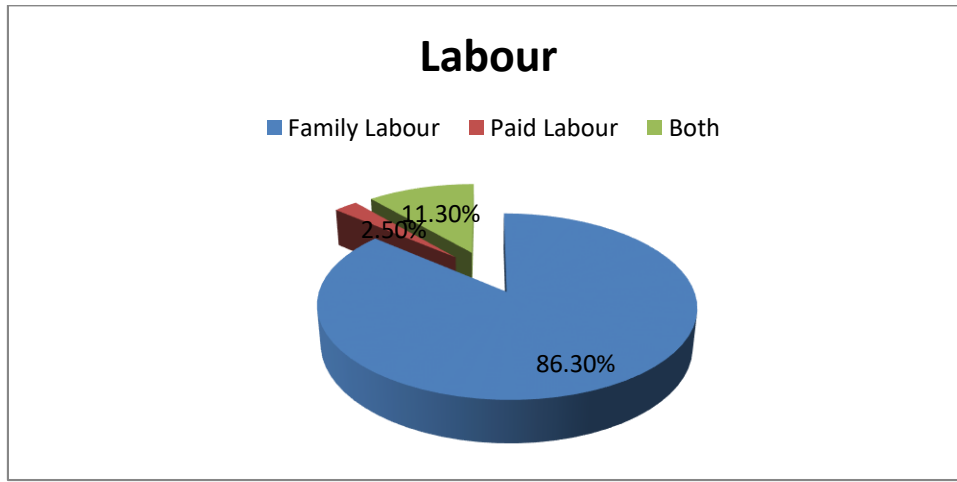


Fig-4: Labour

On the above account, it can be said that daily cost of milk production in Lucknow finds Rs. 500 to 1000. 56.25% dairy farmers bear this cost for milk production. 30.4% dairy farmers have less than Rs. 500 cost and 13.33% has greater than Rs. 1000 cost in milk production in Lucknow district. Fig-7.

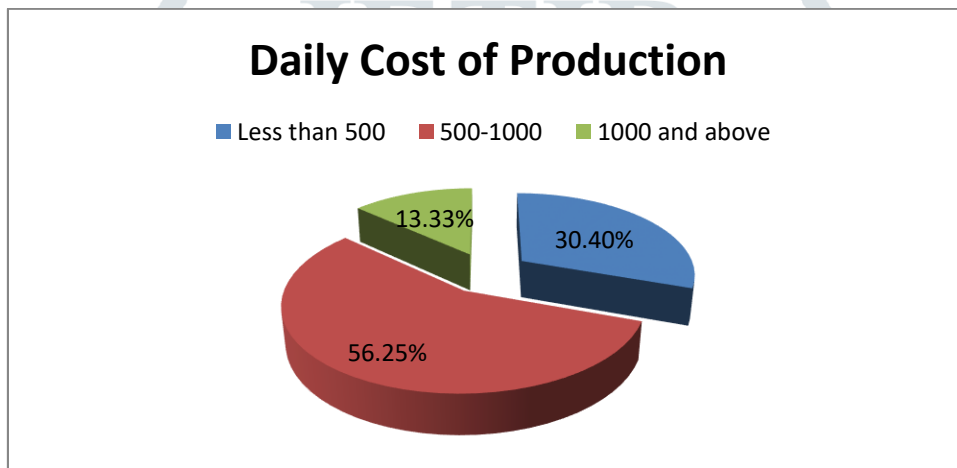


Fig-5: Daily Cost of Production

Fig 8 describes that 35.8 per cent of farmers has a milk production of 10- 20 litres per day from their farm, followed by 25 per cent of farmers who gets less than 10 litres of milk from their farm. Only 2.5 per cent of the farmers supply more than 100 litres of milk per day. The low quantity of milk production is due to the existence of small farmers in Lucknow, therefore the average quantity of milk production in Lucknow ranges from 10 to 20 litres of milk per day.

