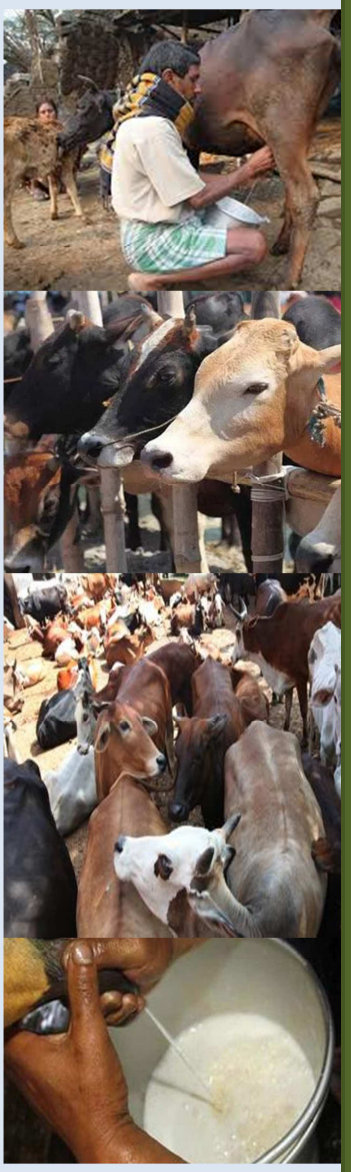
Study Number – 187

Assessment of the Status of Dairying and Potential to Improve Socio-Economic Status of the Milk Producers in West Bengal



Debanshu Majumder
Ranjan K. Biswas
Bitan Mondal
Ashok Sinha

Study sponsored by Ministry of Agriculture and Farmers Welfare
Government of India, New Delhi

Agro-Economic Research Centre
(For the States of West Bengal, Sikkim and Andaman & Nicobar Islands)
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Project Team:

Team Leader

Debanshu Majumder

Drafting and Report Writing

Debanshu Majumder
Ranjan K. Biswas
Bitan Mondal

Field Survey and Tabulation

Ashok Sinha
Vivekananda Datta
Debajit Roy
Nityananda Maji
Munsi Abdul Khaleque
Ranjan K. Biswas
Debanshu Majumder

Secretarial Assistance

Dibyendu Mondal
Parag Mitra
Debsankar Das
Amulya Ratan Patra

Coordinator

Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat.

Preface

The study on "Assessment of the Status of Dairying and Potential to Improve Socio-Economic Status of the Milk Producers in West Bengal" is an All India Coordinated Study and was carried out at the Agro-Economic Research Centre, Visva-Bharati, Santiniketan, West Bengal at the instance of Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi. The task of coordination has been entrusted with Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat.

Dairying is an important and integral part of the rural economy of West Bengal, which is perceived to be an effective instrument for bringing socio-economic transformation in the state. It contributes nearly one-fifth to the agricultural value of output and provides employment to about 2 million people, the majority of whom are resource-poor. Production of total milk in the state has increased from a mere 35 lakh metric tones in 2000-01 to over 50 lakh metric tones in 2015-16. However, organized dairying is yet to achieve its full potential in the state. Despite of impressive growth in milk production, productivity of dairy animals continues to remain very low and milk marketing system is mostly dominated by unorganized sector. The major share of milk production of the state is used for the manufacture of traditional dairy products (channa) by unorganized sector. Further, not only the state has predominantly indigenous cows, mostly non-descript, the infrastructure for milk procurement and milk processing in the state is also very poor. Therefore, the state needs special attention as it seems to be lagging behind in dairying as compared to several states in India. The present study provides a detailed documentation of the dairy landscape in West Bengal.

The task of completion of this study was assigned to Debanshu Majumder, as Team Leader. He was assisted by Ranjan Kumar Biswas, Ashok Sinha, Dabajit Roy, Vivekananda Datta, Munshi Abdul Khaleque and Nityananda Maji in field survey, data entry and tabulation. Secretarial assistance was provided by D. Mondal, D. Das, P. Mitra and A.R. Patra. B. Singh and S. Hansda helped in the office maintenance. Dr. Bitan Mondal, Institute of Agriculture also helped in compiling secondary information as well as in drafting the report.

We acknowledge the generosity of Prof. Swapan Kumar Dutta, Vice Chancellor (Officiating) Visva-Bharati, and Madam Ms. Sangeeta Verma (Economic and Statistical Adviser) and Shri P. C. Bodh (Adviser-AER Division) of Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi for their guidance and necessary support in completion of the study. We also thank Prof. Bidhan C. Roy, Hony. Deputy Director, AER Centre, Visva-Bharati, for his support and comments on the draft of the present study.

We are extremely indebted to Ms. Dora Saha, Manager, SAS, National Dairy Development Board (NDDB), Kolkata, for her guidance and active support in course of the study without which the present project would not have been completed.

We are equally indebted to Dr. Amrita Patel, Former Chairman, NDDB, Anand and for her guidance and useful suggestions/comments during the National Workshop cum Seminar held in AER Centre, VVN, Anand. We thank our respected colleagues from the participating AER Centres for their comments during the workshop. A word of appreciation is also to Mr. Biswajit Bhattacharya, NDDB, Anand for his valued opinion and supplying secondary information regarding dairying in the state.

We are deeply grateful to the Managing Directors, District Milk Unions of Bankura, Nadia, North and South Twenty Four Parganas for providing the necessary data and support in course of primary data collection.

We are particularly thankful to Prof. S. S. Kalamkar, Hon'ble Director, AERC, Vallabh Vidyanagar, Anand, Gujarat for his effective coordination of the study and for his valuable suggestions and comments which he rendered from time to time in course of the study.

Last but not the least; thanks are due to innumerable respondents in the villages who ungrudgingly took the pain of answering to our questions for hours at end. We thank each one of them for their invaluable support.

Prof. Amit Kumar Hazra
Registrar (Acting)
&
Hony. Director
Agro-Economic Research Centre
Visva –Bharati, Santiniketan

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Executive Summary

E1.1 Introduction

Dairying plays a vital role in rural economy by providing employment and income generating opportunities particularly for small, marginal and women farmers and landless labourers.

Bullocks and milch animal are the main support of agricultural operations and also a major source of supplementary income to the marginal and small farmer and landless agricultural labourers. On the other hand, the by-products of agricultural produce happen to be the chief ingredients of food for cattle and milch animals. The requisite labour for keeping dairy animals is also available from within the farmer's family. A very large portion of female labour force of cultivator households gets self-employment in several occupations allied to cattle and buffalo rearing.

E1.2 Need of the study

Over the periods since independence shift from cultivators to agriculture labourers has been significant in West Bengal. There is a critical need for generating adequate employment opportunities for these groups of population. Dairy farming may become an alternative way of livelihood. However, the productivity levels of milch animals are quite low and that the genetic pool of the milch animal population is of low quality, despite the fact that this region has relatively superior resource endowment.

The dairy cooperative structure has been rather weak in these parts of the country in terms of coverage of dairy cooperatives in villages, milk producers and share of milk procurement in surplus milk. But there is immense potentiality for using agricultural wastes as cheap and economical cattle ration. Moreover, preponderance of indigenous animals in the study area could minimise the impact of climatic variability as they are more resilient to such changes.

It is in this light we had taken up the study with following objectives.

E1.3 Objectives of the study

a) To assess the present status of dairying with reference to animal distribution, milk production, consumption and marketable surplus.

b) To identify the constraints in dairy development from supply side, institutional deficiency and processing infrastructure.

c) To identify different central and state government schemes related to dairy development at district level and document technical as well as operational details of the schemes and understand how convergence is ensured.

d) To highlight the facilitating factors that could help promoting dairy development to improve socio economic status of the milk producers.

e) To suggest broad areas for focussed interventions for promoting dairy development in the selected state and the way forward.

f) To suggest suitable policy measures to ensure compliance of effective convergence of various schemes for the benefits of dairy farmers.

E1.4 Data and Methodology

The study is based on both, the secondary and primary level data. The secondary data pertain to dairy development efforts and information as regards to various schemes implemented by the government while primary data from villages were collected using a multistage sampling procedure.

Four districts (viz. Bankura, Nadia, North 24 Parganas and South 24 Parganas) were selected from 3 respective agro-climatic regions of the state in consultation with National Dairy Development Board (NDDB), Kolkata. In each district two CD blocks (one having close proximity with District HQ and the other one a far-away) were chosen at the second stage. In the next stage, two villages were so selected that one having Dairy Cooperative Society and the other did not come under such coverage (henceforth DCS & NDCS villages). Thus, total numbers of selected villages in the State were 16. From each selected village, 15 milk producers (5 from each category of small, medium and large milk producers) were selected randomly adding to a total sample of 240 milk producers in the State. All milk producers were interviewed with a structured questionnaire. In addition, data on parameters related cost of milk production were collected from 03 milk producers from each village (one each from three categories), thus total 48 milk producers.

Officials of every District Milk Union (DMU) and Primary Dairy Cooperative Society (PDCS) were interviewed and data were collected with a structured schedule.

E1.5 Limitation of the Study

The most important limitation of this study is that published information for Animal Husbandry and Dairying in West Bengal state is too scanty than the requirement of the study. This restricted us to analyse few important dimension of the study, as compared to other states, which requires comparable and continuous time-series data on several variables related to dairying and animal husbandry in West Bengal.

E1.6 Findings from Secondary Data

E1.6.1 Trend in Contribution of Dairy in GSDP in West Bengal

Animal husbandry plays an important role in rural economy of West Bengal state. The contribution of Livestock was 4.30 per cent to the state GSDP in 2013-14. On the other hand, the contribution of agriculture to total GSDP was 12.35 per cent. The contribution of agriculture and livestock to total GSDP was estimated to be 16.64 per cent, while contribution of livestock to agriculture and livestock together was nearly 26 per cent. Thus, more than one fourth of the agriculture sector output comes from livestock sector. The share of GVO from livestock to agriculture sector has remained between 20.57 - 25.81 per cent with some little fluctuation during the last one and half decade.

Livestock contributes more than 20 per cent to the agricultural GDP of West Bengal and is one of the biggest sectors for supporting livelihood in the state. Livestock output at constant prices was reported at Rs. 288.75 billion in 2011-12 (at constant prices), of which milk contributes about 47.15 per cent or Rs. 136.16 billion.

E1.6.2 Composition of Livestock & details on Cow and Buffalo Breeds in West Bengal

However, over the period, share of cattle population in total livestock population has declined from 65.45 per cent in 1961 to 54.42 per cent in 2012. The share of buffalo population has also decreased considerably (5.62% to 1.97%) during the corresponding period. In absolute term, the rate of cattle population increases by 43.90%, while the rate of buffalo population

decreases by 39.45 %. In case of small ruminants, sheep population has increased by 101 per cent and goat population increased by 154.95 per cent in 2012 over 1961. Total livestock population in West Bengal has increased by 73.07 per cent during last five decades period.

The State has some high-quality and high-yielding breeds of cattle and buffaloes. Sahiwal, Gir, Jersey and Holstein Friesian breeds in cows, and Murrah breed in buffaloes were known for their high milk yielding capacity. The Jersey breed is found in all over the state of West Bengal. But till today, indigenous breeds are predominant in the state.

E1.6.3 Plan wise Outlay and Expenditure under Dairy Development

The State Government policy has been providing necessary support for dairy development in the state through cooperative sector. However, percentage share of expenditure on dairy development to total expenditure has declined considerably. As compared to around 41.29 per cent share of total expenditure on dairy development during 1974-1978, it has declined to 10.69 per cent during the period of 2002-03 to 2011-12.

E1.6.4 Growth in Milk Production and Productivity in West Bengal

Most of the animals in West Bengal are Zebu cattle i.e. non descriptive cow whose productivity is very low. In order to improve the productivity of Bengal *desi* cow, Artificial Insemination (AI) with frozen semen of quality breeds is being extensively carried out. The entire breedable cow population in the state is being tried to be brought under the coverage of AI at the Gram Panchayat (GP) level. Moreover co-operative unions are also responsible for performing AI under their care. They also supply feed, fodder seeds etc. to the beneficiary farmers which in turn help to improve the milk production of the state.

The milk production has increased from 35 lakh tonnes in 2000-2001 to 49.6 lakh tonnes in 2014-15 registering a growth of 41.71 per cent over base year. As a result, the per capita availability of milk in the state increased from 116 gms/day in 2000-01 to 145 gms/day in 2014-15.

Out of total bovine milk production in 2015-16, 62.32 per cent share accounts for Indigenous cattle, 32.79 per cent share accounts for Crossbred cows and remaining 4.89 per cent was of Buffalo breed.

E1.6.5 Milk Consumption and Marketable Surplus

On the basis of availability of data on milk utilisation pattern in West Bengal, it has been found that out of total production of milk at home, about 65 per cent was sold, while 22 per cent milk was consumed at the home and remaining 13 per cent milk was converted into milk products in 2014-15.

E1.6.6 Status of Availability of Feed and Fodder

As against the estimated animals' requirements of dry matter, feed resources available in West Bengal are lower. In the last almost one and half decade (1997 to 2011), shortage of dry matter in the State reduced from 57.86 per cent of the requirement to 46.91 per cent.

Green fodder is a comparatively economical source of nutrients. However, the availability of green fodder is also lower than estimated requirement in West Bengal. The estimation in 2007-08 regarding area under fodder crops indicated that only 0.04 per cent area to the gross sown area of 9752 thousand hectare was under fodder cultivation in West Bengal.

In West Bengal, there is absence of regulated and organized fodder market. Small scale marketing of fodder exists in all rural areas where fodder is sold by producers to traders or directly to the consumers.

E1.6.7 Infrastructure Development

For veterinary Services, 110 State Animal Health Centre (SAHC) & District Veterinary Hospital (DVH), 341 Block Animal Health Centre (BAHC), 273 Additional Block Animal Health Centre (ABAHC), 3248 Animal Development Aid Centre (ADAC) and 5744 Artificial Insemination Centre (AIC) are working at present. Still these facilities are not available in the interior villages. The state has no any facility for Mobile Animal Health Centre. In case of Cattle Breeding Farm, the West Bengal state has 7 Breeding Farms in Haringhata, Kurseong, Salboni, Suri, Kharagpur,

Kalyani, and Beldanga. These Breeding Farms are operating since 1990-91. There are seventeen Co-operative Milk Unions as well as Co-operative Dairy Unions in West Bengal.

E1.6.8 Dairy Development Institutions in West Bengal

A. Directorate of Dairy Development:

Directorate of Dairy Development, Government of West Bengal is engaged in the processing of raw milk to produce pasteurised and homogenised market milk and various milk products, and sells them through its own network of Milk booths, Suravis, Agents and Distributors in safe and wholesome condition. With the implementation of Operation Flood Programme in the mid-1970s, the extension, procurement and other farmer related activities on Dairy Development have been handed over to the Co-operative sector, i.e.; West Bengal Co-operative Milk Producers' Federation Limited.

B. West Bengal Co-Operative Milk Producers' Federation Ltd.

West Bengal Co-operative Milk Producers' Federation Ltd. (Federation) was formed as an apex body of milk cooperatives in West Bengal for developing the dairy industry.

The Federation has implemented the Women Dairy Co-operative Project (WDCP) funded by the Ministry of HRD, Govt., of India and thereby empowering the Women economically and socially.

Funded by the Ministry of Agriculture, Govt. of India the Federation is also implementing Integrated Dairy Development Project (IDDP) in the hilly, Non-OF and backward areas of West Bengal.

C. Mother Dairy Calcutta (MDC)

Apart from Directorate of Dairy Development and West Bengal Co-operative Milk Producers Federation, Mother Dairy Calcutta is also providing necessary support towards dairy development in the state through its own infrastructural and managerial capabilities. Today Mother Dairy has become a household name in case dairy products to the urban consumers of the state especially greater Kolkata and neighbouring towns.

E1.6.9 Policies and Programmes / Schemes for Dairy Development

In West Bengal, the Animal Resources Development Department is responsible for the formulation and implementation of Livestock and Poultry policies and programmes of the state. The following participatory branches including a university under this department are looking after the successful implementation of all the projects and schemes of the Department (NDDB, 2017):

1. Directorate of Animal Resources & Animal Health (DAR&AH)
2. Directorate of Dairy Development
3. Paschim Banga Go-Sampad Bikash Sanstha (PBGSBS)
4. West Bengal University of Animal and Fishery Sciences (WBUAFS)
5. West Bengal Cooperative Milk Producers' Federation Ltd. (WBCMPF)
6. West Bengal Dairy & Poultry Development Corporation Limited (DAIRPOUL)
7. West Bengal Livestock Development Board
8. Mother Dairy
9. West Bengal Veterinary Council
10. The Calcutta Society for the Prevention of Cruelty to Animals (CSPCA)

E1.7 Findings from Primary Survey

E1.7.1 About Selected Study Area, Sample Households and Milk Unions

In all districts barring South Twenty Four Parganas, the milk unions cover over five hundred villages in respective districts. Activities of Sundarban MU have been rejuvenated in 2015 and were found to grow in a steady pace during the time of survey.

The number of cooperative societies under the jurisdiction of the milk unions was highest in Bankura (350) while it was lowest in South Twenty Four Parganas (44). However, the milk procurement/collection figures reveal that Nadia topping the list with 143.3 lakh kilograms of liquid milk from the cooperative societies per annum.

As far as milk processing plants are concerned, all the districts of the present study did not have such plants. Of the four, Bankura, Nadia and North Twenty Four Parganas had milk processing

plants situated in the district. South Twenty Four Parganas did not have such facility. Even in the former three districts the plants generally processed liquid milk of various standards.

On the whole the villages (both DCS and NDCS) in four districts were placed more or less at par in respect of the basic socio-economic parameters with a little difference among them.

In terms of average family size the households of four districts (both DCS and NDCS villages) reveal similar pattern. The average family size in aggregate was around 4.3-4.4 in DCS and NDCS villages. Average age of respondents varied between 46.7 to 50 years while average age of the family was around 37 years. It was also interesting to find that average age of female respondents was significantly lower than that of male respondents in all four district irrespective of DCS or not. In the households under present enquiry the education scenario was found quite dismal.

Population composition in respect of religious groups revealed that in all villages, people from Hindu religious belief dominate the social scenario of whom people from the Scheduled and other backward communities are of sizeable proportion in the respective size-classes. Scheduled Tribes were few in number.

Families in both DCS and NDCS villages were mostly farming families pursuing cultivation as their principal occupation. Most of the households took up dairy enterprise as their subsidiary source of income even in the DCS villages. In the DCS villages the size of average operated land had been 0.28 hectares in contrast to 0.40 hectares of average operational land in the NDCS villages. In a sense the farmers of the villages without dairy cooperatives are marginally better off than their DCS counterparts.

The general crop rotation practice throughout the year could be described by Rice followed by Potato and Mustard followed by Rice once again in *Kharif, Rabi* and *Summer* seasons respectively.

E1.7.2 Cost of Milk Production and Awareness about Schemes

Breedable Animals

In DCS villages herd strength of local milch animals were higher than that in the NDCS villages

across all size-classes. But when it came to rearing of cross bred animals, NDCS farmers owned more cross bred cow than the former ones. So far as the cattle sheds are concerned NDCS farmers were found to own more sheds on an average for their cattle than DCS farmers.

Average age of the breedable local cows in the DCS villages was 6 years in aggregate of all size-classes while for cross bred cow average age had been 5 years. Average age at first calving for local cows was higher than the cross bred cows in both the areas. Lactation order was found more or less same for all types of farmers with marginal variation among the village clusters and size-classes.

A dismal scenario was observed as regards to insurance coverage for the cattle.

Labour Use Pattern

In both DCS and NDCS villages no hired labour had been employed for dairy operations. It is noteworthy to mention that in DCS villages across all size-class participation of women family members had been higher both in terms of number per day as well as hours of involvement in such activities. Moreover they had been members of DCS too.

Details on Feed/Fodder and Water

NDCS households across all size-classes were feeding their cattle with more of dry and green fodder and supplements as compared to the DCS farmers. In case for concentrates DCS and NDCS farmers were applying prepared cattle feed in more or less equal quantity. In case of cross bred cow, however, feeding was higher among the DCS households than their NDCS counterparts. Average grazing hours for local cattle was 3.4-3.8 hours while it was 2.5 for cross bred cattle.

In the villages of the present study (both DCS & NDCS) normal water of adequate quantity was reported by the respondents. The main source of water for dairy had been tube wells supplemented by farm ponds and open wells.

Details on Veterinary and Breeding Services and Expenditures

Most of the animals in DCS and NDCS villages across size-classes received vaccines like HS, BQ and FMD. Vaccination among the small size-class had been a little lower as compared with the

other two size-classes. Use of vaccines for cross bred cows was marginally higher than the local cows. Artificial insemination (AI) had been the main method of conception for the cattle.

Awareness about the Schemes

Knowledge and awareness regarding vaccination and AI schemes had been to the fullest extent. But when the question boiled down to awareness about other schemes there was sharp contrast between the farmers of DCS and NDCS villages. For the DCS farmers knowledge had been imparted by the milk cooperatives and milk unions functioning in the area. For the NDCS farmers, however, source of their awareness had been fellow farmers and neighbours.

Most of the benefitted DCS farmers seemed to be satisfied with the assistance they received through the several schemes and reported quality of the material had been up to their expectation.

Cost of Milk Production

For calculating cost and returns we had imputed the value of family labour with ruling wages rates for male and female. It is observed that labour cost has been the main component of total cost in all cases. The proportion of labour component, however, was found decreasing with increase in the size-class of both DCS and NDCS villages. The prices offered by the private agents were lower than the prices paid by the local dairy cooperatives.

Coming to the question of net returns per day per animal, we are faced with a situation where farmers were incurring heavy losses. Barring only two categories of middle and large farmers rearing cross bred cows in both types of villages all other farmers were suffering sizeable amount of net losses per day. But if the imputed value of labour gets deducted from total cost the households across each and every size-class and for all types of cows earned substantial positive profit per day per animal. It might have been due to over-optimal usage of family labour in dairy activities.

E1.7.3 Milk Consumption and Marketable Surplus

Use of Milk at Home and Processing

In the DCS households data for milk drawn per animal per day revealed that the quantity of milk drawn per local cow was 2.64 litres for the DCS village while it had been 5.65 litres for cross bred cow. For NDCS households, however, quantities were to the tune of 2.93 litres and 5.45 litres respectively.

General practice among the farmers of all categories was to sell out bulk of the liquid milk. It was interesting to note that in both cases milk of cross bred cow was sold directly in greater proportion than the milk of local cow. This in a way points towards household's preference for milk of the local cow for their own consumption.

Sale of Milk and Cost of Milk Marketing

In all size-class categories the percentage of sale by the DCS farmers to milk cooperatives accounted for over 85 per cent. For NDCS farmers, however, proportion of total sales, being around 85 per cent, had been given to the private vendors and middlemen.

The price offered by cooperatives had always been higher than the price offered by the private ones. Payments by DCS were generally transferred to suppliers' bank accounts on weekly basis whereas payments from local vendors were received after a month including delayed payments.

Handling of Income from Dairying

Involvement of women members in receiving income from sale of milk was found in both DCS and NDCS families. As far as income from sale of cow dung, cow dung cakes and farm yard manure, women had almost unquestionable authority of receiving the income in both types of villages. Share of expenses for family maintenance had been higher in comparison with the share of expenses for dairy activities from sales proceeds of milk. However, income from dung sale was switched towards upkeep of the cattle herd in greater proportion with some inter size-class variations.

Problems in Milk Marketing

The milk cooperatives, though operating in every district, were too small in number to rope in the large number of small milk producers in respective areas under their coverage. Moreover, their procurement capacity had been rather small as compared to the supply of liquid milk. And these cooperatives were faced with competition from the enumerable private intermediaries who collected the milk from producer's door steps. Moreover, there existed problems of milk adulteration and malpractice by the small private players as complained by some of the DCS members.

E1.7.4 Constraints

Constrains faced by Milk Producers

Delivery of cattle feed from the DCS and private agents were found inadequate. Most of the households could purchase cattle feed on credit from private agents only. There was no provision of credit from the dairy cooperatives. Cattle feed and mineral mixtures, when purchased from open market or private agents had been much costlier than that been supplied by the cooperatives.

Emergency veterinary service in general was made available by the private agents in all the villages though charges for such had been high. Vaccines too, been supplied by the private agents, were inadequate in supply and poor in quality. Semen had also been insufficient in supply.

All the milk producers found the milk procurement price to be low whether being disposed with cooperatives or private vendors. However, the regularity of payment differed between the societies and vendors. There had been no incentive bonus and advance payment to the producers either by cooperative societies or the private agents for supplying milk.

As of infrastructure, it was found that the households mainly suffered from lack of improved equipment and training facilities, irregularity of supply of cattle feed, vaccines, semen at AI centre and infrequent visit of veterinary staff. Both DCS and NDCS households were

complaining against poor conception rate through AI, poor knowledge about proper feeding and health care and cheap and scientific housing for animals.

High cost of feed and mineral mixture, veterinary medicines emergency veterinary services added with low price of milk are major economic hurdles. Main constraints for DCS and NDCS farmers turned out to be lack of purchasing power resulting out of lower socio-economic conditions.

Constraints faced by PDCS

All the DCS were of the opinion that the average milk yield in the respective areas was sometimes low. Unavailability of emergency veterinary services and infrequent visit by veterinary staff had been a serious obstacle in Nadia, North and South Twenty Four Parganas. Large number of small producers in Nadia and South Twenty Four Parganas posed serious problem of monitoring and follow-up activities by the DCSs.

Market related constraints included DCS's inability to market value added milk products in all districts. In fact there was no provision at the DCS level to process milk and produce value added products.

Constraints faced by Milk Unions

There was deficiency in skilled manpower of which all the milk unions were suffering.

Technical constraints included unavailability of required inputs, technical knowhow and instruments to detect adulterants in milk, state of the art technology for quick fat detection.

As far as the governance issues were concerned, it was observed that some of the milk unions were looking for autonomy and staff recruitment for smooth functioning and monitoring of the MU and the DCSs. Formation of new Board of Directors and reduction in political intervention was also necessary.

Gradual increase in overhead expenditure coupled with decreasing quantum of milk procurement had resulted in a severe financial crisis in the districts of Nadia and North Twenty Four Parganas.

E1.8 Conclusions

- The State and Central Government policy has been providing some support for dairy development in the state of West Bengal through co-operative sector. However, as against the estimated animals' requirements, feed resources available in West Bengal are lower. In West Bengal, however, there exists high incidence of non-descript cows in comparison with the crossbred varieties.
- In terms of socio-economic parameters villages of four districts (both DCS and NDCS villages) reveal more or less similar pattern. Families were mostly farming families pursuing cultivation as their principal occupation. Most of the households took up dairy enterprise as their subsidiary source of income. In the villages dairy enterprise was being run solely by family labour. It is noteworthy to mention participation of women family members remained crucial for such operation.
- Poor state of awareness about various dairy developments schemes were observed among the NDCS households. A dismal scenario was observed as regards to insurance coverage for the cattle in all the villages regardless of DCS or NDCS.
- It is observed that labour cost has been the main component of total cost in all cases. There might be over optimal use of family labour.
- The milk cooperatives, though operating in every district, were too small in number to wrap the large number of small milk producers in respective areas. Moreover, their procurement capacity had been rather small as compared to the supply of liquid milk.
- Service delivery of cattle feed and fodder was found inadequate. Cattle feed and mineral mixtures, when purchased from open market or private agents had been much costlier.
- Procurement price of milk had been non-remunerative for the farmers whether purchased by cooperatives or private vendors.
- As of infrastructure, the households suffered from lack of improved equipment, training facilities, irregularity of supply of cattle feed, vaccines, semen at AI centre and infrequent visit of veterinary staff. Charges for emergency veterinary service provided by private agents had been high.

- All the DCS were of the opinion that the average milk yield in the respective areas was sometimes low. Unavailability of emergency veterinary services and infrequent visit by veterinary staff had been a serious obstacle. Large number of small producers also posed serious problem of monitoring and follow-up activities by the DCSs.
- There was severe deficiency in skilled manpower of which all the milk unions were suffering. Technical constraints included unavailability of required inputs, technical knowhow and instruments to detect adulterants in milk, state of the art technology for quick fat detection. As far as the governance issues were concerned, it was observed that some of the milk unions were looking for autonomy and staff recruitment for smooth functioning and monitoring of the MU and the DCSs. Gradual decrease in quantum of milk procurement has posed serious threat.

E1.9 Recommendations

- Innumerable small dairy farms are to be fastened in some sort of milk chain by the cooperative societies. So, there is urgent need to enhance the number of PDCS in each district to reduce the exploitation by private vendors.
- The infrastructure for milk procurement and transportation should be improved at the DCS level.
- Enhanced operation of DCS offering remunerative price to farmers can motivate them in joining the society and at the same time this partnership would be able to make a dent in farmers' economic hardship.
- Service delivery of feed and fodder to be enhanced. Provision for vaccinations and emergency veterinary services including AI needed to be boosted. In this aspect DCSs working at the village level could play an important role.
- Re-orientation and proper implementation of government policies for dairy development at the grassroots must be taken care of. And in view of such re-orientation more autonomy and funds are to be provided to DCS.
- For increasing awareness regarding scientific dairy farming new training programmes need to be arranged especially for the women. These might be able serve twin purposes

of imparting improved consciousness among women regarding dairy farming and might as well be supportive for women empowerment in the village society.

- It remained essential that the farmers be motivated to insure their cattle for it minimized the risk. Procedural changes, if necessary, can be thought of so that the farmers can avail these benefits. Outreach of the facility needs to be provided at the village level. For DCS membership insuring cattle might be made a mandatory criterion.
- The DCSs were of opinion that there had been fluctuations in milk yield across seasons. Proper and scientific dairy practices backed by better awareness supported by government veterinary and DCS staff might be able to bring about a change in such paucity.
- The milk unions might be provided with skilled manpower for proper implementation and monitoring of the operations of DCS. More autonomy in MUs' functioning might be necessary and political intervention must be restricted.
- Establishing milk processing plants in the districts are of urgent importance for production of value added milk products that would ensure higher return.
- Offering remunerative price for milk is a decision that depends on the policy of the government. In face of rising cost a hike in procurement price may be thought of which in turn would motivate and improve economic conditions of the farmers.
- As such there are ample central and state sector schemes for development of animal husbandry in general and dairy expansion in particular. Convergences of many of such schemes were found in the survey area of this present study. But the scope and coverage seemed somewhat restrictive. Policy re-orientation might be sought for rejuvenating the dairy sector in the villages of West Bengal.

Chapter I

Introduction

1.1 Prelude

In India, two almost contemporary central sector programmes was launched by Government of India in last century for development of agriculture and its allied sector, specifically dairy industry. These two programmes were “Green Revolution” for agriculture development and “Operation Flood” for dairy development. As an impact, Dairy development in India has been acclaimed as one of the most successful development programmes under the world’s largest integrated dairy development programme ‘Operation Flood’ (Shiyani, 1996; NAAS, 2003). India ranks first in the world in milk production, which has increased from 17 million tonnes in 1950-51 to 146 million tonnes in 2014-15. Out of this total production, nearly 51%, 45% and 4% milk come from buffalo, cow and goat respectively. Thus, the per capita availability of the milk in India has increased from 130 grams/day in 1950-51 to 302 grams/day in 2013-14 (http://data.gov.in) as against the world average of 294 grams per day during 2013. Besides, dairying has become an important secondary source of income for a large number of rural families. In fact, dairying is playing a vital role in rural economy by providing employment and income generating opportunities particularly for small, marginal and women farmers and landless labourers. It has been observed that maximum quantity of milk in India is produced by animals reared by small, marginal and women farmers and landless labourers. Thus, livestock rearing has become one of the most important economic activities in rural India. Moreover, livestock rearing is an important source of protein supplement to the family members of the household in the form of milk, eggs and meat. Not only that, in many cases, livestock also a central component of small holder risked management strategies (Randolph et al., 2007). In fact, level of rural poverty is significantly higher in states where livestock sector is underdeveloped (Singh and Meena, 2012). Actually, it is one of the important sub-sectors of agriculture, next only to field crops (Saxena et al., 2002). So, about 15.4 million farmers have been brought under the ambit of 1, 60,000 village level dairy corporative societies up to March 2014 (http://dahd.nic.in) in India.

Considering the importance of dairy sector in India, a number of schemes and programmes of both central and state government are being implemented for dairy development since long back. The department of Animal Husbandry and Dairying of government is the implementing authority of these schemes and programmes. The required financial support for implementing these schemes and programmes are provided through state budgets and central grants. Besides, a number of government welfare schemes are also implemented for dairy development which is funded through budgetary previsions of various departments. Some of such departments are Rural Development and Panchayat Raj, Agriculture and Cooperation, Scheduled Caste and Scheduled Tribe Finance Corporation, Tribal Welfare, Women and Child Welfare, etc.

The state milk federations and the milk unions of each state are also playing significant role for development of dairy sector through evolving a variety of schemes that provide incentives to the milk producers. Besides, district level milk unions of every state have also drawn up some schemes to promote dairy development. Required fund for these schemes come through various ingenious ways, e.g. partly through profits generated in milk business, partly through token cess or through charity/welfare.

Animal husbandry in India is closely interwoven with agriculture and obviously plays an important role in the national economy and also in the socio-economic development of millions rural households (Vaidyanathan, 1989; Mishra, 1995; Chawla, et al, 2004; Sharma, 2004; Birthal, 2016). Livestock rearing is one of the most important economic activities in the rural areas of the country providing supplementary income for most of the families dependent on agriculture. This picture of the country has also been reflected in the state of West Bengal. As per area and population, the ranks of West Bengal state in India are 13th and 4th (Census of India, 2011) respectively. The economy of West Bengal primarily depends on agriculture. More than 70% of the state-population depends either directly or indirectly on agriculture for their earnings. But the fact is, above 90% farmers of the state belongs to small and marginal categories. Due to lack of required area of land, this big proportion of population has to choose some another occupation for sustenance. In this circumstance, cattle rearing have become the first choice as secondary/another occupation to small and marginal farmers and landless labourers of West Bengal due to favourable agro-climatic condition for animal husbandry in the state.

During 2015-16, the annual bovine milk production of West Bengal was 4.9 million tonnes. Among twenty one revenue districts of the state, North 24 Parganas, Nadia, Burdwan and Hooghly are the major milk producing districts. Anand pattern cooperatives are the major organized player in the dairy industry of West Bengal. However, after the liberalization, the dairy sectoris facing stiff competition from various private players. In West Bengal, the dairy cooperatives have been able to procure only around 5.4 per cent of the marketable surplus milk of the state, whereas at national level, dairy cooperatives procure around 16 per cent of the marketable surplus. Most of the procurement of surplus milk is done mainly by the unorganized sector and that too for making various traditional products, predominantly *chhana.* This indicates that organized dairying is yet to achieve its full potential in West Bengal.

WB State Profile:

Geographic profile of West Bengal

The State of West Bengal is one of the Eastern States of India extending between 21°31′ and 27°14′ North latitudes and 86°35′ and 89°53′ East longitudes. The land frontier of the State touches Bangladesh in the east, and is separated from Nepal in the west. Bhutan lies in the north-east, while Sikkim is on the north. On the west there are the states of Bihar, Jharkhand, while in the south lies Orissa, and the Bay of Bengal washing its southern frontiers. The tropic of cancer passes through the state. The state extends from the snow clad Himalayas in the north to the Bay of Bengal in the South. The Ganges and its numerous tributaries have created fertile regions in the State. West Bengal is rich in natural resources and it has an advantage of six agro-climatic regions, fertile soil of vast bio-diversity and consistent irrigation facilities. West Bengal has been divided into 6 agro-climatic zones on the basis of landform hydrology – soil combinations as well as climate variations. These are – (1) Northern Hill Zone (NHZ), (2) Terai – Tista Alluvial Zone (TTAZ), (3) Gangetic / New Alluvial Zone (GAZ), (4) Vindhya / Old Alluvial Zone (VAZ), (5) Coastal Saline Zone (CSZ), and (6) Undulating Red and Laterite Zone (URLZ).

Demographic profile of West Bengal

As per Census 2011, West Bengal has a population of 9, 12, 76,115 consisting 4.68 crore males and 4.44 crore females. West Bengal has a population density of 1028 inhabitants per square km. making it the most densely populated state in India. The population of the state

has increased from 4.43 crore in 1971 to 9.12 crore in 2011. The state has a gender ratio of 950 females per 1000 males. The census report (2011) has also exhibited literacy rate of the state by 76.26 per cent.

Agricultural profile of West Bengal

Agriculture plays such a pivotal role in the state's economy that nearly three out of every four persons is directly or indirectly involved in agriculture. As such agriculture is the primary occupation of the state and the main source of income for the people of West Bengal. Above 70 percent of the total population depends on farming for their livelihood. Though the state has only 3 percent of cultivable land of India, it accounts for 8 percent of the total food grains produced in the nation. The net area under cultivation in West Bengal is about 57, 27,007 ha (65.95 %) with cropping intensity of 184 percent. There are 20.54 % and 13.51 % of the reported area remain under non-cultivable and forest area, respectively. The cropping pattern of the state is dominated by food crops, which account for about 87 percent of the area under principal food crops in the state. The major crops grown in the state include rice, wheat, pulses, jute, oilseeds, vegetables, etc. The state is the highest producer of rice in the nation. There is remarkable progress in the production of jute and oilseeds also. About 60 percent of the raw jute is produced in the state. In case of main working force, West Bengal has faced 2, 30, 23,583 persons of total worker, out of which 19.79 percent and 19.64 percent are accounted for cultivators and agricultural labours, respectively.

Animal Husbandry & Dairy Profile of West Bengal

As per Livestock Census-2012, the West Bengal state has 16, 514 thousand cattle population. Out of this total cattle population, the state has 83.7% indigenous species and 16.3% crossbred species. As a result, per capita milk availability per day is 145 gms in the state. However, as agri-allied sector, dairying is now playing an important role for upliftment of the rural economy in West Bengal.

1.2 Role of Dairy Sector in State Economy of West Bengal

Dairying is an important and integral part of the rural economy of West Bengal. It has been playing a significant role in boosting the agrarian economy of the state. It is one of the main subsidiary sources of livelihood in rural area of the state. Thus, this sector plays a vital role

in the livelihood of the rural people as well as rural economy of the state. It has significant impact on employment as well as income generation for marginal and sub-marginal farmers and landless labourers in West Bengal. However, organized dairying is yet to achieve its full potential in the state.

Cattle and especially bullocks are the primary source of draught power required for the agricultural operations as well as rural transportation. Milch animals are the main origin of the milk requirements of the human beings. Thus, cattle and milch animals provide essential foods like milk and meat. Large quantities of animal by-products are also generated by these animals. Bullocks and milch animal are the main support of agricultural operations and also a major source of supplementary income to the marginal and small farmer and landless agricultural labourers. On the other hand, the by-products of agricultural produce happen to be the chief ingredients of food for cattle and milch animals. Farmers are in a position to follow animal husbandry and dairying as an adjunct to cultivation. The requisite labour for keeping dairy animals is also available from within the farmer's family. A very large portion of female labour force of cultivator households which otherwise have suffered from disguised unemployment, gets self-employment in several occupations allied to cattle and buffalo rearing.

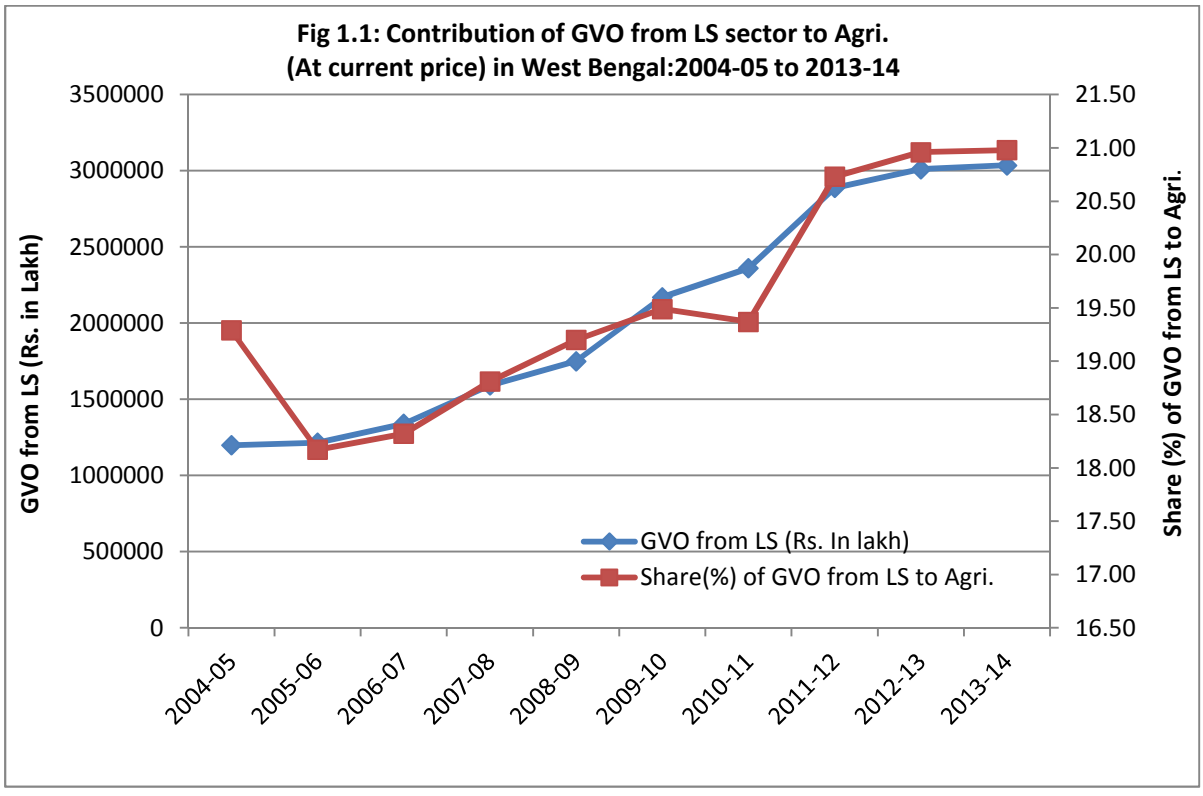
Milch animal-holders feed and nourish dairy animals with crop residuals and agriculture by-products available with them. But the dairy cooperatives have been able to procure only around 5.4 per cent of the marketable surplus milk of the state against around 16 per cent procurement of the marketable surplus milk by dairy cooperatives in India. This indicates the utilization of a large amount of marketable surplus milk by the unorganized sector for conversion into traditional products, predominantly *chhana.* The *chhana* industry of West Bengal is as old as Bengali food culture. Nineteenth century renaissance of Bengal played a major role in the growth of *chhana* based sweet industry. Enterprising skills combined with business acumen provided impetus for a century old industry. However, till date the industry is purely in the hands of unorganized sector. In the present globalized economy which is hindering the growth of the sector.

