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Cost of Milk Production and Returns to the Milk Producers in West Bengal

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1. Introduction

The process of development in dairy activities in India has been widely praised as one of the most successful development programmes in the world, namely 'Operation Flood', often called 'White Revolution'. India is ranked first in the world in milk production, followed by the European Union and the United States. The milk production in India has increased from 17 million tonnes in 1950-51 to 209.96 million tonnes in 2020-21, and it contributes 23 percent of global milk production. The Central and State governments have initiated several measures to increase livestock productivity, thereby significantly boosting milk production. Dairy activity can be considered an important auxiliary source of income for millions of rural families and plays a key role in providing employment and income, particularly for marginal farmers, as most milk-producing households are marginal and landless by their landholding categories.

There are large inter-regional and inter-state variations in milk production and in per capita milk availability in India. As per the data provided by the National Dairy Development Board, the largest producer of milk is Uttar Pradesh, which produces 16.06 percent of the total milk production in the country, followed by Rajasthan and Madhya Pradesh. In 2019-20, more than 90 percent of national milk production comes mostly from thirteen major milk-producing states, i.e., Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat, Andhra Pradesh, Punjab, Maharashtra, Haryana, Bihar, Karnataka, Tamil Nadu, West Bengal and Telangana.

The impact of the 'White Revolution' can be seen in villages through the generation of funds for community development and social welfare, the creation of self-employment opportunities, the promotion of distributive justice, and the removal of the evil of untouchability. This silent social revolution has been relatively smooth and, as a result, even unnoticed by the conservative community. The fact that dairying could play a more productive role in promoting rural welfare and reducing poverty is increasingly recognized. But in West Bengal, it is partly true that, even though there is overproduction, the price of raw milk remains constant. In most cases, it fails to serve as a remunerative livelihood source. It is also interesting to note that West Bengal has recorded a total milch population of 7466, i.e., 5.47% of the total, but contributes only 2.96% to the National milk production, suggesting lower productivity of milch animals in West Bengal.

2. Main Findings

- i. In the sample used for the study, it is found that only one household out of all sample units is of large type, i.e., having more than four milch cows. It reveals that if we consider our sample as a representative one for West Bengal, above 95 percent of the sample dairy farmers are of the small holding category, showing either reluctance about cow rearing or do not consider this culture in a commercial manner. It is also observed that most sample households are headed by a male member, which is not uncommon in rural Bengal. It is also observed that in the case of religion, Hinduism dominates significantly over all other religions, implying that Hindus, by nature, a religious community, are rearing cows as Çow-Seva, and also for domestic milk use.