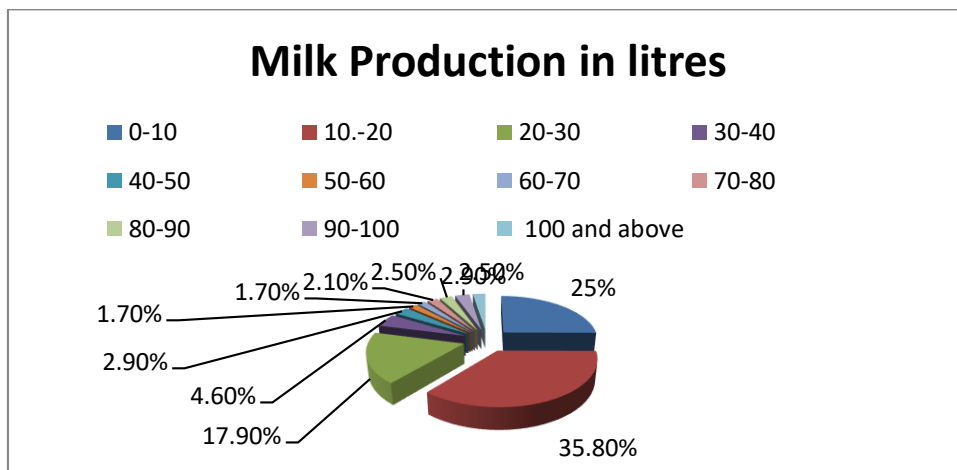


Fig-6: Milk Production in litres

Value received per litre of milk is a significant factor for the dairy farmers. There always occurs a variation in the supply of milk between lean season and the flush season because milk yield depends on the seasonality of breeding and availability of fodder. There is less bargaining power for dairy farmers to get a fair economic price for their pouring milk. However, with the formation of Dairy Co-Operative Milk Societies many incentives and subsidies are given to the farmers. Nevertheless, there is always a difference between the price of milk received from Dairy Co-Operative Society and local sales.

Table-4: Price per litres per day in Selected Area (in Percentage)

Price per litres per day	Direct sales	Cooperative Agency	Intermediary trader	Traditional Milkman
less than 30	1.6	3.8	5.8	4.35
30-35	2.7	25.6	18.6	5.2
35-40	3.8	61.5	17.4	12.2
40-45	4.9	8.9	58.1	36.5
45-50	8.2			41.7
50-55	46.9			
55-60	31.3			
60 and above	1			

Source: Calculated by primary data

From table 4, the price obtained on per litre of milk by majority of farmers ranges between ₹ 35 to ₹ 40 per day (61.5 per cent) from society, followed by ₹ 30 to ₹ 35 (25.6 per cent) . From the local sales they obtain a price between ₹ 50 to ₹ 55 per day (46.9 per cent), followed by ₹ 55 to ₹ 60 (31.3 per cent) on a per day basis. Pouring milk to the Dairy Co-Operative Society alone is not profitable option for the dairy farmers. On an average, the price they receive on per litre of milk is between ₹ 35 to ₹ 40. But on the other hand, if the farmers market their milk through local sales, they receive a price between ₹ 50 and ₹ 60 on per litre of milk. The price given at Dairy Co-Operative Society depends on the quality of milk which the farmers pour. The quality of the milk is being tested using FAT and SNF (Solid Not Fat) content in the milk.

The main aim of any business activity is to reap high returns. It is the same in case of dairy farm activity. The return made by the farmers solely depends on the quantity of milk farmers market daily from their farm units. Fig 7, shows that 73.3 per cent of the farmer's get a daily return from the milk they market, and it gets less than ₹1000. It is followed by those who receive greater than ₹ 1000 (18.3 per cent) a day. Only 8.5 per cent of farmers receive greater than ₹ 2000 from their milk production on a per day basis, and this is earned by large dairy farmers. It is understood from the figure that, most of the farmers do not get a proper return from the milk production.