The capital city of Kolkata is the major market of *chhana.* The *chhana* consumed by the sweetshops of the city is either manufactured in-house or obtained from the local *chhana* markets or supplied by vendors from adjoining districts. Two adjoining districts namely,

Hooghly and North 24 Parganas are the major suppliers of *chhana.* The sweet industry of the state is directly providing employment to about 7 lakh people and the downstream *chhana* industry providing about 4 lakh employments. There are about 15,000 sweetshops and five wholesale *chhana* markets in Kolkata.

1.3 Trend in Contribution of Dairy in GSDP

Animal husbandry plays an important role in rural economy of West Bengal state. The contribution of Livestock was 4.30 per cent to the state GSDP in 2013-14. On the other hand, the contribution of agriculture to total GSDP was 12.35 per cent. The contribution of agriculture and livestock to total GSDP was estimated to be 16.64 per cent, while contribution of livestock to agriculture and livestock together was nearly 26 per cent. Thus, more than one fourth of the agriculture sector output comes from livestock sector (Table 1.1 & Fig. 1.1). The share of GVO from livestock to agriculture sector has remained between 20.57 - 25.81 per cent with some little fluctuation during the last one and half decade.



Livestock contributes more than 20 per cent to the agricultural GDP of West Bengal and is one of the biggest sectors for supporting livelihood in the state. Livestock output at constant

prices was reported at Rs. 288.75 billion in 2011-12 (at constant prices), of which milk contributes about 47.15 per cent or Rs. 136.16 billion (Table 1.2).

Table 1.1: Contribution of Gross Value of Output and Gross Value Added from Agriculture and Livestock Sector to Total GSDP at Current Prices of West Bengal State

Sr. No.	Year	Total GSDP (Rs In Crores)	Contribution of GVO from Agriculture to Total GSDP (%)	Contribution of GVO from Livestock to Total GSDP (%)	of GVO from Agriculture & Livestock to Total GSDP (%)	Contribution of GVA from Agriculture & Livestock to Total GSDP (%)	Contribution of GVO from Livestock to Agriculture & Livestock sector %)
1	1999-00	135376	25.30	6.55	31.86	GVA Data Not Available In West Bengal	20.57
2	2000-01	143724	22.55	6.42	28.96		22.16
3	2001-02	157144	23.03	6.19	29.22		21.17
4	2002-03	168000	20.83	6.14	26.98		22.77
5	2003-04	189258	20.55	5.80	26.35		21.99
6	2004-05	208656	18.57	5.75	24.31		23.64
7	2005-06	230245	18.65	5.28	23.93		22.05
8	2006-07	261682	17.69	5.12	22.81		22.45
9	2007-08	299483	17.87	5.32	23.18		22.93
10	2008-09	341942	16.43	5.12	21.55		23.75
11	2009-10	398880	17.25	5.44	22.69		23.98
12	2010-11	460959	16.45	5.12	21.56		23.74
13	2011-12	528316	16.00	5.47	21.47		25.46
14	2012-13	603311	14.51	4.99	19.50		25.60
15	2013-14	706561	12.35	4.30	16.64		25.81

1.4 Composition of Livestock & details on Cow and Buffalo Breeds in West Bengal State

The West Bengal state possesses a remarkable position in the country so far as livestock wealth and development are concerned. The Nineteenth Livestock Census (2012) of India has placed total livestock population at 512.06 million, out of which, 30.35 million livestock (5.93 %) population was in the state of West Bengal. There is a decrease in livestock population over 2007 to 2012 from 36.60 million to 30.35 million registering a negative growth of 17.09 per cent in the total number of animals of various species (Table 1.3).

The state accounts for 8.65 per cent share in cattle population, 0.55 per cent of buffalo population, 1.65 per cent sheep population and 8.51 per cent goat population of the country. The negligible share of mules & donkeys (0.1 %) and yaks (1.30 %) in national stock has also been recorded in 2012. As per Livestock Census 2012, among the species, Cattle contributes highest share (54.42 per cent) in total livestock population followed by Goat (37.91%), Sheep (3.54 %), Pigs (2.13%) and Buffaloes (1.97 %), besides marginal contribution

Table 1.2: Value of Output: Agriculture and Livestock

Item	Value of Output: Agriculture and Livestock in West Bengal							
	2004-05	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
Value of Output at Current Prices *(Rs. billion)*								
Agriculture & Allied*	621.81	668.82	731.20	846.16	911.45	1113.24	1218.31	1392.82
Agriculture	387.41	429.50	462.83	535.12	561.96	688.05	758.05	845.43
Livestock	119.91	121.52	133.96	159.18	175.02	217.01	236.00	288.75
Share of Value of Output to Agriculture and Allied* *(%)*								
Agriculture	62.30	64.22	63.30	63.24	61.66	61.81	62.22	60.70
Livestock	19.28	18.17	18.32	18.81	19.20	19.49	19.37	20.73
	2004-05	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12***
Value of Output at Constant Prices *(Rs. billion)* (2004-05 & 2011-12)								
Agriculture & Allied*	621.81	627.89	646.38	690.16	669.25	722.15	713.68	1392.82
Agriculture	387.41	384.89	390.58	415.23	410.04	441.46	431.23	845.43
Livestock	119.91	122.42	125.57	136.70	132.65	137.65	143.15	288.75
Share of Value of Output to Agriculture and Allied* *(%)*								
Agriculture	62.30	61.30	60.43	60.16	61.27	61.13	60.42	60.70
Livestock	19.28	19.50	19.43	19.81	19.82	19.06	20.06	20.73
	2004-05	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
Value of Livestock Output at Current Prices *(Rs. billion)*								
Milk	56.98	58.50	62.70	71.36	82.24	100.37	105.03	136.16
Meat	44.75	47.42	50.34	65.05	66.91	80.70	88.19	111.15
Egg	4.51	4.73	4.98	5.49	6.51	10.09	11.96	14.03
Dung	10.03	10.77	11.37	12.08	12.52	16.87	19.96	21.14
Others^	3.61	4.08	4.56	5.18	6.82	8.96	10.84	6.26
Share of Livestock Output at Current Prices *(%)*								
Milk	47.52	48.14	46.81	44.83	46.99	46.25	44.50	47.15
Meat	37.32	39.02	37.58	40.87	38.23	37.19	37.37	38.49
Egg	3.76	3.89	3.72	3.45	3.72	4.65	5.07	4.86
Dung	8.36	8.86	8.49	7.59	7.15	7.77	8.46	7.32
Others^	3.01	3.36	3.40	3.25	3.90	4.13	4.59	2.17
	2004-05	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12***
Value of Livestock Output at Constant Prices *(Rs. billion)* (2004-05 & 2011-12)								
Milk	56.98	58.08	59.42	60.90	62.24	64.08	66.62	136.16
Meat	44.75	45.63	46.78	55.76	50.03	51.94	53.70	111.15
Egg	4.51	4.63	4.75	4.78	4.79	5.36	5.79	14.03
Dung	10.03	10.17	10.32	10.48	10.64	10.81	10.99	21.14
Others^	3.61	3.88	4.27	4.76	4.94	5.45	6.03	6.26
Share of Livestock Output at Constant Prices *(%)*								
Milk	47.52	47.44	47.32	44.55	46.92	46.55	46.54	47.15
Meat	37.32	37.27	37.25	40.79	37.72	37.73	37.51	38.49
Egg	3.76	3.78	3.78	3.50	3.61	3.89	4.04	4.86
Dung	8.36	8.31	8.22	7.67	8.02	7.85	7.68	7.32
Others^	3.01	3.17	3.40	3.48	3.72	3.96	4.21	2.17

***at 2011-12 price**

Notes: P:Provisional Estimates, Q:Quick Estimates ,*Includes Livestock, Forestry & Fisheries, ^Includes Wool and Hair, Silk worm Cocoons & Honey ,Increment in Stock

Source: State wise estimate of Value of Output (Ag & Allied) with base year 2004-05 & 2011-12, MoSPI, GoI.

Table 1.3: Growth of the Livestock in West Bengal and India

Sr. No	Livestock Census Year	Total Livestock (000)		% Share of WB to All India	% Growth of WB State between two Census
		All India	West Bengal		
1	1951	292784	-	-	-
2	1956	306615	-	-	-
3	1961	336432	17535	5.21	-
4	1966	344111	19410	5.64	10.69
5	1972	353338	18721	5.30	- 3.55
6	1977	369525	24134	6.53	28.91
7	1983	419588	28948	6.90	19.95
8	1987	445285	30842	6.93	6.54
9	1993	470830	33786	7.17	9.54
10	1997	485385	35958	7.41	6.43
11	2003	485002	32039	6.60	- 10.90
12	2007	529698	36604	6.91	14.25
13	2012	512057	30348	5.93	- 17.09

Note: Figures without Dog & Rabbit.
Source: Directorate of Animal Resource & Animal Health, GoWB

is attributed by other livestock species such as Horses and Ponies, Mules, Donkeys, Yaks, etc. (Table 1.4).

Table 1.4: Species-wise Livestock population & its Share in total livestock

(Number in thousand)

Sr. No.	Particulars	West Bengal -2012				India 2012	
		Livestock-2012	% share in India	% share in total Livestock	Rank in All India	Livestock-2012	% share in Total Livestock
1	Cattle	16514	8.65	54.42	3	190904	37.28
2	Buffaloes	597	0.55	1.97	11	108702	21.23
3	Sheep	1076	1.65	3.54	10	65069	12.71
4	Goats	11506	8.51	37.91	4	135173	26.40
5	Pigs	648	6.29	2.13	5	10294	2.01
6	Horses & Ponies	4	0.64	0.01	14	625	0.12
7	Mules	Negligible	0.1		13	196	0.04
8	Donkeys				12	319	0.06
9	Camel	-	-		-	400	0.08
10	Yaks	1	1.30	0.003	5	77	0.02
11	Mithun	-	-		-	298	0.06
	Others	2	Negligible	0.006			
12	Total Livestock	30348	5.93	99.99	7	512057	100.00

Note: Figures without Dog & Rabbit.
Source: Directorate of Animal Resource & Animal Health, GoWB, 19th Livestock Census, 2012

However, over the period, share of cattle population in total livestock population has declined from 65.45 per cent in 1961 to 54.42 per cent in 2012. The share of buffalo population has also decreased considerably (5.62% to 1.97%) during the corresponding period. In absolute term, the rate of cattle population increases by 43.90%, while the rate of buffaloes population decreases by 39.45 %. In case of small ruminants, sheep population

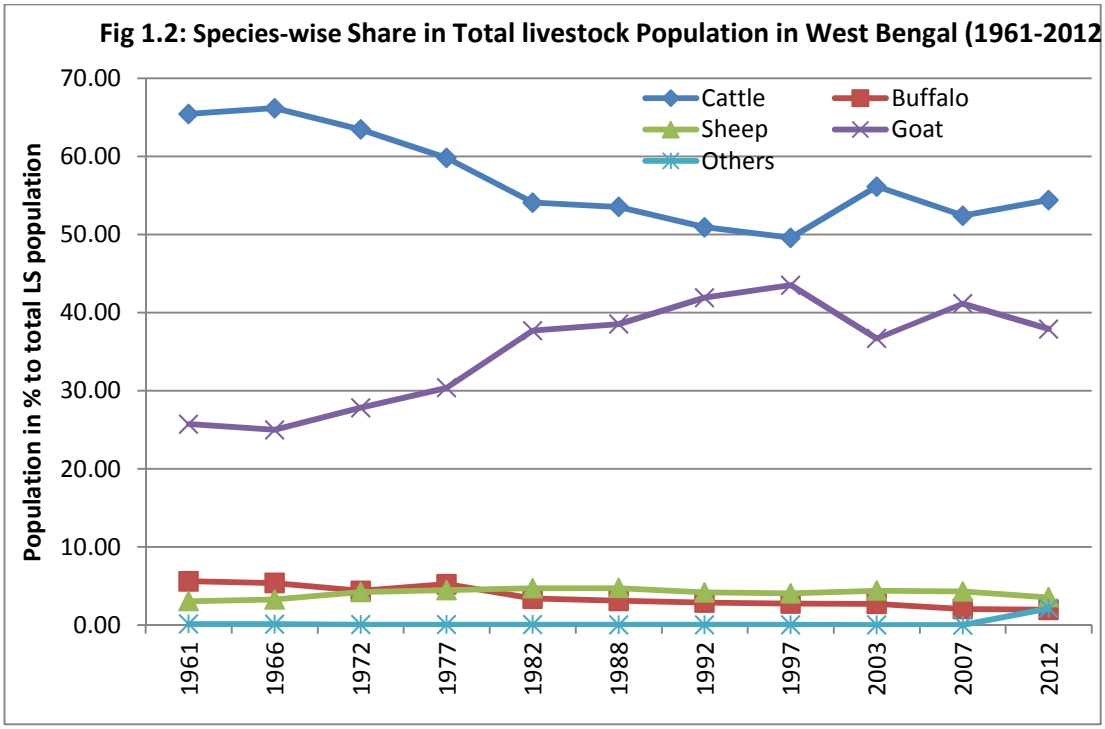


Table 1.5: Growth in Livestock Population in West Bengal- 1951 to 2012

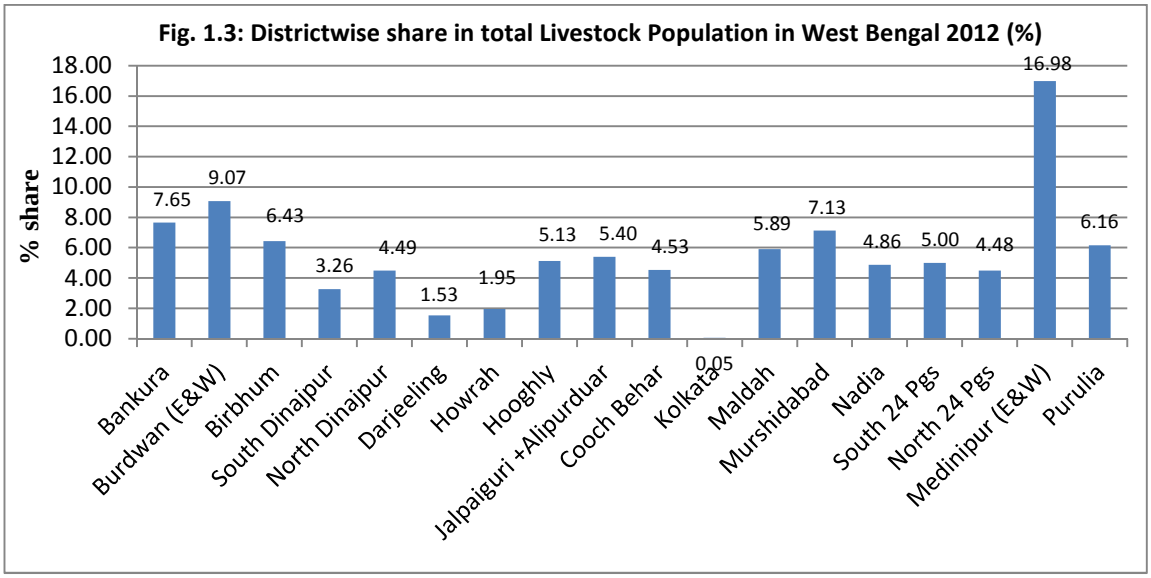
(No. in thousand)

Sr. No.	Year	Cattle		Buffalo		Sheep		Goat		Total Livestock	
		Nos.	GR (%)	Nos.	GR (%)	Nos.	GR (%)	Nos.	GR (%)	Nos.	GR (%)
1	1951	-	-	-	-	-	-	-	-	-	-
2	1956	-	-	-	-	-	-	-	-	-	-
3	1961	11476	-	986	-	535	-	4513	-	17535	-
4	1966	12845	11.93	1048	6.29	638	19.25	4852	7.51	19410	10.69
5	1972	11878	- 7.45	824	- 21.37	793	24.29	5211	7.40	18721	- 3.55
6	1977	14435	21.53	1268	53.88	1079	36.06	7335	40.76	24134	28.91
7	1982	15658	8.47	987	- 22.16	1365	26.51	10916	48.82	28948	19.95
8	1988	16510	5.44	965	- 2.23	1460	6.96	11890	8.92	30842	6.54
9	1992	17206	4.21	980	1.55	1415	- 3.08	14167	19.15	33786	9.54
10	1997	17832	3.64	998	1.84	1462	3.32	15648	10.45	35958	6.43
11	2003	17984	0.85	876	- 12.22	1411	- 3.49	11757	- 24.86	32039	- 10.90
12	2007	19188	6.69	764	- 12.78	1577	11.76	15069	28.17	36604	14.25
13	2012	16514	- 13.93	597	- 21.86	1076	- 31.77	11506	- 23.64	30348	- 17.09

Note: GR- Growth rate over previous census year.
Source: Directorate of Animal Resource & Animal Health, GoWB

has increased by 101 per cent and goat population increased by 154.95 per cent in 2012 over 1961 (Fig. 1.2). Total livestock population in West Bengal has increased by 73.07 per cent during last five decades period (Table 1.5).

The district-wise share in total state livestock population figures (Fig. 1.3 & Table 1.6) indicate that Medinipur (East + West) district has the highest number of livestock population (16.98 %) followed by Burdwan (East + West) district (9.07%), Bankura district (7.65%), Murshidabad district (7.13%), Birbhum district (6.43%), Maldah district (5.89%), Jalpaiguri + Alipur district (5.40%), Hooghly district (5.13%) and South 24 Parganas district (5.00%).



These eleven districts together accounted for 68.68 percent of total livestock population in the state in 2012 (Fig. 1.3). Medinipur East and West district jointly has the highest percentage share of cows (64.62%) followed by Cooch Behar (63.73%) and Hooghly district (61.44%). Though, highest percentage share of indigenous cattle and crossbred cattle was found separately in Howrah (67.81%) and Darjeeling district (23.21%) respectively. On the other hand, the existences of maximum percentage share of buffalo was observed in Kolkata district (9.57%) followed by Purulia (4.02%) and Burdwan East and West district jointly (3.57%) (Table 1.6).

As per measurement of livestock population density per square kilometre in 2012, the overall highest livestock and bovine animal density was recorded in Hooghly district followed by Howrah district (Table 1.7).

Table 1.6: District wise Percentage share of Animals in Total Livestock Population in WB

District	District wise Percentage share of animals in Total livestock population in WB State-2012											
	Crossbred	Indigenous	Total Cow	Buffalo	Total Sheep	Goat	Others	Total Pigs	Horses & Ponies	Mules	Donkey	Camel
Bankura	6.34	52.46	58.80	2.87	3.44	32.59	2.30	0.17	-	-	-	-
Burdwan (E&W)	9.89	42.18	52.07	3.57	4.43	37.19	2.75	0.25	-	-	-	-
Birbhum	4.29	44.63	48.92	2.98	8.40	38.12	1.59	0.10	-	-	-	-
South Dinajpur	2.03	48.72	50.75	0.71	0.77	44.45	3.32	0.10	-	-	-	-
North Dinajpur	4.37	50.33	54.70	1.24	0.19	42.07	1.80	0.08	-	-	-	-
Darjeeling	23.21	25.47	48.68	0.63	0.49	39.40	10.80	0.16	-	-	-	-
Howrah	6.63	67.81	74.44	0.71	0.05	24.68	0.13	0.002	-	-	-	-
Hooghly	14.25	47.19	61.44	1.54	0.04	35.59	1.39	0.07	-	-	-	-
Jalpaiguri +Alipurduar	6.32	51.69	58.01	0.54	1.58	34.26	5.62	0.30	-	-	-	-
Cooch Behar	4.81	58.92	63.73	0.27	6.35	28.35	1.30	0.06	-	-	-	-
Kolkata	17.59	13.89	31.48	9.57	0.21	46.40	12.35	0.004	0.002	-	-	-
Maldah	5.58	36.63	42.21	2.18	2.18	50.41	3.01	0.18		-	-	-
Murshidabad	18.43	25.51	43.94	2.54	2.83	50.12	0.58	0.05	0.002	-	-	-
Nadia	22.04	28.74	50.78	1.20	0.76	46.41	0.84	0.04	0.005	-	-	-
South 24 Pgs	17.17	30.64	47.81	2.44	3.65	44.49	1.61	0.05	-	-	-	-
North 24 Pgs	4.06	47.80	51.86	0.38	6.33	40.33	1.10	0.07	-	-	-	-
Medinipur (E&W)	10.49	54.13	64.62	1.55	2.07	30.27	1.50	0.25	-	-	-	-
Purulia	0.72	44.02	44.74	4.02	11.77	36.37	3.10	0.19	-	-	-	-
WB State	9.21	45.21	54.42	1.97	3.54	37.91	0.006	2.13	0.01	negligible		

Source: Directorate of Animal Resource & Animal Health, GoWB; Statistical Abstract 2014

India has a total 137 breeds of domesticated animals, of which only a few breeds, including some internationally recognised ones, are available in West Bengal. The State has some high-quality and high-yielding breeds of cattle and buffaloes (Table 1.8). Sahiwal, Gir, Jersey and Holstein Friesian breeds in cows, and Murrah breed in buffaloes were known for their high milk yielding capacity. The Jersey breed is found in all over the state of West Bengal. But till today, indigenous breeds are predominant in the state. However, the performances of some breeds that are commonly found in this state are presented in Table 1.9.

It has been observed that, between 1982 and 1992, livestock population per hundred households, has declined by about 15.02 per cent with highest decline among large and medium landholding size categories (Table 1.10). This is perhaps because of the facts that medium and large farmers are increasingly relying on machine powers rather draft power

for farming activities. Small and marginal farmers are maintaining livestock both for draft power as well as for alternative source of livelihood.

Table 1.7: District-wise Livestock and Bovine Density (1992-2012) in WB

Districts	Livestock (No. per sq km)					Bovine (No. per sq km)				
	1994*	1997	2003	2007	2012	1994	1997	2003	2007	2012
Bankura	331	353	389	384	330	210	219	215	240	208
Burdwan (E&W)	407	435	511	489	381	247	259	265	264	218
Birbhum	436	462	533	519	422	232	240	243	264	223
South Dinajpur	362	385	418	466	432	217	225	220	268	230
North Dinajpur	380	406	484	495	426	212	219	261	266	243
Darjeeling	164	176	223	173	131	77	80	71	94	73
Howrah	495	530	592	367	404	315	331	328	239	304
Hooghly	581	622	716	576	487	334	349	351	333	311
Jalpaiguri +Alipurduar	211	224	294	265	248	128	132	152	165	154
Cooch Behar	517	553	630	502	401	292	303	278	312	260
Kolkata	323	359	394	243	69	103	117	91	39	32
Maldah	727	793	381	486	465	182	191	193	210	213
Murshidabad	466	502	580	661	404	204	215	258	264	189
Nadia	573	616	687	478	372	266	277	282	228	195
South 24 Pgs	241	256	318	225	151	118	122	135	112	80
North 24 Pgs	538	576	686	454	327	304	319	341	241	167
Medinipur (E&W)	316	340	404	418	360	223	231	251	274	242
Purulia	326	334	387	342	289	175	166	168	167	146
WB State	381	408	454	413	335	207	215	225	225	193

*Note: Data for 1992 is not available in WB

Source: NDDB: Statistical Abstract 2014: Directorate of Animal Resource & Animal Health, GoWB

Table 1.8: Distribution of West Bengal's Cattle Breeds in WB

Breeds	Breeding Tract	Utility	Distribution
A) Cattle			
Sahiwal	Breeding Tract is Montgomery region/ district of undivided India (present Pakistan)	Milch	Uttar Pradesh, Punjab, Rajasthan, West Bengal
Gir	Originated in Gir forests of South Kathiawar in Gujarat. Also found in Amreli, Bhavnagar, Junagadh and Rajkot districts of Gujarat,Maharashtra and adjacent Rajasthan.	Milch	Rajasthan, Madhya Pradesh, Maharashtra, West Bengal. Exported to Brazil, Mexico, USA and Venezuela.
Jersey	Island of Jersey, U.K	Milch	West Bengal and some other states of India.
Holstein Friesian	Northern parts of Netherlands, especially in the province of Friesland.	Milch	West Bengal and some other states of India.
B) Buffalo			
Murrah	Rohtak, Hisar and Jind of Haryana, Nabha and Patiala districts of Punjab and southern parts of Delhi state	Milch	Delhi, Haryana, Punjab, Western U.P, West Bengal, etc.

Source: AE Nivsarkar *et al.,* (2000), Animal Genetics Resources of India, Cattle and Buffalo, ICAR publication.
Website: vikaspedia.in/agriculture/livestock/cattle-buffalo/breeds-of-cattle-buffalo

Table 1.9: Performance of Cattle and Buffalo Breeds

Parameter	Cattle				Buffalo
	Sahiwal	Gir	Jersey	Holstein	Murrah
Breed Population ('000)					
Lactation Yield(kg)					
Field	2325 (1600 - 2750)	2790 (2732 - 3312)	3476 (1722 – 4500)	4300 (3926 - 4568)	1752 (1003-2057)
Farm	1900	2125 (1835 - 2950)	4000	6000	1500 - 2500
Lactation Length(days)	318 (285 - 375)	305 (302 - 329)	325 - 357	312 - 349	299 (269 - 337)
Calving Interval (days)	450 (390 - 550)	435 (420 - 480)	465 (450 - 490)		453 (430 - 604)
Dry Period (days)	165 (158 - 172)	115 (75 - 155)			
Age at First calving (months)	1183 (940 - 1520)	46 (44 - 53)	900 - 1260	1320 - 1680	1319 (1214 - 1647)

Source: NDDB, Kolkata; Animal Genetics Resources of India, Cattle and Buffalo, ICAR publication.

Table 1.10: Livestock per 100 Households across Landholding Size: West Bengal

Landholding Size (Ha)	Livestock per 100 Households across Landholding Size in West Bengal		
	1982	1992	% Change
I. Landless	43	21	-51.16
II. Up to 0.2	77	247	220.78
III. 0.21 – 1.0	614	509	-17.10
IV. 1.01 – 4.0	1707	723	-57.64
V. 4.01 – 10	3527	538	-84.75
VI. > 10.0	1937	0	-100.00
All	233	198	-15.02

Source: NSSO 37th, 48th & 59th Rounds, Reports on Land and Livestock Holding Survey, GOI.

The decline however, is significantly higher i.e. 100 per cent among the households of largest landholding size class (with >10 hectares of land). What is however important is that the livestock population in the first group of landholding size (i.e. up to 0.2 hectare) has increased at a significant rate by 220.78%, though it has decreased again in the next size class (i.e. 0.21–1.0 hectare). The point should be underlined here that the percentage of declination in livestock population starts rising from this category of households and reaching a peak at 100 per cent among the largest landholding size class, i.e. with >10 hectares of land. The evidence suggests sustained importance of livestock among marginal farmers only as compared to landless and medium to large farmers.

Among different species of livestock, the steepest decline is observed in the case of buffalo (90.9%), followed by bullocks (34.7%) and then by cow (14.5%). The average size of sheep and goat possessed by all rural households has increased by 23.5 per cent. It may be noted that the increase in the average size of sheep and goat has been observed among the marginal and small landholding size classes. The landless and the medium and large landholding size classes once again, have lost out thus, registering a negative growth (Table 1.11).

Table 1.11: No of Major Livestock Species per 100 Households across Landholding Size in West Bengal (1982 & 1992)

Landholding Size (Ha) No.	Bullock			Cow			Buffalo			Sheep and Goat		
	1982	1992	% Change	1982	1992	% Change	1982	1992	% Change	1982	1992	% Change
I. Landless	6	1	-83.3	13	6	-53.8	0	0	0	24	14	-41.6
II. Up to 0.2	15	25	66.6	30	68	126.6	1	2	100.0	31	152	390.3
III. 0.2 – 1.0	256	182	-28.9	169	134	-20.7	15	1	-93.3	174	192	10.3
IV 1.01 – 4.0	689	254	-63.1	451	173	-61.6	115	4	-96.5	452	292	-35.4
V 4.01 – 10	1164	184	-84.1	1245	159	-87.2	595	16	-97.3	523	179	-65.8
VI > 10.0	547	0	-100.0	347	0	-100.0	200	0	-100.0	843	0	-100.0
All	92	60	-34.7	62	53	-14.5	11	1	-90.9	68	84	23.5

Source: NSSO 37th, 48th & 59th Rounds, Reports on Land and Livestock Holding Survey, GOI.

The following Table 1.12 presents the number per 1000 of households reporting owing livestock of different types for each size class of households operational holdings in West Bengal (Rural) as per NSSO -59th round conducted in 2003.

1.5 Plan wise Outlay and Expenditure under Dairy Development

Livestock sector has been making rapid strides and spectacular growth in recent time, with positive impact on the lives of rural people mainly small farmers, marginal farmers and agricultural landless labours by raising their living standards considerably.

The State Government policy has been providing necessary support for dairy development in the state through cooperative sector. Table 1.13 gives details regarding plan-wise outlay and expenditure on animal husbandry and dairy development by the Government of West Bengal (excluding central assistance and fund). This table shows that there has been consistent increase in the plan provision for animal husbandry and dairy development. The

proportion of plan expenditure in the plan provision has also been increasing with up and down pattern. This has led to increase in number of milch animals, milk production and qualitative improvement in milch animals.

Table 1.12: Number per 1000 of households reporting owing livestock of different types for each size class of household's operational holdings in West Bengal (Rural) 2002-03

size class of operational holding (ha)	West Bengal (Rural)- No. of households per 1000 households reporting owning of								
	cattle			buffalo	other large heads	sheep, goats	fowl*, duck	other birds	pigs and rabbits
	cross breed	non-descript	all						
nil	0	0	0	0	1	45	111	1	1
≤ 0.002	17	239	256	0	0	932	727	0	442
0.002 - 0.005	54	519	573	1	0	439	427	8	50
0.005 - 0.040	85	85	632	8	0	347	499	12	57
0.040 - 0.5	65	458	517	20	0	257	353	8	10
0.5 - 1.0	99	672	749	51	0	316	491	14	20
1.0 - 2.0	60	720	761	89	0	307	500	16	38
2.0 - 3.0	152	771	877	139	0	374	570	48	0
3.0 - 4.0	103	793	896	153	0	504	511	48	0
4.0 - 5.0	212	788	1000	0	0	46	253	0	0
5.0 - 7.5	404	443	791	404	0	133	281	0	0
7.5 - 10.0	0	1000	1000	0	0	0	556	0	0
10.0 - 20.0	0	0	0	0	0	0	0	0	0
> 20.0	0	0	0	0	0	0	0	0	0
all sizes	**52**	**378**	**423**	**23**	**0**	**219**	**326**	**8**	**17**

Note: *includes hens, cocks and chickens.
Source: Livestock Ownership Across Operational Holding Classes in India, NSS Report No. 493(59/18.1/1).

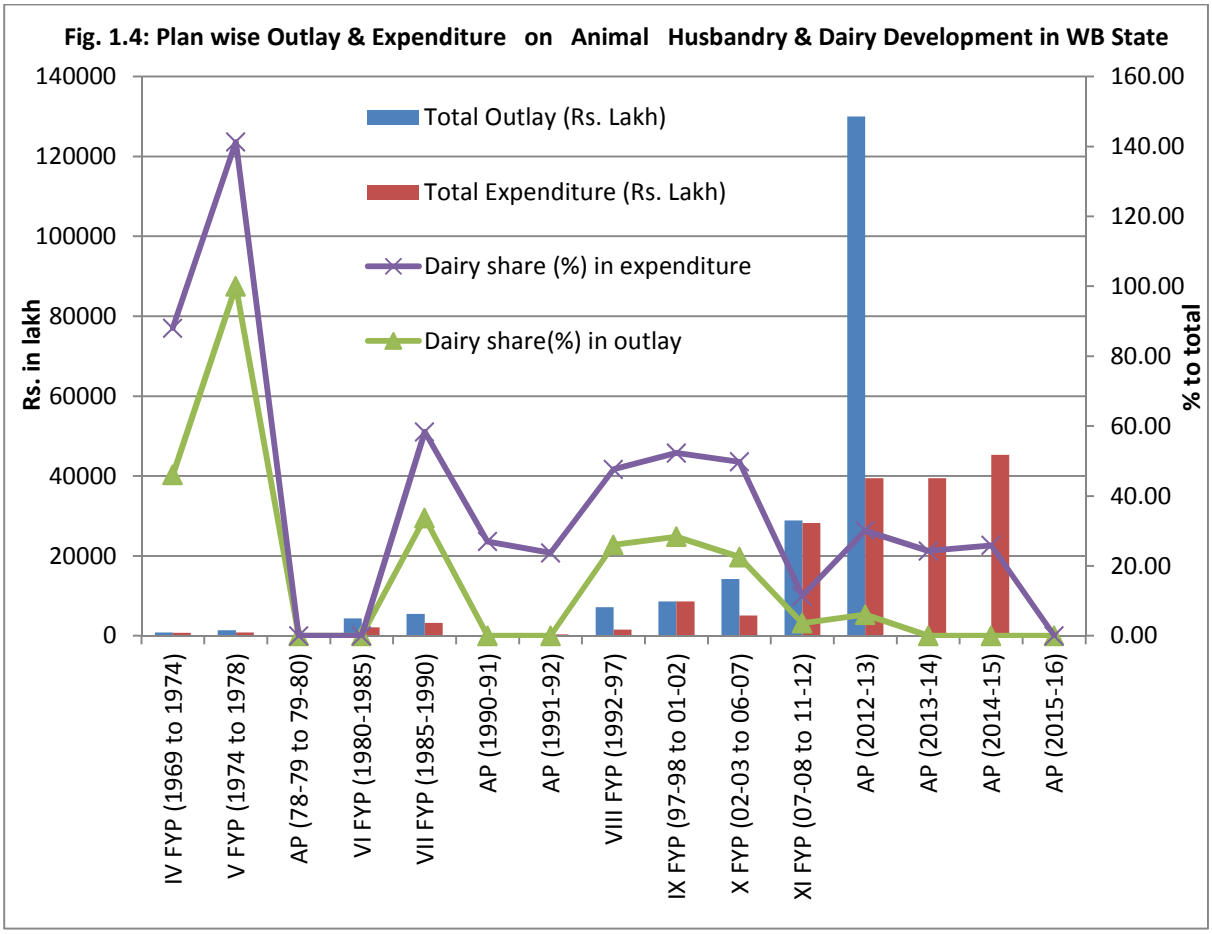
The outlay and expenditure on dairy development has also increased over the period of time. However, percentage share of expenditure on dairy development to total expenditure has declined considerably (Fig. 1.4 & Table 1.13). As compared to around 41.29 per cent share of total expenditure on dairy development during 1974-1978, it has declined to 10.69 per cent during the period of 2002-03 to 2011-12. The proportion of expenditure to outlay on dairy development was much better during the corresponding period, which was recorded for the period from 2012-13 to 2014-15, to be around 4 times than the allotment of Rs. 78.60 lakh for the period of 12th FYP.

1.6 Growth in Milk Production and Productivity (Regional trend)

West Bengal is a state in the eastern India. Milk production in this state has been improving considerably due to the efforts of the Operation Flood Projects. But the per capita availability is far below from the other improved states like Haryana, Punjab, etc. The main

reason behind this is lack of high milk producing milch animals. Most of the animals in West Bengal are Zebu cattle i.e. non descriptive cow whose productivity is very low. In order to improve the productivity of Bengal desi cow, Artificial Insemination (AI) with frozen semen of quality breeds is being extensively carried out. The entire breedable cow population in the state is being tried to be brought under the coverage of AI at the Gram Panchyat (GP) level. Moreover co-operative unions are also responsible for performing AI under their care. They also supply feed, fodder seeds etc. to the beneficiary farmers which in turn help to improve the milk production of the state. In fact, the numbers of initiatives were taken by the government which could help in improving the milk productivity over the period.

Fig. 1.4: Plan wise Outlay & Expenditure on Animal Husbandry & Dairy Development in WB State



A trend showing the increase in milk production over the past one and half decades is depicted in Fig 1.5. The graph shows there is a consistent increase in the production of milk over the years. The milk production has increased from 35 lakh tonnes in 2000-2001 to 49.6 lakh tonnes in 2014-15 registering a growth of 41.71 per cent over base year. The milk production in the state has been increasing continuously. As a result, the per capita

availability of milk in the state increased from 116 gms/day in 2000-01 to 145 gms/day in 2014-15 (Table 1.14).

Table 1.13: Plan-wise Outlay and Expenditure on Animal Husbandry and Dairy Development in WB

Sr. No.	Plan Period	Outlay (Rs. In Lakh)			Expenditure (Rs. In Lakh)		
		Animal Husbandry (Revised)	Dairy Development (Revised)	Total	Animal Husbandry	Dairy Development	Total
1	IV FYP (1969 to1974)	457.49	390.13	847.61	451.67	327.25	778.92
2	V FYP (1974 to 1978)	-	1368.00	1368.00	475.00	334.00	809.00
3	AP (1978-79 to 1979-80)	Sector wise figure not available					
4	VI FYP (1980-1985)	4400.00 (AH+Dairy)		4400.00	2148.42 (AH+Dairy)		2148.42
5	VII FYP (1985- 1990)	3630.00	1845.00	5475.00	2439.00	798.00	3237.00
6	AP(1990-91)	-	-	-	467.94	172.95	640.89
7	AP (1991-92)	-	-	-	246.89	76.83	323.72
8	VIII FYP (1992-97)	5325.79	1874.21	7200.00	1218.32	335.36	1553.68
9	IX FYP (1997-98 to 2001 -02)	6190.00	2449.00	8639.00	6518.42	2053.69	8572.11
10	X FYP (2002-03 to 2006-07)	11033.27	3214.85	14248.12	3704.43	1387.37	5091.80
11	XI FYP (2007-08 to 2011-12)	27828.00	1051.00	28879.00	26079.13	2179.41	28258.54
12	AP (20I2-201 3)	1221.50 (5 yrs outlay)	78.60 (5 yrs outlay)	1300.10 (5 yrs outlay)	299.44	94.94	394.38
13	AP (2013-2014)	-	-		298.67	95.74	394.41
14	AP (20 l4-20I 5)	-	-		335.69	117.31	453.00
15	AP (2015-201 6)	-	-				

Source: Statistical Abstract 2014, Govt. Of West Bengal

Out of total milk production, about 47.98 per cent of the milk production is contributed by Indigenous cow followed by 44.35 per cent by Crossbred cow. The buffalo contribute 4.64 per cent of the total milk production in the state whereas Goat contributes 3.02 per cent to total milk production (Table 1.14). The productivity of cows and buffalo in term of daily milk yield is increasing continuously (Fig 1.6). Despite of increase in milk yield, there is still a wide scope for improving milk yield of milch animals.