- ii. It is observed that both the total number of animals and the total milch animals are higher for local cattle than for crossbreed. It is found that 71 households have their own funded pucca cattle shed. It is found that the present value of any type of cattle shed is higher than the present value of fodder storage, and the average productive life is lower for a cattle shed than for fodder storage.
- iii. Holding of most of the milking assets like milking cans, grass cutter and chopper, Feed container is increasing across milk producing categories, which is very usual. Earnings from a job or any service contribute more than any other income source. Income from agriculture and from the sale of milk, cow dung, and urine is increasing across milk-producing groups. Dairy income pushes total annual income to increase. The average milk yield is highest during the rainy season, followed by summer and winter. It is very obvious that in rainy weather, cows eat more as this is the harvesting time. The milk yield of both breeds is increasing across milk-producing categories. It is noticed that the average milk rate is lower for the local cow.
- iv. Cattle are the only major dairy animals, and buffalo are quite negligible in our sample, at least in the state of West Bengal. Local cattle (LC) have a lower estimated present market value than cross-bred cattle (CB) among small and medium-sized farmers. The average age and average age at first calving are higher for the local cattle (LC) than the cross-breed cattle (CB) across the farming category. The average lactation order is similar for both LC and CB cattle, at around 2.5.
- v. The average dry and in milk period for LC milk is much higher than that for CB milk in our study area. The overall dry and milk periods for LC milk are approximately 245 and 263 days, respectively, whereas they are approximately 179 and 309 days for CB. The average milk drawn (two times a day) in milking time is severely lower for the LC cattle (1.54 lit/day) than the CB cattle (4.34), and the average milk drawn (lit/day) of the CB cattle is about 181.82% higher than the LC cattle.
- vi. There is no significant difference in feed and fodder quantity consumption between the in milk and dry periods for green fodder and dry fodder across the size of milk producers, but it varies as per the change in season. The consumption of green fodder is significantly higher in the rainy season than it is in the winter. This is due to the free availability of green fodder, such as grass, during the rainy seasons. The increase in consumption of green fodder leads to a decrease in the consumption of dry fodder in rainy seasons compared to winter seasons.
- vii. The study discovered a significant change in average price of dry fodder across the size of milk producers and seasons. The respondents of the sample area have reported that there is no cost incurred for the grazing. It is found that the average cost of labour is about Rs. 66 per day per milk animal, and almost 99.7% of the total labour cost is contributed by family labour. The average veterinary cost is Rs. 2.27/- per day per milch animal, and the Artificial Insemination (AI) cost is Rs. 244 per year per cattle, respectively. The study has found no transportation cost and a tiny amount of light and water cost in the sample area of West Bengal.
- viii. It is clear from the study that local cows are generally reared for domestic consumption of milk and cross breeds are mainly for commercial purpose. The study found that the overall cost per day for cross-breed milk is higher than for local milk, and the same

holds for small- and medium-sized milk producers. This indicates that as cattle size increases, the marginal cost per day per milch cow decreases for both local and cross-breed milch cows.

- ix. From the study, it is found that earnings from cross-breed cattle are more than 2.5 times higher than the earnings from local milch cattle. The study has found a positive relationship between gross income and the size of milk producers across breeds of milch animals. The study found that the critically low net income from local cattle is due to low daily milk yield. Low market prices and high feed costs are also important factors contributing to low income from dairy activities in the state of West Bengal.
- x. The study has adopted the sensitivity analysis with two conditions, a decrease in fodder cost by 5% & increase in milk yield by 5%. The analysis shows that the percentage change in net income is greatest when both approaches are used together. In comparing these two approaches, the study found that a 5 per cent increase in yield is more effective in increasing income than a 5 per cent reduction in fodder costs.
- xi. It is found that overall earnings per litre for the lactation period are negative for the in-milk local milch animal, which is indicated by the high average variable cost over the sale price per litre of milk, not covering the part of operational expenses by producing milk. The overall BEP per cross-breed milch per lactation is 167.90 litres as observed in the sample study for West Bengal. Across the size of milk producers, it is found that small local milk producers are facing operational losses. But in case of paid out cost, the BEP for lactation period, it is found that all the BEP are feasible as no milk producers are facing losses considering the paid-out cost. The table also found that the overall BEP was lower for local cattle (52.28 litres), compared to cross breed cattle (53.83 litres) and across all the sizes of milk producers, the results are also the same.
- xii. As per the lactation period, the MoS ratio (explained in percentage) is highest, i.e., the risk position is lowest for medium-sized milk producers. The percentage of MoS is not feasible for small local milk producers as the producers are running with losses considering the total cost of cultivation. But in paid out cost the percentage of MoS is also feasible for both local and cross breed cattle, and the risk factor associated with milk production is higher for milk producers with local cattle than for those with cross breed cattle. Again across the size of milk producers it is found that the risk position is high for small milk producers than the medium and large milk producers.
- xiii. Overall percentage of BEP to total output per lactation can be calculated for cross-breed milch and for local it is infeasible as BEP is not calculated due to the average variable cost per litre being higher than the average selling price, i.e., the sector is already in a loss position. Across the size of milk producers, it is found that the percentage is lower for medium size of milk producers.
- xiv. But as per paid out cost the overall percentage of BEP to total output is lower for cross breed cattle (3.2%) compared to local cattle (9.3%) milk producers. Across the size of milk producers the result is better for medium size of milk producers than the others.