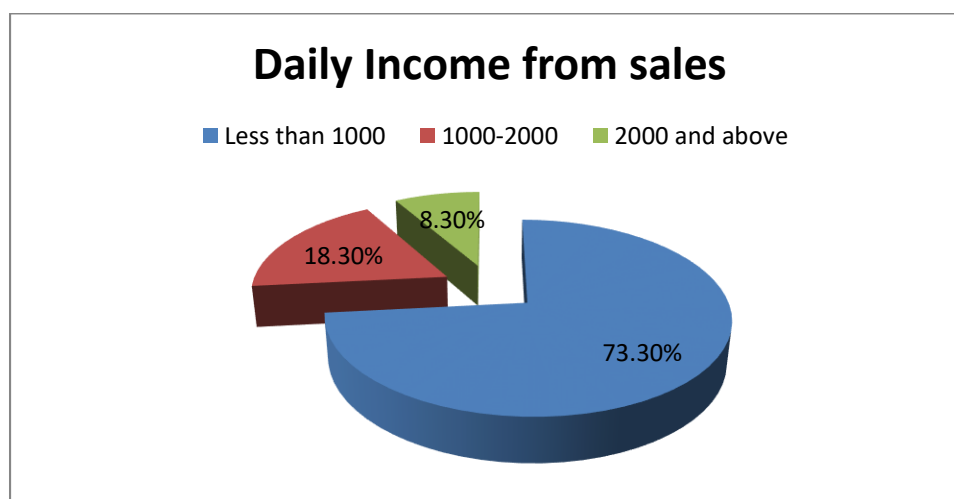


Fig-7: Daily Income from sales

The return received from the milk production is used by the farmers to buy feed inputs and other necessary items for the maintenance of the cattle. When the returns are low, it is very difficult for the farmers to scale up their activity. Most of the dairy farmers who consider this as a primary occupation exist from this sector due to the low returns from the milk. But for those who consider this as a subsidiary occupation the low returns are not a deciding factor because the income from dairy farming is considered only as a supplementary income to their family.

Cost Benefit in Dairy Farming

Profit from Milk Sales

Profit in simple terms is defined as any financial gain arising from any business activity. Profit is the main aim of any transaction. It helps in estimating the effectiveness of its business efforts. Profit is divided into two categories mainly, accounting profit and economic profit. The accounting profit does not take into consideration the implicit cost (Opportunity cost), whereas economic profit includes the implicit cost for the estimation of profit. When the accounting profit is positive, the economic profit can be negative. However, the business always pays its tax based on its accounting profit, whether or not its economically successfully depends on its economic profit. The profitability of a dairy business largely depends on milk revenues and feed cost. The following analyses are made to estimate the accounting profit of the farm activity on a per-day basis.

Estimation of Accounting Profit

The accounting profit is calculated by deducting the explicit cost from the total revenue. The total revenue of any dairy farm sector is calculated by adding the value from milk yield in rupees with value of dung and other value-added products. The explicit cost includes the total cost excluding the family labour and other self-generated inputs taken for the maintenance of the milch animal. To understand the accounting profit from milk yield, the estimation is done on the basis of the value of milk yield which is taken as the total revenue. From Table 5, the average accounting profit earned by the dairy farmers on a per day basis in Lucknow is ₹ 82.55. The mean of concentrates cost (₹507.98) and veterinary cost (₹ 275.72) per day is very high. The farmers in Lucknow depends on the family labour and self-generated inputs like green fodder and dry fodder for the maintenance of milch animal, therefore the cost for these inputs is less while comparing with other inputs cost. The accounting profit excludes the implicit cost in the calculation. Most of the farmers earn a profit between ₹ 80 to ₹ 500 on a per day basis.

Table-5: Estimation of Accounting Profit

Particulars	Amount	Mean (Per Household)
Cost of Green Fodder	5042.64	21.01
Cost of Dry Fodder	11542.61	48.09
Cost of Concentrates	121915.2	507.98
Total Feed Cost (a-c)	138500.45	577.08
Labour Cost	12849.6	53.54
Veterinary Cost	66172.8	275.72
Total Cost (a-e)	217522.85	906.34
Total Income	237336	988.90
Accounting Profit	19813.15	82.55

Source: Calculated by primary data

Estimation of Economic Profit

The economic profit is used as an indicator of profitability in the farm. It is calculated by deducting total cost from the total revenue. The total cost consists of both implicit cost (opportunity cost) and explicit cost. The implicit cost or the imputed cost is the cost which arises when a firm uses its own input resources. The explicit cost is the out of pocket cost or the cost involved to make direct payments to others. Table 6 reveals that the

mean economic profit of the dairy farmers in Lucknow is -₹743.28. The average cost of labour (₹ 754.36) is high while calculating the economic profit due to the presence of the imputed value for the family labour in the calculation.