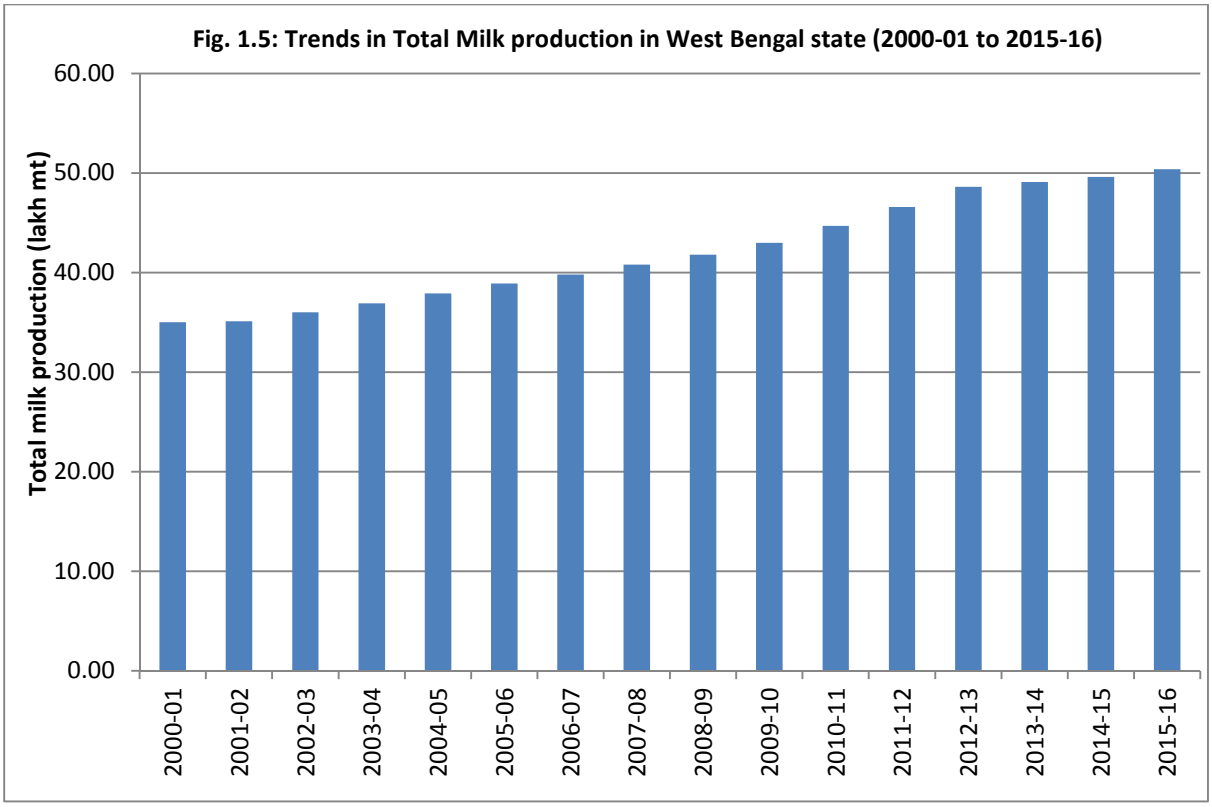
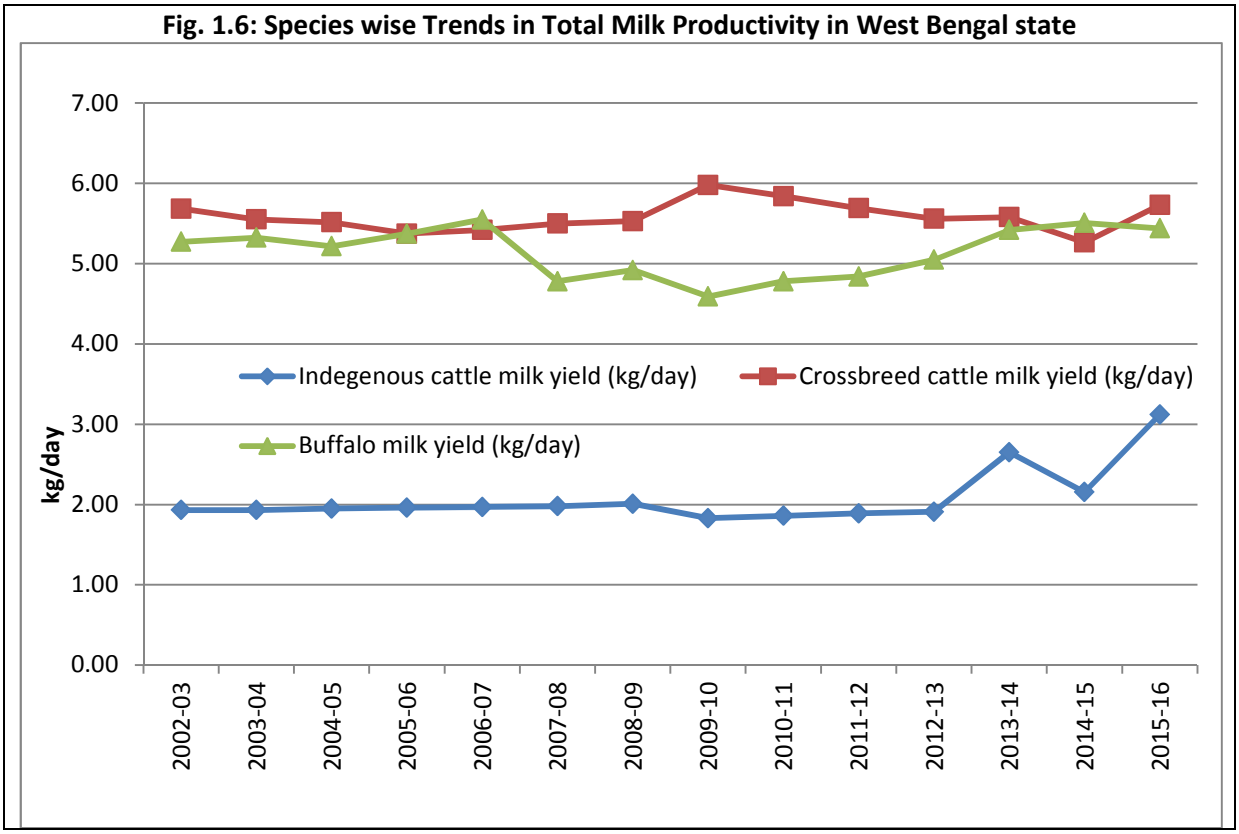


Table 1.14: Milk Production in West Bengal: 2000-01 to 2015-16

Sr. No	Year	Milk Production in million tones						Growth of Milk Production (%) over base year	Per Capita availability (gms/ day)
		In milk Cow		In Milk Buffalo	In milk Bovine	In Milk Goat	Total		
		Indigenous	C.B.						
1	2000-01	3.10		0.30		0.10	3.50	-	116
2	2001-02						3.51	0.29	120
3	2002-03	2.22	0.96	0.30	3.48	0.12	3.60	2.86	121
4	2003-04	2.26	1.01	0.30	3.57	0.12	3.69	5.31	122
5	2004-05	2.32	1.06	0.29	3.67	0.12	3.79	8.29	124
6	2005-06	2.38	1.09	0.30	3.77	0.12	3.89	11.17	125
7	2006-07	2.19	1.44	0.25	3.88	0.11	3.98	13.77	126
8	2007-08	2.24	1.49	0.24	3.97	0.11	4.08	16.49	128
9	2008-09	2.28	1.54	0.25	4.07	0.11	4.18	19.31	129
10	2009-10	2.12	1.83	0.22	4.17	0.13	4.30	22.83	131
11	2010-11	2.19	1.92	0.22	4.33	0.14	4.47	27.74	135
12	2011-12	2.28	2.02	0.22	4.51	0.15	4.66	33.11	139
13	2012-13	2.36	2.12	0.23	4.71	0.15	4.86	38.80	144
14	2013-14	2.36	2.16	0.24	4.75	0.15	4.91	40.14	144
15	2014-15	2.38	2.20	0.23	4.81	0.15	4.96	41.69	145
16	2015-16	3.06	1.61	0.24	4.91	-	-	-	-

Source: Dept. of Animal Husbandry, Dairying & Fisheries, GoI; Annual Administrative Report, ARD Dept.

Fig. 1.6: Species wise Trends in Total Milk Productivity in West Bengal state



Out of total bovine milk production in 2015-16, 62.32 per cent share accounts for Indigenous cattle, 32.79 per cent share accounts for Crossbred cows and remaining 4.89 per cent was of Buffalo breed (Table 1.14). The significant growth in population of in milk bovine animals supported by increase in milk yield of bovine animals which has increased (bovine milk production) by 21.23 per cent in 2015-16 over 2002-03 (Fig. 1.7). The share of cross bread cows in total milk production has increased while share of indigenous cows and buffalo has declined during last one and half decade. The corresponding share was 66.75 per cent, 28.19 per cent and 5.06 per cent respectively in 2000-01.

District-wise milk production in West Bengal state for the year 2015-16 is presented in Fig 2.8. It can be seen that Medinipur East and West district jointly is the highest milk producing district in the state with an estimated milk production of about 903 thousand tonnes during 2015-16 accounting 18.40 per cent of total milk production in the state.

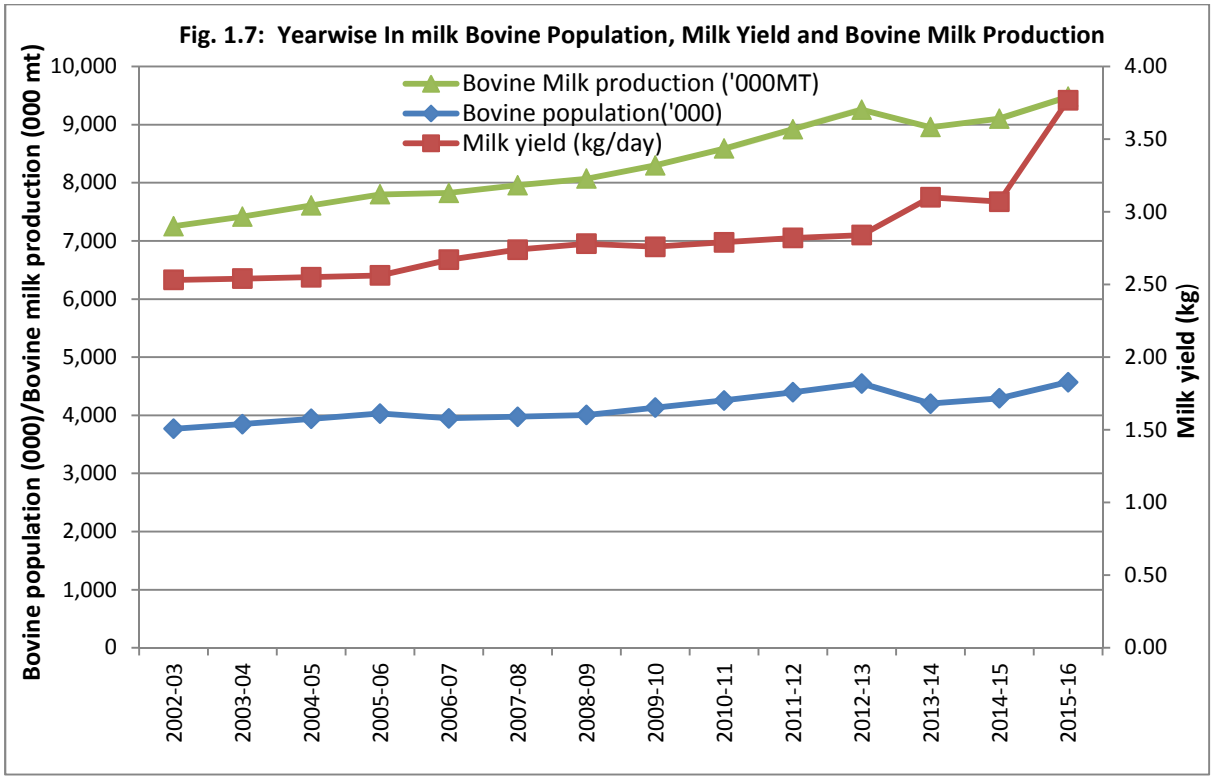


Fig. 1.7: Yearwise In milk Bovine Population, Milk Yield and Bovine Milk Production
Bovine population (000)/Bovine milk production (000 mt)
Milk yield (kg)
Bovine Milk production ('000MT)
Bovine population('000)
Milk yield (kg/day)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16

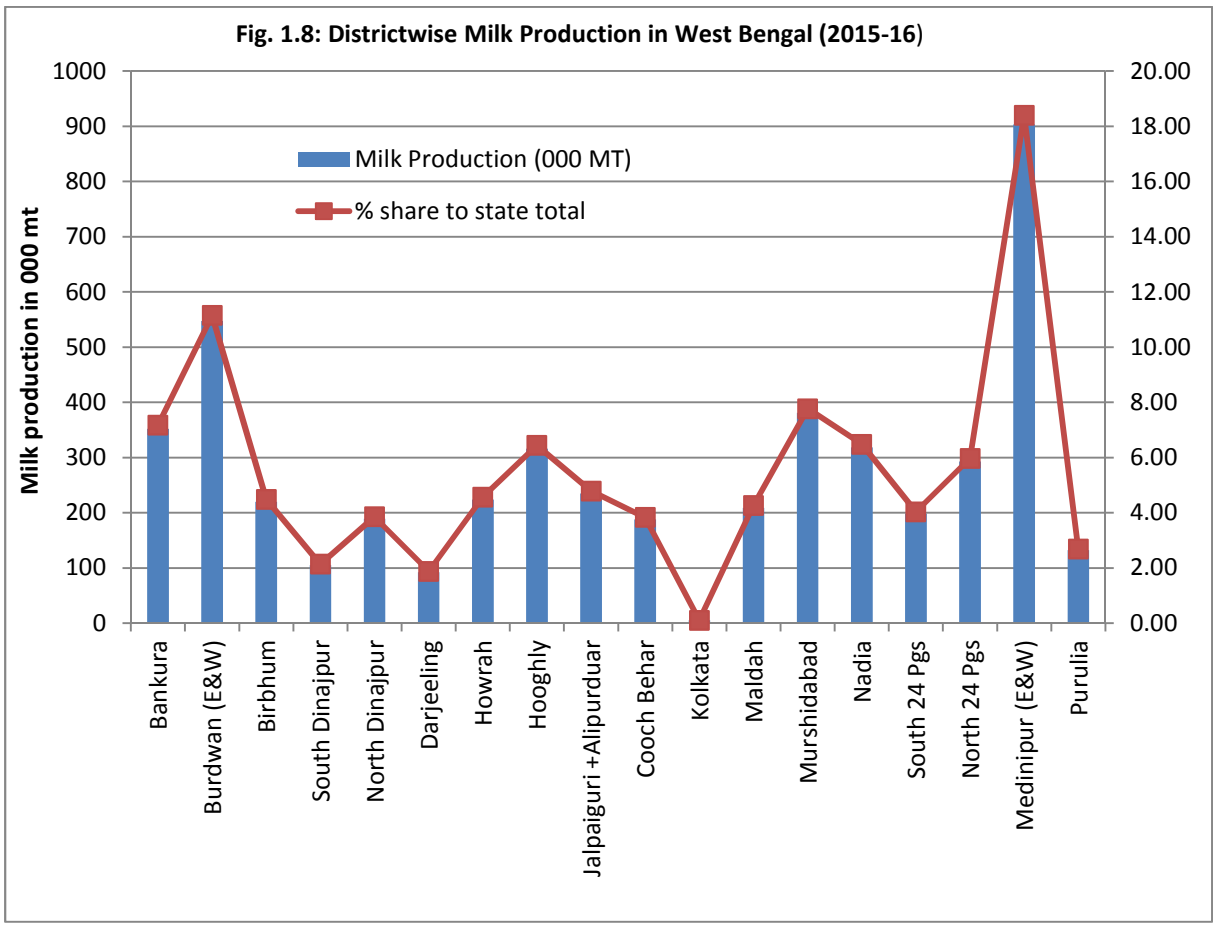


Fig. 1.8: Districtwise Milk Production in West Bengal (2015-16)
Milk production in 000 mt
Milk Production (000 MT)
% share to state total
1000
900
800
700
600
500
400
300
200
100
0
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Bankura
Burdwan (E&W)
Birbhum
South Dinajpur
North Dinajpur
Darjeeling
Howrah
Hooghly
Jalpaiguri +Alipurduar
Cooch Behar
Kolkata
Maldah
Murshidabad
Nadia
South 24 Pgs
North 24 Pgs
Medinipur (E&W)
Purulia

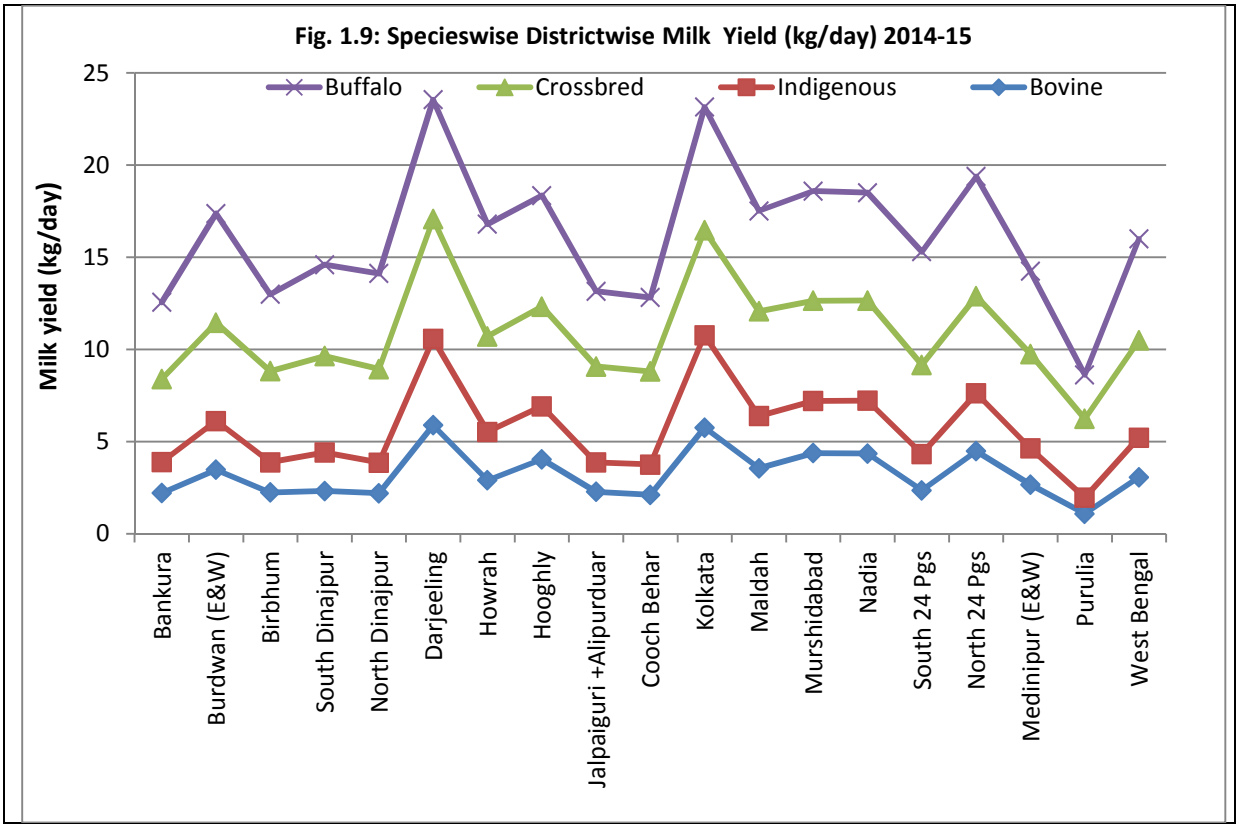
Burdwan East and West district jointly is the second largest producer of milk with an estimated share of about 11.15 per cent, followed by Murshidabad (7.76 %), Bankura (7.17%) and Nadia (6.48%). The top thirteen districts together contributes about 77.22 per cent of milk production of the state, those are Bankura, Burdwan (E & W), Birbhum, Howrah, Hooghly, Jalpaiguri + Alipurduar, Murshidabad, Nadia, North 24 Parganas and Medinipur (E & W). Category-wise share of milk production in West Bengal clearly indicate that top ranked milk producer nine districts in West Bengal are dominated by the production of milk by Indigenous cows, followed by Crossbred, Buffalo and Goat (Table 1.15).

The species-wise district wise milk yield data presented in Fig 1.9 & Map 1.1 indicate that among the species, the highest milk yield was recorded in buffalo followed by cross breed cows. The highest bovine milk yield is recorded in Darjeeling district (5.9 kg/day) and the lowest was in Purulia district (1.1 kg/day). In case of indigenous cows, highest milk yield was recorded in Kolkata district (5.0 kg/day) and the lowest was in Purulia (0.9 kg/day).

Table 1.15: District wise & category wise Percentage share of Milk Production in WB

Name of the District	District wise & category wise Percentage share of Milk Production in WB (2014-15)					
	% share of Crossbred Cow	% share of Indigenous Cow	% share of Total Cattle	% share of Buffalo	% share of Goat	% share of Total Milk Production
Medinipur (E&W)	15.75	18.09	16.97	5.53	13.29	16.32
Burdwan (E&W)	10.10	13.16	11.69	23.71	11.62	12.25
Murshidabad	14.94	5.31	9.94	8.47	9.01	9.84
Nadia	12.72	4.78	8.60	2.11	3.80	8.15
Hooghly	9.58	6.23	7.84	9.46	5.22	7.84
North 24 Pgs	8.85	4.64	6.67	25.41	4.08	7.47
Bankura	4.06	6.68	5.42	4.53	8.29	5.47
Maldah	3.79	5.96	4.92	4.34	7.03	4.95
Howrah	1.61	7.61	4.72	2.80	1.41	4.53
Jalpaiguri +Alipurduar	3.58	4.42	4.02	1.22	3.36	3.86
Birbhum	2.71	4.15	3.46	3.23	9.86	3.64
South 24 Pgs	1.72	4.84	3.34	2.26	3.23	3.29
Darjeeling	5.07	1.82	3.38	1.01	1.49	3.21
North Dinajpur	2.12	3.76	2.97	2.46	5.68	3.03
Cooch Behar	2.11	4.02	3.10	0.31	2.39	2.95
South Dinajpur	0.70	2.95	1.87	0.07	2.77	1.81
Purulia	0.40	1.52	0.98	2.13	7.43	1.23
Kolkata	0.18	0.06	0.12	0.96	0.05	0.16
WB State	100.00	100.00	100.00	100.00	100.00	100.00

Source: NDDB, Kolkata

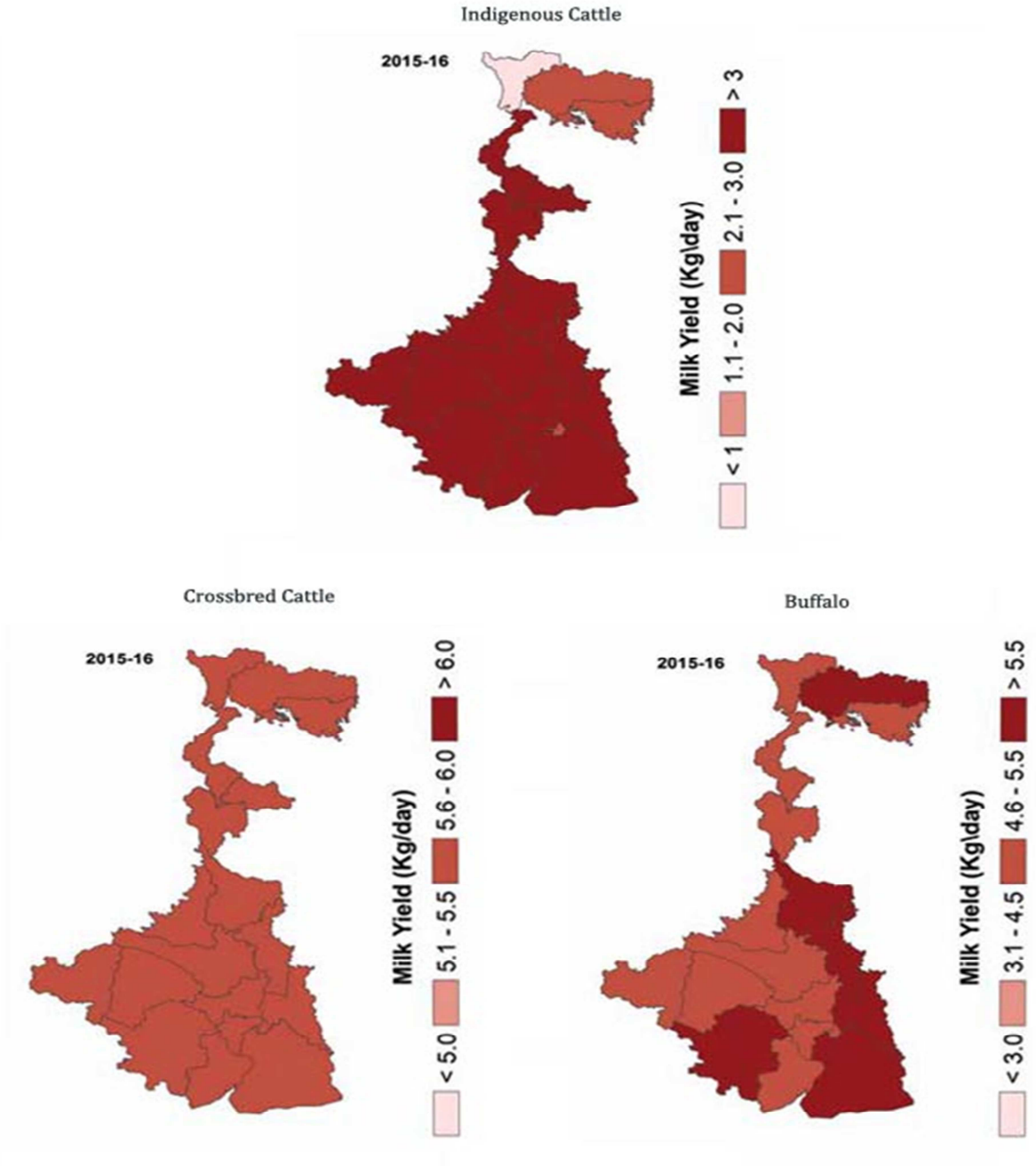


Among the species, the highest milk yield was recorded in cross breed cows in Darjeeling district (6.5 kg/day) and the lowest was in Purulia district (4.3 kg/day). Kolkata district was the top rank district in case of buffalo yield (6.7 kg/day) while same was recorded lowest in Purulia district (2.4 kg/day). The highest milk density is recorded in Hooghly (437 kg/day/sqkm) and at the same time highest per capita milk availability is also recorded in Hooghly district (248 gm/day) (Fig. 1.10).

1.7 Milk Consumption and Marketable Surplus

On the basis of availability of data on milk utilisation pattern in West Bengal, it has been found that out of total production of milk at home, about 57 per cent was sold, while 39 per cent milk was consumed at the home and remaining 4 per cent milk was converted into milk products in 2009-10. The share of quantity of milk sold has been increased to 65 per cent in 2014-15, while consumption of milk share declined to 22 per cent and share of converted into milk products increased to 13 per cent during the same period (Table 1.16).

Map 1.1: District wise Yield of Species



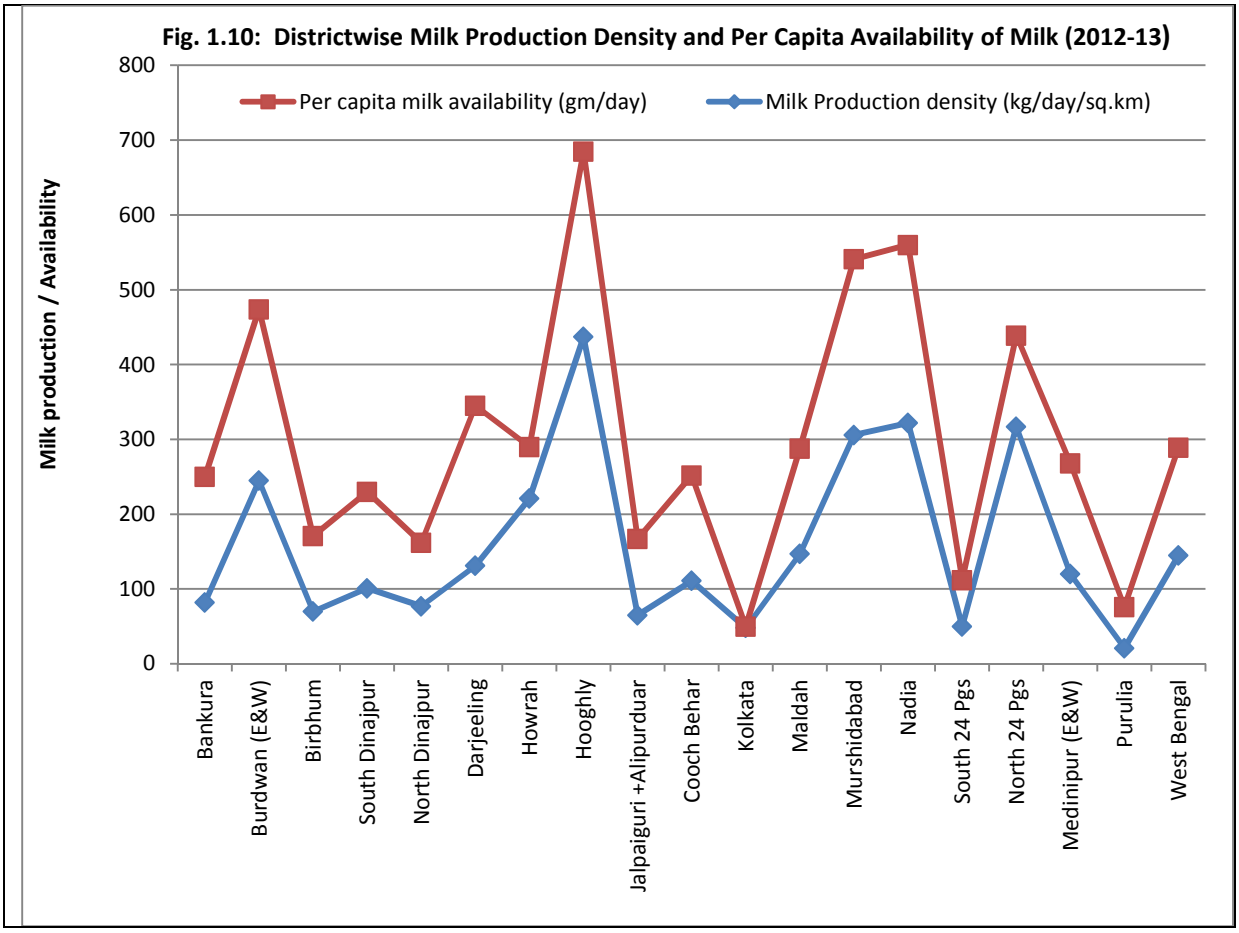


Table 1.16: Milk Utilisation Pattern in Households in West Bengal (1997-98 to 2015-16)

Item	Milk Utilisation Pattern in Households in West Bengal (1997-98 to 2015-16)											
	1997-98	2000-01	2003-04	2006-07	2007-08	2008-09	2009-10	2011-12	2012-13	2013-14	2014-15	2015-16
Quantity sold (%)	-	-	-	-	-	-	57	56	57	57	65	-
Converted into milk products (%)	-	-	-	-	-	-	4	5	4	5	13	-
Consumed at home	-	-	-	-	-	-	39	38	39	38	22	-

Source : NDDB (Kolkata); Directorate of Animal Husbandry, Govt. of West Bengal.

1.8 Status of Availability of Feed and Fodder

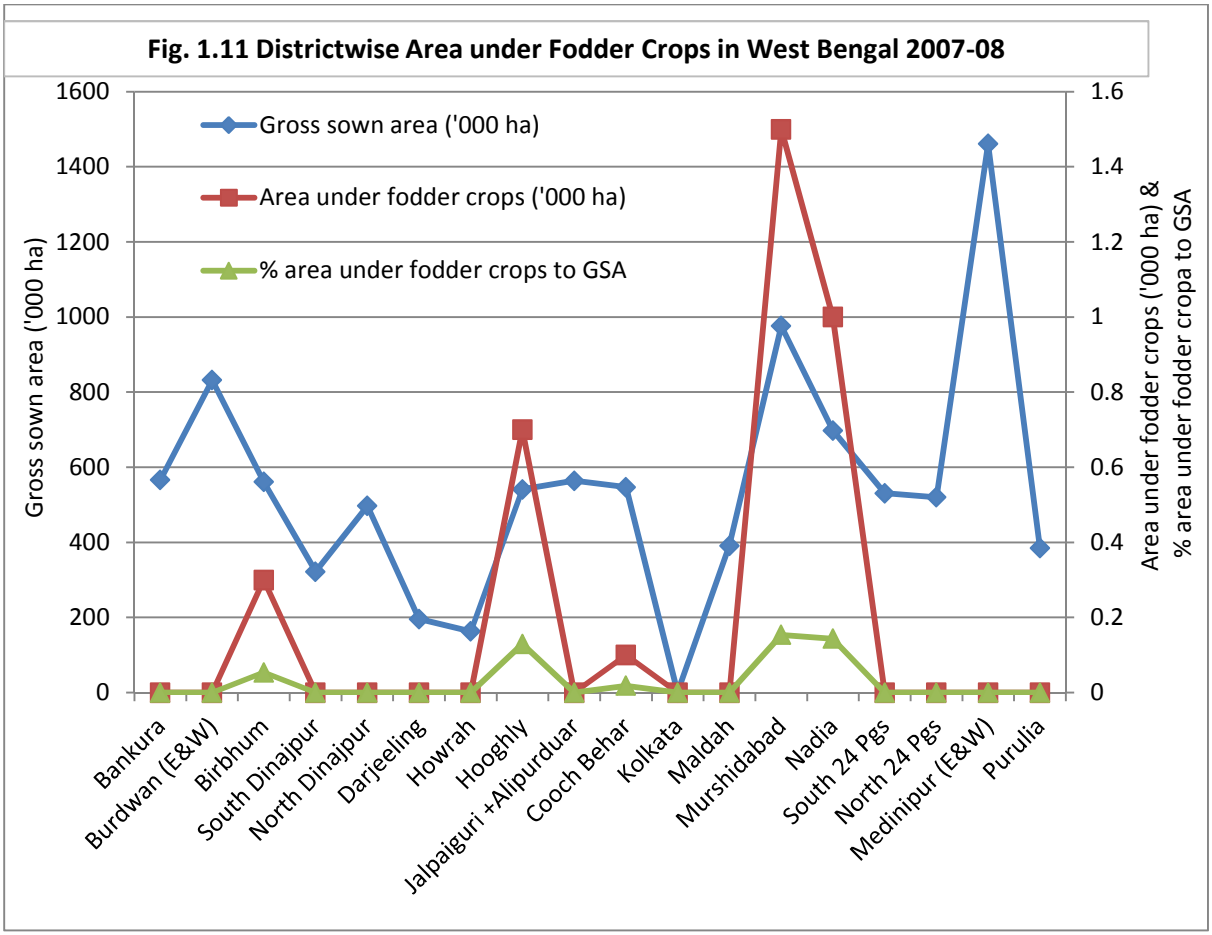
As against the estimated animals' requirements of dry matter, feed resources available in West Bengal are lower. In the last almost one and half decade (1997 to 2011), shortage of dry matter in the State reduced from 57.86 per cent of the requirement to 46.91 per cent (Table 1.17).

Green fodder is a comparatively economical source of nutrients. However, the availability of green fodder is too lower than estimated requirement in West Bengal. The estimation in 2007-08 regarding area under fodder crops indicated that only 0.04 per cent area (3600 hectare) to the gross sown area of 9752 thousand hectare was under fodder cultivation in West Bengal. Murshidabad district had the largest area under fodder crops (0.15%) followed by Nadia (0.14%), Hooghly (0.13%), Birbhum (0.05%) and Cooch Behar (0.02%) district (Fig. 1.11). In West Bengal, there is absence of regulated and organized fodder market. Small scale marketing of fodder exists in all rural areas of the state where fodder are sold by producers to traders or directly to the consumers. In rural areas, farmers having surplus fodder sell some quantity to needy cattle owners. Generally, demand for green and dry fodders in a village is met from within village. While green fodder is available from crops like lucerne, bajra, maize and sorghum, the sources of dry fodder are crop-residues and by-product of cereals and pulses crops. Farmers bring head loads or cartloads of fodder from their fields to the village. Normally, surplus green fodder is sold as standing crop on area basis. Surplus dry straw is sold either in bundles or weight basis in the village to needy cattle owners. Natural grass is abundantly available from during the month of September to October when grass is harvested. Generally, grass producers sell their grass soon after the harvest to needy farmers. Grass being a bulky and less remunerative product, producers sell it just after harvest.

Table 1.17: Dry matter Availability, Requirement & Surplus/Deficit in West Bengal

Year	Dry matter Availability, Requirement & Surplus/Deficit in WB (000MT)		
	Availability	Requirement	Deficit/Surplus
1992	-	-	-
1997	17,049	40,462	-23,413
2003	27,519	46,308	-18,789
2007	29,344	45,855	-16,511
2008	30,025	46,437	-16,412
2009	30,025	47,347	-17,322
2010	28,165	48,627	-20,462
2011	26,719	50,327	-23,608

Source: NDDB, Kolkata



1.9 Infrastructure Development

The milk co-operatives in West Bengal have developed modern systems of veterinary care and artificial insemination and provide these services to a large number of milk producers at very low prices. The district co-operatives have vans equipped with a trained veterinary surgeon and medicines stationed in different centres to cater to the needs of the members of the cooperatives. The special emphasis on development of dairy infrastructure was given during the Operation Flood movement.

The animal health care is more important for all over economic growth in West Bengal state at present. For veterinary Services, 110 State Animal Health Centre (SAHC) & District Veterinary Hospital (DVH), 341 Block Animal Health Centre (BAHC), 273 Additional Block Animal Health Centre (ABAHC), 3248 Animal Development Aid Center (ADAC) and 5744 Artificial Insemination Centre (AIC) are working at present. Still these facilities are not available in the interior villages. The state has no any facility for Mobile Animal Health Centre. In case of Cattle Breeding Farm, the West Bengal state has 7 Breeding Farms in Haringhata, Kurseong, Salboni, Suri, Kharagpur, Kalyani, and Beldanga. These Breeding

Farms are operating since 1990-91. Besides cattle Breeding Farm, the state has 27 Poultry Breeding Farms also. The location of these Poultry Breeding Farms is as follows: (i) State Poultry Farm, Tollygunge, Kolkata, (ii) State Poultry Farm, Nimpith, South 24-Parganas, (iii) State Poultry Farm, Kakdwip, South 24-Parganas, (iv) State Poultry Farm, Gobardanga, North 24-Parganas, (v) State Poultry Farm, Ranaghat, Nadia, (vi) State Poultry Farm, Krishnagar, Nadia, (vii) State Poultry Farm, Haringhata, Nadia, (viii) State Livestock Farm, Kalyani, Nadia, (ix) DCF, Domkol, Murshidabad, (x) State Poultry Farm, Berhampore, Murshidabad, (xi) State Poultry Farm, Malda, (xii) SDBF, Raigunj, Uttar Dinajpur, (xiii) SDPF, Cooch Behar, (xiv) State Poultry Farm, Balurghat, Dakshin Dinajpur, (xv) State Poultry Farm, Mohitnagar, Jalpaiguri, (xvi) PMC, Kurseong, Darjeeling, (xvii) DCF, Purulia, (xviii) SDBF, Medinipur, (xix) SPF, Medinipur (xx) DCF, Contai, Purba Medinipur, (xxi) SDPF, Bankura, (xxii) DCF, Suri, Birbhum, (xxiii) State Poultry Farm, Durgapur, Burdwan, (xxiv) State Poultry Farm, Golapbag, Rajbati, Burdwan, (xxv) DCF, Burdwan, (xxvi) DCF, Baligori, Hooghly, (xxvii) DCF, Kantapukur, Howrah.

Table 1.18: Veterinary Infrastructure and Manpower in West Bengal state

Year	No. of Veterinary Institutions	No. of Veterinarians	Cattle Equivalent Units Per Veterinary Institution	Cattle Equivalent Per Veterinarian
2010-11	8440	6538	-	-
2011-12	9716	7168	-	-
2012-13	9716	6770	-	-
2013-14	9102	-	-	-
2014-15	9014	-	-	-

Note: Data of "No. of Veterinarians" for the year 2013-14 & 2014-15 is not available.
Source: State Statistical Hand Book 2015 (Vet. Instn) & District Statistical Hand Book 2013 (Vetn), GoWB

Table 1.19: Growth in Infrastructure facilities for Animal Husbandry in West Bengal

Year	Growth in Infrastructure facilities for Animal Husbandry in West Bengal (Nos)							
	SAHC + DVH	BAHC	ABAHC	ADAC	MAHC	AIC (including PB+Coop)	Breeding Farms	
							Cattle	Poultry
1960-61	-	-	-	-	-	-	-	-
1970-71	-	-	-	-	-	-	-	-
1980-81	-	-	-	-	-	-	-	-
1990-91	110	341	270	620	82	114	7	-
2000-01	110	341	271	2147	-	3512	7	-
2010-11	110	341	271	3248	5	4465	7	26
2011-12	110	341	273	3248	-	5744	7	26
2012-13	110	341	273	3248	-	5744	7	27

Source: Statistical Abstract 2014 & District Statistical Hand Book 2013, Govt. of West Bengal; Animal Resource Development Department, Govt. of West Bengal

The details about the veterinary infrastructure and Manpower available in West Bengal state is presented in Table 1.18, growth in infrastructure facilities for animal Husbandry in West Bengal is presented in Table 1.19 and district wise number of veterinary institutions in West Bengal during 2012 – 2013 is presented in Table 1.20.

Table 1.20: District wise Number of Veterinary Institutions in West Bengal (2012–2013)

Sr. No.	District	SAHC + DVH	BAHC	ABAHC	ADAC	MAHC	AIC (including PB+Coop)	Total Vet. Insti.
1	Bankura	5	22	22	190	-	343	582
2	Burdwan (E&W)	11	31	20	277	-	473	812
3	Birbhum	7	19	17	167	-	276	486
4	South Dinajpur	2	8	8	65	-	133	216
5	North Dinajpur	3	9	9	99	-	187	307
6	Darjeeling	6	10	7	22	-	69	114
7	Howrah	3	14	11	157	-	254	439
8	Hoogly	5	18	17	210	-	386	636
9	Jalpaiguri	6	13	13	148	-	240	420
10	Cooch Behar	6	14	10	128	-	220	378
11	Kolkata	1						1
12	Maldah	4	15	15	147	-	252	433
13	Murshidabad	8	26	17	255	-	545	851
14	Nadia	9	17	16	187	-	404	633
15	South 24 Pgs	6	29	20	312	-	410	777
16	North 24 Pgs	6	22	16	200	-	397	641
17	Medinipur (E&W)	14	54	36	514	-	864	1482
18	Purulia	8	20	19	170	-	290	507
	WB State	110	341	273	3248	-	5744	9716

Source: District Statistical Hand Book 2013, GoWB

There are seventeen Co-operative Milk Unions as well as Co-operative Dairy Unions in West Bengal. But, there is no authentic and published information regarding Milk processing capacity in West Bengal state. However, the details on number of societies with bulk milk cooler (BMC), automatic milk collection System (AMCS) and number of chilling centre with installed capacity (1000 litres/day) is presented in Table 1.21. Medinipur, North 24 Parganas, Nadia, Darjeeling, South 24 Parganas and Bankura district have these infrastructure available on larger number than other districts in the state.