- xv. The study found that the overall BEP for the cycle of both the local milch cattle and cross-breed milch cattle cannot be estimated, as for the cycle, the average variable cost per litre of milk is much higher than the average selling price per litre of milk. This indicates that, in a cycle, both local and cross-breed milch cattle producers are at a loss. However, with the paid-out cost, the overall BEP for the cycle is feasible (119.43) for only cross-breed cattle, and for local milk producers, the BEP cannot be estimated. Across the size of milk producers, it is found that small local milk producers face losses and cannot cover the cost from the selling price of milk per litre, hence, the BEP cannot be calculated. Medium milk producers earn some profit above the cost of milk production.
- xvi. In the comparison of analysis between total cost approach and paid out cost approach it is evident that the milk producers are not operating as a professional production units as here the farming activities are continuing with a severe loss situation but one professional milk producers will not proceed for the production after operational losses.
- xvii. The milk producers in West Bengal are continuing the dairy activities as they cover the paid-out cost part of the lactation period, which is incurred for the dairying activities, but they have compromised the imputed cost. The waste and by-products from cultivation are used as the main fodder in the state of West Bengal. Most milk producers are also cultivators, so the importance of continuing milk production lies in using waste and by-products as cattle fodder without incurring significant actual paid-out costs.
- xviii. From the constraint analysis, it is observed that most of the respondents agree that high feed cost is a problem in milk production. It is also evident in our results. The percentage is higher for small producers. Over 60 percent of households say that the timely non-availability of fodder, especially hay, is a constraint in milk production. The higher price of milch animals is not a problem for milk production, as they revealed that value determines a cow's quality.
- xix. About half of the sample households reveal that low milk yield of milch animals is a problem which calls for breed improvement of milch animals. Over 70 percent of the sample households have responded that the milk price should be higher to generate more income from milk sales. It is also found that most of the sample households said that the high cost of veterinary medicines, which added to the cost of milk production, was a major concern, while the lack of nutritious food for animals was not a severe problem for milk production.
- xx. Most of the households admitted that they have poor knowledge about feeding and healthcare, calling for an increase in consciousness and proper education in the village about feeding management and healthcare through block livestock development officers and local Pranimitras. Half of the total sample cited inadequate or insufficient finance to invest in the dairy business for quality milk production cannot be considered a primary problem.
- xxi. Unavailability of green and dry fodder throughout the year was there, can be considered as a major problem in feeding management. It is also found from the responses that the majority of grazing land are degraded and encroached. It is

interesting to see that most households have never heard of PDCS. So, PDCS is needed to develop the dairy sector in West Bengal.

- xxii. The high cost of cattle feed and mineral mixture cannot be considered to be a primary problem since half of the sample is neutral. This is probably happening because of the reduced use of cattle feed and mineral mixture. High cost and low returns cannot be considered major problems, as fodder production culture is not established. Regarding the diversion of feed and fodder ingredients for industrial use, most households are neutral for the same reason previously mentioned.
- xxiii. From the responses, it is found that the lack of necessary space to tie the animals is not a big problem in feeding management. It is also observed that the farmers have land to cultivate fodder seeds, but due to the traditional cropping system, no one is attempting to cultivate fodder.

3. Policy Suggestions

India still stands first in milk production in the world, although there exist large inter-regional and inter-state variations in milk production as well as in per capita availability of milk in India. From the survey data, it is found that in West Bengal, dairy farming is carried out at a domestic subsistence level, but it needs a professional touch with the help of a commercial think tank. This study concludes with the following recommendations to guide the development of the dairy business in West Bengal.