Table-6: Estimation of Economic Profit

Particulars	Amount	Mean (Per Household)
Cost of Green Fodder	32208	134.2
Cost of Dry Fodder	14380.8	59.92
Cost of Concentrates	121915	507.98
Total Feed Cost (a-c)	168504	702.1
Labour Cost	181045	754.36
Veterinary Cost	66172.8	275.72
Total Cost (a-e)	415722	1732.18
Total Income	237336	988.9
Accounting Profit	-178386	-743.28

Source: Calculated by primary data

It is noted from the study, that the accounting profit of the dairy farmers on a per day basis shows a positive profit and the economic profit is showing a negative profit, which is mainly because of the existence of implicit cost in the calculation of economic profit. Whenever the accounting profit is positive, the economic profit will show negative due to the presence of imputed cost.

Profitability

The main goal of every dairy farm management is to attain profit. Milk is the only farm product among the other agricultural product where one can get 70 per cent of the market price. Dairying is the only activity which provides a daily or a weekly income. It is also a product that can be marketed directly to the consumers without any middlemen. Therefore, it is necessary to examine the profitability aspect of the production. The farmers should have a complete control over the total cost of production.

Table-7: Classification based on perceived profitability of the farm

Particulars	Percentage
High Loss	11.7
Loss	9.6
Break Even Point	27.5
Profitable	42.9
High Profitable	8.3
Total	100

Source: Calculated by primary data

From table 7, 43.4 per cent of farmers are of the opinion that the farm performance is profitable for them. 27.3 per cent of the farmers are in the category of breakeven point; this is due to the lack of control on the cost of production for the farmers.

Conclusion

Dairy Farmers can reach high profit, if the inputs are effectively utilised in their dairy farms. The dairy farming can be profitable though the sales of milk, cow dung and cow urine, and also through the sales of slurry, jeevamruta (a mixture of cow dung , cow urine, jiggery and sugar cane juice). Now with the advent of highly acclaimed organic agriculture, the sale of organic fertilisers can also add to the profitability of the dairy farmers. The socio-economic status of the dairy farmer reveals that majority of the farmers form their base with limited milch animal on marginal land holdings .Though dairy farming has emerged as a main occupation for minor category of farmers, there is still room to introduce new employment opportunities in this sector. Most of the

dairy farmers still prefer to run the dairy business in the conventional methods. The educational qualification can be increased for the dairy farmers, which will enable them to accept and adopt new modern technologies. The profit earned by the farmers is not enough to match their good share of return from dairy farm activity. The profit purely depends upon the returns and the cost of milk production. Only if the inputs are effectively utilised the farmers can reap good share of return from this sector.

Suggestions

Agriculture is the art of growing plants and animals. It is more important for any developing economy as it provides food and employment opportunities. Dairy farming is the most important sector among the agricultural branches. Farmers aim to maximize production from the inputs taken. However, the farmers of Lucknow district have failed to achieve high economic efficiency scores due to the high cost of production and other constraints faced by the farmers. On the basis of this study following suggestions are given for an economic dairy farming in Lucknow district.

- Dairy farmers can reach higher profits, if the inputs are used effectively in their dairy farms. Dairy farming can be profitable through the sale of milk, dung and cow urine, as well as through the sale of ghoul, jeevamrita (a mixture of cow dung, cow urine, jaggery and sugarcane juice). Now with the advent of the highly acclaimed organic agriculture, the sale of organic fertilizers can also benefit the dairy farmers.
- Non-availability of fodder and high milk purchase price are the hurdles faced by dairy farmers in Lucknow district. Farmers should be properly informed about the benefits of green fodder cultivation with protein rich plants and leguminous plants like lucerne and cow pea. Farmers should take initiative to make silage. Dairy Co-Operative Society can also make and store silage for the short season and can help its member farmers when needed.
- Awareness should be spread about good quality feed like TMR (Total Mix Ration). Each society can source raw materials to keep quality high and costs low, which can then be distributed to their members.
- The price of milk offered in Dairy Co-Operative Society should be revised keeping in view the cost of milk production. For this, a Common Agriculture Policy (CAP) can be introduced. The payment of milk is received from the bank account of the farmer. But this facility is difficult for the aged farmers. Separate arrangements should be made for senior citizen farmers.

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