1.10 Need of the study

West Bengal, an eastern state of India have moderate to low development status. According to Census of India 2011, the population density in West Bengal was 1028 persons/ square kilometre as compared to national average of 368 persons/ square kilometre. Urbanisation is relatively low (19%) compared to the national average of 31%. The shift from cultivators to agriculture labourers is significant in West Bengal as compared to national shift. There is

a critical need for generating adequate employment opportunities for these groups of population. But there is a crisis of gainful employment round the year. Dairy farming may become the alternative way of livelihood for this unemployed population.

Table 1.21: Details about Bulk Cooler, Automatic Milk Collection Systems and Chilling Centres facility with Dairy Cooperative Societies in West Bengal

Sr. No.	Name of Milk Producers' Co- op. Union Ltd.	No. of Societies with		No. of Chilling Centre-Installed Capacity (1000 litres/day)
		Bulk Milk Cooler (BMC)	Automatic Milk Collection System (AMCS)	
1	Midnapore MU	15	80	38.0
2	Damodar MU	7	23	18.0
3	Ichhamati MU	14	52	56.0
4	Bardhaman MU	8	25	23.5
5	Kishan Mu	20	47	43.0
6	Himul MU	21	40	33.0
7	Fedn MU (Murshidabad)	3	0	25.0
8	Bhagirathi MU	1	172	5.0
9	Sundarban MU	14	4	15.5
10	Mayurakshi MU	6	8	6.5
11	Kulick MU (N. Dinajpur)	7	17	7.0
12	Kangshabati MU	18	34	21.0
13	Manbhum MU	2	4	5.0
14	Fedn MU (Malda)	4	8	3.0
15	Howrah MU	8	3	4.0
16	Kulick MU (S. Dinajpur)	3	5	2.0
17	Jalpaiguri	2	0	8.0
Total		**153**	**522**	**313.5**

Source: NDDB, Kolkata

The West Bengal state has predominantly indigenous cows, mostly non-descript. Share of non-descript indigenous cows in this state is about two-thirds of total cow population. The productivity levels of milch animals are quite low. This shows that the genetic pool of the milch animal population is of low quality.

This observation indicate that the status of dairy development in West Bengal is low in comparison to elsewhere in the country, despite the fact that this region has relatively superior resource endowment. The dairy cooperative structure in the area has been weak in comparison to elsewhere in the country. The coverage of dairy cooperatives in terms of villages, milk producers and share of milk procurement in surplus milk is low. There is immense potentiality for using agricultural wastes e.g. paddy straw, jute wastes and vegetable wastes as cheap and economical cattle ration. Preponderance of indigenous

animals in the study area would minimise the impact of climate change as they are more resilient to temperature change. The increased volume of milk through these animals would also help in reducing pressure from the states where crossbred cows are in majority and may face an adverse impact of climate change.

To achieve the above growth, it is believed that the quantum jump in milk production is possible through increase in productivity, and linking small holders to dairy cooperatives/producer groups/SHGs with forward linkages with milk processing. This means that the areas which have low levels of productivity, preponderance of low yielding non-descript animals, but rich in resource endowment and presence of good markets would require attention of the policy makers for initiating a focussed programme for West Bengal state. A comprehensive assessment of the present status of dairy development in this state and potential for growth from the perspective of regional and national consideration needs to be drawn up for dairy development.

Therefore, the present study was undertaken with the following objectives in the state of West Bengal. It is an important milk producing state in eastern part of India. The state has a very few well established cooperative dairy sector, but the growth in dairy is not uniform in all regions of the state.

1.11 Objectives of the study

a) To assess the present status of dairying with reference to animal distribution, milk production, consumption and marketable surplus.
b) To identify the constraints in dairy development from supply side, institutional deficiency and processing infrastructure.
c) To identify different central and state government schemes related to dairy development at district level and document technical as well as operational details of the schemes and understand how convergence is ensured.
d) To highlight the facilitating factors that could help promoting dairy development to improve socio economic status of the milk producers.
e) To suggest broad areas for focussed interventions for promoting dairy development in the selected state and the way forward.
f) To suggest suitable policy measures to ensure compliance of effective convergence of various schemes for the benefits of dairy farmers.

1.12 Data and Methodology

The study is based on both, the secondary and primary level data. The secondary data pertain to dairy development efforts, various schemes implemented and in force, changes in size and composition of livestock population and milch animals as well as milk production across regions, per capita milk availability, infrastructure available, related data were compiled from the offices of the NDDB and State Department of Animal Husbandry & Dairying as well as from the government publications such as Livestock Census (Department of Animal Husbandry), Statistical Abstract of the State, Economic Surveys and related web sites. Besides tabular analysis, annual compound growth rates were calculated to indicate an increase or decrease in livestock populations and other related parameters during inter census periods / years. For the study, primary data were collected from the selected Milk producers, Primary Dairy Cooperative Societies and Milk Unions through structured and pre-tested schedules / questionnaires.

Sampling Framework

The primary data were collected from the sample farmers selected on the basis of the sampling design described below and as presented in Tables 1.22 to 1.24.

I) Selection of Milk Union/District Milk Union/District (MU/DU/D):

- Four districts, where district milk union is in operation, have been selected for this study from three agro-climatic regions of West Bengal as per advice from the officials of NDDB, Kolkata. The districts have been selected because dairy development schemes are functional in these districts which will help in obtaining data from the study area. The districts were selected primarily on the basis of quantity of cattle milk production, performance of district milk union and other development aspects (Map 1.2, Tables 1.22 &1.25).
- It was attempted that the four milk unions / district milk unions / districts were selected from different regions / zones in order to capture holistic macro picture at the state level.
- Accordingly, selected 4 districts / milk unions from 3 respective agro-climatic regions are as follows:
    i) *North 24 Parganas* district from New Alluvial Region,

ii) *Nadia* district from New Alluvial Region,

iii) *Bankura* district from Red & Laterite Region, and

iv) *South 24 Parganas* district from Coastal & Saline Region.

For an optimum assessment of the status of dairying in West Bengal, these regions as well as districts have been selected on the basis of performance of District Milk Union (DMU) ranging from highly developed to poorly develop. (Table 1.22)

II) Selection of Villages:

- From each milk union / district milk union / district, four villages were selected.
  i) Two villages nearer to the MU/DU/District place: One village having dairy cooperative and one village without dairy cooperative- both located nearby.
  ii) Two villages about 25-50 kms away from the MU/DU/District place: One village having dairy cooperative and one village without dairy cooperative- both located nearby.
- Thus, total numbers of selected villages in the State were 16 villages.

III) Selection of Milk Producers:

- From each selected village, 15 milk producers (5 from each category) were selected randomly. Thus, total sample size of milk producers in the State was 240 (15x16).

Table 1.22: Selected Three Agro-Climatic Regions of West Bengal

Regions	Districts	Features
New Alluvial Region	**North 24 Parganas**, **Nadia**, Malda, Murshidabad, Burdwan	Mostly progressive farmers; deep, alluvial soils are overexploited due to suitableness of crop enterprise; ground water, river and canal water are the main source of irrigation; besides farming, **highly developed dairying and strong dairy cooperatives exist in this region**.
Red & Laterite Region	**Bankura**, Paschim Medinipur, Purulia, Birbhum	Mostly arid to semi-arid climate; hard lateritic soil have poor storability; rain water is the main source of irrigation; agriculture dependent mostly on monsoon; **moderate dairying and dairy cooperatives exist in this region**.
Coastal & SalineRegion	**South 24 Parganas**, Purba Medinipur, Howrah, kolkata	Low level of economic enterprise; semi-arid to humid climate; mostly saline soil; large areas under rainfed farming systems; **poor dairying and dairy cooperatives exist in this region.**

Source: District Statistical Hand Book, GoWB, 2014.

Table 1.23 Sampling Frameworks

DMU/DU	DMU1/DU1				DMU2/DU2				DMU3/DU3				DMU4/DU4			
Rank	**High**				**High**				**Moderate**				**Poor/Low**			
Taluka/ Block	T_1 / B_1		T_2 / B_2		T_1 / B_1		T_2 / B_2		T_1 / B_1		T_2 / B_2		T_1 / B_1		T_2 / B_2	
Villages	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16
Location	**close**	**close**	**away**	**away**	**close**	**close**	**away**	**away**	**close**	**close**	**away**	**away**	**close**	**close**	**away**	**away**
DC/NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC
Small	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Medium	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Large	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Total sample	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	30		30		30		30		30		30		30		30	
	60				60				60				60			
PDCS	1		1		1		1		1		1		1		1	
TOTAL	**DMU-04; Village-16; Milk Producers-240; PDCS-08**															

Note: DMU- District Milk Union; DU- District Union; DC- Dairy Cooperative Village; NDC- Non-Dairy Cooperative Village; PDCS- Primary Dairy Cooperative Society;

Table 1.24: Total numbers of selected DCS and NDCS Milk Producers in West Bengal state

Districts/ Milk Unions	DCS				NDCS			
	Small	**Medium**	**Large**	**Total**	**Small**	**Medium**	**Large**	**Total**
Ichhamati MU	10	10	10	30	10	10	10	30
Kishan MU	10	10	10	30	10	10	10	30
Kangsabati MU	10	10	10	30	10	10	10	30
Sundarban MU	10	10	10	30	10	10	10	30
West Bengal	40	40	40	120	40	40	40	120

Note: DCS- District Cooperative Society; NDCS- Non-District Cooperative Society

- The milk producers were categorized as follows as per holding of number of cattle population and random selection method for selecting milk producers was followed from total milk producers list (without village census):
  - i) Small Milk Producers (1-2 Milch animal),
  - ii) Medium Milk Producers (3-5 Milch animal) and
  - iii) Large Milk Producers (above 5 Milch animal)

Table 1.25: Selected villages / talukas / districts / Milk unions in West Bengal state

Sr. No.	Region/ Region Name	District Milk Union	Selected district	Selected Taluka	Selected villages (DCS)	Selected villages (NDCS)
1.	South	Sundarban District Cooperative Milk Producers' Union Ltd., Alipur*	South 24 Parganas	Basanti	Nafarganj	Ranigarh
				Basanti	Garanbose	Bharatgarh
2.	East	Ichhamati District Cooperative Milk Producers' Union Ltd., Barasat	North 24 Parganas	Bongaon	Nutangram	Ambarpur
				Bagdah	Malipota	Srinathpur
3.	West	Kangsabati District Cooperative Milk Producers' Union Limited, Bankura	Bankura	Taldangra	Banshkopa	Masatkhal
				Simlapal	Kushtora	Bankata
4.	North-East	Kishan District Cooperative Milk Producers' Union Ltd, Krishnagar	Nadia	Nakashipara	Bholadanga	Dahakula
				Karimpur	Gouas	Baliakandi

*Sundarban MU has been functioning for last one year in the district. But selection of South Twenty four Parganas was strongly suggested by NDDB, Kolkata. Basanti is the nearest block (which is more than 60 kms. away from DHQ) where Milk co-operatives are functioning in some of the villages. Hence, we had to stick to selection of one CD Block in this district (two villages in close proximity and two far away).

- Data on parameters related cost of milk production were collected from 03 milk producers from each village (one each from three categories), thus total 48 (3x16) milk producers.

Data collection from District Milk Union & PDCS:

- Officials of every District Milk Union (DMU) and Primary Dairy Cooperative Society (PDCS) were interviewed and data were collected with a structured schedule.

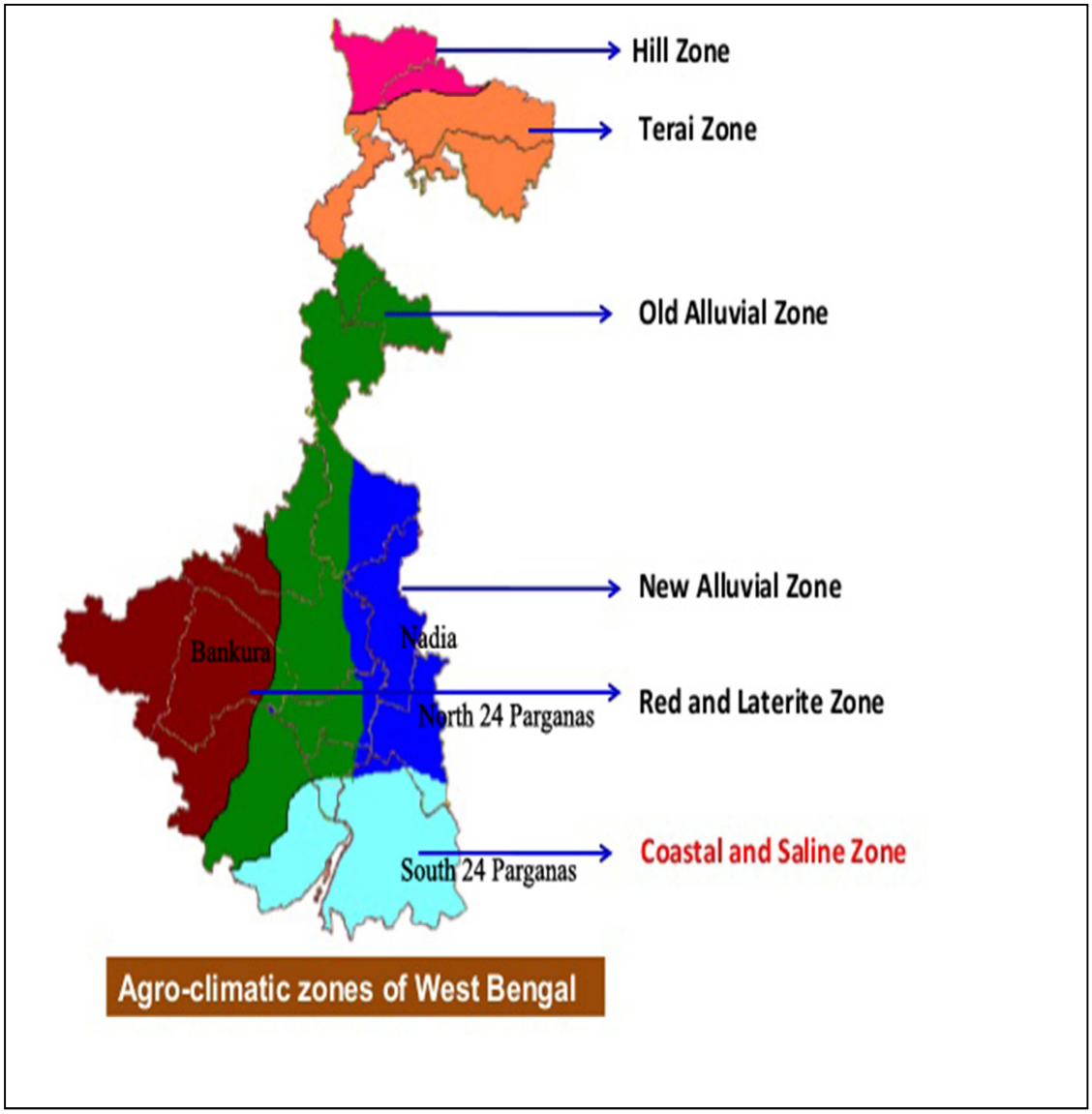
Survey Schedules:

The different survey schedules for the collection of data have been developed. Four types of survey schedules were canvassed in the study area.

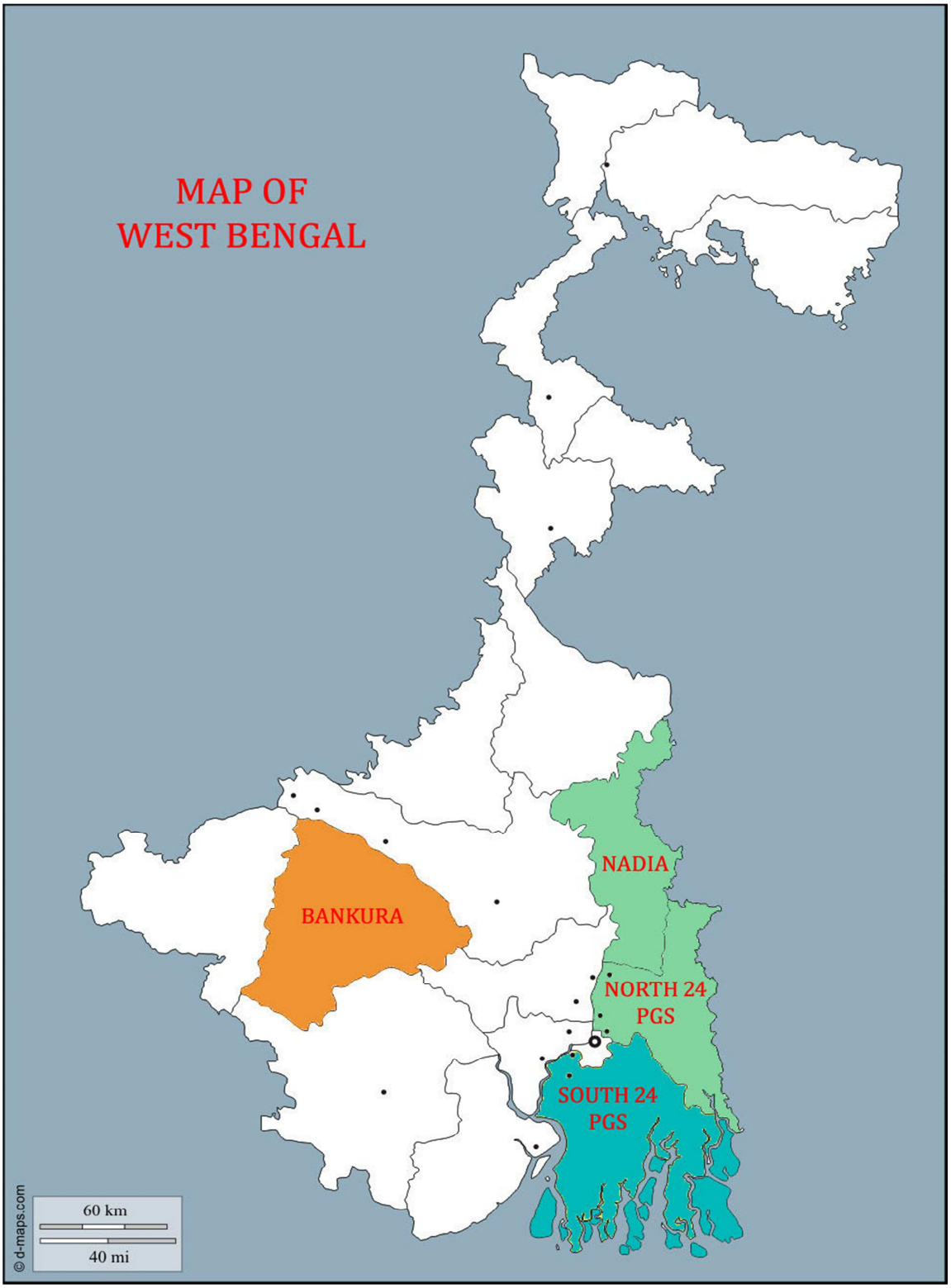
- ***Household Survey Schedule 1.0:*** To collect the information from the selected milk producers (covering both those are members of PDCS and non members of such any cooperative society) on structured interview schedules on some selected parameters such as: socio-economic characteristics, cropping pattern of sample household, herd strength & cattle shed, details of breed-able animals on survey date, milk

production, use and sale, season wise milk yield (per day), availability of water for dairy, labour use pattern in dairy/ involvement of rural men and women in dairy activities, feed and fodder per animal at the time of survey (kg/animal/day), veterinary and breeding expenditure during last one year, awareness about the various schemes, service delivery, constraints faced in dairy and suggestion/s for improvement in adoption of dairy schemes, various aspects of rearing of animals and feeding pattern constraints, perception, awareness about RBP, etc. from the sample milk producer.

Map 1.2: Six Agro-Climatic Regions of West Bengal



Map 1.3: Selected Agro-Climatic Regions of West Bengal



- ***Household Schedule-Cost of Milk Production 2.0:*** In order to estimate the cost of milk production, this schedule was canvassed among the few selected milk producer households in addition to the information collected in Schedule 1.0.

- ***Primary Dairy Cooperative Society (PDCS) Schedule 3.0:*** The desired information from the respondent society/unit/agent was collected in this schedule on selected aspects such as : total number of members enrolled, availability of some facilities, month-wise milk collection and rate paid, concentrates supplied by the society/firm during last one year, veterinary and breeding services provided by society/firm during last one year, any outbreak of disease of livestock during the past one year, training arranged/provided by society during last one year, details of development programmes/support, effect of programmes on key variables, general opinion, perception, constraints and suggestions regarding particular program, constraints faced by PDCS/ private firm.
- ***Milk Union Schedule 4.0:*** This schedule was designed to collected the information from milk unions on related parameters such as: districts, villages and PDCS covered, details on milk collection/procurement, different programs/ schemes, year wise average cost of processing of milk (Rs/litre) dairy plant, production and marketing of different product, constraints faced, potential for future and suggestions.

1.13 Limitation of the Study

Though considerable precautions and thoughts have been exercised to make the study precise, objective and reliable, yet because of limited resources at the disposal, the study has been restricted to specific areas and could not be extended to larger areas and more respondents. Individual's biases and prejudices on the part of the respondents might have influenced the findings of the study because the field level investigation was based on individual's perception and expressed opinion. However, due care was taken to check such biases, which was not apparent, through inter-checks of different elements of the data. However, due to its demonstration of the various issues and aspects of the problem, the study might have much wider application and this could be extended to other similar areas. Besides, period of survey was also a limitation of this study. The previous years' data about dairy farming had been collected in maximum cases. So, collected data about dairy farming is supposed to reflect the assumption in reply to some questions. In fact, previous years' information about dairy farming had been collected from the respondents within few hours of a day. However, the most important limitation of this study is that published information for Animal Husbandry and Dairying in West Bengal state is too scanty than the requirement

of the study. This restricted us to analyse few important dimension of the study, as compared to other states, which requires comparable and continuous time-series data on several variables related to dairying and animal husbandry in West Bengal.

1.14 Organization of Report

The entire study report has been organized into eight chapters including Introduction as Chapter 1. The Status of Dairy Development Institutions in West Bengal based on available literature published by Government sector has been included in Chapter 2. Policies and Programmes / Schemes for Dairy Development & Convergence of Schemes have been described in Chapter 3. Chapter 4 has been furnished with Socio-Economic Profile of Selected Milk Unions, PDCS / Private Units and Milk Producers. The identity of the 5th Chapter is presentation of the Cost of Milk Production and Awareness about the Schemes. The 6th Chapter has been highlighted the Milk Consumption and Marketable Surplus. The Constraints faced in Production and Marketing of Milk and Suggestions are the feature of 7th Chapter. The last and 8th Chapter has been characterized by Summary and Recommendations based on findings of this study.

The next chapter presents the "Status of Dairy Development Institutions in West Bengal".

Chapter II

Status of Dairy Development Institutions in West Bengal

2.1 Introduction

Dairying is an important and integral part of the rural economy of West Bengal. Milk production in the state was estimated at 13,804 tonne kg per day (TKgpd) (5.04 Million MT) in 2015-16 which is about 3.2 per cent of total milk production of the country (NDDB, 2017). Milk production in the state has grown at a CAGR of 2.42 per cent during the last 5 years (NDDB, 2017). Paschim Medinipur is the highest milk producing district in the state followed by Bardhaman. It is evident that almost half of the total milk production of West Bengal is concentrated in six districts, namely, Paschim Medinipur, Bardhaman, Murshidabad, Bankura, Nadia and Hooghly. Out of the total annual milk production of about 5.04 million tonnes in West Bengal during 2015-16, bulk of the production is destined for home consumption only (35%) (NDDB, 2017). The organised sector for milk production in West Bengal is still in the nascent stage and major portion of the marketed surplus is consumed by the unorganised sector consisting mainly of numerous sweets and sweetmeat shops situated all around Bengal. However constant efforts were initiated both from central and state governments since independence to channelize the flow of milk to organized sector through establishments of milk co-operatives, milk unions and institutional efforts to ensure remunerative dairy business to the producers.

2.2 Dairy Development Institutions

Table 2.1: Institutions Responsible for Dairy Development and their responsibilities

Name of the Institutions	Responsibility
Directorate of Dairy Development	Milk Processing & Supply at Greater Kolkata & other areas
West Bengal Cooperative Milk Producers' Federation Ltd. (WBCMPF)	Milk Marketing
Mother Dairy, Calcutta	Milk Processing & Supply at Greater Kolkata & other areas

2.2.1 Dairy Development Boards/ Corporations/Cooperative Federations:

A. Directorate of Dairy Development:

Directorate of Dairy Development, Government of West Bengal is engaged in the processing of raw milk to produce pasteurised and homogenised market milk and various milk products, and sells them through its own network of Milk booths, Suravis, Agents and Distributors in safe and wholesome condition. With the implementation of Operation Flood Programme in the mid-1970s, the extension, procurement and other farmer related activities on Dairy Development have been handed over to the Co-operative sector, i,e; West Bengal Co-operative Milk Producers' Federation Limited.

Under this Directorate, the oldest dairy at Haringhata was established in June, 1950 primarily to cater to the demands of local hospitals, government institutions and common people of Kanchrapara and Kalyani cities. Subsequently four more dairies were established viz.,

(1) Central Dairy, Belgachia, Kolkata in 1962 - for supply of milk in Greater Kolkata region,

(2) State Dairy, Durgapur in 1972 - for supply of milk in Durgapur and Asansol areas.

(3) State Dairy, Burdwan in 1982 - for supply of milk in Burdwan

(4) State Dairy, Krishnagar in 1987 - for supply of milk in Krishnagar region.

To feed raw chilled milk to these dairy plants, different chilling plants were established. However, subsequently considering the reduced demand of raw milk by the government dairies, it was felt necessary to hand over the chilling plants to the West Bengal Co-operative Milk Producers' Federation Limited for their effective use. Accordingly, except three chilling plants, all ten chilling plants have been handed over to the Milk Federation/Milk Unions on management and utilisation of assets basis. The State Dairy at Burdwan was non-operational since 20th May, 2004. Now, it has been handed over to Mother Dairy, Calcutta on "Management of asset basis" for its utilisation for processing and packaging of market milk. The production and distribution of milk at the State Dairy, Durgapur is kept suspended since May 2012 due to administrative unavoidable reasons (ARD, Govt. of WB, 2014).

Different varieties of milk and milk products manufactured and marketed by the Directorate of Dairy Development, Govt. of West Bengal are being sold under the brand name “HARINGHATA”.

The central dairy is having the grater installed capacity as compared to other dairies of the state (Table 2.2). However it is of a major concern that the effective capacity utilization in all the dairies are much lower than the installed capacity (Table 2.2) which depicts the decreasing demand of the organized sector in the state.

Table 2.2: Physical Capacities and Capacity Utilization in different dairies

Name of the Dairy	**Year of Establishment**	**Installed Capacity (TLPD)**	**Capacity Utilized (TLPD)**
Central Dairy	09/1962	200	37.90 (18.95%)
Haringhata Dairy	06/1950	50	1.70 (3.4%)
Krishnagar Dairy	01/1987	20	Handed over to Milk Fedn. / Kishan Milk Union on 05/06/06
Durgapur Dairy	10/1972	50	Non-operational since May 2012
Burdwan Dairy	11/1982	20	Handed over to Mother Dairy, Calcutta on “Management of Asset basis” on May 2013.

Source: Animal resource development department, Government of West Bengal

Several bulk chilling plants were established all across the states for immediate processing of the raw milk and increase its self-life. Most of the chilling plants has been handed over to the milk federations for operational purposes (Table 2.3).

Bulk of the raw milk procurement is still undertaken mainly through central dairy situated in Kolkata to cater the entire urban population of the city. However the proportion of utilisation of value added dairy products like butter is in negligible amount (Table 2.4).

Table 2.3: Status of Chilling Plants of Directorate of Dairy Development

Name of the Dairy	Chilling Plant	Capacity (TLPD)	Year of Establishment	Remarks
Central Dairy	1. Champadanga	4	1965	Handed over to Milk Fedn. (14.02.06)
Haringhata Dairy	2. Dhaniakhali	5	1965	Handed over to Milk Fedn.
	3. Mogra	4	1965	Closed
	4. Habra	4	1960	Handed over to Milk Fedn.
Krishnagar Dairy (Handed over to Milk Fedn.)	5. Bethuadahri	10	1964	Handed over to Milk Fedn. (05.10.05)
	6. Plassey	4	1965	Handed over to Milk Fedn. (05.10.05)
	7. Fulia	10	1954	Handed over to Milk Fedn. (05.10.05)
Durgapur Dairy	8. Sonamukhi	4	1973	Handed over to Milk Fedn. (03.11.06)
	9. Bishnupur	4	1972	Handed over to Milk Fedn. (22.04.08)
	10. Baramullah	2	1993	Yet to be handed over
Burdwan Dairy (Non-functional since 20.05.04)	11. Shaktigarh	2	1967	Yet to be handed over
	12. Katwa	4	1972	Handed over to Milk Fedn. (21.02.06)
	13. Kusumgram	4	1987	Handed over to Milk Fedn. (06.10.05)

Source: Animal resource development department, Government of West Bengal

In tune with the milk procurement, it is evident that the central dairy is mainly responsible for milk production only and the other (i.e. Haringhata Dairy) is attempting to produce value added dairy products (Table 2.5). However considering the changing demand pattern of the urban consumers to the value added and functional dairy products, attempts may be initiated to divert the production more towards value added products rather traditional and bulky milk products.

Table 2.4: Dairy-wise Utilization of Raw Materials and Production of Milk & Milk Products

Sl. No.	Name of the Dairy	Raw Milk Procurement and Consumption (TKPD)	Skimmed MilkPowderConsumption (MT/ day)	White Butter Consumption (MT/day)
1	Central Dairy	11.37	2.01	0.24
2	Haringhata Dairy	1.50	0.03	0.00
	Total	12.87	2.04	0.24

Source: Animal resource development department, Government of West Bengal

Table 2.5: Production of Milk and Milk Products

Sl. No.	Name of the Dairy	Milk Production (TLPD)	Ghee (MT/Y)	Chocolate (MT/Y)	Lassi (MT/Y)
1	Central Dairy	28.71	Nil	Nil	Nil
2	Haringhata Dairy	1.56	13.07	0.40	Nil
	Total	30.27	13.07	0.40	Nil

Source: Animal resource development department, Government of West Bengal

The fund utilization pattern of the different milk supplying institutions depicts that major portion of the allotment was not utilized (Table 2.6). Further only non-plan budget was utilised and plan budget was completely un-utilized in all the milk supply except greater Kolkata (Table 3.6). Planned expenditure will be essential for long run sustainability of the supplies with greater efficiency and reasons of only non-planned expenditure may be critically looked into for possible modification in the future budget allocations.

Table 2.6: Schemes of the Directorate of Dairy Development (2012 - 2013)

Scheme	Source	Allotment (Rs.)	Fund Utilized (Rs.) (Total Expenditure)	Percentage Utilization Of Funds	Sales Proceeds of Milk & Milk Products (Rs.)
Greater Kolkata Milk Supply	State Plan	21,46,194	8,32,678	38.80	-
	Non-Plan	119,52,18,500	69,90,06,028	58.48	24,43,91,259
Durgapur Milk Supply	State Plan	Nil	Nil	Nil	Nil
	Non-Plan	7,99,76,500	3,25,95,410	40.76	
Burdwan Milk Supply	State Plan	NIL	Nil	Nil	
	Non-Plan	2,51,14,000	1,70,06,734	67.72	
Krishnagar Milk supply	State Plan	NIL	Nil	Nil	
	Non-Plan	47,33,250	31,81,900	67.22	

Source: Animal resource development department, Government of West Bengal

Major Activities Undertaken

- Revision of Procurement Price of Raw Milk: The procurement price of raw milk in flush (3 months) and lean season (9 months) with effect from 1st April 2014 are Rs.22.60 and Rs.23.60 respectively per Kg of milk containing 4.5% Fat and 8.5% Solids-not-Fat. Farmer-Producers, however, get Rs.20.00 and Rs.21.00 respectively as their share of price.

- State Dairy, Burdwan, which was closed since May, 2004 was handed over to Mother Dairy, Calcutta in compliance with the Cabinet decision for its operation on "Management of Assets" basis. The renovation works with a project cost of Rs. 5.74 crores, out of RKVY Fund, has been completed and its operation resumed since February 2014. At present 2000 litres of processed and packaged milk are being supplied from the dairy under "Mother Dairy" brand.

- The State-of-the-art newly built Quality Control Laboratory at Central Dairy was inaugurated by the Hon'ble Chief Minister of West Bengal on 18th Nov. 2013.

- Notifications appointing the officers from this Directorate as Designated Officer and Food Safety Officers under Food Safety and Standards Act, 2006 and Rules and Regulations framed thereunder has been withdrawn by the Deptt. of Health and Family Welfare, Govt. of West Bengal.

Thrust Areas:

(a) Renovation and Modernization of Haringhata Dairy at Mohanpur, Nadia under RIDF - XVIII is going on in full swing. Approx. 10% of the work has been completed till March 2014.

(b) Renovation and Modernization of milk processing and packaging facilities at central dairy aligning well with the requirements of FSSAI requirements.

(c) Renovation and Modernization of Govt. Milk Depots by Franchisee in a P-P-P model by dovetailing the sales of Directorate of Dairy Development, WB Livestock Development Corporation Ltd. and Mother Dairy, Calcutta through modern day kiosks by modernising the Govt. Milk depots through franchisee has been initiated and 7 (seven) such

depots, located at prime areas in Kolkata, have already been converted and are in operation. Several other depots will be modernized in the same manner.

(d) 'Khatal' Removal and beautification of Kolkata: A total of 40 cattle, stray and from Khatals, have been seized and removed from Kolkata Municipal Corporation area.

(e) Develop alternative sources of raw milk from private producer-suppliers of our state to meet up the raw milk demand of the Govt. Dairies.

(f) Disposal of Condemned vehicles and unserviceable Plant machineries: Steps have been initiated to dispose of the condemned vehicles (especially milk vans) of this Directorate and also the unserviceable and obsolete plant and machineries *(Animal resource development department, Government of West Bengal, 2014)*.

B. West Bengal Co-Operative Milk Producers' Federation Ltd.

West Bengal Co-operative Milk Producers' Federation Ltd. (Federation) was formed as an apex body of milk cooperatives in West Bengal for developing the dairy industry. It was registered in 1983.

The mandate of the Federation is to achieve the following objectives:

Objectives:

- To provide assured and remunerative market for the milk produced by the farmer members.
- To provide quality milk to urban consumers.
- To build village level institutions in cooperative sector to manage the dairy activities.
- To ensure provision of milk production inputs, processing facilities and dissemination of know how.
- To facilitate rural development by providing for self-employment at village level thereby, preventing migration to urban areas and opportunity for steady income.

The philosophy of the Federation is to organize institutions to be owned and managed by the milk producers themselves to achieve economies of scale to ensure maximum returns and at the same time to provide quality milk at reasonable price to urban consumers (*Animal resource development department, Government of West Bengal, 2014)*.

Ultimately, the network of cooperative organizations should build a bridge between masses of rural producers and millions of urban consumers and achieve a socio-economic transformation in the state.

Present Status

Presently, 4120 primary milk producers' cooperative societies in the village level collect milk from its producer members and make regular payment. In addition, the district Milk Unions, provide various services, like veterinary cover, artificial insemination, fodder etc. to its producer members. These societies within a milk shed, normally co-terminus with the districts, affiliate themselves into District Milk Unions, which collect the milk procured by the Primary Milk Producer's Cooperative Societies from their doorstep, processes and markets the milk in the district or outside. The Milk Unions facilitate various inputs to the primary societies for onward transmission to producer members.

The District Milk unions, in turn, affiliate themselves into the West Bengal Milk Federation, whose role is to guide and monitor the Milk Unions in all its activities and for development and implementation of the various Government schemes.

The Federation has 93% of its share held by the State Government, providing share contribution of Rs.383.49 lakh and Rs.29.38 lakh from Milk Unions totalling Rs.412.87 lakh. It has a Board of Directors with Chairpersons of the Milk Unions and Govt. nominee. Presently post of the Chairman is held by the State Govt. nominee.

Present infrastructure of the federation:

i. 6.00 lakhs LPD Mother Dairy Plant (of the State Government) managed by the Federation at Dankuni, Hooghly.

ii. 1.00 lakh LPD Dairy Plant of Himul Milk Union at Matigara, Darjeeling.

iii. 1.50 lakh LPD Dairy Plant of Bhagirathi Milk Union at Berhampore,

Murshidabad.

iv. 4.00 lakh LPD Metro Dairy (Joint Venture in which the Federation holds 47% equity) at Barasat, North 24 - Parganas.

v. Two 100 MT / Day Cattle Feed Plants of Himul (at Matigara) and of Bhagirathi (at Berhampore).

vi. 146 Chilling Units having Chilling Capacity of 2.49 lakh litres per day.

vii. Four Dairy Plants having capacity of 4000 LPD (expandable to 10000 LPD) each at (i) Bolpur, Dist. Birbhum (ii) Raigunj, Dist. Uttar Dinajpur (iii) Belguma, Dist. Purulia & (iv) Raipur, Dist. Bankura.

viii. 10000 LPD Dairy at Cooch Behar handed over to Cooch Behar Zilla Parishad.

ix. 20000 LPD State Dairy Krishnagar handed over by the State Govt. to the Federation and run by the Kishan Milk Union.

x. Benmilk Training Centre (BTC) at Berhampore, Murshidabad.

xi. Kishan Bhaban (Farmer's Hostel) at Belgachia, Kolkata.

During the year 2013 - 2014 on average 285.40 TKgPD milk was procured from various District Milk Unions covering 1637 functional societies and 2.75 lakh farmer members. Major portion of the procured milk was supplied to different urban dairies namely Mother, Metro and Central Dairies, which marketed in and around Kolkata both processed milk and milk products.

The federation is continuously procuring raw milk from the dairy producers both in flush as well as lean seasons. The minimum price for farmers increased marginally since 2012 in tune with the increasing market price of raw milk but the producer's share have decreased from 2012. But overall the producers' share was sufficiently high as compared to other mode of disposal (Table 2.7).

Table 2.7: Procurement Price of Raw Milk per kg (4.5% Fat / 8.5% SNF)

With effect from 01.12.2012				**Producers' share**
Flush season	19.80	Minimum Farmer's Price	18.00	91.00%
Lean season	20.85	Minimum Farmer's Price	19.00	91.00%
With effect from 01.04.2014				**Producers' share**
Flush season	22.60	Minimum Farmer's Price	20.00	88.50%
Lean season	23.60	Minimum Farmer's Price	21.00	89.00%

Source: Animal resource development department, Government of West Bengal

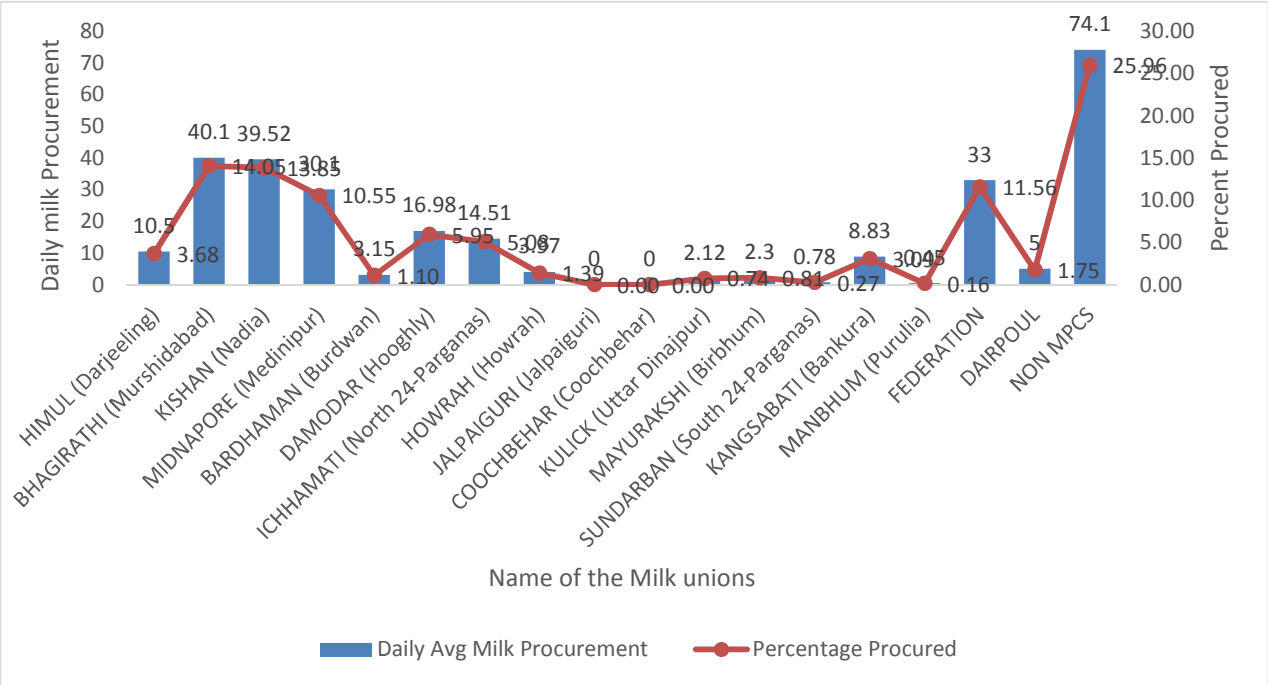
The state is having around fifteen milk unions from the districts from which two unions is currently not functioning (Table 2.8). The highest milk is procured from Bhagirathi milk union in Murshidabad (146 lakh Kgs per annum) followed by Kisan milk union in Nadia district (144 lakh Kgs. Per annum). However in respect of percentage of total milk procured the non-MPCS tops the chart as almost 26% of the total milk procured is destined to the non-MPCS (Fig 2.1). The procurement in few unions is miserably low (e.g., Burdwan, Bankura, North Dinajpur, Howrah etc.) comparing to the other performing unions (Table 2.8). Efforts should be initiated to improve the supply of milk to organised sectors through these milk unions for better price realisation as well as overall wellbeing of the milk producers in those areas.