- a) Feed and fodder costs, the dominant component of the total cost structure, are increasing day by day under the prevailing market mechanism in the dairy business. This directly raises the cost of dairy inputs and reduces earnings from dairy activities. There is a need to control the upward trends in feed and fodder costs. The best strategy, as suggested by the study, is the development of feed and fodder cultivation through the initiative of the PDCS and other governmental or non-governmental organizations. In this study, it is observed that most farmers have land, and ensuring infrastructure for fodder cultivation would be an optimal policy for dairy development in West Bengal.
- b) Another common issue identified in this study is the low milk yield in dairy animals. Increasing the yield rate of milch animals is another important issue to consider. Increasing milk yield is not easy, but some strategies can be used. The main problem with the low milk yield is the poor quality of the cattle breeds. The government should take the necessary steps to provide high-yielding breeds and genetic improvement for milch animals.
- c) The study found that there is a lack of support from the local government authorities in providing scientific and technological knowledge to the milk producers. But the local authorities have a crucial role in providing adequate scientific and technological knowledge regarding high-yielding breeds, AI, feeding management, and healthcare to the milk producers at the village level. Hence, the study recommends enhancing the effectiveness of existing government authorities by providing them with adequate scientific knowledge to improve milk production at the village level. By increasing the number of milking days in a lactation cycle, proper feeding management, and access to healthcare facilities, the yield rate and milk production can be increased. The sample

households are also unaware of animal insurance. Therefore, knowledge of animal insurance should be provided through the government officials.

- d) The main hindrance to dairy activities found in the study is the inadequate earnings from milk production. In this regard, the study has identified another point: the critical minimum sale price of milk. The study argues that the lack of a smooth, horizontal milk market and poor supply chain management are the reasons for low milk prices. Most milk producers sell their output domestically to NDCS agents, middlemen, or consumers or hotels. For the milk producers in the hill regions, it is also hard to find such a marketing chain; as a result, instead of selling milk, the milk producers in that area prepare "butter" and some by-products like 'Churpi' and then sell those products in the local market, which is considered to be the main earning from milk production. An efficient marketing system, combined with effective milk supply chain management in the village, can solve the problem. So, the governing authorities, along with policy experts, should take the initiative to address the obstacles in West Bengal.
- e) The cooperative milk unions also have a major role in marketing milk and supply chain management. There are currently 13 cooperative milk unions registered in West Bengal Cooperative Milk Producers Federation Ltd., which procures milk from milk producers of potential villages through the primary milk society. There is a need to increase the number of milk unions and primary milk societies at the village level, with greater operational efficiency across the various districts of the state. A special focus is needed on the state's northern region, especially the hilly region, as the milk union is currently not operating in the majority of the districts in that region.
- f) Policy should encourage milk producers' companies to enter the dairy sector, specifically in milk marketing and supply chain management at the village level.
- g) There are various types of support schemes initiated by the central government and NDDDB jointly, but it was found in the study that most of the sample farmers are unaware of these schemes, so the benefits are not distributed evenly to the milk producers at the village level. NDDDB has developed a number of app-based supporting technologies, such as "e-Gopala" and "Pashumitra," but the majority of people in our sample area are unaware of any of them. There is a need to promote the benefits of such schemes to milk producers, and their smooth implementation is needed immediately in the village.
- h) In the state of West Bengal, most of the milk producers are rearing cattle only to use their agricultural by-products and wastes as fodder for cattle rather than as a profit-making business. Government subsidies for dairy development for all types of milk producers are falling short of their objectives to generate professionalism in milk production. Instead, it is necessary to set up a target group of potential milk producers and a special drive to provide them with the benefits of various developmental schemes, thereby creating a group of productive and potential milk producers for the development of the dairy sector.
- i) Availability of credit for purchasing high-yielding animals is another possible way of strengthening the dairying sector in the state of West Bengal. Most of the milk producers in this study agree that the lack of finance for dairy activities is a major

constraint for dairy development. The availability of credit facilities with subsidised interest rates can also develop the concerned sector to an optimal level.

- j) Other incentives like subsidized bio-gas unit may be given to the large milk producers which may increase their income from dairy in one hand and on the other hand that may give an encouragement to others for rearing a large number of milch animals, as a result numbers professional large milk producers will be increased in the dairy sectors in West Bengal.