Table 2.8: Daily average Milk Procurement from DCS / WDCS of the Milk Unions during the year 2013 - 14 (Fig. in TKgPD)

NAME OF THE MILK UNION/ UNIT	Daily Average Milk Procurement (TKgPD)	Annual Milk Procurement (Lakh Kg)
HIMUL (Darjeeling)	10.50	38.325
BHAGIRATHI (Murshidabad)	40.10	146.365
KISHAN (Nadia)	39.52	144.248
MIDNAPORE (Medinipur)	30.10	109.865
BARDHAMAN (Burdwan)	3.15	11.498
DAMODAR (Hooghly)	16.98	61.977
ICHHAMATI (North 24-Parganas)	14.51	52.961
HOWRAH (Howrah)	3.97	14.490
JALPAIGURI (Jalpaiguri)	Presently Defunct	Presently Defunct
COOCHBEHAR (Coochbehar)	Presently Defunct	Presently Defunct
KULICK (Uttar Dinajpur)	2.12	7.738
MAYURAKSHI (Birbhum)	2.30	8.395
SUNDARBAN (South 24-Parganas)	0.78	2.487
KANGSABATI (Bankura)	8.83	32.230
MANBHUM (Purulia)	0.45	1.642
FEDERATION	33.00	120.450
DAIRPOUL	5.00	18.250
NON MPCS	74.10	270.465
T O T A L	285.40	**1041.710**

Source: Animal resource development department, Government of West Bengal

Fig 2.1: Daily Average Milk Procurement and Percent procured by different Milk Unions



Source: Animal resource development department, Government of West Bengal

Other initiatives towards Dairy Development

The Federation has implemented the Women Dairy Co-operative Project (WDCP) funded by the Ministry of HRD, Govt., of India and thereby empowering the Women economically and socially.

599 Women Dairy Co-operative Societies have been organized with 57837 women members pouring on an average 37856 kgs. of milk per day. The WDCP was put into operation in April, 1993 and Rs.13.40 crores was received from Govt. of India for implementing the project in the districts;-

Phase - I	24 Parganas (North), Murshidabad, Darjeeling, Jalpaiguri & Bardhaman
Phase - II	Bankura, Coochbehar, Midnapore, & Hooghly
Phase - III	24 Parganas (North), Bardhaman & Murshidabad
Phase - IV	Midnapore, Coochbrhar, Darjeeling & Murshidabad
Phase - V	24 Parganas (North), Dakshin Dinajpur, Murshidabad & Hooghly
Phase - VI	Midnapore, Darjeeling, Malda & Bardhaman

Funded by the Ministry of Agriculture, Govt. of India the Federation is also implementing Integrated Dairy Development Project (IDDP) in the hilly, Non-OF and backward areas of West Bengal.

650 Primary Societies have been organized with 36564 members procuring 11493 kgs. of milk per day. The IDDP has been operating from April 1995 and Rs.12.77 crores received from Govt. of India, Rs.10.96 crores has been utilized for implementing the project in the following districts:-

Phase - I	Birbhum, Jalpaiguri, 24 Parganas (South) & Uttar Dinajpur
Phase - II	Purulia
Phase - III	Howrah
Phase - IV	24 Parganas (North), Purulia, Birbhum, Bankura & Dakshin Dinajpur

Bhagirathi and Ichhamati Milk Union are included under Clean Milk Production (CMP) Project of TIFAC. The total project cost is Rs.224 Lakh, out of which TIFAC authority will provide Rs.100 lakh and the balance by State Govt. Expenditure to the extent of

Rs.186.99 lakh has so far been made.

Since 2008-09 CMP under Phase - I with the assistance from Govt. of India is being implemented in the milk unions viz. Himul, Midnapore, Bardhaman, Kulick, Kangsabati and Mayurakshi. Fund to the tune of Rs. 281.68 lakh having been received from the Govt. of India was fully utilized for setting-up of Bulk Milk Coolers, MilkTesting Equipments, and Training etc. Since 2011-12 CMP under Phase - II is being implemented in the Milk Unions viz. Ichhamati, Howrah and Kishan at a cost of Rs. 172.48 lakh. Rs. 100.44 lakh was received by the Federation out of which Rs.100.61 lakh has been utilised.

Projects Undertaken by the Federation

Table 2.9:A brief account of different projects during 2013 -14 (in Rs. Lakh)

Name of Scheme	Financial Achievement in 2013-14	Physical Performance in 2013-14
Clean Milk Production (CMP-II) Centrally Sponsored Scheme Fund Received Rs. 49.22 lakh (14.01.13)	Spent Rs.37.68 Lakh during the year 13-14& during the year 12-13 Rs. 11.54 Lakh	1. Installation of BMCU (500 LPD): 7 nos. in three Districts [Howrah (Udaynarayanpur)-1 no./North 24 Pgns (Bagdah & Gaighata)-4 nos./ Nadia((Karimpur)-2 nos.] Beneficiaries- 7 Milk Coop Societies under 3 District Milk Unions. 2. Distribution of 2000 SS Milk pails (5 Ltr.) to milk farmers under 3 Dist Milk Unions (Howrah/Kishan/Ichamati). Beneficiaries- 2000 milk Coop Farmers. 3. Distribution of 3850 sets Hygiene & Detergent Kit to milk farmers under 3 District Milk Unions. Beneficiaries- 3850 milk farmers. 4. Training of milk farmers on Clean Milk Production- 3000 nos. (Howrah (Howrah)-500/ Ichamati (N.24Pgns)-1500/ Kishan (Nadia)- 1000 Beneficiaries- 3000 milk Coop Farmers.
Intensive Dairy Development Project-IV (IDDP-IV)Fund Recd. Rs. 365.86 Lakh (Oct'12) Centrally Sponsored Scheme	Spent Rs. 93.26 Lakh during the year 13-14 & during the year 12-13 Rs.111.034 Lakh	1. Installation of IBT (1 no.), Milk Condensing Unit (1 no.), Boiler (1 no.), Walk-in-Cold Store (1 no.) and ETP(1 no.) at Berachampa CP in North 24 Pgns Distt under Ichamati Milk Union. Beneficiaries- Ichamati Milk Union (1600 farmers) 2. Supply of Milk can, Fodder seed, Cattle Feed,milk testing equipment, vaccine & dewormer, milk testing equipment, with training of farmers tothemilk farmers under IDDP-IV in 2 Distt MilkUnion. Beneficiaries-1600 farmers of 2 Milk Unions (Ichamati/ Manbhum).

National Mission for Protein Suppliment (Under RKVY) Fund Recd Rs. 277.0 Lakh (Apr'13) Centrally Sponsored Scheme	Spent Rs. 277.00 Lakh during the year 13-14	1. Distribution of 17,000 SS milk pails (5 Ltr) to the milk farmers in the Districts (Bardhaman/ Bankura/Purulia/Paschim Midnapore/ Howrah/ Nadia/N.24 Pgns./Murshidabad/U.Dinajpur/ Darjeeling) Beneficiaries- 10 District Milk Union (17,000 milk Farmers) 2. Distribution of 180 nos. AMCU (Automatic Milk Collection Unit) in 7 Distt. Milk Unions (Nadia/ D.Dinajpur/Murshidabad/Bankura/ Birbhum/ Howrah/Paschim Midnapore) Beneficiaries- 180 Milk Coop Societies under 7 Distt. Milk Union. 3. Installation of BMCUs (2000 LPD): 3 nos. in 2 Districts [Howrah (Shyampur)-1 no/ Bankura (Kotulpur & Khatra)-2 nos.] Beneficiaries- 2 Distt. Milk Union (Howrah & Kangsabati).
State Plan (13-14) (Development of Milk Cooperatives & Transport subsidy on Cattle Feed) Fund Recd Rs. 900.00 lakh in the month (Sept' 13, Jan' 14 & Mar '14)	Spent Rs. 546.73 Lakh during the year 13-14	1. Reimbursement of Fund in terms of special financial Assistance to meet up milk productioncost to the milk producers under 10 Distt. MilkUnions (Bhagirathi/Kishan/Midnapore West/Damodar/Bardhaman/Ichamati/ Kangsabati/Kulick/Sundarban/Howrah). Beneficiaries- 10 Distt. Milk Unions (70,000 milk farmers). 2. Transport subsidy on cattle feed distribution to theCoop farmers under14 Distt. Milk Union (Bhagirathi/ Kishan/ Midnapore West/Damodar/ Bardhaman/Ichamati/Kangsabati/Kulick/ Sundarban/Howrah/Manbhum/Tamralipta/May urakshi/himul). Beneficiaries- 14 Distt. Milk Union (80,000 milk farmers)
State Plan (12-13) (Dairy Infrastructure Development) Fund Recd. **Rs.** 300.00 Lakh (Apr' 13)	Spent **Rs. 265.92** Lakh during the year 13-14	1. Established & Started activity of Tamralipta Milk Union, in Purba Midnapore. 2. Establishment of one new 2000 LPD BMCU centre at Ramnagar, Purba Midnapore. Beneficiaries- Tamralipta Milk Union(500 milk farmers) 3. Construction of boundary wall at Belguma Dairy, under Manbhum Milk Union. Beneficiaries- Manbhum Milk Union (Purulia). 4. Establishment of 2 KL BMCU (2 nos.) at Indus & Patrasayer under Kangsabati Milk Union. Beneficiaries- Kangsabati Milk Union (2500 Milk farmers under NDP-I)
State Plan (13-14) Fodder Development	Spent **Rs. 18.74** Lakh during the year 13-14	Released the fund among eight potential Milk Unions (Midnapore/Brahman/Damodar/ Ichamati/ Kishan/Howrah/Bhagirathi/Tamralipta) for distribution of seeds, preparation of fodder plot,

Program) Fund Recd **Rs.** 18.74 Lakh(Mar' 14		straw/cellulosic waste enrichment. Beneficiaries- 8 Milk Union (3050 Milk Farmers)
National Dairy Plan-I (NDP	Spent **Rs. 113.60** Lakh During the year 13-14	1. Village based milk procurement system (VBMPS) organized: 209 nos. in 4 Districts (Bankura/Nadia/ Murshidabad/North 24 Pgns.) under Kangsabati, Kishan, Bhagirathi and Ichamati Milk Union Beneficiaries- 4 Distt. Milk Unions (8360 milk farmers) 2. Fodder Development in Murshidabad District under Bhagirathi Milk Union within 62 nos. of Societies organized under NDP-I. Beneficiaries- Bhagirathi Milk Union(2480 milk farmers)

Source: Animal resource development department, Government of West Bengal

The milk unions have received funds from NDDB under National dairy Plan-I starting from 2013 and within one year three milk unions were able to utilise most of the fund under village based milk procurement scheme (utilization is more than 70% and highest of 92% in Ichhamati milk union in North 24 Pargana) (Table 2.10). However there is still larger scope of fund utilization from the scheme in the rest unions. The NDP from NDDB may act as a true catalyst in reviving the milk unions in the state and increase the flow of raw milk to the organized sectors in tune of the other dairy developed state like Gujrat.

Table 2.10: Details of National Dairy Plan-I (NDP-I) (2013-14) in different Milk Unions (inRs. Lakh)

Sr. No.	Name of EIA	Sub Project	PSC approval date	Total Outlay	Fund released till 31.03.2014	Fund Utilized	Percentage Utilization of released fund
1	Bhagirathi Milk Union (Murshidabad)	FD	11.2.13	45.46	23.35	12.65	54.16
2	Bhagirathi Milk Union (Murshidabad)	VBMPS	11.2.13	196.02	16.43	11.57	70.41
3	Ichamati Milk Union (North 24-Parganas)	VBMPS	24.5.13	106.74	25	23.05	92.19
4	Kangsabati Milk Union (Bankura)	VBMPS	24.5.13	273.03	49.6	41.34	83.33
5	Kishan Milk Union (Nadia)	VBMPS	24.5.13	223.48	48	25	52.08
	Total			844.73	162.38	113.60	

FD- Fodder Development, VBMPS- Village Based Milk Procurement System
Source: Animal resource development department, Government of West Bengal

An insight into the profit and loss statement of different milk unions from 2007-08 to 2012-13 reveals that out of total 15 milk unions established in the state, 13.33% (2 in nos.) were defunct and almost 60% of the total milk unions were more or less in profitable situation during the period (Table 2.11). However 20% of the total established unions, namely himul, kisan and manbhum were continuously running in loss during the period (Table 2.11). Moreover, it is matter of concern that more unions were prone to loss during the later period as compared to the earlier period. It may also be enunciated from the figures that farmer producers are losing interest in supplying raw milk to the unions and more milk is diverting to unorganised sectors (Table 2.11). A further study into the mode of operations of these unions may help to get better insight of the situation and improve the situation thereof.

Table 2.11: Profit & Loss Status of Milk Unions (in Rs. Lakh)

NAME OF M.U.	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
HIMUL	(2.04)	(5.76)	(101.87)	(244.60)	(239.38)	
BHAGIRATHI	(117.11)	(42.14)	(4.57)	3.00	13.75	95.06
KISHAN	(40.37)	(3.57)	(41.13)	(29.67)	(25.73)	(25.63)
MIDNAPORE	1.30	0.47	7.85	3.04	1.78	1.24
BARDHAMAN	1.43	8.34	9.06	4.01	3.91	(6.64)
DAMODAR	18.23	38.99	23.35	16.81	(14.77)	(70.81)
ICHHAMATI	17.08	17.99	18.62	20.00	7.34	(39.54)
HOWRAH	0.16	0.94	1.29	2.24	2.54	1.94
JALPAIGURI	Presently Defunct					
COOCHBEHAR	Presently Defunct					
KULICK	1.57	1.87	2.62	2.05	2.75	
MAYURAKSHI	4.41	6.99	1.34	2.25	4.11	
SUNDARBAN	3.93	0.74	0.82	0.58	3.89	0.33
KANGSABATI	(9.41)	(12.07)	0.08	54.49	40.00	
MANBHUM	0.18	(17.57)	(36.13)	(14.09)	(9.82)	(2.98)

* Figures in the parenthesis denotes loss

Source: Animal resource development department, Government of West Bengal

Apart from managing the unions, the federation is also engaged in organizing 'Dairy Co-operative Societies', 'Women Dairy Co-operative societies', establishment of artificial insemination centre to uplift the genetic potential of the cattle in the state. A glimpse of the physical achievements of the federation is enlisted in the following (Table 2.12).

Table 2.12: Physical Achievements of WBCMPF

PARTICULARS	**2010-11**	**2011-12**	**2012-13**	**2013-14**
DCS/WDCS organized (cum)	3862	3899	3998	3086
DCS/WDCS registered (cum)	2050	2058	2138	1034
Farmer members (cum)	257652	259334	267124	274530
Avg. milk procurement (Kg. PD)	330500	307330	334080	285400
AI Sub Centres (cum)	669	663	610	612
AI done	367869	346563	330230	302318
Avg milk procured per farmer	1.28	1.18	1.25	1.04
W D C P :				
WDCS organised (cum)	599	599	599	599
WDCS registered (cum)	426	426	426	426
Farmer Members (cum)	57591	57709	57709	57837
Avg. Milk procurement	39361	39100	33100	37856
I D D P :				
DCS organised (cum)	441	551	650	650
DCS registered (cum)	295	297	305	331
Farmer Members (cum)	26287	31724	36564	36564
Avg. Milk procurement	9894	15204	19160	11493

Source: Animal resource development department, Government of West Bengal

Table 2.13 Infrastructure as on 31st March 2014 in Co-op Sector

District / Milk Union	Chilling Infrastructure				Total Chilling Infrastructure		Dairy Plant		Cattle Feed Plant		No. of AMCU
	Chilling Plant		BMCU								
	Qty (No)	Capacity (TLPD)	Qty (No)	Capacity (TLPD)	Qty (No)	Capacity (TLPD)	Qty (No)	Capacity (TLPD)	Qty (No)	Capacity (MT/Day)	
Darjeeling / HIMUL	-	-	21	21	21	21	1	100	1	100	40
Murshidabad / Fedn.	1	10	3	12	4	22	-	-	-	-	15
Nadia / Kishan	-	-	14	30	14	30	1	20	-	-	47
Midnapore/ Midnapore	-	-	15	35	15	35	-	-	-	-	80
Hooghly / Damodar	-	-	7	14	7	14	-	-	-	-	23
Burdwan / Bardhaman	2	6	8	7.5	10	13.5	-	-	-	-	25
24 Pags (N) / Ichhamati	2	8	12	29	14	37	-	-	-	-	52
24 Pags (S) / Sundarbon	-	-	14	15.5	14	15.5	-	-	-	-	4
Birbhum / Mayurakshi	-	-	6	6.5	6	6.5	1	4	-	-	8
Uttar Dinajpur / Kulick	-	-	7	7	7	7	1	4	-	-	17
Dakshin Dinajpur /Kulick	-	-	3	1.5	3	1.5	-		-	-	5
Malda / Kulick	-	-	4	3	4	3	-	-	-	-	8
Bankura / Kangsabati	-	-	17	31	17	31	1	4	-	-	34
Purulia / Manbhum	-	-	2	1	2	1	1	4	-	-	4
Howrah / Howrah	-	-	7	9	7	9	-	-	-	-	3
Murshidabad / Bhagirathi	-	-	-	-	-	-	1	150	1	100	172
Purba Medinipur / Tamralipta	-	-	1	2	1	2	-	-	-	-	-
TOTAL	5	24	141	225	146	249	7	286	2	200	537

Source: Animal resource development department, Government of West Bengal

A critical look into the performance of the milk unions during 2013-14 reveals that all the milk unions were engaged in organising primary milk co-operatives and till the reported period, Murshidabad milk union had the highest no of functional cooperatives (396) followed by Nadia (266) and Ichhamati (241). The performances of Purba Medinipur, South

24 Pargana and Purulia were poor as they failed to have any functional milk co-operatives (nil in case of Purba Medinipur) or very less in number (13 each for South 24 Pargana and purulia) (table 2.14). Bhagirathi milk union in Murshidabad has the highest farmer member (68130, 24.82%) followed by Ichhamati milk union in North 24 Pargana (36225, 13.20%), and Kisan milk union in Nadia (33481, 12.20%). Besides organising the milk co-operatives, the unions also provides AI service to their farmer members and each unions have their own AI sub centres. In this case also, Murshidabad union is having the largest number of AI sub centres (191) among all the unions followed by Midnapur union (111) and Ichhamati Union in North 24 Pargana (80). Poor performance of the few milk unions is also evident from their poor organisation of milk co-operatives and insufficient AI facilities to the members resulting into poor financial performances as evident from the earlier discussion.

Table 2.14: Performance of Milk Union during 2013-14

District / Milk Union	Primary Milk Co-operatives			Farmer Members(cum)	AI. Sub-centres (cum)	A.I. Done	Female Calves Born
	Organised (cum)	Registered (cum)	Functional (cum)				
Darjeeling/HIMUL	526	348	138	23089	20	982	275
Murshidabad / Bhagirathi	760	460	396	68130	191	64166	19377
Nadia / Kishan	472	283	266	33481	52	48146	7279
Midnapore/ Midnapore	477	290	214	27583	111	69177	15998
Bardhaman/ Bardhaman	193	101	37	10783	38	31623	4022
Hooghly/Damodar	292	131	35	26975	30	7955	1579
North 24-Pgs/Ichhamati	582	163	241	36225	80	37660	4332
Howrah/Howrah	96	46	60	4394	Done by ARDD		
Dinajpur (N&S), Malda/Kulick	178	99	26	13337	6	9259	1420
Birbhum/ Mayurakshi	149	43	42	6765	26	12361	1826
South 24-Pgs/Sundarban	121	92	13	9220	16	3701	445
Bankura/ Kangsabaty	175	56	156	10725	25	14457	1577
Purulia/Manbhum	74	44	13	3823	17	2831	431
Purba Medinipur/ Tamralipta (de-affiliated from Paschim Medinipur)	25						
Total	4120	2156	1637	274530	612	302318	58561

Source: Animal resource development department, Government of West Bengal

C. Mother Dairy Calcutta (MDC)

Apart from Directorate of Dairy Development and West Bengal Co-operative Milk Producers Federation, Mother Dairy Calcutta is also providing necessary support towards dairy development in the state through its own infrastructural and managerial capabilities. Today Mother Dairy has become a household name in case dairy products to the urban consumers of the state especially greater Kolkata and neighbouring towns. A glimpse of the main activities of Mother dairy is enlisted below.

- Fresh milk collected from village level dairy cooperative societies (through Milkfed) &self-help group in Non-MPCS areas.
- This has resulted in increase of collection capacity of Mother Dairy from 80,000 litres to1.60 lakh litres per day (avg).
- From loss it has come to profit of Rs. 11.00 crore during the year 2012-13, Rs. 5.38 crore during the year 2013-14.
- It has launched various products like Flavoured Yoghurt, Probiotic Doi, Paneer, Mango Pudding, Vanilla & Chocolate Flavoured Ice Cream Cones, Choco & Orange Candy.
- It has set up 18 modernized Milk Depots in collaboration with WB Livestock Dev. Corporation and Directorate of Dairy Development to sell their products jointly all over Kolkata.
- MDC has taken over Burdwan State Dairy which was closed for more than 9 years. The renovation works with a project cost of Rs. 5.70 crore has been completed that start functioning from February 2014.
- It has launched 100 ice cream push carts to expand its sale of ice cream products in Kolkata.

Table 2.15: Performance at glance

SL. NO	ACTIVITY	UNITS	As On 16.09.2014
1	Raw Milk Procurement	Ton KG / Day	161.3
2	Total Nos. of Milk Booths/Outlet	Nos.	1943
3	Total Nos. of Delivery Boys (door to door service)	Nos.	13500
4	Total No of self-employment generation (including Delivery Boys)	Nos	19430
5	Average Daily Sale of Liquid Milk	Ltrs/day	305967
6	Sale of Mishti Doi/Yoghurt	Kg/day	1356
7	Sale of Probiotic Doi	Kg/day	785
8	Sale of Paneer	Kg/day	825
9	Sale of Ice Cream	Kg/day	451
10	Peda	Kg/day	30
11	Mango Pudding	Kg/day	30
12	Cow Ghee	Kg/day	100

Source: Animal resource development department, Government of West Bengal

Table 2.16: District-wise Outlets of Mother Dairy Calcutta

District	Kiosks/ Outlets for self-employment as on 31.03.2013	Targeted No of Kiosks/ Outlets for self-employment (2013-14)	Actual No of Kiosks/ Outlets achieved for self employment (2013-14)	Kiosks/ Outlets for self-employment as on 31.03.2014	Reamrks
Kolkata	899	175	180	1079	1) No of persons engaged in each outlet - 10 2) Total no of self-employment -25270
Bankura	18	8	6	24	
Birbhum	25	12	10	35	
Burdwan	120	25	18	138	
Coochbehar		5		0	
D Dinajpur		5		0	
U Dinajpur		5		0	
Darjeeling	28	20	16	44	
Howrah	272	35	28	300	
Hooghly	239	25	22	261	
Jalpaiguri			5	5	
Malda	31	20	15	46	
Murshidabad		5		0	
Nadia	26	15	12	38	
North 24 Pgs	149	30	22	171	
South 24 Pgs	118	50	42	160	
Paschim Medinipur	77	40	32	109	
Purba Medinipur	48	30	27	75	
Purulia	27	20	15	42	
Total	2077	525	450	2527	

Source: Animal resource development department, Government of West Bengal

Chapter III

Policies and Programmes / Schemes for Dairy Development

3.1 Introduction

In West Bengal, the Animal Resources Development Department is responsible for the formulation and implementation of Livestock and Poultry policies and programmes of the state. The following participatory branches including a university under this department are looking after the successful implementation of all the projects and schemes of the Department (NDDB, 2017):

1. **Directorate of Animal Resources & Animal Health (DAR&AH):**
   It is playing pivotal role for the control of animal diseases, scientific management and upgradation of genetic resources of livestock and poultry birds, increase in availability of nutritious feed and fodder, extension of activities on animal husbandry practices and also enhancement of production and profitability of livestock enterprises.
2. **Directorate of Dairy Development:**
   It is engaged in the processing of raw milk to produce pasteurised and homogenised market milk and various milk products, which in turn, are sold through its own network.
3. **Paschim Banga Go-Sampad Bikash Sanstha (PBGSBS):**
   It is registered society created to act as catalyst for qualitative, quantitative and genetic improvement of bovine population in this State.
4. **West Bengal University of Animal and Fishery Sciences (WBUAFS):**
   It imparts quality education, undertakes basic and need-based research and disseminates proven technologies to the rural masses.
5. **West Bengal Cooperative Milk Producers' Federation Ltd. (WBCMPF):**
   The WBCMPFL was registered in the year 1983 in order to eliminate middlemen and organise institutions to be owned and managed by the milk producers themselves. The basic objective was to provide assured and remunerative market for the milk produced by the farmer members.
6. **West Bengal Dairy & Poultry Development Corporation Limited (DAIRPOUL):**
   It is a government enterprise created in 1969 to supply high quality compounded feed for livestock under "Epic" brand name.

7. West Bengal Livestock Development Board:

It focuses on meat and meat product marketing.

8. Mother Dairy:

It oversees milk processing and supply to Greater Kolkata and other areas.

9. West Bengal Veterinary Council:

The council is sincerely discharging the statutory functions like regulation of veterinary practice, Registration & Renewal of Veterinary Practitioners, monitoring the professional conduct, etiquette and code of ethics of registered veterinarians and organization of workshops and seminars to promote professional knowledge.

10. The Calcutta Society for the Prevention of Cruelty to Animals (CSPCA):

The CSPCA, a charitable organization formed in the year 1861 with an objective to give relief to the helpless animals, especially the stray dogs. The society provides treatment and health care to the animals free of cost. It is a non-profitable organization surviving purely on Government aid and donations.

The main programmes and schemes for dairy development in West Bengal can be classified into two categories viz.

I. Central Schemes;

II. State Schemes;

3.2 Animal Husbandry and Dairy Development

Table 3.1 Central schemes for Animal Husbandry Development

1.	National Programme for Bovine Breeding (NPBB)	NPBB sponsored by Government of India is implemented in West Bengal though BGSBSP. The Sanstha has more than 3,000 Pranibandhu working at Gram Panchayat level for delivery of breeding inputs at the farmer's doorstep. These workers perform Artificial Insemination (AI), vaccination of animals and provide primary health care. Funds are also used for improvement in quality of bulls used for natural service and artificial insemination, imposing strict quality control of services and inputs, consolidation and initiation of programme for development and conservation of recognized indigenous breed so as to improve the genetic makeup as well as their availability. The chief objective of the Program is to arrange quality AI services at Farmers' door step and to bring all breedable females under organized breeding through AI or Natural service using germplasm of High Genetic Merit. It also aims to conserve, develop and proliferate selected Indigenous Bovine breed of High Socio economic importance.
2.	Rashtriya Krishi Vikas Yojana	During the year 2016-17, the total outlay under RKVY for the state was to the tune of Rs. 62.24 crore to ensure a comprehensive development in agriculture

	(RKVY)	and allied sectors. The ARD Department has implemented the following projects/ schemes under RKVY during the year 2016-17. i. Extension of Animal Health Care Services in remote areas of West Bengal through the Mobile Veterinary Clinic (MVC); ii. Livelihood improvement of poor and tribal people through livestock based enterprises in selected villages of Jhargram Block ; iii. Prani-Shakti - Tablet PC & Web-enabled Animal Resources Extension & Information Management System; iv. Purchase of new Freeze Drier Machine at IAH&VB, Belgachia; v. Setting up of the Mineral Mixture Plant by WBCMPFL; vi. Optimization of productive efficiency through organization of Animal Health Camps (Parasitic Control & Fertility Improvement) vii. Modernization and Strengthening of Bull Mother Farm, Haringhata; vii. Certificate Course on Artificial Insemination (Pranisebee); viii. Establishment of FSBS at Pedong, Darjeeling.
3.	Rural Infrastructure Development Fund (RIDF)	Under RIDF, the following activities were undertaken by the State during 2016-17: i) Strengthening and modernising treatment & diagnostic facilities at Block Level ii) Modernization of Haringhata Dairy iii) Upgradation of Infrastructure Facilities of Sperm Station at Beldanga, Murshidabad iv) Establishment of Murrah Buffalo Bull Mother Farm at Turkidanga, Bishnupur, Bankura
4.	Professional Efficiency Development	Through this Programme, the West Bengal Veterinary Council has trained 320 (three hundred twenty) nos. of Veterinarians and provided advance knowledge in the field of Veterinary & Animal Sciences during 2016-17. The Central Government provides 50 per cent assistance for setting up and functioning of Veterinary Council.
5.	National Dairy Plan-I	Under NDP-I, the mandate is to strengthen the Frozen Semen Stations located at Haringhata & Salboni and increase its production by two fold. Moreover, under Bull Production Programme through imported Embryo the Project, production of pure Jersey & Holstein bulls were aimed through advanced Embryo Transfer technology.
6.	Assistance to States for Control of Animal Diseases (ASCAD)	This scheme aims to control livestock diseases through conducting mass vaccination and diagnosis of diseases in the newly established DDLs to reduce the morbidity & mortality of animals. It is implemented in the state from the year 2004-05 with 75 per cent central share and 25 per cent state share
7.	Establishment and Strengthening of Veterinary Hospital and Dis-pensaries(ESVHD)"	The West Bengal, DAIRPOUL is entrusted the responsibility of implementing of Centrally Sponsored ESVHD scheme. The corporation has renovated as well as constructed Veterinary Hospitals and Dispensaries.

8.	National Animal Disease Reporting System (NADRS)	DAR&AH is implementing NADRS in West Bengal. NADRS involves computerized linking 333 block, District and the State headquarters in the State with the central project monitoring unit New Delhi to record and monitor livestock disease situation.
9.	National Livestock Mission (NLM)	Under NLM, four different components were covered during 2016- 17 with a total outlay of ` 11 85.84 lakh
	a. Risk management and Insurance of Milch Animals	The scheme, being implemented by PGSBS, aims towards risk Management and Insurance of 143,000 nos. of Milch Animals. With 16 per cent of premium payment, the beneficiary can insure his dairy animal and Centre & State Governments bear 40 per cent and 44 per cent of premium cost respectively.
.	b. Modernization and Development of Breeding Infrastructure	It proposes development of Kotulpur Fodder Farm into a Model State- of- the-Art Farm. This is being implemented by the Directorate of AR&AH, GoWB on funding pattern of 60 per cent Central & 40 per cent State share.
	c. Fodder Seed Production, Procurement & Distribution	The objective is Fodder Seed Production, Procurement & Distribution. Target is to supply of 14,000 Minikit. This is being implemented by the Directorate of AR&AH, GoWB (Funding pattern of 60:40 as CS:SS)
10.	Integrated Sample Survey (ISS)	As per the guidelines of GoI, the Department of ARD regularly conduct field survey work to generate season-wise and annual estimates (district-wise & for the state) of production of milk and other other livestock products and by-products. For this purpose, 50 per cent central assistance is provided to the State.
11.	Livestock Census	In addition to ISS, the Department of ARD conducts Quinquennial Livestock Census every five years to capture total livestock population, male & female bovines, milch & in-milk population.

Source: NDDB, 2017

Table 3.2: State Schemes

1.	Cattle & Buffalo Development	The Scheme aims to augment milk production in the State through the following: i. Breed up-gradation / crossbreeding of low milk producing local Cattle & Buffalo through artificial insemination ii. Frozen Semen Straws production of elite bulls of Gir, Sahiwal, Jersey & Murrah (buffalo) breed iii. Infrastructure development, which are not included under NDP & NPBB iv. Maintenance and updation of e-PBGSBS Management System, a bovine Breeding management System.
2.	Establishment of Fodder Development Plot	This program aims to develop Fodder Demonstration Plot in 10 (ten) cottahs of land in farmers' field to encourage livestock farmers in production of Green Fodder
3.	Enrichment of dry fodder	It aims to enrich the straw/ cellulosic waste by addition of urea for enhancing the nutritional value
4.	Fodder Seed production through JV initiative	It aims to enhance the production of Certified Fodders Seeds in Government Fodder Farms, Kishan Vikas Kendra & Agriculture Universities

Source: NDDB, 2017

Table 3.3: Central Schemes for Dairy development in the State

1.	National Dairy Plan-I	In order to increase productivity of milch animals and to provide a greater access to the organised milk-processing sector to rural milk producers, NDP-I is being implement in West Bengal. The scheme provides 100 per cent grant-in-aid for animal nutrition & breeding activities, 25 per cent grant-in-aid for capital expenditure on new semen station and 50 per cent grant on cost of capital items for village milk procurement system.

Source: NDDB, 2017

Table 3.4: State Schemes for Dairy Development

1.	Development of Milk Co-operatives	A) Developments of Milk Co-operative Societies by extending special financial assistance to meet up milk production cost to the dairy cooperative farmers through the Dist. Milk Unions. B) Improvement of the quality of milk and enhancement of milk yield, providing of Milk Scanner and Special Feed Additives to the members of the Milk Coop Societies to maintain quality milk supply chain and to save the milk farmers from the clutches of unscrupulous traders and to deliver good quality processed milk to the urban consumers.
2.	Creation of Capital Assets (Infrastructure Development)	Setting up of infrastructure for Value Added Products, expansion of basic Civil Infrastructure for installing Dairy Machineries. Keeping these factors in view, extension of Civil Infrastructure in the Dairy Plants of the Milk Unions and installation of Dairy Equipment.
3.	Women Empowerment in Milk Cooperatives	Assistance towards construction of Society Building, Furniture, AMCU(s), Milk Cans for Women Dairy Cooperative Societies and Milk Pails, Cattle Insurance, Chaff Cutter, Cattle Shed for Individual Women Farmers. Involvement of rural women in restructuring of their socio-economic status and promoting of rural women empowerment as a Govt. policy.
4.	Incentive for Cattle Feed Subsidy to the Milk Cooperative Farmers	Incentive for providing balanced Cattle Feed to the Milk Cooperative farmers for their cattle to maintain the health and enhancement of milk yield.
5.	Fodder Development Programme	A) Azolla Cultivation among the Marginal Farmers having almost no land for Fodder cultivation opted for Production Unit as an alternative source of Green Fodder. Production of raw milk after Azolla feeding increases and more milk price earned which can be considered to be profitable to the farmers as Low Cost Technology with trouble free cultivation. B) Fodder Seed - Due to high price rise of concentrates, farmers are now finding difficulty in maintaining cattle. Encouraging farmers in taking Green Fodder for better nutrition of cattle and thus enhancement of milk yield, steady conception and good growth by providing Green Fodder as Feed would help to minimize the cost of Milk production and execution of the same among the Dairy Cooperative Farmers through the Dist. Milk Union

Source: NDDB, 2017

Chapter IV

Socio-Economic Profile of Selected Milk Unions, PDCS/Private Units and Milk Producers

West Bengal, with an area of 88,752 square kilometres and twenty-three districts, has been classified into six major agro-climatic regions (viz. Hill, Terai, Old Alluvial, New Alluvial, Red & Laterite and Coastal & Saline Zones) depending on the locational geo-morphology and climatic conditions. For the purpose of the present study, as discussed earlier, we have chosen four districts from three different agro-climatic zones.

4.1 About Selected Study Area and Milk Unions

The district of Bankura (geographical area 6882 square kilometres) is situated in the Red & Laterite Zone in the western part of the state. Nadia having geographical area of 3927 square kilometres is situated in the eastern part of the state and have been classified under New Alluvial Zone. The two districts of Twenty Four Parganas i.e. North and South have geographical areas 9960 square kilometres and 4094 square kilometres respectively. South Twenty Four Parganas is located in the southernmost part of the state and classified under Coastal & Saline Zone while major portion of its Northern counterpart (situated in south-eastern part) comes under New Alluvial region. A small chunk of North Twenty Four Parganas faces coastal and saline geo-morphological scenario.

In course of the present study it was found that each of the selected districts is having a milk union that is taking care of the functioning of the Dairy Cooperative Societies (DCS) within the district. Very fascinatingly two of the milk unions of Bankura and North Twenty Four Parganas were named after the major river flowing through the district. In Bankura it is Kangsaboti (Kangsaboti Co-op Milk Producers' Union Ltd) while in the other it is Ichamati (Ichamati Milk Producers' Union Ltd). The milk union in Nadia is known as The Kishan Co-op. Milk Producers' Union Ltd (Table 4.1). In South Twenty Four Parganas, however, the milk union is named after the great mangrove forest (Sundarban) of the Bengal delta (Sundarban Co-operative Milk & Livestock Producers' Union Ltd.).

Table 4.1: Selected Milk Producers' Cooperative Unions in West Bengal

Sr. No.	*Name of Milk Producers' Cooperative Union*	*District*	Agro-Climatic Zone	Region
1	Kangsaboti Co-op Milk Producers' Union Ltd.	Bankura	Red & Laterite	West
2	The Kishan Co-op. Milk Producers' Union Ltd.	Nadia	New Alluvial	East
3	Sundarban Co-operative Milk & Livestock Producers' Union Ltd.	South 24 Parganas	New Alluvial	South-East
4	Ichamati Milk Producers' Union Ltd.	North 24 Parganas	Coastal & Saline	South

Source: National Dairy Development Board, Kolkata

Table 4.2: Details of Selected Milk Producers' Cooperative Unions in West Bengal 2015-16

Sr. No	Item No	Selected Co-operative Milk Producers' Union			
		Kangsaboti MU	Kishan MU	Sundarban MU	Ichamati MU
1	No. of Districts covered	1	1	1	1
2	Name of Districts Covered	Bankura	Nadia	South 24 Parganas	North 24 Parganas
3	Villages Covered	765	734	84	579
4	Milk Co-op.Soc.				
	(i) Registered	NA	NA	NA	NA
	(ii)Proposed	NA	NA	NA	NA
	(iii)Total	350	242	44	205
	(iv) Functioning	NA	NA	NA	NA
5	Members of Milk Co-op. Soc. (000)	19.8	32.1	1.9	37.1
6	(i) Milk collected from Soc. (lakh Lit.)	2.0	143.3	3.1	47.9
	(ii) Milk collected from Other. (lakh lit.)	0	0	0	0
	Total Milk collected (lakh lit.)	2.0	143.3	3.1	47.9
7	Sale of Rajka Seed (kgs)	NA*	NA	NA	NA
8	Sale of other Seeds (kgs)	NA	NA	NA	NA
9	Roots/ Slips distributed(Nos)	NA	NA	NA	NA
10	Production of Cattle feed(M.T.)	NA	NA	NA	NA
11	Sale of Balance Feed(M.T.)	437	353.0	NA	409.4
12	No of Female Co- Society	NA	NA	NA	NA
13	No of Members of Female Co Societies	NA	NA	NA	NA
14	Installed Capacity (LLPD)	NA	NA	NA	NA
15	Milk Procure (LKPD)	NA	NA	NA	NA
	(i) Collected from Soc.	NA	NA	NA	NA
	(ii) Collected from Others	NA	NA	NA	0
16	Milk Processing Cap.(LLPD)	NA	NA	NA	NA
17	Procurement price Rs/lit Fat	NA	NA	NA	NA
18	Supply of Chaff Cutter	NA	NA	NA	NA
19	Av. Veterinary visits	0	8.2	NA	20.9

Source: As reported by the Managing Directors of respective milk unions.
*NA= Not Applicable, as some of the parameters were not included in the questionnaire.

In all four districts barring South Twenty Four Parganas, the milk unions cover over five hundred villages in respective districts (Table 4.2). In South Twenty Four Parganas, however, the milk union had been suffering from disorderly functioning lately. Activities of Sundarban MU have been rejuvenated in 2015 and were found to grow in a steady pace during the time of survey. But the locational specificity of the district, been situated in the delta region with numerous rivers and rivulets crisscrossing through the land terrain, poses hindrance to easy communication from one area to another.

The number of cooperative societies under the jurisdiction of the milk unions was highest in Bankura (350), while it was lowest in South Twenty Four Parganas (44). However, the milk procurement/collection figures reveal that Nadia topping the list with 143.3 lakh kilograms of liquid milk from the cooperative societies per annum. Sale of balanced feed was highest in the district of North Twenty four Parganas (registering sale quantum of 409.4 M.T.). The average veterinary visit had been maximum in North Twenty Four Parganas.

The Kishan milk union has been the oldest milk union among the four under consideration (Table 4.3[1]). It was registered on the 25th day of May 1980 while the other three were established in the late 90's. Over the years from 2009-10 to 2012-13 the cumulative number of functional cooperative societies were highest that are operating within the jurisdiction of Kishan milk union. However, despite being a late beginner the Ichamati MU has more farmer members than the other three MUs. Milk procurement figures over the years are matter of great concern. In all the milk unions barring Sundarban MU, the milk procurement per day (KPD) has decreased during 2012-13 in comparison with previous year's figures. The reduction appears to be very sharp in case of Ichamati MU. Sundarban MU, though starting at a low base has developed marginally in 2012-13. But overall the scenario seems to be very bleak.

This gets corroborated from the overall data of cooperative societies that have been organized and the cumulative numbers of farmer members in West Bengal. In a span of four years from 2009-10 to 2012-13 it increased at a slow pace (Table 4.4). The increase in the number of societies had been to the tune of a meagre 4.7 per cent from 2009-10 to 2012-

[1] Tables 4.3, 4.4, 4.5, 4.6 and 4.7 had to be restructured in accordance with the availability of data for West Bengal from secondary sources. Data available from secondary sources have been presented in Tables 4.3, 4.4, 4.5 and 4.6. Table 4.7 has been dropped. But to keep parity with the subsequent table numbers we stuck to the design given by the coordinating centre. And hence, tables in the subsequent section begin with Table 4.8.

13. Corresponding figure as regards to membership of farmers was 8.1 per cent. Development of the dairy sector in the second decade of this new millennium, as revealed from the official information, does not seem to be encouraging.

As far as milk processing plants are concerned, all the districts of the present study do not have such plants. Of the four, Bankura, Nadia and North Twenty Four Parganas have milk processing plants situated in the district. South Twenty Four Parganas does not have such facility. Even in the former three districts the plants generally process liquid milk of various standards. Only in Nadia and North Twenty Four Parganas processing of Ghee and Ice Cream is done. The 4000 LPD plant in Bankura has been processing liquid milk only (Table 4.5).

Table 4.3: Milk Unions in the Selected Districts.

	2009-10	**2010-11**	**2011-12**	**2012-13**
Kangsaboti Co-op. Milk Producers' Union Ltd. [DoR 18.06.1999]				
Primary Co-operatives (Cumulative)				
Organized	97	118	150	175
Registered	26	28	29	61
Functional	97	110	137	164
Farmer Members	7823	9935	10205	10725
AI Sub Centre (Cumulative)	25	25	25	25
Milk Procurement (KPD)	7800	12000	14130	10000
The Kishan Co-op. Milk Producers' Union Ltd. [DoR 25.09.1980]				
Primary Co-operatives (Cumulative)				
Organized	408	416	428	427
Registered	273	276	283	283
Functional	199	204	212	225
Farmer Members	29016	29557	30525	30525
AI Sub Centre (Cumulative)	83	84	87	52
Milk Procurement (KPD)	45350	45390	42920	39500
Sundarban Co-op. Milk & Livestock Producers' Union Ltd. [DoR 10.02.1997]				
Primary Co-operatives (Cumulative)				
Organized	121	121	120	121
Registered	91	91	92	92
Functional	17	15	20	18
Farmer Members	9200	9200	9200	9220
AI Sub Centre (Cumulative)	16	16	16	16
Milk Procurement (KPD)	1000	3200	870	1560
Ichamati Milk Producers' Union Ltd. [DoR 31.07.1997]				
Primary Co-operatives (Cumulative)				
Organized	515	517	517	535
Registered	152	152	152	152
Functional	243	249	182	141
Farmer Members	32051	32981	32981	32981
AI Sub Centre (Cumulative)	80	80	80	80
Milk Procurement (KPD)	46890	48400	30640	18010

Source: http://www.benmilk.com/pr/kangsaboti.html; kishan.html; ichamati.html; sundarban.html.
DoR- Date of Registration

The situation must have improved a little in 2015-16 which gets reflected in the data provided by the milk unions of the four districts (Table 4.6). The Kangsaboti MU of Bankura and the Sundarban MU of South Twenty Four Parganas are producing Ghee, though in a small quantity, nonetheless have initiated production of value added products from milk. The Ichamati MU, however, have diversified its products in a number of items like Paneer, Lassi etc. On the contrary the Kishan MU of Nadia is found to produce none of the value added products. Value addition and manufacturing the milk products have ample market opportunities particularly in the urban areas and are the main source of profit for the unions. Establishment of processing plants backed by a regular and continuous inflow of liquid mild from the grass root producers make a dent in the prevailing impasse of the dairy industry. We shall take up the subject in later chapter.

Table 4.4: Number of Milk Cooperative Societies in West Bengal

Year	2009 - 10	2010 - 11	2011 - 12	2012 - 13
Society Organized (Cumulative)	3,819	3,862	3,899	3,998
Farmer Members (Cumulative)	2,47,148	2,57,652	2,59,334	2,67,124

Source: http://www.benmilk.com/soc.html

Table 4.5: Milk Processing Plants in the Sample District

Plants	Capacity	Products Manufactured
Raipur Dairy, Raipur, Bankura.	4,000 LPD	Liquid Milk
State Dairy, Krishnagar, Nadia	20,000 LPD	Milk of Various Standards, Ghee
Metro Dairy Ltd., Barasat, 24 Parganas (N)	4.0 LLPD	Milk of Various Standards, Ice Creams

Source: http://www.benmilk.com/plants.html

4.2 About the Study Villages

It has already been stated in methodology that from each of the four districts, four villages were chosen for the purpose of the survey. Of the four, two villages enjoyed the coverage of dairy cooperative society (we call them DCS villages) while the other two had no benefit of dairy cooperative society within the village (the NDCS villages). Hence, eight villages in total were DCS villages and the other eight were NDCS villages.

Table 4.6: Details of Production and Marketing of Processed Products by Selected Milk Producers' Cooperative Unions in West Bengal 2015-16

Sr. No	Name of Districts Covered	Selected Co-operative Milk Producers' Union			
		Bankura	Nadia	South 24 Parganas*	North 24 Parganas
1	Production of Ghee ('000 Kg.)	3.5	-	6.05	11.57
	Total Production Cost of Ghee/Kg. (Rs.)	312.00	-	376.25	373.50
	Total Margins Received from Ghee/Kg. (Rs.)	68.00	-	50.00	55.07
2	Production of Paneer ('000 Kg.)	-	-	-	2.74
	Total Production Cost of Paneer/Kg. (Rs.)	-	-	-	230.00
	Total Margins Received from Paneer/Kg. (Rs.)	-	-	-	27.20
3	Production of Lassi ('000 Kg.)	-	-	-	126.39
	Total Production Cost of Lassi/Kg. (Rs.)	-	-	-	53.10
	Total Margins Received from Lassi/Kg. (Rs.)	-	-	-	21.90
4	Production of Peda ('000 Kg.)	-	-	-	25.53
	Total Production Cost of Peda/Kg. (Rs.)	-	-	-	284.00
	Total Margins Received from Peda/Kg. (Rs.)	-	-	-	49.00

Source: As reported by the Managing Directors of respective milk unions.
*Data relates to 2016-17.

At this juncture, a few words regarding *Mouza* (defined in terms of Judicial List of land revenue system) and village (cluster of households residing in neighbourhood) need mentioning. As a general rule *Mouza* and village are co-terminous in West Bengal. But at the same time there are few exceptions to this general rule. In course of our village survey in South Twenty Four Parganas we came across two villages (viz. Ranigarh1 and Ranigarh 2) that come under the jurisdiction of Ranigarh *Mouza*. Ranigarh 1 is a DCS village while Ranigarh 2 is a NDCS one. Nutangram(NDCS villages in North Twenty Four Parganas) is a part of jurisdictional area of Satbaria *Mouza*. And Malipota (another NDCS village in North Twenty Four Parganas) refers to Paschim Malipota *Mouza*.

Population composition of the DCS villages in four districts reveals that proportion of Scheduled Caste population is highest in Nafarganj in South Twenty Four Parganas (64.3% of total population) followed by Ambarpur in North Twenty Four Parganas (56.6%) and Banskopa in Bankura (41.9%)(Table 4.8). Proportion of Scheduled Tribes, however, is higher in both the villages of Bankura (18.2% & 22.7% in Banskopa and Bankata respectively) and Bholadanga in Nadia (18.4% of total population). All the villages barring two (Banskopa & Ranigarh 1) have the facility of safe drinking water as per 2011 census. But in a span of five years (from 2011 to 2016) the situation must have changed for the fact that during primary survey we found use of tube wells in these two villages. Electricity is available for domestic purposes in almost all the villages. Irrigation facilities in the villages seem abundant. In

South Twenty Four Parganas proportion of irrigated area to net sown area was around 50 per cent, which had been in the lower side among all the DCS villages. Geographical specificity of being situated in the delta might have been a cause for poor irrigation. In other districts proportion of irrigation to net sown area ranged between 66.9 per cent in Bankura to 100.0 per cent in North Twenty Four Parganas.

Table 4.8: Basic details of Selected DCS Villages (2011 Census)

	Basic details of Selected DCS Villages							
	Bankura		Nadia		South 24 Parganas		North 24 Parganas	
Area details	Banskopa	Bankata	Bholadanga	Goash	Nafarganj	Ranigarh 1*	Ambarpur	Nutangram**
Area of village (in hectares)	304.22	100.55	312.42	1099.35	868.05	253.9	358.52	235.88
No. of households	467	113	844	2618	849	575	691	578
Population	2160	576	3534	9609	3744	2973	2734	2496
SC population	904	13	802	3524	2408	818	1547	399
ST population	394	131	650	256	148	83	19	9
Drinking water facilities	A	NA	A	A	A	NA	A	A
Approach paved roads	NA	A	NA	A	A	NA	A	A
Approach mud roads	A	A	A	A	NA	A	A	A
Distance (kms)-nearest town	33	36	23	77	37	25	19	10
Electricity for domestic use	A	NA	A	A	A	A	A	A
Electricity of agricultural use	A	NA	A	A	NA	NA	NA	A
Net Sown Area (Ha.)	206.39	95.5	306.42	919.25	811.15	164.76	287	164.38
Irrigated area(Ha.)	202.34	64.89	237	735.4	394.63	84.97	287	147.48
Un-irrigated area (Ha.)	4.05	30.61	69.42	183.85	416.52	79.79	0	16.9
% Irrigated Area	98.0	67.9	77.3	80.0	48.7	51.6	100.0	89.7
Culturable waste (Ha.)	0	0	0	27	0	0	2	52.5
Area not available for cultivation (Ha.)	97.83	5.05	6	153.1	56.9	89.14	69.52	19

Source: Field Survey Data A=Available/Yes, NA=Not Available/No

*Ranigarh 1 &Ranigarh 2 both come under Ranigarh *Mouza*.

**Nutangram comes under Satbaria *Mouza*

Table 4.9: Basic details of Selected NDCS Villages (2011 Census)

Details	Basic details of Selected NDCS Villages							
	Bankura		Nadia		South 24 Parganas		North 24 Parganas	
	Kustara	Masatkhal	Dahakula	Baniakandi	Goran Bose	Ranigarh 2*	Srinathpur	Malipota**
Area of village (in hectares)	131.4	128.5	359.36	249.56	1018.6	253.9	74.46	211.65
No. of households	142	86	574	256	2754	575	183	432
Population	729	479	2478	994	12642	2973	751	1785
SC population	76	0	143	42	4632	818	75	739
ST population	94	0	603	0	126	83	9	526
Tube wells for domestic use	A	NA	A	A	NA	NA	A	A
Pucca Road	NA	NA	A	A	NA	NA	A	A
Gravel Roads	A	A	A	A	A	A	A	A
Distance (kms)- nearest town	30	36	27	85	26	25	16	69
Electricity for domestic use	A	A	A	A	A	A	A	A
Electricity of agricultural use	A	NA	A	A	NA	NA	A	NA
Net Sown Area (Ha.)	130.4	52.16	159.72	190.4	548.5	164.76	74.46	186.6
Irrigated area (Ha.)	116.15	22.4	159.72	139.18	40.5	84.97	59.46	11.4
Un-irrigated area (Ha.)	14.25	29.76	0	51.22	508	79.79	15	175.2
% Irrigated Area	89.1	42.9	100.0	73.1	7.4	51.6	79.9	6.1
Culturable waste (Ha.)	0	0	54.36	7.94	0	0	0	2.75
Area not available for cultivation (Ha.)	1	76.34	145.28	51.22	470.1	89.14	0	22.3

Source: Field Survey Data; A=Available/Yes, NA=Not Available/No
*Ranigarh 1 &Ranigarh 2 both come under Ranigarh *Mouza*.
**Malipota refers to Paschim Malipota in Census 2011.

As far as the NDCS villages are concerned, we came across sizeable incidence of Scheduled Caste communities in the districts of both North and South Twenty Four Parganas. Malipota in North and Goran Bose in South recorded incidence of Scheduled Caste population to the tune of 41.4 per cent and 36.6 per cent respectively (Table 4.9). On the contrary people belonging to Scheduled Tribe communities were found in significant proportion in Kushtora

(Bankura) and Dhakula (Nadia). All the villages were having roadway connectivity of gravel road and were enjoying facilities of domestic electrification. The villages in general were having irrigation facilities for cultivation of crops barring Goran Bose in South Twenty Four Parganas and Malipota in the north. These two villages were primarily monocropped.

On the whole the villages (both DCS and NDCS) in four districts were placed more or less at par in respect of the basic socio-economic parameters with a little difference among them. Important was to find two monocropped villages having very poor facilities of irrigation for agricultural purposes.

4.3 About Sample PDCS & Private Dairy Units

It was interesting to find that dairy farming as an occupation was quite common in the villages having dairy cooperatives. Particularly in the villages of Nadia, South Twenty Four Parganas and Bankura households pursuing dairy enterprise seemed to be common (Table 4.10). The presence and establishment of dairy cooperatives in the villages might have had a positive impact on motivating the people in indulging into this agriculture allied activity. Total milk produced in the villages was procured by the society. No private dairy unit (PDU) was found in the study villages. Quantum of milk being collected had been maximum in the villages of Bankura. It is also worth mentioning that the entire milk procured by the milk cooperatives was sent to respective milk unions. Average fat content of procured milk ranged from 4.0 to 4.9, which seemed to be a little low.

Table 4.10: Profile of Selected PDCS & Private Dairy Units in West Bengal 2015-16

District	Profile of Selected PDCS & Private Dairy Units in Gujarat							
	Bankura		Nadia		South 24 Parganas*		North 24 Parganas	
Selected PDCS								
Village	**Bankata**	**Banskopa**	**Goash**	**Bholadanga**	**Nafarganj**	**Ranigarh 1**	**Nutangram**	**Ambarpur**
Total No. of HHs in Village	300	150	786	389	200	200	250	210
Total No. of Dairy Farmer households (approx.)	115	120	642	367	120	150	100	56
Total milk collection (liters)	108859.6	112532.5	23166.0	520.5	10910.0	11800.0	NA	19091.0
Av. Fat (%)	4.4	4.3	4.0	4.3	4.6	4.9	NA	4.2
Total No. of milk producers	110	100	65	36	75	50	79	56
Milk sent to Milk Union (liters)	108859.6	112532.5	23166.0	520.5	10910.0	11800.0	NA	19091.0
Milk sold @ dairy- Quantity (lit)	0	0	0	0	0	0	NA	0
Milk sold @ dairy- Rate/lit (Rs.)	0	0	0	0	0	0	NA	0
Selected Private Dairy Units- PDU								
Tehsil/ Taluka	-	-	-	-	-	-	-	-
Village	-	-	-	-	-	-	-	-
Agent	-	-	-	-	-	-	-	-
Total No. of HHs in Village	-	-	-	-	-	-	-	-
Total No. of Dairy Farmers hh (approx.)	-	-	-	-	-	-	-	-
Total milk collection (liters)	-	-	-	-	-	-	-	-
Av. Fat (%)	-	-	-	-	-	-	-	-
Total No. of milk producers	-	-	-	-	-	-	-	-
Milk sent to Milk Union (liters)	-	-	-	-	-	-	-	-
Milk sold @ dairy- Quantity (lit)	-	-	-	-	-	-	-	-
Milk sold @ dairy- Rate/lit (Rs.)	-	-	-	-	-	-	-	-
Any Other	-	-	-	-	-	-	-	-

Source: Field Survey Data

*Data relate to March 2016 to January 2017

4.4 About the Sample Households

4.4.1 Socio-Economic Characteristics

Dairy as an economic enterprise of a family depends on various socio-economic parameters that indicates the household's resource position. Apart from possession of investible capital for the enterprise it is access to the quality of human capital that may turn out to be a significant determinant of success of the business. Dairy activity in West Bengal is carried out mostly by participation of family labour in the villages, of which we shall be discussing later on. But in view of such involvement of family members age and gender composition within the family, educational background, participatory motivation of family members etc. are important factors that have direct influence on betterment and expansion of the enterprise.

Table 4.11: Family Profile of Selected Households

Sl. No.	Particulars	DCS (n=120)				NDCS (n=120)			
		SM	MM	LM	TM	SM	MM	LM	TM
1.	Average Household Size (Nos.)								
	Male	2.0	2.1	2.3	2.1	1.9	2.2	2.8	2.3
	Female	1.5	1.7	1.7	1.6	1.4	1.7	1.7	1.6
	Children (<15)	0.7	1.0	1.1	0.9	0.8	0.7	0.8	0.8
	Total	4.0	4.3	4.5	4.3	4.0	4.3	5.0	4.4
2.	Gender of Respondent / HH (%)								
	Male	40.0	40.0	37.5	39.2	40.0	42.5	42.5	41.7
	Female	60.0	60.0	62.5	60.8	60.0	57.5	57.5	58.3
3.	Average Age of Respondent (years)								
	Male	52.6	53.4	53.4	53.1	49.1	52.7	54.7	52.1
	Female	43.5	44.9	41.1	43.2	43.1	43.8	39.3	42.0
	Total	49.0	50.0	48.8	49.2	46.7	48.9	48.2	47.9
4.	Average Age of Family (years)	37.1	37.4	37.0	37.2	37.1	37.1	35.4	36.5
5.	Average Education of Respondent / HH (Years)	5.9	6.6	7.3	6.6	4.8	5.6	4.3	4.9
6.	% of Family Members Works in Dairy	70.9	65.9	68.9	68.5	61.6	67.1	64.0	64.3

Note: SM-Small, MM-Medium, LM-Large, TM-Total
Source: Field survey data

In terms of average family size the households the villages of four districts (both DCS and NDCS villages) reveal similar pattern. The average family size in aggregate was around 4.3-4.4 in DCS and NDCS villages (Table 4.11). Average family size had been smallest (4.0) among small milk producers and highest (5.0) among large milk producers in NDCS villages. Average

age of respondents varied between 46.7 to 50 years while average age of the family was around 37 years. This signified presence of relatively younger members in the family. It was also interesting to find that average age of female respondents was significantly lower than that of male respondents in all four district irrespective of DCS or not. As dairy is an enterprise that requires day to day nurturing of the cattle and taking care through scientific veterinary practices, education of respondents might have a crucial impact on cattle rearing. In the households under present enquiry the education scenario was found quite dismal. Average years of formal education among the DCS households was 6.6 while it had been 4.9 among NDCS ones. The numbers of years signify that the respondents in general have formal education not higher than middle school standards. In respect of development of human capital and initiating entrepreneurship among them education in general plays an important role. And village of this present concern suffered from such expansion.

Population composition in respect of religious groups revealed that in all villages, people from Hindu religious belief dominate the social scenario of whom people from the Scheduled and other backward communities are of sizeable proportion in the respective size-classes. Scheduled Tribes were few in number (Table 4.12). However, all the size-class categories with exception of middle farmers in DCS villages seemed to be predominantly from Hindu upper and middle caste families along with few Muslim families.

It was remarkable to observe that in the DCS villages decision makers in the dairy activity across all size-classes were mostly female members of the family. On the contrary, in the NDCS villages male members dominate decision making as regard to dairy enterprise. In face of the patriarchal social structure in villages of West Bengal the DCS must have had some impact through its operation to tilt the power balance towards women. In each village at least 2.5 members are involved in dairy activities.

Families in both DCS and NDCS villages were mostly farming families pursuing cultivation as their principal occupation. Across all size-classes in DCS villages 76.7 per cent in aggregate were cultivators while for NDCS the corresponding percentage was 74.2. There were few wage earning households, the proportion of which ranged between 7.5-17.5 per cent irrespective of having a milk cooperative or not. Involvement of families in Dairy and Animal Husbandry as their principal occupation was also not encouraging. Most of the households took up dairy enterprise as their subsidiary source of income even in the DCS villages.

Table 4.12: Socio-Economic Characteristics of Selected Households

Sl. No.	Particulars	DCS (n=120)				NDCS (n=120)			
		SM	MM	LM	TM	SM	MM	LM	TM
1.	Gender of Decision Maker (%)								
	Male	45.0	45.0	47.5	45.8	80.0	80.0	82.5	80.8
	Female	55.0	55.0	52.5	54.2	20.0	20.0	17.5	19.2
2.	Religion (% to total)								
	Hindu	100.0	100.0	95.0	98.3	95.0	97.5	95.0	95.8
	Muslim	0.0	0.0	5.0	1.7	5.0	2.5	5.0	4.2
	Christian	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sikh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3.	Social Group (% to total)								
	Scheduled Tribe	0.0	10.0	7.5	5.8	2.5	2.5	0.0	1.7
	Scheduled Caste	25.0	27.5	25.0	25.8	17.5	20.0	12.5	16.7
	Other Backward Class	17.5	15.0	12.5	15.0	17.5	15.0	10.0	14.2
	General/Open	55.0	47.5	55.0	52.5	62.5	62.5	77.5	67.5
4.	Occupation (%)								
	Principal								
	Cultivator	77.5	85.0	67.5	76.7	65.0	77.5	80.0	74.2
	AH & Dairying	10.0	7.5	15.0	10.8	17.5	15.0	12.5	15.0
	Agri. Labour	12.5	7.5	15.0	11.7	17.5	5.0	7.5	10.0
	Nonfarm Labour	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Own Non-Farm Establishment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Trade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Employee in Service	0.0	0.0	2.5	0.8	0.0	2.5	0.0	0.8
	Other (Specify)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Subsidiary								
	Cultivator	10.0	7.5	12.5	10.0	17.5	15.0	12.5	15.0
	AH & Dairying	90.0	92.5	85.0	89.2	82.5	85.0	87.5	85.0
	Agri. Labour	0.0	0.0	2.5	0.8	0.0	0.0	0.0	0.0
	Nonfarm Labour	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Own Non-Farm Establishment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Trade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Employee in Service	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other (Specify)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.	Average Oper.Land Holding (ha.)								
	Irrigated	0.22	.27	.28	.26	.34	.38	.45	.39
	Un-irrigated	0.02	.03	.02	.02	.01	.01	.02	.01
	Total	.24	.30	.30	.28	.35	.39	.47	.40
6.	Average Experience in Dairy (years)	14.7	14.2	14.1	14.3	13.8	15.7	16.1	15.2
7.	Income Group (%)								
	BPL	60.0	52.5	47.5	53.3	37.5	37.5	40.0	38.3
	APL	40.0	47.5	52.5	46.7	62.5	62.5	60.0	61.7
8.	House Structure (%)								
	Pucca	22.5	25.0	40.0	29.2	22.5	37.5	37.5	32.5
	Semi-pucca	22.5	22.5	20.0	21.7	22.5	25.0	25.0	24.2
	Kuccha	55.0	52.5	40.0	49.2	55.0	37.5	37.5	43.3

Note: SM-Small, MM-Medium, LM-Large, TM-Total.
Source: Field survey data

Hence, agriculture is still the principal source of livelihood in the selected villages of West Bengal dominated by the tiny land operators. In the DCS villages the size of average operated land had been 0.28 hectares in contrast to 0.40 hectares of average operational land in the NDCS villages. In a sense the farmers of the villages without dairy cooperatives are marginally better off than their DCS counterparts.

Table 4.13: Cropping Pattern of Sample Households (2015-16) **(Total Area in ha.)**

	Seasons/Crops/Categories	DCS (n=120)				NDCS (n=120)			
		SM	MM	LM	TM	SM	MM	LM	TM
A.	Kharif								
	Paddy	7.54	9.07	9.91	26.52	10.27	12.88	14.08	37.23
	Moong	0.06	0.01	0.03	0.10	0.06	0.01	0.03	0.10
	Cotton	0.00	0.00	0.00	0.00	0.28	0.28	1.03	1.59
	Sugarcane	0.00	0.00	0.00	0.00	0.03	0.03	0.23	0.29
	Jute	0.88	1.41	3.56	5.85	0.75	1.18	1.62	3.55
	Vegetables	0.28	0.89	0.73	1.90	0.10	0.00	0.00	0.10
	Fodder Crop 1 (Goma)	0.59	0.60	0.34	1.53	0.28	0.66	0.54	1.48
	Fodder Crop 2 (Maize)	0.03	0.08	0.03	0.14	0.03	0.00	0.12	0.15
	Fodder Crop 3 (Coarse Cereals)	0.00	0.00	0.65	0.65	0.00	0.00	0.00	0.00
	Total Kharif	9.38	12.06	15.25	36.69	11.80	15.04	17.65	44.49
B.	Rabi								
	Paddy	1.20	0.72	1.59	3.51	1.53	1.22	1.13	3.88
	Wheat	0.53	0.56	1.43	2.52	0.20	0.27	1.13	1.60
	Barley	0.16	0.13	0.09	0.38	0.16	0.13	0.09	0.38
	Gram	0.88	1.23	2.25	4.36	1.29	1.31	0.91	3.51
	Mustard	0.85	1.10	2.01	3.96	1.76	1.90	2.32	5.98
	Lentil	0.00	0.00	0.00	0.00	0.16	0.05	0.07	0.28
	Potato	1.67	1.84	2.03	5.54	1.93	2.42	2.89	7.24
	Vegetables	0.51	1.05	0.92	2.48	0.31	0.32	0.69	1.32
	Fodder crops 1 (Grass)	0.18	0.20	0.28	0.66	0.24	0.30	0.79	1.33
	Fodder crops 2 (Oat)	0.47	0.47	0.74	1.68	0.30	0.42	0.65	1.37
	Total Rabi	6.45	7.30	11.34	25.09	7.88	8.34	10.67	26.89
C.	Summer								
	Paddy	2.11	2.35	3.07	7.53	2.21	2.87	3.81	8.89
	Sesame	0.12	0.26	0.35	0.73	0.13	0.00	0.00	0.13
	Jute	0.00	0.00	0.00	0.00	0.35	0.17	0.18	0.70
	Vegetables	0.50	0.40	1.13	2.03	0.21	0.63	0.15	0.99
	Fodder Crops 1 (Goma)	0.00	0.32	0.76	1.08	0.07	0.17	0.10	0.34
	Fodder Crops 2 (Maize)	0.44	0.32	0.03	0.79	0.21	0.46	0.52	1.19
	Fodder Crops 3 (Coarse Pulses)	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.12
	Total Summer	3.17	3.65	5.34	12.16	3.18	4.36	4.82	12.36
4.	Net Cropped Area	9.38	12.06	15.25	36.69	11.80	15.04	17.65	44.49
5.	Gross Cropped Area	19.00	23.01	31.93	73.94	22.86	27.74	33.14	83.74
6.	Cropping Intensity	202.56	190.80	209.38	201.53	193.73	184.44	187.76	188.22

Note: SM-Small, MM-Medium, LM-Large, TM-Total.
Source: Field survey data

This gets reflected in the household's position in economic hierarchy of the villages where household living under the official poverty line (BPL) was more in number in the DCS villages while 61.7 per cent of total household in NDCS villages lived in income group of above the poverty line (APL).Despite these differences in land holding and income pattern we observed a mixed pattern in respect of housing structure among the rural households. To mention only that trivial incidence of Kuccha structure for living is common among families of small and middle size-classes. We may add that housing pattern does not depend only on one's economic position but also has an influence of

the cultural practice prevailing in the neighbourhood. In villages of West Bengal Kuccha (mud walls with thatched roof) or Semi-pucca structure (mud walls with tile/tin roof) are very common till date.

4.4.2 Cropping Pattern

Cropping pattern in the DCS and NDCS villages suggested that in *Kharif* season Paddy is the main crop being cultivated by the farming families. Small portion of land was devoted to crops like Jute, Cotton and Fodder crops (Table 4.13) in this season. In Rabi, however, Potato and Mustard dominated the crop combination. There had been land allotted to vegetables like cauliflower, cabbage etc. by the households irrespective of presence of dairy cooperative in the villages. Hence, farming families, however their economic position might be, tried to grow some vegetables in their land mostly for the market and as well as for home consumption too. We did find a part of land being allotted to cultivation of fodder crops like Oats, Course Pulses, and Maize for fodder and cultivation of some varies of grass. *Summer* season was once again revealed predominance of Paddy cultivation. So, the general crop rotation practice throughout the year can be described by Rice followed by Potato and Mustard followed by Rice once again. As the villages received irrigation for crop cultivation the cropping intensity was high with 201.53 in the DCS villages that were marginally higher than that in the NDCS villages (188.22).

4.5 Chapter Summary

In all districts barring South Twenty Four Parganas, the milk unions cover over five hundred villages in respective districts. Activities of Sundarban MU have been rejuvenated in 2015 and were found to grow in a steady pace during the time of survey.

The number of cooperative societies under the jurisdiction of the milk unions was highest in Bankura (350) while it was lowest in South Twenty Four Parganas (44). However, the milk procurement/collection figures reveal that Nadia topping the list with 143.3 lakh kilograms of liquid milk from the cooperative societies per annum.

As far as milk processing plants are concerned, all the districts of the present study do not have such plants. Of the four, Bankura, Nadia and North Twenty Four Parganas have milk processing plants situated in the district. South Twenty Four Parganas does not have such

facility. Even in the former three districts the plants generally process liquid milk of various standards.

On the whole the villages (both DCS and NDCS) in four districts were placed more or less at par in respect of the basic socio-economic parameters with a little difference among them. Important was to find two monocropped villages having very poor facilities of irrigation for agricultural purposes.

In terms of average family size the households the villages of four districts (both DCS and NDCS villages) reveal similar pattern. The average family size in aggregate was around 4.3-4.4 in DCS and NDCS villages. Average age of respondents varied between 46.7 to 50 years while average age of the family was around 37 years.

It was also interesting to find that average age of female respondents was significantly lower than that of male respondents in all four district irrespective of DCS or not. In the households under present enquiry the education scenario was found quite dismal.

Population composition in respect of religious groups revealed that in all villages, people from Hindu religious belief dominate the social scenario of whom people from the Scheduled and other backward communities are of sizeable proportion in the respective size-classes. Scheduled Tribes were few in number.

Families in both DCS and NDCS villages were mostly farming families pursuing cultivation as their principal occupation. Most of the households took up dairy enterprise as their subsidiary source of income even in the DCS villages.

In the DCS villages the size of average operated land had been 0.28 hectares in contrast to 0.40 hectares of average operational land in the NDCS villages. In a sense the farmers of the villages without dairy cooperatives are marginally better off than their DCS counterparts.

This gets reflected in the household's position in economic hierarchy of the villages where household living under the official poverty line (BPL) was more in number in the DCS villages than their NDCS counterpart.

The general crop rotation practice throughout the year can be described by Rice followed by Potato and Mustard followed by Rice once again in *Kharif, Rabi* and *Summer* seasons respectively. As most of the villages received irrigation for crop cultivation, the cropping intensity was high in the DCS villages as compared to the NDCS villages.

Chapter V

Cost of Milk Production & Awareness about the Schemes

5.1 Introduction

In this chapter we shall take up the details of cattle that are being reared by the families of both DCS and NDCS villages. In the preceding chapter we had discussed about the socio-economic position of the households in the villages of the four districts and also analysed their capabilities in association with their size-class identities.

5.2 Breedable Animals

In the study villages, which is also a common feature in the state of West Bengal too, there still exist a combination of both local, nondescript and cross bred cows as milch animals. In the study area the cross bred cows were mostly Jersey and Gir. In the DCS villages herd strength on an average was observed as 8.08 which in case of milch cows had been 3.77 (Table 5.1). Corresponding figures for NDCS villages were 7.68 and 3.63 respectively (Table 5.2). The DCS households seemed to have a marginal edge as compared to their NDCS counterparts. But when one looks into the details of breeds reared an interesting feature gets reflected. In DCS villages herd strength of local milch animals are higher than that in the NDCS villages across all size-classes. But when it comes to rearing of cross bred animals, NDCS farmers owned more cross bred cow than the former ones. In previous chapter we had discussed at length about the resource position of the farmer in both DCS and NDCS villages. There we had observed that the NDCS farmers had a marginal advantage in terms of their income and resource position in comparison with DCS farmers. Endowment differential might have had an impact on ownership pattern of types of cattle in the survey villages. Cross bred cows are costlier than the available local breeds. Hence, farmers enjoying a relatively better financial position (farmers of NDCS villages) would prefer to have highly productive cross bred cows to carry out their dairy enterprise. The particular feature gets reflected in all size-classes. So far as the cattle sheds are concerned NDCS farmers were found to own more sheds on an average for their cattle than DCS farmers. In small farm category total shed ownership was same in both types of villages. But as we

went along the ownership ladder the NDCS farmers (in both categories of medium and large) were found to own more of cattle shed than their DCS brothers.

Table 5.1: Details on Herd Strength & Cattle Shed – DCS Households

Particulars	Details on Herd Strength & Cattle Shed- West Bengal -DCS (n=120)							
	Total Animal (No.)				Milch Animal (No)			
	SM	MM	LM	TM	SM	MM	LM	TM
Local Cattle	1.61	2.91	5.46	3.40	0.70	1.29	2.54	1.55
Cross Bread	2.91	5.46	8.72	5.75	1.29	2.57	4.22	2.72
Buffalo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	3.80	7.53	12.90	8.08	1.68	3.48	6.15	3.77
	Av. No. of Cattle Shed				Present Average value in Rs./shed			
Pucca	0.00	0.06	0.00	0.02	NA	3125.00	NA	1063.83
Semi-Pucca	0.46	0.50	0.60	0.52	19615.38	17916.67	20750.00	19432.43
Kuccha	1.06	1.07	1.03	1.05	9629.03	9550.00	11661.29	10288.04
Total	1.00	1.07	1.07	1.04	15218.75	12766.67	21766.67	16554.35

Source: Field Survey Data; NA=Not Applicable

Table 5.2: Details on Herd Strength & Cattle Shed – NDCS Households

Particulars	Details on Herd Strength & Cattle Shed- West Bengal -NDCS (n=120)							
	Total Animal (No)				Milch Animal (No)			
	SM	MM	LM	TM	SM	MM	LM	TM
Local Cattle	1.23	2.76	4.44	2.81	.49	1.24	2.15	1.30
Cross Bread	3.07	5.36	10.25	6.28	1.40	2.58	4.97	3.01
Buffalo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.07	0.00	0.02	0.00	0.00	0.00	0.00
Total	3.50	7.03	12.53	7.68	1.53	3.28	6.08	3.63
	Cattle Shed				Present Average value in Rs./shed			
Pucca	0.00	0.05	0.14	0.07	NA	380.95	9545.45	3573.77
Semi-Pucca	0.21	0.36	0.43	0.34	8913.04	14071.43	17321.43	13721.52
Kuccha	1.17	1.03	1.13	1.11	8494.29	8548.39	9709.68	8900.00
Total	1.00	1.15	1.45	1.21	11235.29	12850.00	18500.00	14350.88

Source: Field Survey Data; NA=Not Applicable

In the survey area we had found only cows that were being reared by the households. Buffalo milk in general has low acceptability in this part of the country. As is evident from Table 5.3 that average yield of cross bred cows were substantially higher than the local cows. However, in the DCS the average yield of milk seemed to be higher than NDCS ones.

Table 5.3: Details of Animals Breeds for DCS & NDCS

No.	Particulars	Name of breeds	Av. Yield (Kg/day)/ Range	
			DCS	NDCS
1	Local Cow	Local Non-descript Breeds	1.00 to 6.00	0.00 to 6.50
2	Crossbred Cow	Jersey, Gir Cross Breed	1.20 to 14.00	0.70 to 10.00
3	Buffalo	NA	NA	NA
4	Others	NA	NA	NA

Source: Field Survey Data; NA= Not Applicable

Average age of the breedable local cows in the DCS villages was 6 years in aggregate of all size-classes while for cross bred cow average age had been 5 years. For the NDCS households, however, average age was found same (6 years for both local cow &cross bred cow) (Table 5.4 & Table 5.5). Average age at first calving for local cows was higher than the cross bred cows in both the areas. Lactation order was found more or less same for all types of farmers with marginal variation among the village clusters and size-classes. Yield figures revealed that in villages with cooperatives average yield of present lactation had been marginally higher to that of last lactation in case of local cow as well as for the cross bred cow. Among NDCS, however, the yield figures did not show much of a change over two lactations.

Table 5.4: Details of Breedable Animals with DCS Households on Survey Date

No	Particulars	Animal (DCS)							
		Local Cow				Crossbred Cow			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Av. Age (year)	6	6	6	6	6	5	6	5
2	Av. Age at I st(Calving Month)	38	38	41	39	31	30	30	30
3	Lactation Order@	3	3	3	3	3	3	3	3
4	Lactation Period (Days)	228	219	209	218	226	225	230	227
5	Peak Yield-								
	Last Lactation	2.50	2.42	2.46	2.46	5.45	4.83	5.34	5.19
	Present Lactation	2.83	2.99	2.47	2.74	6.27	5.80	5.56	5.86
6	Total Animals Covered under Insurance (n=120)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Premium paid (Rs./animal)	NA	NA	NA	NA	NA	NA	NA	NA
	Government	NA	NA	NA	NA	NA	NA	NA	NA
	Self	NA	NA	NA	NA	NA	NA	NA	NA

Source: Field survey data. NA=Not Applicable

Table 5.5: Details of Breedable Animals with NDCS Households on Survey Date

No	Particulars	Animal (NDCS)							
		Local Cow				Crossbred Cow			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Av. Age (year)	7	6	6	6	6	5	6	6
2	Av. Age at I st(Calving Month)	40	38	41	40	29	32	32	31
3	Lactation Order@	4	2	3	3	3	3	3	3
4	Lactation Period (Days)	246	208	229	228	197	211	215	208
5	Peak Yield-								
	Last Lactation	2.73	3.09	3.13	2.98	5.05	5.61	5.52	5.41
	Present Lactation	2.88	3.16	2.60	2.86	5.12	5.69	5.50	5.45
6	Total Animals Covered under Insurance (n=120)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Premium paid (Rs./animal)	NA	NA	NA	NA	NA	NA	NA	NA
	Government	NA	NA	NA	NA	NA	NA	NA	NA
	Self	NA	NA	NA	NA	NA	NA	NA	NA

Source: Field survey data; NA=Not Applicable

In course of our field visits we observed a dismal scenario as regards to insurance coverage for the cattle. In none of the villages, be it with dairy cooperative or not, we could locate a household under the coverage of cattle insurance. Our discussion with administrative personnel of the dairy cooperatives in this regard pointed towards lack of motivation among the dairy farmers to avail the benefits of cattle insurance. Under institutional assistance for purchase of cattle insurance stands mandatory. But the farmers of the present concern were mostly the small ones with little credibility of institutional finance for purchasing cattle.

Table 5.6: Season-wise Milk Yield (Per day) of Selected HH 2015-16

No	Season	Season wise Milk Yield (Per day) of Selected HH 2015-16 (Av. Yield (Lit/animal)							
		Local Cow				Crossbred Cow			
		SM	MM	LM	TM	SM	MM	LM	TM
A	**DCS HH n=120**								
1	Rainy	3.0	3.2	2.9	3.0	6.1	5.8	5.4	5.7
2	Winter	1.8	2.0	2.0	1.9	3.9	3.8	3.6	3.8
3	Summer	2.5	2.6	2.5	2.5	5.1	4.8	4.5	4.8
B	**NDCS HH n=120**								
1	Rainy	3.0	3.4	3.1	3.1	5.6	5.9	4.9	5.5
2	Winter	1.7	1.9	2.0	1.9	3.5	3.7	3.4	3.5
3	Summer	2.6	2.7	2.7	2.6	4.6	4.8	4.2	4.5

Source: Field survey data.

As regards to mild yield per day across seasons we found that milk output of cross bred cows had always been higher than the local cow irrespective of seasons, locational specificity (i.e. DCS/NDCS) and size-class categories (Table 5.6). This observation was obvious. Had it been otherwise all the dairy farmers would have opted for local cattle.

5.3 Labour Use Pattern

In the area of the present study the dairy activity is being run by family labour of the farming families. This is somewhat a general phenomenon in West Bengal too. In view of the small scale of operation the households do not employ hired labour for dairy activities. Hence, in DCS as well as in NDCS villages we did not find employment of any hired labour for dairy operations (Table 5.7 & Table 5.8). It is noteworthy to mention that in DCS villages across all size-class participation of women family members had been higher both in terms of number per day as well as hours of involvement in such activities.

Table 5.7: Labour Use Pattern -DCS Households

Sr. No.	DCS	Involvement of Rural Men and Women in Dairy activities															
		No. of Workers / Day								Total Hours Worked / Person / Day							
		Male				Female				Male				Female			
		SM	MM	LM	TM	SM	MM	LM	TM	SM	MM	LM	TM	SM	MM	LM	TM
A	**Family Labours**																
1	Fodder Management	1.2	1.3	1.5	1.3	1.6	1.7	1.9	1.7	1.6	2.9	3.6	2.7	2.7	3.1	4.1	3.3
2	Shed Management	1.3	2.0	1.7	1.6	2.1	2.2	2.3	2.2	1.5	2.2	2.2	1.9	1.7	2.3	3.0	2.3
3	Milking	0.4	0.6	0.6	0.5	1.5	1.3	1.6	1.5	0.2	0.4	0.5	0.4	1.1	1.1	1.4	1.2
4	Animal Health	0.7	0.9	1.0	0.8	1.0	1.0	1.0	1.0	0.7	0.7	1.2	0.9	0.8	0.9	1.1	0.9
B	**Hired Labours**																
1	Fodder Management	--	- -	- -	- -	- -	- --	- -	- -	--	- -	- -	- -	- -	- --	- -	- -
2	Shed Management	--	- -	- -	- -	- -	- --	- -	- -	--	- -	- -	- -	- -	- --	- -	- -
3	Milking	--	- -	- -	- -	- -	- --	- -	- -	--	- -	- -	- -	- -	- --	- -	- -
4	Animal Health	--	- -	- -	- -	- -	- --	- -	- -	--	- -	- -	- -	- -	- --	- -	- -
C	**Labour Rate (Rs./Day) Male/Female**	195.0	195.0	195.0	195.0	182.5	182.5	182.5	182.5	--	- -	- -	- -	- -	- --	- -	- -

Source: Field Survey Data.

The scenario remained more or less same in the context of NDCS villages too. Here animal health is taken care of by male members of the households. But in general from animal feeding to shed cleaning and management and even milking the animals, female members

of the family play most important role in process of cattle nurturing. Any enterprise of animal husbandry particularly cattle rearing necessitates day to day love and care. In West Bengal the rearers are generally small farming families who depend on participation of family labour. Moreover, as we have discussed in the previous chapter that households of both DCS and NDCS villages in general were pursuing dairy activities as an additional source of income, they would rather involve family members rather than employing hired labour. In such a situation participation of women members becomes one of utmost importance. Average market wage rate for male and female labour were observed as Rs. 195.00 and Rs. 182.50 respectively.

Table 5.8: Labour Use Pattern -NDCS Households

Sr. No.	NDCS	Involvement of Rural Men and Women in Dairy activities-NDCS															
		No. of Workers / Day								Total Hours Worked / Person / Day							
		Male				Female				Male				Female			
		SM	MM	LM	TM	SM	MM	LM	TM	SM	MM	LM	TM	SM	MM	LM	TM
A	**Family Labours**																
1	Fodder Management	1.0	1.4	1.4	1.3	1.8	1.7	2.1	1.9	2.0	3.3	3.6	3.0	2.6	2.6	3.2	2.8
2	Shed Management	1.4	1.7	1.8	1.6	2.3	2.2	2.3	2.2	1.3	1.9	2.5	1.9	1.7	2.1	2.7	2.2
3	Milking	0.3	0.3	0.5	0.3	1.5	1.5	1.5	1.5	0.3	0.3	0.4	0.3	1.2	1.2	1.4	1.3
4	Animal Health	1.0	1.0	1.0	1.0	0.7	0.9	1.0	0.9	1.0	1.0	1.5	1.2	0.5	0.8	1.2	0.8
B	**Hired Labours**																
1	Fodder Management	--	- -	- -	- -	- -	- --	- -	- -	--	- -	- -	- -	- -	- --	- -	- -
2	Shed Management	--	- -	- -	- -	- -	- --	- -	- -	--	- -	- -	- -	- -	- --	- -	- -
3	Milking	--	- -	- -	- -	- -	- --	- -	- -	--	- -	- -	- -	- -	- --	- -	- -
4	Animal Health	--	- -	- -	- -	- -	- --	- -	- -	--	- -	- -	- -	- -	- --	- -	- -
C	**Labour Rate (Rs./Day) Male/Female**	195.0	195.0	195.0	195.0	182.5	182.5	182.5	182.5	--	- -	- -	- -	- -	- --	- -	- -

Source: Field Survey Data.

5.4 Details on Feed/Fodder and Water

Feed and fodder are very important determinants of the quality and quantity of output from the cattle. For development of the enterprise optimized use of required feed and fodder are essential. In face of resource crunch of the respondents economization is also very important. We had classified fodder into four main categories viz. dry fodder, green fodder,

concentrates and supplements. Dry fodder used by the farmers were mainly paddy and wheat straw and roughages, green fodder comprised of mainly cut grass either from common land or cultivated grass, maize, coarse pulses etc., concentrates were prepared cattle feed either supplied by the DCS or purchased from the market while supplements in most cases were molasses, mustard oil and oil cakes, salt etc.

Table 5.9: Details of Feed and Fodder (at the Time of Survey)

No	Stall-Feeding	Details of Feed and Fodder (at the Time of Survey) (Kg. /day /Animal)							
		Animal type (Quantity Fed (Kg))							
		Local Cows				Cross Breed			
		SM	MM	LM	TM	SM	MM	LM	TM
A	**DCS**								
1	Dry Fodder	7.5	7.1	8.1	7.6	7.3	7.9	7.8	7.7
2	Green Fodder	9.5	10.6	10.6	10.3	13.0	12.7	11.1	12.2
3	Concentrates	1.2	1.2	1.2	1.2	0.9	1.1	1.3	1.1
4	Supplements (Gram)	390	432	481	439	380	437	446	423
5	Out feeding Grazing (No of Hrs./day)	4.0	3.8	3.6	3.8	2.7	2.4	2.5	2.5
B	**NDCS**								
1	Dry Fodder	8.2	8.6	8.4	8.4	7.2	8.3	8.2	7.9
2	Green Fodder	10.3	12.5	12.9	11.9	11.3	10.9	11.5	11.2
3	Concentrates	1.1	1.1	1.1	1.1	1.0	0.9	1.0	1.0
4	Supplements (Gram)	500	447	477	476	500	420	438	451
5	Out feeding Grazing (No of hrs./day)	3.6	3.1	3.5	3.4	2.4	2.5	2.5	2.5

Source: Field Survey Data.

It was interesting to find that for local animals NDCS household across all size-classes were feeding their cattle with more of dry and green fodder and supplements as compared to the DCS farmers (Table 5.9). In case for concentrates DCS and NDCS farmers were applying prepared cattle feed in more or less equal quantity. In case of cross bred cow, however, feeding was higher among the DCS households than their NDCS counterparts. It might be a case where the DCS households are taking more care of their cross bred animals for a better return. Out feeding and grazing had been higher among local cattle than the cross bred ones. Average grazing hours for local cattle was 3.4-3.8 hours while it was 2.5 for cross bred cattle.

Table 5.10: Availability of Water for Dairy activities- DCS households

No.	Particulars	Availability of Water for Dairy –DCS (% of response)											
		Rainy				Winter				Summer			
		SM	MM	LM	TM	SM	MM	LM	TM	SM	MM	LM	TM
A	Sources of Water Available for Dairy Purpose												
1	Open Well	5.0	5.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.8
2	Tubewell	70.0	75.0	80.0	75.0	75.0	80.0	80.0	78.3	75.0	80.0	77.5	77.5
3	River	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Canal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Village Talawadi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Farm Pond	25.0	20.0	20.0	21.7	25.0	20.0	20.0	21.7	25.0	20.0	20.0	21.7
7	Tanker	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Av. Distance (Meters)	41.4	44.8	29.3	38.7	36.6	44.1	29.0	36.7	37.3	44.1	29.0	36.9
B	**Supply of Water is adequate**												
1	Yes	100	100	100	100	95.0	95.0	97.5	95.8	95.0	95.0	97.5	95.8
2	No	0.0	0.0	0.0	0.0	5.0	5.0	2.5	4.2	5.0	5.0	2.5	4.2
C	**Water Quality (Village talawadi/Tanker)**												
1	Normal	90.0	95.0	97.5	94.2	95.0	97.5	87.5	93.3	95.0	97.5	97.5	96.7
2	Poor	5.0	2.5	2.5	3.3	0.0	0.0	12.5	4.2	0.0	0.0	2.5	0.8
3	Very Poor	5.0	2.5	0.0	2.5	5.0	2.5	0.0	2.5	5.0	2.5	0.0	2.5
D	**Alternative source of Water supply in shortage**												
	None	50.0	45.0	50.0	48.3	52.5	45.0	50.0	49.2	50.0	45.0	50.0	48.3
1	Open Well	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.8
2	TubeWell	50.0	50.0	50.0	51.7	47.5	50.0	50.0	50.8	50.0	50.0	50.0	51.7
3	River	0.0	5.0	0.0	4.2	0.0	5.0	0.0	4.2	0.0	5.0	0.0	4.2
4	Canal	0.0	0.0	0.0	3.3	0.0	0.0	0.0	3.3	0.0	0.0	0.0	3.3
5	Village Talawadi	0.0	0.0	0.0	4.2	0.0	0.0	0.0	4.2	0.0	0.0	0.0	4.2
6	Farm Pond	0.0	0.0	0.0	5.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	5.0
7	Tanker	0.0	0.0	0.0	5.8	0.0	0.0	0.0	5.8	0.0	0.0	0.0	5.8
	Av. Distance (Meters)	93.0	146.4	85.8	109.6	91.6	146.4	85.8	109.4	93.0	146.4	85.8	109.6
E	**Payment Made for Water, If any (Rs)**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Field Survey Data.

Table 5.11: Availability of Water for Dairy activities- NDCS households

No.	Particulars	Availability of Water for Dairy –NDCS (% of response)											
		Rainy				Winter				Summer			
		SM	MM	LM	TM	SM	MM	LM	TM	SM	MM	LM	TM
A	Source of Water Available for Dairy Purpose												
1	Open Well	2.5	0.0	2.5	1.7	2.5	0.0	2.5	1.7	2.5	0.0	2.5	1.7
2	Tubewell	72.5	80.0	75.0	75.8	72.5	80.0	75.0	75.8	72.5	80.0	75.0	75.8
3	River	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Canal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Village Talawadi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Farm Pond	25.0	20.0	22.5	22.5	25.0	20.0	22.5	22.5	25.0	20.0	22.5	22.5
7	Tanker	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Av. Distance (Meters)	31.3	31.5	27.1	29.9	32.3	31.5	27.1	30.3	32.3	31.5	27.1	30.3
B	Supply of Water is adequate												
1	Yes	100	100	100	100	100	100	100	100	100	100	100	100
2	No	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C	Water Quality (Village talawadi/Tanker)												
1	Normal	100.0	100.0	100.0	100.0	100.0	100.0	90.0	96.7	100.0	100.0	100.0	100.0
2	Poor	0.0	0.0	0.0	0.0	0.0	0.0	10.0	3.3	0.0	0.0	0.0	0.0
3	Very Poor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D	Alternative source of Water supply in shortage												
	None	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	27.5	25.0	25.0	25.8
1	Open Well	0.0	0.0	0.0	0.0	5.0	0.0	0.0	1.7	5.0	0.0	0.0	1.7
2	TubeWell	60.0	62.5	62.5	61.7	55.0	62.5	62.5	60.0	52.5	62.5	62.5	59.2
3	River	2.5	0.0	0.0	0.8	2.5	0.0	0.0	0.8	2.5	0.0	0.0	0.8
4	Canal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Village Talawadi	5.0	12.5	12.5	10.0	5.0	12.5	12.5	10.0	5.0	12.5	12.5	10.0
6	Farm Pond	7.5	0.0	0.0	2.5	7.5	0.0	0.0	2.5	7.5	0.0	0.0	2.5
7	Tanker	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Av. Distance (Meters)	72.8	73.4	75.7	74.0	72.8	73.4	75.7	74.0	72.8	73.4	75.7	74.0
E	Payment Made for Water, If any (Rs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Field Survey Data.

Apart from feed and fodder, importance of water is no less in dairy activities. Adequate and assured supply of good quality of water remains a vital component for improved cattle health. In the villages of the present study (both DCS & NDCS) normal water of adequate quantity was reported by the respondents. The main source of water for dairy had been tube wells supplemented by farm ponds and open wells (Table 5.10 & Table 5.11). Over 70

per cent of farmers were observed using tube wells as the primary source of water in DCS and NDCS villages. About 20-25 per cent reported using ponds as the source of water and rest using dug wells. In all seasons viz. rainy, winter and summer tube wells turned out to be the main source from which water was collected. Average distance of water source in DCS villages had been 29-45 metres while it was 27-32 metres in NDCS villages. So, in general the dairy farmers in general did not suffer from scarcity of water throughout the year. Main alternative source had also been tube wells installed at furthest distance less than 150 metres. No payment for water was observed in the study area.

5.5 Details on Veterinary and Breeding Services and Expenditures

Veterinary expenditure figures revealed that most of the animals in DCS and NDCS villages across size-classes received vaccines like HS, BQ and FMD (Table 5.12 & Table 5.13). Vaccination among the small size-class had been a little lower as compared with the other two size-classes. Use of vaccines for cross bred cows was marginally higher than the local cows. Average expenditure on medicines and doctors was to the tune of Rs. 497.00 for local cow and Rs. 544.00 for cross bred cows in DCS villages in aggregate. Contrarily, NDCS villages revealed low expenditure on medicines and doctors for cross bred cow in comparison with the local ones.

Table 5.12: Details of Veterinary and Breeding Expenditure during last one year DCS Households

No.	Particulars	DCS - Veterinary and Breeding Expenditure during Last year (2015-16)							
		LC				CB			
		SM	MM	LM	TM	SM	MM	LM	TM
A	Vaccination								
	HS	10	23	54	87	12	30	50	92
	BQ	21	43	92	156	35	80	132	247
	FMD	22	42	81	145	25	65	76	166
B	Medicines + Doctor(Rs)	471	517	499	497	497	554	577	544
C	Av. No. of Visit By Vet./Year	2.7	2.7	2.6	2.7	2.9	3.1	3.1	3.0
D	Service								
	Artificial Insemination	19	22	27	68	31	35	35	101
	Natural service	1	0	0	1	0	0	0	0
	Amount	160	159	158	159	140	147	143	143
E	No. of AI Per conception	2.0	1.9	1.9	2.0	2.0	1.8	2.0	2.0
F	Per visit rate paid to vet. Doctor (Rs/visit	118	124	121	121	122	120	116	119

Source: Field Survey Data

Table 5.13 Details of Veterinary and Breeding Expenditure during last one year NDCS Households

No.	Particulars	NDCS - Veterinary and Breeding Expenditure during Last year (2015-16)							
		LC				CB			
		SM	MM	LM	TM	SM	MM	LM	TM
A	Vaccination								
	HS	11	28	69	108	11	21	34	66
	BQ	18	43	76	137	33	61	150	244
	FMD	17	43	60	120	19	55	96	170
B	Medicines + Doctor(Rs)	407	441	460	437	448	411	400	419
C	Av. No. of Visit vet./yr	2.5	2.7	2.5	2.6	3.0	2.8	2.9	2.9
D	Service								
	Artificial Insemination	18	17	21	56	28	30	32	90
	Natural service	1	0	1	2	0	0	0	0
	Amount	183	172	162	172	140	148	166	152
E	No. of AI Per conception	1.8	1.8	2.0	1.9	1.8	1.9	1.8	1.9
F	Per visit paid to vet. doctor (Rs/visit)	114	124	100	112	123	135	127	128

Source: Field Survey Data.

In all the villages and across all size-classes of farmers artificial insemination (AI) had been the main method of conception for the cattle. Cost of AI had been Rs. 140-160 in DCS villages and Rs. 140-183 in NDCS village with variations among size-classes of farmers. But at the same time AI proved to be less efficient for the fact that average number of AI per conception was around 2for both types of villages. So, on the whole we could say that the farmers had to pay a sizeable amount of money for vaccinating and artificially inseminating the animals. Payment to veterinary doctors had also been on the higher side paying Rs. 100-135 per visit with an average number of visits per year being around 3.

5.6 Awareness about the Schemes

Currently there are many schemes imparted by the Government for promotion and development of the dairy sector and enhancing economic condition of the dairy farmers. In addition to that funds are allotted through the milk unions for assisting the farmers in their entrepreneurship. To reap the benefit from such schemes, proper knowledge and awareness about the schemes is the foremost criterion. In course of the study we had tried to assess the level of awareness among the farmers as regard to the various assistance programmes.

Table 5.14: Details on Awareness about various schemes

Sr. No.	Particulars	DCS % of response				NDCS % of response			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Awareness about different Vaccinations schemes/programmes (%) Yes	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	No	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Awareness about Artificial Insemination (AI) programmes (%)-Yes	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	No	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Awareness about any dairy development scheme/programmes (%)- Yes	75.00	77.50	95.00	82.50	7.50	37.50	40.00	28.33
	No	25.00	22.50	5.00	17.50	92.50	62.50	60.00	71.67
4	Sources of information about schemes (%)								
	a) Govt. Animal Husbandry Department	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	b) Dairy Cooperative/ Milk Union	72.50	77.50	95.00	81.67	0.00	0.00	0.00	0.00
	c) Media (Press/TV)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	d) Fellow farmer/dairy owner/neighbor	0.00	0.00	0.00	0.00	7.50	37.50	40.00	28.33
	5. Have you benefited with any dairy scheme (%) Yes	52.50	60.00	65.00	59.17	-	-	-	-
	No	47.50	40.00	35.00	40.83	-	-	-	-
	a) If benefited, please provide following								
	i) Av. No. of visits to concern office	-	-	-	-	-	-	-	-
	ii) Wage days lost, if any (Days)	-	-	-	-	-	-	-	-
	iii) Total Expenditure to avail scheme (doc/travel/etc.)	-	-	-	-	-	-	-	-
	iv) Bribe paid to any one	-	-	-	-	-	-	-	-
	v) Quality of material received					-	-	-	-
	Good	92.31	100.0	100.0	100.0	-	-	-	-
	Bad	8.33	0.00	0.00	0.00	-	-	-	-
	vi)Satisfied with benefit received (%) -Yes	95.00	82.50	92.50	90.00	-	-	-	-
	No	5.00	17.50	7.50	10.00	-	-	-	-
	If no, give reason	-	-	-	-	-	-	-	-
	Chicks Died	2.50	0.00	0.00	0.83				
	Poor Quality	0.00	7.50	7.50	5.00				
	Small Quantity	2.50	10.00	0.00	4.17				

Source: Field Survey Data.

Responses about vaccination and artificial insemination were similar in both types of villages and across all size-classes of farmers. We have already observed in the preceding section that the households were quite conscious about vaccinating their cattle. And artificial insemination had been a common practice across all villages. Hence, knowledge and

awareness regarding these had been to the fullest extent. In all villages irrespective of DCS/NDCS and milch animal size-class the farmers had a complete knowledge about such schemes (Table 5.14). But when the question boiled down to awareness about other schemes there was sharp contrast between the farmers of DCS and NDCS villages. Over 70 per cent of the dairy farmers in cooperative village responded in affirmative as regard to their knowledge about other dairy development scheme though level of awareness increased with increase in the size-class category. In aggregate 82.5 per cent of the total farmers in DCS category were found aware about other schemes. On the contrary, situation in the NDCS villages was rather gloomy with a meager 28.3 per cent awareness among farmers of all size-classes. In these villages too, knowledge among small farmers was poor as compared to their middle and large counterparts. For the DCS farmers' knowledge had been imparted by the milk cooperatives functioning in the area. In addition, personnel from milk unions have played crucial role in informing the farmers about the schemes. For the NDCS farmers, however, source of their awareness had been fellow farmers and neighbours.

Most of the benefitted farmers seemed to be satisfied with the assistance they received through the several schemes and reported quality of the material had been up to their expectation.

5.7 Cost of Milk Production

To assess profitability of the dairy enterprise information on cost and returns per animal per day were collected. Total cost comprised of cost on feed and fodder, labour cost and veterinary cost. As in all the villages the dairy farms are run solely by family labour, we had imputed the value of family labour with ruling wages rates for male and female. It is observed that labour cost has been the main component of total cost in all cases. Among DCS households, imputed value of family labour was to the tune of 58.4 per cent of total cost for local cows and 56.9 per cent in case of cross bred cows (Table 5.15). The proportion of labour component, however, was found decreasing with increase in the size-class.

Table 5.15: Cost of Cow Milk Production and Net Returns- DCS households

Sr. No.	Particulars	DCS- Cost of Milk Production –Cow							
		LC				CB			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Total Dry Fodder (Rs./Animal/Day)	16.0 (7.2)	15.3 (9.7)	17.1 (12.6)	16.2 (9.7)	15.6 (8.0)	16.7 (10.3)	16.6 (12.1)	16.4 (10.0)
2	Total Green Fodder (Rs./Animal/Day)	12.0 (5.4)	13.6 (8.6)	13.1 (9.6)	12.9 (7.7)	16.3 (8.4)	16.0 (9.9)	13.9 (10.1)	15.4 (9.4)
3	Total Concentrates (Rs./Animal/Day)	19.1 (8.6)	19.9 (12.6)	18.8 (13.8)	19.2 (11.5)	15.0 (7.7)	17.9 (11.0)	20.6 (14.9)	18.0 (11.0)
4	Total Supplements (Rs./Animal/Day)	16.0 (7.2)	17.7 (11.2)	19.7 (14.5)	18.0 (10.8)	15.6 (8.0)	17.9 (11.0)	18.3 (13.3)	17.3 (10.6)
5	Total feed & fodder (Rs./Animal/Day)	63.0 (28.5)	66.5 (42.2)	68.7 (50.6)	66.4 (39.7)	62.5 (32.2)	68.5 (42.3)	69.5 (50.4)	67.1 (41.1)
6	Total Labour (Rs./Day)								
	Male (Rs./Day)	50.3 (22.8)	40.0 (25.4)	28.6 (21.0)	38.5 (23.0)	55.8 (28.8)	45.1 (27.8)	30.1 (21.8)	43.1 (26.4)
	Female (Rs./Day)	104.5 (47.3)	47.7 (30.3)	35.3 (25.9)	59.3 (35.4)	72.6 (37.4)	45.2 (27.9)	34.9 (25.4)	49.8 (30.5)
	Total	154.8 (70.1)	87.7 (55.7)	63.8 (47.0)	97.8 (58.4)	128.5 (66.2)	90.3 (55.7)	65.0 (47.2)	92.9 (56.9)
7	Veterinary Cost (Rs./Animal/Day)	3.0 (1.4)	3.3 (2.1)	3.0 (2.2)	3.1 (1.8)	3.2 (1.6)	3.3 (2.0)	3.4 (2.5)	3.3 (2.0)
8	Total Cost (Rs./Animal/Day)	220.8 (100.0)	157.5 (100.0)	135.9 (100.0)	167.4 (100.0)	194.1 (100.0)	162.1 (100.0)	137.9 (100.0)	163.2 (100.0)
9	Milk Production (Litre/Animal)	2.6	2.8	2.5	2.6	5.9	5.6	5.6	5.7
10	Price (Rs. /litre)	24.9	24.8	24.5	24.7	24.1	24.2	24.1	24.1
11	Returns from Milk Production (Production*Avg Price)	63.3	69.6	60.8	64.3	139.8	134.0	132.8	135.3
12	Income from Dung (Rs./Animal/Day)	35.8	35.9	36.6	36.2	43.3	44.8	44.4	44.2
13	Total Income (Rs./Animal/Day)	99.1	105.5	97.4	100.5	183.2	178.8	177.2	179.5
14	Net Return/Profit (RS./Animal/Day)	-121.8	-52.0	-38.5	-66.9	-10.9	16.7	39.3	16.3
15	Net Return/Profit without imputed value of fam.lab. (Rs./Animal/Day)	**33.1**	**35.8**	**25.3**	**30.9**	**117.5**	**107.0**	**104.3**	**109.2**

Source: Field Survey Data.

Table 5.16: Cost of Cow Milk Production and Net Returns- NDCS households

Sr. No.	Particulars	NDCS- Cost of Milk Production -Cow							
		LC				CB			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Total Dry Fodder (Rs./Animal/Day)	18.6 (7.6)	18.4 (10.9)	17.9 (13.2)	18.2 (10.3)	15.0 (6.7)	17.7 (11.2)	17.5 (12.7)	16.8 (9.9)
2	Total Green Fodder (Rs./Animal/Day)	13.1 (5.3)	15.7 (9.3)	16.3 (12.1)	15.2 (8.6)	13.9 (6.2)	13.7 (8.7)	14.4 (10.5)	14.0 (8.3)
3	Total Concentrates (Rs./Animal/Day)	15.1 (6.2)	18.1 (10.7)	17.7 (13.1)	17.1 (9.7)	15.6 (7.0)	15.0 (9.5)	16.6 (12.1)	15.7 (9.3)
4	Total Supplements (Rs./Animal/Day)	20.5 (8.3)	18.2 (10.8)	19.5 (14.5)	19.4 (11.0)	20.5 (9.2)	17.2 (10.9)	17.9 (13.1)	18.4 (10.9)
5	Total feed & fodder (Rs./Animal/Day)	67.3 (27.4)	70.4 (41.6)	71.4 (52.9)	69.9 (39.6)	64.9 (29.2)	63.6 (40.4)	66.4 (48.4)	65.0 (38.4)
6	Total Labour (Rs./Day)								
	Male (Rs./Day)	48.7 (19.9)	46.3 (27.4)	28.9 (21.4)	39.9 (22.6)	74.9 (33.7)	48.9 (31.0)	36.5 (26.6)	52.1 (30.7)
	Female (Rs./Day)	126.5 (51.6)	49.6 (29.3)	32.0 (23.7)	63.8 (36.2)	79.8 (35.8)	42.0 (26.7)	31.5 (22.9)	49.3 (29.1)
	Total	175.2 (71.4)	95.9 (56.7)	60.9 (45.1)	103.7 (58.8)	154.7 (69.5)	90.9 (57.7)	67.9 (49.5)	101.4 (59.9)
7	Veterinary Cost (Rs./Animal/Day)	2.8 (1.1)	2.9 (1.7)	2.8 (2.0)	2.8 (1.6)	3.0 (1.3)	3.1 (1.9)	3.0 (2.2)	3.0 (1.8)
8	Total Cost (Rs./Animal/Day)	245.3 (100.0)	169.2 (100.0)	135.0 (100.0)	176.4 (100.0)	222.6 (100.0)	157.5 (100.0)	137.3 (100.0)	169.4 (100.0)
9	Milk Production (Litre/Animal)	2.6	3.3	2.8	2.9	4.8	5.7	5.7	5.4
10	Price (Rs. /litre)	23.8	23.0	22.3	23.0	22.1	22.6	22.7	22.5
11	Returns from Milk Production (Production*Avg Price)	61.1	74.4	61.1	65.3	105.4	128.5	127.7	121.4
12	Income from Dung (Rs./Animal/Day)	37.7	38.4	36.9	37.6	43.4	43.5	44.2	43.7
13	Total Income (Rs./Animal/Day)	98.8	112.9	98.0	102.9	148.8	171.9	171.9	165.1
14	Net Return/Profit(RS./Animal/Day)	-146.6	-56.4	-37.0	-73.5	-73.8	14.5	34.6	-4.3
15	Net Return/Profit without imputed value of fam.lab. (Rs./Animal/Day)	**28.7**	**39.5**	**23.8**	**30.1**	**79.4**	**105.3**	**102.5**	**96.4**

Source: Field Survey Data.

A similar pattern was observed in the NDCS households too where the labour cost had been observed as 58.8 per cent and 59.9 per cent in aggregate for localand cross bred cows respectively (Table 5.16).On the other hand the quantum of milk production per animal per

day was higher for cross bred cow than local ones. The DCS villages had a marginal edge in terms of milk output from cross bred cows over NDCS ones while the contrary was observed in case of local breeds. The prices offered by the private agents were lower than the prices paid by the local dairy cooperatives.

Coming to the question of net returns per day per animal, which is of foremost importance for the enterprise, we are faced with a situation where farmers were incurring heavy losses. Barring only two categories of middle and large farmers rearing cross bred cows in both types of villages all other farmers were suffering sizeable amount of net losses per day. It is a fact that cross bred cows offer more milk as compared to the local non-descript varieties. The small farmers owning one cross bred cow or at most two could not find it economical from the point of profitability. At the same time we must take note of the fact that most of the households in either DCS or NDCS villages were pursuing dairy activities as their subsidiary source of income and managing them solely with participation of family labours. Family labour, when employed in the activities, does not consider the optimization criterion for maximization of profit from the enterprise. This remains true for the owned agriculture too. Over optimal use of family labour, when imputed with market wage rates got inflated and ended in showing heavy losses from the dairy business. In addition, the opportunity cost of labour particularly of women from relatively higher ethnic strata of the rural society seems to be very poor. Moreover, social and cultural practices that prevail in the agrarian society restrict them from opting for economic employment outside the domestic periphery.

But if the imputed value of labour gets deducted from total cost the households across each and every size-class and for all types of cows earned substantial positive profit per day per animal which again might not be the real scenario. The actual profit earning might be lying somewhere between the two poles. But at this juncture, on the basis of availed data, it could be asserted that rearing of cross bred cows as dairy enterprise were profitable than nurturing of local non-descript breeds.

5.8 Chapter Summary

In DCS villages herd strength of local milch animals are higher than that in the NDCS villages across all size-classes. But when it comes to rearing of cross bred animals, NDCS farmers

owned more cross bred cow than the former ones. So far as the cattle sheds are concerned NDCS farmers were found to own more sheds on an average for their cattle than DCS farmers.

Average yield of cross bred cows were substantially higher than the local cows. However, in the DCS the average yield of milk seemed to be higher than NDCS ones.

Average age of the breedable local cows in the DCS villages was 6 years in aggregate of all size-classes while for cross bred cow average age had been 5 years. Average age at first calving for local cows was higher than the cross bred cows in both the areas. Lactation order was found more or less same for all types of farmers with marginal variation among the village clusters and size-classes.

A dismal scenario was observed as regards to insurance coverage for the cattle.

Milk output of cross bred cows had always been higher than the local cow irrespective of seasons, locational specificity (i.e. DCS/NDCS) and size-class categories.

In both DCS and NDCS villages no hired labour had been employed for dairy operations. It is noteworthy to mention that in DCS villages across all size-class participation of women family members had been higher both in terms of number per day as well as hours of involvement in such activities. Moreover they had been members of DCS too.

NDCS household across all size-classes were feeding their cattle with more of dry and green fodder and supplements as compared to the DCS farmers. In case for concentrates DCS and NDCS farmers were applying prepared cattle feed in more or less equal quantity. In case of cross bred cow, however, feeding was higher among the DCS households than their NDCS counterparts. Average grazing hours for local cattle was 3.4-3.8 hours while it was 2.5 for cross bred cattle.

In the villages of the present study (both DCS & NDCS) normal water of adequate quantity was reported by the respondents. The main source of water for dairy had been tube wells supplemented by farm ponds and open wells.

Most of the animals in DCS and NDCS villages across size-classes received vaccines like HS, BQ and FMD. Vaccination among the small size-class had been a little lower as compared with the other two size-classes. Use of vaccines for cross bred cows was marginally higher

than the local cows. Artificial insemination (AI) had been the main method of conception for the cattle.

Knowledge and awareness regarding vaccination and AI schemes had been to the fullest extent. But when the question boiled down to awareness about other schemes there was sharp contrast between the farmers of DCS and NDCS villages. For the DCS farmers knowledge had been imparted by the milk cooperatives and milk unions functioning in the area. For the NDCS farmers, however, source of their awareness had been fellow farmers and neighbours.

Most of the benefitted DCS farmers seemed to be satisfied with the assistance they received through the several schemes and reported quality of the material had been up to their expectation.

For calculating cost and returns we had imputed the value of family labour with ruling wages rates for male and female. It is observed that labour cost has been the main component of total cost in all cases. The proportion of labour component, however, was found decreasing with increase in the size-class of both DCS and NDCS villages. The prices offered by the private agents were lower than the prices paid by the local dairy cooperatives.

Coming to the question of net returns per day per animal, we are faced with a situation where farmers were incurring heavy losses. Barring only two categories of middle and large farmers rearing cross bred cows in both types of villages all other farmers were suffering sizeable amount of net losses per day. But if the imputed value of labour gets deducted from total cost the households across each and every size-class and for all types of cows earned substantial positive profit per day per animal.

Chapter VI

Milk Consumption and Marketable Surplus

6.1 Introduction

We have so far been engaged in discussing various aspects of cattle rearing and production of milk. But as we all know that liquid milk is a highly perishable output hence it needs proper care for preservation and marketing. Moreover, preparation of milk products adds value to the basic output and has larger market opportunities. In West Bengal, however, the Government run milk processing plants are few in number and have little opportunities of product diversification. Apart from that there are innumerable private middlemen who play a very important role in supplying milk and some basic milk products like *Paneer*, Curd etc. to the consumers in the townships and cities. There local and faraway sweetshops also depend on these middlemen for uninterrupted supply of milk and products for their own use in preparing sweets.

Though we have already seen that the local vendors pay less to the farmers than the cooperatives, nonetheless farmers having no cooperative in the vicinity prefer to sell their product to the middlemen. Moreover, the local vendors collect the milk from the door step of the farmer and one does not have to commute to the milk procurement point. The price offered by the vendors does not depend on the fat content in the milk supplied by the households.

But even after such advantages that are given by the private vendors the farmers who have the opportunity of having milk cooperative in neighbourhood choose to be a member of the one.

Presently, we shall be discussing these issues on the basis of out observations at the field level.

6.2 Use of Milk at Home and Processing

In course of the village survey data as regard to production and use of milk by the households was collected. In the DCS households data for milk drawn per animal per day revealed that the quantity of milk drawn per local cow was 2.64 litres for the DCS village

while it had been 5.65 litres for cross bred cow. For NDCS households, however, quantities were to the tune of 2.93 litres and 5.45 litres respectively (Table 6.1 and Table 6.2). In case of local cattle NDCS households were drawing more milk from cow while milk from cross bred cow was greater among DCS households.

Table 6.1: Production and Use of Milk by selected DCS Households (day of visit)

Sr. No.	Particulars	Local Cow				Crossbred Cow			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Milk Drawn Lit/animal	2.59	2.83	2.54	2.64	5.87	5.55	5.56	5.65
2	Use of Milk at Home (lit)	11.30	11.70	13.00	36.00	18.50	18.00	16.70	53.20
	% Milk used at Home	19.96	17.70	18.95	18.82	10.27	8.71	8.43	9.10
	For Direct Consumption (%)	84.07	82.05	92.31	86.39	77.30	44.44	37.13	53.57
	For Processing (%)	15.93	17.95	7.69	13.61	22.70	55.56	62.87	46.43
3	Raw/Liquid Milk sold (Lit)	45.30	54.40	55.60	155.30	161.70	188.70	181.30	531.70
	% to total production	80.04	82.30	81.05	81.18	89.73	91.29	91.57	90.90

Source: Field Survey Data.

Table 6.2: Production and Use of Milk by selected NDCS Households (day of visit)

Sr. No.	Particulars	Local Cow				Crossbred Cow			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Milk Drawn Lit/animal	2.74	3.30	2.82	2.93	4.87	5.71	5.68	5.45
2	Use of Milk at Home (lit)	16.00	8.80	21.20	46.00	19.30	14.50	11.00	44.80
	% Milk used at Home	27.59	15.49	30.59	24.99	14.89	8.43	6.07	9.28
	For Direct Consumption (%)	60.00	56.82	58.49	58.70	76.68	72.41	69.09	73.44
	For Processing (%)	40.00	43.18	41.51	41.30	23.32	27.59	30.91	26.56
3	Raw/Liquid Milk sold (Lit)	42.00	48.00	48.10	138.10	110.30	157.50	170.30	438.10
	% to total production	72.41	84.51	69.41	75.01	85.11	91.57	93.93	90.72

Source: Field Survey Data.

General practice among the farmers of all categories was to sell out bulk of the liquid milk. In the DCS villages over 80 per cent of total milk production from local cow was sold while the corresponding percentage for cross bred milk was to the tune of over 90 per cent. In the NDCS case proportion of milk sold accounted for 75 per cent and about 91 per cent

respectively. It was interesting to note that in both cases milk of cross bred cow was sold directly in greater proportion than the milk of local cow. This in a way points towards household's preference for milk of the local cow for their own consumption. This gets corroborated from the data on usage of milk at home from two different varieties of cattle. The DCS households preferred cross bred milk for processing while NDCS preferred milk of local cow for such preparations. There was not much of a difference among the size-classes except for the fact that the large farmers of DCS villages had a strong preference for milk from local cow for direct consumption at home.

6.3 Sale of Milk and Cost of Milk Marketing

It is evident from Table 6.3 and Table 6.4 that bulk of the milk produced by the DCS farmer across all size-classes and breed were disposed at dairy cooperatives. In all size-class categories the percentage of sale to DCS accounted for over 85 per cent. For NDCS farmers, however, proportion of total sales to the same tune had been given to the private vendors and middlemen. The DCS households were found selling a small quantum directly to local customers. Middle and large farmers rearing local cattle and small and large producers rearing cross breed had their own marketing in a meagre proportion. Private vendors and local sweet shops also had a marginal share of total sale of cross breed milk by the DCS farmers. The price offered by cooperatives had always been higher than the price offered by the private ones. Price paid by the DCS had been Rs. 24.91 per litre for local cow's milk and Rs. 24.38 for cross breed milk while price offered by private vendors and sweet shops or even direct customers was around Rs. 22-23 per litres. Payments by DCS were generally transferred to suppliers' bank accounts on weekly basis whereas payments from local vendors were received after a month. However, no reasons were reported by the farmers as to their disposal with avenues other than DCS.

Table 6.3: Sale of Milk and Cost of Milk Marketing- DCS Households

Sr. No	Particulars	DCS HH- Sale of Milk and Cost of Milk Marketing							
		Local Cow				Crossbred Cow			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Milk Sold (% to total prod	80.04	82.30	81.05	81.18	89.73	91.29	91.57	90.90
2	Agencies								
A	**DCS**								
	Milk Sold (% to total sale)	94.48	94.85	85.79	91.50	86.64	91.10	88.75	88.94
	Price (Rs./Lit	24.95	25.00	24.79	24.91	24.29	24.59	24.24	24.38
	Payment (%)	-	-	-	-	-	-	-	-
	Daily	-	-	-	-	-	-	-	-
	Weekly	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Monthly	-	-	-	-	-	-	-	-
	Half Monthly	-	-	-	-	-	-	-	-
	Distance (Kms)	0.55	0.40	0.48	0.48	0.42	0.50	0.46	0.46
	Transport Cost (Rs.)	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.02
B	**Consumer**								
	Milk Sold (% to total sale)	-	5.15	14.21	6.89	3.40	-	2.76	1.97
	Price Rs./Lit	-	21.50	22.23	22.05	23.00	-	22.20	22.60
	Payment (%)	-	-	-	-	-	-	-	-
	Daily	-	-	-	-	-	-	-	-
	Weekly	-	-	-	-	-	-	-	-
	Monthly	-	100.0	100.0	100.0	100.0	-	100.0	100.0
	Half Monthly	-	-	-	-	-	-	-	-
	Distance (Kms)	-	0.00	0.00	0.00	0.50	-	0.00	0.25
	Transport Cost (Rs.)	-	0.00	0.00	0.00	0.00	-	0.00	0.00
C	**Private vendor /Middlemen**								
	Milk Sold (% to total sale)	5.52	-	-	1.61	2.47	6.04	-	2.90
	Price Rs./Lit	23.00	-	-	23.00	21.50	21.43	-	21.45
	Payment (%)	-	-	-	-	-	-	-	-
	Daily	-	-	-	-	-	-	-	-
	Weekly	-	-	-	-	-	-	-	-
	Monthly	100.0	-	-	100.0	100.0	100.0	-	100.0
	Half Monthly	-	-	-	-	-	-	-	-
	Distance (Kms)	0.00	-	-	0.00	0.00	0.07	-	0.05
	Transport Cost (Rs.)	0.00	-	-	0.00	0.00	0.00	-	0.00
D	**Sweet Shops**								
	Milk Sold (% to total sale)	-	-	-	-	7.48	2.86	8.49	6.19
	Price Rs./Lit	-	-	-	-	23.25	21.50	22.77	22.72
	Payment	-	-	-	-	-	-	-	-
	Daily	-	-	-	-	-	-	-	-
	Weekly	-	-	-	-	-	-	-	-
	Monthly	-	-	-	-	100.0	100.0	100.0	100.0
	Half Monthly	-	-	-	-	-	-	-	-
	Distance (Kms)	-	-	-	-	0.30	0.30	0.27	0.28
	Transport Cost (Rs.)	-	-	-	-	0.00	0.00	0.00	0.00
G	members did not sale milk to dairy								
	reasons	NR	NR	NR		NR	NR	NR	

Source: Field survey data; NR-Not Reported.

Table 6.4: Sale of Milk and Cost of Milk Marketing- NDCS Households

Sr. No	Particulars	NDCS HH- Sale of Milk and Cost of Milk Marketing							
		Local Cow				Crossbred Cow			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Milk Sold (% to total prod	72.41	84.51	69.41	75.01	85.11	91.57	93.93	90.72
2	Agencies								
A	**DCS**								
	Milk Sold (% to total sale)	23.81	22.08	-	14.92	-	-	-	-
	Price (Rs./Lit	25.00	24.50	-	24.75	-	-	-	-
	Payment (%)	-	-	-	-	-	-	-	-
	Daily	-	-	-	-	-	-	-	-
	Weekly	100.0	100.0	-	100.0	-	-	-	-
	Monthly	-	-	-	-	-	-	-	-
	Half Monthly	-	-	-	-	-	-	-	-
	Distance (Kms)	0.75	0.75	-	0.75	-	-	-	-
	Transport Cost (Rs.)	0.00	0.00	-	0.00	-	-	-	-
B	**Consumer**								
	Milk Sold (% to total sale)	-	-	-	-	-	-	-	-
	Price Rs./Lit	-	-	-	-	-	-	-	-
	Payment (%)	-	-	-	-	-	-	-	-
	Daily	-	-	-	-	-	-	-	-
	Weekly	-	-	-	-	-	-	-	-
	Monthly	-	-	-	-	-	-	-	-
	Half Monthly	-	-	-	-	-	-	-	-
	Distance (Kms)	-	-	-	-	-	-	-	-
	Transport Cost (Rs.)	-	-	-	-	-	-	-	-
C	**Private Vendor Middlemen**								
	Milk Sold (% to total sale)	76.19	77.92	100.00	85.08	100.00	100.00	100.00	100.00
	Price Rs./Lit	22.89	22.82	22.32	22.64	21.94	22.63	22.69	22.45
	Payment (%)	-	-	-	-	-	-	-	-
	Daily	-	-	-	-	-	-	-	-
	Weekly	-	-	-	-	-	-	-	-
	Monthly	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Half Monthly	-	-	-	-	-	-	-	-
	Distance (Kms)	0.00	0.40	0.25	0.21	0.00	0.01	0.03	0.01
	Transport Cost (Rs.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D	**Sweet Shops**								
	Milk Sold (% to total sale)	-	-	-	-	-	-	-	-
	Price Rs./Lit	-	-	-	-	-	-	-	-
	Payment	-	-	-	-	-	-	-	-
	Daily	-	-	-	-	-	-	-	-
	Weekly	-	-	-	-	-	-	-	-
	Monthly	-	-	-	-	-	-	-	-
	Half Monthly	-	-	-	-	-	-	-	-
	Distance (Kms)	-	-	-	-	-	-	-	-
	Transport Cost (Rs.)	-	-	-	-	-	-	-	-

Source: Field survey data.

Non DCS farmers, on the other hand, depended on private vendors and middlemen for disposal of milk though at a lower price offered by the PDCS. A few non-members were found disposing a part of their output from local cow at the nearest procurement point of local dairy cooperative. However, no direct sale to consumers or sweet shops was observed in case of NDCS farmers. Cross Breed milk was totally procured by the middlemen.

6.4 Handling of Income from Dairying

As we have observed in the preceding chapter that participation of family members particularly women were of crucial importance for dairy farming at the family level. Our sample consisted of families which in no way were in position to employ hired labour for their enterprise.

Table 6.5: Details about Income received from Dairying and its use

Sr. No	Particulars	Who receives the income				Income spent on (share in approx.)					
						Family Exp			Animal Feed & Health		
		SM	MM	LM	TM	SM	MM	LM	TM	SM	MM
I	**DCS**										
A	*Income from dairy (sale of milk)*										
1	Male	22.50	25.00	25.00	24.17	54.75	53.63	55.68	45.25	46.38	44.33
2	Female	37.50	25.00	30.00	30.83						
3	Both	40.00	50.00	45.00	45.00						
B	*Income from sale of products*										
1	Male	0.00	2.50	0.00	0.83	83.75	73.33	0.00	16.25	26.67	0.00
2	Female	7.50	5.00	0.00	4.17						
3	Both	2.50	0.00	0.00	0.83						
4	N.A.	90.00	92.50	100.00	94.17						
C	Income sale of dung /FYM										
1	Male	5.00	12.50	10.00	9.17	44.38	40.25	52.38	55.63	59.75	47.63
2	Female	80.00	75.00	62.50	72.50						
3	Both	15.00	12.50	27.50	18.33						
II	**NDCS**										
A	*Income from dairy (sale of milk)*										
1	Male	27.50	27.50	32.50	29.17	57.00	52.00	54.53	43.00	48.00	45.48
2	Female	40.00	35.00	35.00	36.67						
3	Both	32.50	37.50	32.50	34.17						
B	Income from sale of products										
1	Male	0.00	2.50	2.50	1.67	44.00	12.50	27.22	56.00	87.50	72.78
2	Female	22.50	17.50	20.00	20.00						
3	Both	2.50	0.00	0.00	0.83						
4	N.A.	75.00	80.00	77.50	77.50						
C	Income sale of dung /FYM										
1	Male	10.00	17.50	12.50	13.33	52.00	47.29	47.71	48.00	52.71	52.29
2	Female	57.50	52.50	47.50	52.50						
3	Both	20.00	17.50	27.50	21.67						
4	N.A.	12.50	12.50	12.50	12.50						

Source: Field Survey Data.

At the same time in the districts we came across primary dairy cooperatives being run by women in general. Particularly in the districts of North and South Twenty Four Parganas participation of women in decision making at the household level as well as DCS level had been at a considerable extent. In other districts too, female members of families were of utmost importance for dairy enterprises. This gets reflected in Table 6.5 where it is found that over 70 per cent of the DCS families in aggregate reported involvement of women members while receiving the income from sale of milk. Women solely accounted for around 31 per cent while spouse together accounted for 45 per cent. The feature is observed in all size-class categories. As far as income from sale of cow dung, cow dung cakes and farm yard manure, women had almost unquestionable authority of receiving the income. In NDCS households too, women had their fair share in decision making in dairy enterprises.

When we look into the data as to the distribution of income received from dairy into family expenses vis-à-vis expenses incurred for animal feed and health, an interesting feature is observed. When sales proceeds of liquid milk was concerned, which had been the main source of dairy income, household spent more on family maintenance rather than diverting the money to meet expenses of dairy activities. This was a feature observed in DCS as well as in NDCS villages. Contrarily, income from dung sale was switched towards upkeep of the cattle herd in greater proportions with some variations within size-classes.

6.5 Problems in Milk Marketing

There have been continuous attempts for development of milk sector and improving the conditions of milk producers in the state. But it is evident from the present study that small producers operating at family level dominated the scenario. Hence, it remained mostly unorganized. The milk cooperatives in every district were found to operate but they were too small in number to wrap the large number of small milk producers in respective areas. Moreover, their procurement capacity had been rather small as compared to the supply of liquid milk.

At the same time there operated small private vendors who generally collected milk from producer's door step. It would be almost impossible for the little producers to sell their

output without these intermediaries. Innumerable small producers were in no position to have a control over market price.

Over and above all, there existed acute problem of milk adulteration and malpractice by the small private players as complained by some of the DCS members.

6.6 Chapter Summary

In the DCS households data for milk drawn per animal per day revealed that the quantity of milk drawn per local cow was 2.64 litres for the DCS village while it had been 5.65 litres for cross bred cow. For NDCS households, however, quantities were to the tune of 2.93 litres and 5.45 litres respectively.

General practice among the farmers of all categories was to sell out bulk of the liquid milk. It was interesting to note that in both cases milk of cross bred cow was sold directly in greater proportion than the milk of local cow. This in a way points towards household's preference for milk of the local cow for their own consumption.

In all size-class categories the percentage of sale to DCS accounted for over 85 per cent. For NDCS farmers, however, proportion of total sales, being around 85 per cent, had been given to the private vendors and middlemen.

The price offered by cooperatives had always been higher than the price offered by the private ones. Payments by DCS were generally transferred to suppliers' bank accounts on weekly basis whereas payments from local vendors were received after a month.

Involvement of women members in receiving income from sale of milk was found in both DCS and NDCS families. As far as income from sale of cow dung, cow dung cakes and farm yard manure, women had almost unquestionable authority of receiving the income in both types of villages.

Share of expenses for family maintenance had been higher in comparison with the share of expenses for dairy activities from sales proceeds of milk. However, income from dung sale was switched towards upkeep of the cattle herd in greater proportion with some inter size-class variations.

The milk cooperatives, though operating in every district, were too small in number to wrap the large number of small milk producers in respective areas. Moreover, their procurement capacity had been rather small as compared to the supply of liquid milk. And these cooperatives were faced with competition from the enumerable private intermediaries who collected the milk from producer's door steps.

Over and above all, there existed acute problem of milk adulteration and malpractice by the small private players as complained by some of the DCS members.

Chapter VII

Constrains faced in Production and Marketing of Milk and Suggestions

7.1 Introduction:

In this chapter we are concerned with the constraints that were being faced by the milk producers in course of their entrepreneurship. On one hand, hindrance might have been in the production process due to insufficiency of service delivery, infrastructural inadequacy, and economic stringency and so on. On the other, there might be hurdles in marketing of the output by the farmers. Nature and extent of various constraints faced by the farmers as well as their suggestions in this regard was recorded in course of our field survey. The results are being discussed in this chapter for DCS and NDCS households.

7.2 Service Delivery System

Efficacy in service delivery of input and output is one of the main determinants for successful and profitable operation of animal husbandry in general and dairy enterprise in particular. Adequacy and timeliness in supplying cattle feed, veterinary services including artificial insemination, proper vaccination to check disease outbreak are important components of input service delivery. On the other hand it is a fact that the primary output of dairy sector i.e. liquid milk is a highly perishable commodity and hence needs proper and efficient output delivery system whether been provided by the government/cooperative societies or the private players in this sector. At the same time the economics of this enterprise i.e. profitability from dairy business is of primary concern to the farmers. Assistance to the farmers in respect of input and output delivery should be such that the farmers could make it a profitable business proposition.

It is in this light we take up the present section considering farmers from the DCS as well as NDCS villages analyzing their experience as regards to input and output delivery system.

Table 7.1: Details of Input and Output Service Delivery experienced by DCS households

No	Particulars	Service Provider (% of response) - DCS											
		PDCS				Agent				Private agent			
		SM	MM	LM	TM	SM	MM	LM	TM	SM	MM	LM	TM
A	**Input Delivery (%)**												
1	**Supply of Cattle Feed**												
	Adequate	33.3	0.0	0.0	22.5	-	-	-	-	23.1	37.5	17.1	26.3
	Inadequate	66.7	100.0	100.0	77.5	-	-	-	-	76.9	62.5	82.9	73.8
	Not Available	-	-	-	-	-	-	-	-	-	-	-	
2	**Cattle feed & fodder seed on Credit**												
	Available	0.0	0.0	0.0	0.0	-	-	-	-	59.1	63.3	65.4	62.8
	Not Available	100.0	100.0	100.0	100.0	-	-	-	-	40.9	36.7	34.6	37.2
3	**Cost of cattle feed & mineral mixture**												
	High	9.1	0.0	0.0	6.7	-	-	-	-	100.0	100.0	84.6	94.3
	ok	90.9	100.0	100.0	93.3	-	-	-	-	0.0	0.0	15.4	5.7
	Not Available												
4	**Emergency Veterinary Services (EVS)**												
	Available	0.0	0.0	0.0	0.0	-	-	-	-	100.0	100.0	100.0	100.0
	Not Available	100.0	100.0	100.0	100.0	-	-	-	-	0.0	0.0	0.0	0.0
	Charges for EVS												
	High	-	-	-	-	-	-	-	-	100.0	92.5	92.5	95.0
	Medium	-	-	-	-	-	-	-	-	0.0	7.5	7.5	5.0
	Low	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
	Rs/Visit	-	-	-	-	-	-	-	-				
5	**Vaccines**												
	Adequate	0.0	0.0	0.0	0.0	-	-	-	-	5.0	0.0	0.0	1.7
	Inadequate	0.0	0.0	0.0	0.0	-	-	-	-	95.0	100.0	100.0	98.3
	Not Available	100.0	100.0	100.0	100.0	-	-	-	-	0.0	0.0	0.0	0.0
6	**Delivery &applications of quality & requisite quantity of vaccines**												
	Yes	-	-	-	-	-	-	-	-	5.0	0.0	0.0	1.7
	No	-	-	-	-	-	-	-	-	95.0	100.0	100.0	98.3
7	**Semen at the AI centre**												
	Adequate	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
	Inadequate	-	-	-	-	-	-	-	-	100.0	100.0	100.0	100.0
	Not Available	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
8	**Provision of loan in society or govt. for Purchasing cattle**												
	Adequate	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
	Inadequate	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
	Not Available	100.0	100.0	100.0	100.0	-	-	-	-	100.0	100.0	100.0	100.0
9	**Charges for insurance**												
	Very high	-	-	-	-	-	-	-	-	-	-	-	-
	High	-	-	-	-	-	-	-	-	-	-	-	-
	Medium	-	-	-	-	-	-	-	-	-	-	-	-
10	**Technical Guidance**												
	Available	100.0	100.0	100.0	100.0	-	-	-	-	100.0	100.0	100.0	100.0
	Not available	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
B	**OUTPUT DELIVERY**												
1	Milk Price(Rs./lit)												
	Adequate	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
	Low	100.0	100.0	100.0	100.0	-	-	-	-	100.0	100.0	100.0	100.0
2	**Payment of Milk**												
	Immediate	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
	Within 2 days	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
	Within 15 days	100.0	100.0	100.	100.0	-	-	-	-	0.0	0.0	0.0	0.0
	More than 15 days	0.0	0.0	0.0	0.0	-	-	-	-	100.0	100.0	100.0	100.0
3	**incentives or bonus for supplying milk**												
	Adequate	-*	-	-	-	-	-	-	-	-*	-	-	-
	Low	-	-	-	-	-	-	-	-	-	-	-	-

	Not Available	100.0	100.0	100.0	100.0	-	-	-	-	100.0	100.0	100.0	100.0
4	**Acceptability cross-bred cow milk in family**												
	Poor	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
	Acceptable	100.0	100.0	100.0	100.0	-	-	-	-	-	-	-	-
	Not acceptable	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
5	**Advance payment for milk by society/ vendors**												
	Available	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
	Not available	100.0	100.0	100.0	100.0	-	-	-	-	-	-	-	-

Source: Field Survey Data.

* No incentive bonus is given for supplying milk

As regards to delivery of cattle feed the DCS households depended on the cooperatives as well as private agents while NDCS ones had to rely solely on the private agents operating in the neighbourhood. In both cases, however, the supply of cattle feed was found inadequate (Table 7.1 and Table 7.2). Service delivery like balanced cattle feed has long drawn impact on cattle health and productivity. Adequacy and timeliness in such provisions is of utmost importance. But 77.5 per cent of the total DCS households complained about insufficiency of the cattle feed provided by the cooperatives while 73.8 per cent criticized the private agents. On the other hand 92.5 per cent of NDCS families complained against the private agents for inadequacy of supply of cattle feed. However insufficient the supply of feed might be, most of the households could purchase it on credit from private agents only. There was no provision of credit from the dairy cooperatives. A section of DCS farmers responded in negation as to the credit facility provided by the private agents. Cattle feed and mineral mixtures, when purchased from open market or private agents had been much costlier than that been supplied by the cooperatives. Almost all the DCS households found supply price of feed and mineral mixture provided by cooperative societies to be reasonable. Emergency veterinary service in general was made available by the private agents in all the villages though charges for such had been high. Vaccines too, been supplied by the private agents, were inadequate in supply and poor in quality as complained by the respondents. Semen had also been insufficient in supply. There had been no provision of loan for purchasing cattle by the cooperative societies as well as the private agents for DCS households. NDCS being marginally better off in terms of their resources and credibility found provision for such loans inadequate. As we have mentioned earlier that no household was found in course of the village survey to have insured the cattle, hence, the households refrained from registering their answers as regards to insurance charges. Technical guidance was found adequately provided by both dairy cooperatives and the private agents.

Table 7.2: Details of Input and Output Service Delivery experienced by NDCS households

No	Particulars	Service Provider (% of response) - NDCS											
		PDCS				Agent				Private agent			
		SM	MM	LM	TM	SM	MM	LM	TM	SM	MM	LM	TM
A	**Input Delivery (%)**												
1	**Supply of Cattle Feed**												
	Adequate	-	-	-	-	-	-	-	-	10.0	5.0	7.5	7.5
	Inadequate	-	-	-	-	-	-	-	-	90.0	95.0	92.5	92.5
	Not Available	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
2	**Cattle feed & fodder seed on Credit**												
	Available	-	-	-	-	-	-	-	-	75.0	65.0	82.5	74.2
	Not Available	-	-	-	-	-	-	-	-	25.0	35.0	17.5	25.8
3	**Cost of cattle feed & mineral mixture**												
	High	-	-	-	-	-	-	-	-	100.0	100.0	100.0	100.0
	ok	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
	Not Available	-	-	-	-	-	-	-	-				
4	**Emergency Veterinary Services (EVS)**												
	Available	-	-	-	-	-	-	-	-	100.0	100.0	100.	100.0
	Not Available	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
	Charges for EVS												
	High	-	-	-	-	-	-	-	-	100.0	100.0	95.0	98.3
	Medium	-	-	-	-	-	-	-	-	0.0	0.0	5.0	1.7
	Low	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
	Rs/Visit	-	-	-	-	-	-	-	-				
5	**Vaccines**												
	Adequate	-	-	-	-	-	-	-	-	5.0	2.5	0.0	2.5
	Inadequate	-	-	-	-	-	-	-	-	95.0	97.5	100.0	97.5
	Not Available	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
6	**Delivery & applications of quality & requisite quantity of vaccines**												
	Yes	-	-	-	-	-	-	-	-	5.0	2.5	0.0	2.5
	No	-	-	-	-	-	-	-	-	95.0	97.5	100.0	97.5
7	**Semen at the AI centre**												
	Adequate	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
	Inadequate	-	-	-	-	-	-	-	-	100.0	100.0	100.0	100.0
	Not Available	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
8	**Provision of loan in society or govt. for Purchasing cattle**												
	Adequate	-	-	-	-	-	-	-	-				
	Inadequate	-	-	-	-	-	-	-	-	25.0	25.0	25.0	25.0
	Not Available	-	-	-	-	-	-	-	-	75.0	75.0	75.0	75.0
9	**Charges for insurance**												
	Very high	-	-	-	-	-	-	-	-	-	-	-	-
	High	-	-	-	-	-	-	-	-	-	-	-	-
	Medium	-	-	-	-	-	-	-	-	-	-	-	-
10	**Technical Guidance**												
	Available	100.0	100.0	100.0	100.0	-	-	-	-	100.0	100.0	100.0	100.0
	Not available	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
B	**OUTPUT DELIVERY**												
1	Milk Price(Rs./lit)												
	Adequate	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
	Low	100.0	100.0	-	100.0	-	-	-	-	100.0	100.0	100.0	100.0
2	**Payment of Milk**												
	Immediate	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
	Within 2 days	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0
	Within 15 days	100.0	100.0	-	100.0	-	-	-	-	0.0	0.0	0.0	0.0
	More than 15 days	0.0	0.0	0.0	0.0	-	-	-	-	100.0	100.0	100.0	100.0
3	**incentives or bonus for supplying milk**												

	Adequate	-	-	-	-	-	-	-	-	-	-	-	-
	Low	-	-	-	-	-	-	-	-	-	-	-	-
	Not Available	-	-	-	-	-	-	-	-	100.0	100.0	100.0	100.0
4	**Acceptability cross-bred cow milk in family**												
	Poor	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
	Acceptable	-	-	-	-	-	-	-	-	100.0	100.0	100.0	100.0
	Not acceptable	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
5	**Advance payment for milk by society/ vendors**												
	Available	-	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
	Not available	-	-	-	-	-	-	-	-	100.0	100.0	100.0	100.0

Source: Field Survey Data.

Being a highly perishable output disposal of liquid milk is of extreme importance for growth of the dairy sector. Regularity and adequacy in output service delivery is hence necessary. All the milk producers found the milk procurement price to be low whether being disposed with cooperatives or private vendors. However, the regularity of payment differed between the societies and vendors. Payment from society was received by the suppliers within a week or at most two. But for payment from private agents they had to wait for a month. Nonetheless as regards to disposals none of the households complained about irregularity of payment from DCS though few complained about delayed payment by private agents. There had been no incentive bonus and advance payment to the producers either by cooperative societies or the private agents for supplying milk in the villages of the present study. Though the farmers responded in affirmative as to the acceptability of cross bred milk in the family, but in the previous chapter we had observed that the families prefer milk of the local cow for their own consumption.

7.3 Infrastructural Constraints

Proper infrastructural support to the farmers is one of the necessary conditions for development of dairy farming at the village level. As of infrastructure, it was found that the households mainly suffered from lack of improved equipment and training facilities, irregularity of supply of cattle feed, vaccines, semen at AI centre and infrequent visit of veterinary staff (Table 7.3). This had been the situation in all the villages irrespective of having cooperative society or not. But the farmers never complained about inconveniences as regards to delivery time of milk throughout the year even under extreme climatic conditions.

Table 7.3: Details on Infrastructural Constraints faced by Selected Households

No.	Particulars	Infrastructural Constraints (IC) (% to total responses)							
		DCS households				NDCS households			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Lack of improved equipment								
	Never	0.0	5.0	7.5	12.5	0.0	0.0	10.0	10.0
	Sometime	15.0	27.5	50.0	92.5	5.0	37.5	40.0	82.5
	Always	85.0	67.5	42.5	65.0	95.0	62.5	50.0	69.2
2	Irregular & inadequate supply of cattle feed								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	7.5	25.0	40.0	24.2	10.0	27.5	32.5	23.3
	Always	92.5	75.0	60.0	75.8	90.0	72.5	67.5	76.7
3	Unavailability of emergency veterinary services								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	2.5	22.5	35.0	20.0	10.0	25.0	25.0	20.0
	Always	97.5	77.5	65.0	80.0	90.0	75.0	75.0	80.0
4	Infrequent visit of veterinary staff								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	17.5	20.0	32.5	23.3	7.5	35.0	20.0	20.8
	Always	82.5	80.0	67.5	76.7	92.5	65.0	80.0	79.2
5	Unavailability of vaccines								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	17.5	17.5	30.0	21.7	15.0	27.5	22.5	21.7
	Always	82.5	82.5	70.0	78.3	85.0	72.5	77.5	78.3
6	Occasional Availability of semen at the AI centre								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	5.0	12.5	12.5	10.0	7.5	10.0	25.0	14.2
	Always	95.0	87.5	87.5	90.0	92.5	90.0	75.0	85.8
7	Lack of training facilities								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
8	Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day								
	Never	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Unavailability of green/dry fodder throughout the year								
	Never	22.5	30.0	25.0	25.8	5.0	27.5	20.0	17.5
	Sometime	77.5	70.0	75.0	74.2	95.0	72.5	80.0	82.5
	Always	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Unavailability of cattle feed and fodder seed on credit								
	Never	0.0	20.0	30.0	16.7	5.0	12.5	32.5	16.7
	Sometime	10.0	47.5	55.0	37.5	10.0	42.5	52.5	35.0
	Always	90.0	32.5	15.0	45.8	85.0	45.0	15.0	48.3
11	Low average milk yield of the milk animals								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Field Survey Data.

7.4 Economic Constraints

The agrarian sector in West Bengal, as we all know, is dominated by marginal and small farmers. And in the present study we have seen the eight villages of our concern were no exception to that. So far as the economic capabilities are concerned households of the present study remained enveloped in the lower deciles of economic hierarchy though there had been obvious differences between the size-classes and around membership of cooperative societies. Households in general were faced with economic hardship.

Table 7.4: Details on Economic Constraints faced by Selected Households

No.	Particulars	Economic Constraints (EC) (% to total responses)							
		DCS households				NDCS households			
		SM	MM	LM	TM	SM	MM	LM	TM
1	High cost of fodder seed								
	Never	0.0	10.0	10.0	6.7	0.0	0.0	0.0	0.0
	Sometime	65.0	72.5	55.0	64.2	12.5	40.0	37.5	30.0
	Always	35.0	17.5	35.0	29.2	87.5	60.0	62.5	70.0
2	Delay in payment of milk								
	Never	100.0	100.0	100.0	100.0	50.0	52.5	57.5	53.3
	Sometime	0.0	0.0	0.0	0.0	50.0	47.5	42.5	46.7
	Always	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Low price of milk offered								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
4	High cost of cross bred cow								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	32.5	47.5	26.7	5.0	27.5	42.5	25.0
	Always	100.0	67.5	52.5	73.3	95.0	72.5	57.5	75.0
5	High cost of veterinary medicines								
	Never	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	17.5	40.0	19.2	0.0	20.0	52.5	24.2
	Always	100.0	82.5	60.0	80.8	100.0	80.0	47.5	75.8
6	High cost of cattle feed and mineral mixture								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
7	Low provision of loan in society or govt. for purchasing cattle								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	12.5	20.0	10.8
	Always	100.0	100.0	100.0	100.0	100.0	87.5	80.0	89.2
8	Low incentives or bonus for supplying milk								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
9	High charges of emergency veterinary services								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
10	High charges for insurance								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	NA	NA	NA	NA	NA	NA	NA	NA
	Always	NA	NA	NA	NA	NA	NA	NA	NA

Source: Field Survey Data., *NA= Not Applicable.

Economic adversity had a direct bearing on their responses regarding economic constraints that they are faced with. High cost of feed and mineral mixture, veterinary medicines emergency veterinary services added with low price of milk are major economic hurdles (Table 7.4). A section of NDCS farmers, however, complained about delay in payment by the private vendors.

7.5 Marketing Constraints

The households in general seemed unaware about marketing strategies of their own (Table 7.5). It might have been due to the practice that either they poured the milk in society's procurement centre or the vendors collected the milk from door steps. These had been the assured channel of milk disposal. Hence, lack of time for marketing or risk taking behavior had been none of their concern. The farmers, however, were looking for advance payment for milk. In face of increasing prices of feed, fodder, vaccination and medicines this had been their priority. In addition, there were fewer opportunities to market homemade value added milk products like *Ghee* or *Paneer* or even sweets.

Table 7.5: Details on Marketing Constraints faced by Selected Households

		Marketing Constraints (MC) (% to total responses)							
		DCS households				NDCS households			
No.	Constraints	SM	MM	LM	TM	SM	MM	LM	TM
1	Irregular sell of milk								
	Never	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Lack of time for marketing								
	Never	NR*	NR	NR	NR	NR	NR	NR	NR
	Sometime	NR	NR	NR	NR	NR	NR	NR	NR
	Always	NR	NR	NR	NR	NR	NR	NR	NR
3	Less knowledge about marketing strategies								
	Never	NR*	NR	NR	NR	NR	NR	NR	NR
	Sometime	NR	NR	NR	NR	NR	NR	NR	NR
	Always	NR	NR	NR	NR	NR	NR	NR	NR
4	Low risk taking behaviour								
	Never	NR*	NR	NR	NR	NR	NR	NR	NR
	Sometime	NR	NR	NR	NR	NR	NR	NR	NR
	Always	NR	NR	NR	NR	NR	NR	NR	NR
5	No or less advance payment for milk by society/venders								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
6	Inability to market for value added products								
	Never	5.0	20.0	12.5	12.5	7.5	5.0	10.0	7.5
	Sometime	17.5	22.5	27.5	22.5	12.5	22.5	30.0	21.7
	Always	77.5	57.5	60.0	65.0	80.0	72.5	60.0	70.8

Source: Field Survey Data., NR-Not Reported

7.6 Technical Constraints

All household irrespective of their location in DCS village or not are faced with all technical constraints. In Table 7.6 we find that both DCS and NDCS households were complaining against poor conception rate through AI, poor knowledge about proper feeding and health care and cheap and scientific housing for animals. Unavailability of high genetic merit bull had been a general phenomenon and farmers thus had to depend on AI.

Table 7.6: Details on Technical Constraints faced by Selected Households

No.	Constraints	Technical Constraints (TC) (% to total responses)							
		DCS households				NDCS households			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Lack of technical guidance								
	Never	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Unavailability of high genetic merit bull								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3	Poor conception rate through artificial insemination								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
4	Poor knowledge about Feeding and health care								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
5	Lack of knowledge about cheap & scientific housing of animal								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Field Survey Data.

7.7 Socio-Psychological Constraints

Details of socio-psychological constraints faced by the farmers are presented in Table 7.7. Main constraints for DCS and NDCS farmers turned out to be lack of purchasing power resulting out of lower socio-economic conditions. However, there were few households in middle and large size groups in both types of villages who were in disagreement with the proposition that lower socio-economic condition had a bearing on their behavior.

Table 7.7: Details on Socio-Psychological Constraints faced by Selected Households

No.	Constraints	Socio-Psychological Constraints (SC) (% to total responses)							
		DCS households				NDCS households			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Lower socio- economic conditions								
	Never	0.0	10.0	17.5	9.2	0.0	2.5	17.5	6.7
	Sometime	2.5	37.5	50.0	30.0	0.0	27.5	30.0	19.2
	Always	97.5	52.5	32.5	60.8	100.0	70.0	52.5	74.2
2	Lack of purchasing power								
	Never	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3	Lack of time due to busy in domestic/ agricultural work								
	Never	92.5	92.5	90.0	91.7	90.0	72.5	77.5	80.0
	Sometime	7.5	7.5	10.0	8.3	10.0	27.5	22.5	20.0
	Always	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Lack of cooperation and coordination among members								
	Never	NR*	NR	NR	NR	NR	NR	NR	NR
	Sometime	NR	NR	NR	NR	NR	NR	NR	NR
	Always	NR	NR	NR	NR	NR	NR	NR	NR
5	Milk producers are meant for influential people								
	Never	NR*	NR	NR	NR	NR	NR	NR	NR
	Sometime	NR	NR	NR	NR	NR	NR	NR	NR
	Always	NR	NR	NR	NR	NR	NR	NR	NR
6	Milk of cross-bred cow has poor acceptability (family members)								
	Never	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Sometime	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Always	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Field Survey Data., NR- Not Reported

7.8 Other Constraints

Among other constraints faced by both types of households, lack of awareness about quality milk production, lack of finance for investment, lack of veterinary services and proper medicines and equipment, knowledge about mastitis and lack of poor milk testing facilities were found important (Table 7.8). The NDCS households in addition complained against lack of milk chilling facilities in the village.

Table 7.8: Details on Other Constraints faced by Selected Households

No.	Constraints	Other Constraints (OC) (% to total responses)							
		DCS households				NDCS households			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Unavailability of chilling facilities at village level for milk preservation	0.0	0.0	0.0	0.0	65.0	62.5	65.0	64.2
2	Diversion of feed and fodder ingredients for industrial use	NR*	NR	NR	NR	NR	NR	NR	NR
3	Majority of grazing lands are either degraded or encroached	42.5	7.5	20.0	23.3	25.0	15.0	27.5	22.5
4	Poor access to organized markets deprive farmers in getting proper milk price	2.5	7.5	27.5	12.5	0.0	30.0	37.5	22.5
5	Irregular quality electricity supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Poor irrigation facility to grow fodder crops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Non availability of improved fodder seed	27.5	17.5	5.0	16.7	95.0	65.0	75.0	78.3
8	Poor livestock extension services	27.5	20.0	25.0	24.2	62.5	62.5	50.0	58.3
9	Poor knowledge about scientific animal husbandry practices and dairy farming	35.0	50.0	50.0	45.0	62.5	60.0	55.0	59.2
10	Poor knowledge of mastitis (mastitis in dairy animal) in dairy animals	82.5	72.5	62.5	72.5	97.5	87.5	77.5	87.5
11	Lack of awareness about quality milk production	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
12	Poor housing to milch animals	30.0	25.0	12.5	22.5	47.5	40.0	10.0	32.5
13	Unavailability of medicine and equipment required for quality milk production	65.0	50.0	65.0	60.0	77.5	60.0	57.5	65.0
14	Lack of milk testing and animal screening facilities	62.5	30.0	60.0	50.8	52.5	52.5	52.5	52.5
15	Lack of veterinary services in village for quality milk production	65.0	50.0	65.0	60.0	77.5	60.0	57.5	65.0
16	Lack of nutrition's feed for quality milk production	42.5	57.5	50.0	50.0	72.5	47.5	65.0	61.7
17	Lack of ecto parasites control programmes	NAW#	NAW	NAW	NAW	NAW	NAW	NAW	NAW
18	Lack of finance to invest in dairy business for quality milk production/ Inadequate finance	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
19	Lack of necessary space required for tying the milking animals	2.5	20.0	32.5	18.3	0.0	30.0	25.0	18.3
20	Lack of marketing facility for dairy business	20.0	20.0	22.5	20.8	60.0	60.0	52.5	57.5
21	Uneconomical capital investment on quality milk production	NAW	NAW	NAW	NAW	NAW	NAW	NAW	NAW
22	Lack of water supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	Inadequate labour supply	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	Ecological factors- High heat/temperature, High cold, etc	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	Competition from established and large units	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	Difficulty to store milk in summer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	low acceptability of AI in buffalo	NA+	NA	NA	NA	NA	NA	NA	NA
28	Disease outbreak: mortality and morbidity	27.5	17.5	25.0	23.3	37.5	40.0	32.5	36.7
29	Politics in Cooperative is not good	NR	NR	NR	NR	NR	NR	NR	NR

Source: Field Survey Data, *NR-Not Responded; #NAW-Not Aware, +NA-Not Applicable (As no Buffalo)

7.9 Suggestions

Suggestions were sought from the respondents as to their opinion regarding development of the dairy sector in the villages. Irrespective of their locational specificity and position in the size-class hierarchy suggestions centered on a number of parameters that in their assessment could improve the situation and expedite development process. As suggested by the farmers there were urgent need to improve the service delivery along with reducing the cost of medical and veterinary services including AI (Table 7.9). Moreover, regular and timely availability of these services should be ensured. Farmers felt that they were lacking proper technical knowledge for managing the dairy enterprise. So, provisions could be extended to impart scientific and technical knowhow to the farmers. Veterinary literature should be made available at the village level. But over and above all there had been a unanimous demand to enhance the milk procurement price by the milk cooperative societies as well as by the private vendors. It is a fact that the private vendors operated outside the purview of the milk societies and functioned in a manner that the individual farmers had been in a no-bargain situation as regards to price. Prices offered by the middlemen in this sector were rather low. Hence, the NDCS farmers were looking for village level outlets for milk and milk products.

Future Challenges

West Bengal features an ever increasing population on a fertile land. In thickly populated villages it is the marginal and small cultivators who are of sizeable majority. In addition there are landless populations who are mostly wage earners. Still cropping is the main source of livelihood in the rural areas of the state. This was reflected in the results of the present study. We have mentioned that the farmers in the villages tried to pursue dairy activities as an alternative source of income. As a means of living animal husbandry in general and dairy enterprises in particular could play a significant role. But tiny producers scattered over the whole of the state have to be roped in a form of society that could render the necessary assistance to them. With such intensions the dairy cooperative societies were established. But outreach of these societies is still very limited and a large section of dairy farmers are left out of the little benefits that are being imparted by the primary dairy societies. The cooperative societies, on the other hand, are faced with a number of governance restrictions and other limitations of which we shall be discussing

later in this chapter. Presently we take up the constraints faced by the primary dairy cooperative societies.

Table 7.9: Suggestions for improvement in adoption of dairy schemes

Sr. No	Suggestions	% of response to DCS				% of response to NDCS			
		SM	MM	LM	TM	SM	MM	LM	TM
1	Marketing facilities be provided at village level for the outlet of milk and milk products	20.0	20.0	22.5	20.8	60.0	60.0	52.5	57.5
2	Providing technical knowledge to manage the dairy Enterprise	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3	There should be regular and planned supply of vaccines (100%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
4	Subsidies should be given on certain inputs like veterinary medicines, fodder seeds, etc.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
5	Enhanced milk price for the producers	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
6	Loan sanction procedure should be made easy	7.5	30.0	40.0	25.8	0.0	10.0	22.5	10.8
7	The loan amount for the purchase dairy animals need to be increased	2.5	12.5	27.5	14.2	0.0	7.5	5.0	4.2
8	Concentrates should be made available at cheaper rate and in time	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
9	Providing proper A.I. facility at village level /door step	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
10	Cost of veterinary services need to be reduced	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
11	Provide veterinary literature in village	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
12	Small scale dairy industries be encouraged at village level	10.0	32.5	35.0	25.8	7.5	17.5	30.0	18.3
13	Need to improve service delivery	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Field Survey Data

7.10 Constraints faced by PDCS /Private Dairy Units

Major constraints faced by the cooperative societies could be classified into three broad categories viz. milk supply related, infrastructural and market related constraints. From Table 7.10 it is seen that inability on the part of DCS to make advance payment to milk producers is visualized as one of the major hurdles. The DCSs were unable to provide feed and fodder seeds on credit. Inadequate and irregular supply of milk had been a problem in Bankura and Nadia. However, all the DCS were of the opinion that the average milk yield in the respective areas was sometimes low. Unavailability of emergency veterinary services and infrequent visit by veterinary staff had been a serious obstacle in Nadia, North and South Twenty Four Parganas. Large number of small producers in Nadia and South Twenty Four Parganas posed serious problem of monitoring and follow-up activities by the DCSs. In Bankua, South and North Twenty Four Parganas Scarcity of green fodder throughout the year had also been a serious problem.

Table 7.10: Milk Supply related Constraints faced by the PDCS & Private Dairy Units

No.	Constraints	Milk Supply related Constraints faced by (% to total responses)							
		PDCS (% to total responses)				PDU (% to total responses)			
		Bankura	Nadia	South 24 Parganas	North 24 Parganas	Bankura	Nadia	South 24 Parganas	North 24 Parganas
1	High number of small producers								
	Never	25.0	0.0	0.0	25.0	-	-	-	-
	Sometime	0.0	12.5	0.0	0.0	-	-	-	-
	Always	0.0	12.5	25.0	0.0	-	-	-	-
2	No or less provision for advance payment for milk by society or vendors								
	Never	0.0	0.0	0.0	0.0	-	-	-	-
	Sometime	0.0	12.5	0.0	0.0	-	-	-	-
	Always	25.0	12.5	25.0	25.0	-	-	-	-
3	Unable to provide cattle feed and fodder seed on credit to members								
	Never	0.0	0.0	0.0	0.0	-	-	-	-
	Sometime	0.0	0.0	0.0	25.0	-	-	-	-
	Always	25.0	25.0	25.0	0.0	-	-	-	-
4	Poor Quality milk								
	Never	0.0	0.0	0.0	0.0	-	-	-	-
	Sometime	25.0	25.0	25.0	0.0	-	-	-	-
	Always	0.0	0.0	0.0	25.0	-	-	-	-
5	Irregular & inadequate supply of milk								
	Never	0.0	0.0	25.0	25.0	-	-	-	-
	Sometime	12.5	25.0	0.0	0.0	-	-	-	-
	Always	12.5	0.0	0.0	0.0	-	-	-	-
6	Late delivery								
	Never	25.0	0.0	25.0	0.0	-	-	-	-
	Sometime	0.0	25.0	0.0	25.0	-	-	-	-
	Always	0.0	0.0	0.0	0.0	-	-	-	-
7	Unavailability of emergency veterinary services								
	Never	25.0	0.0	0.0	0.0	-	-	-	-
	Sometime	0.0	25.0	12.5	25.0	-	-	-	-
	Always	0.0	0.0	12.5	0.0	-	-	-	-
8	Infrequent visit of veterinary staff								
	Never	0.0	0.0	0.0	0.0	-	-	-	-
	Sometime	25.0	25.0	12.5	12.5	-	-	-	-
	Always	0.0	0.0	12.5	12.5	-	-	-	-
9	Unavailability of vaccines								
	Never	25.0	25.0	25.0	0.0	-	-	-	-
	Sometime	0.0	0.0	0.0	12.5	-	-	-	-
	Always	0.0	0.0	0.0	12.5	-	-	-	-
10	Occasional availability of semen at the AI centre								
	Never	25.0	25.0	25.0	25.0	-	-	-	-
	Sometime	0.0	0.0	0.0	0.0	-	-	-	-
	Always	0.0	0.0	0.0	0.0	-	-	-	-
11	Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day								
	Never	25.0	25.0	12.5	0.0	-	-	-	-
	Sometime	0.0	0.0	12.5	25.0	-	-	-	-
	Always	0.0	0.0	0.0	0.0	-	-	-	-
12	Unavailability of green/ dry fodder throughout the year								
	Never	0.0	25.0	0.0	0.0	-	-	-	-
	Sometime	25.0	0.0	0.0	25.0	-	-	-	-
	Always	0.0	0.0	25.0	0.0	-	-	-	-
13	Low average milk yield of the milk animals in area								
	Never	0.0	0.0	0.0	0.0	-	-	-	-
	Sometime	25.0	25.0	25.0	25.0	-	-	-	-
	Always	0.0	0.0	0.0	0.0	-	-	-	-
14	Lack of cooperation and coordination among members								
	Never	25.0	25.0	0.0	0.0	-	-	-	-
	Sometime	0.0	0.0	25.0	25.0	-	-	-	-
	Always	0.0	0.0	0.0	0.0	-	-	-	-

Source: Field Survey Data.

Note: There were no PDU in the districts under consideration.

Among the infrastructural constraints lack of training facilities and necessary space for diary activities turned out to be major constraints (Table 7.11). In addition lack of improved equipment and scarcity of decentralized chilling facilities sometimes posed hindrance to activities of DCSs.

Table 7.11: Infrastructure related Constraints faced by the PDCS & Private Dairy Units

No.	Constraints	Infrastructure related Constraints faced by (% to total responses)							
		PDCS (% to total responses)				PDU (% to total responses)			
		Bankura	Nadia	South 24 Parganas	North 24 Parganas	Bankura	Nadia	South 24 Parganas	North 24 Parganas
1	Unavailability of chilling facilities at village level for milk preservation.								
	Never	12.5	25.0	0.0	0.0	-	-	-	-
	Sometime	12.5	0.0	25.0	0.0	-	-	-	-
	Always	0.0	0.0	0.0	25.0	-	-	-	-
2	Lack of improved equipment								
	Never	0.0	25.0	0.0	0.0	-	-	-	-
	Sometime	12.5	0.0	0.0	25.0	-	-	-	-
	Always	12.5	0.0	25.0	0.0	-	-	-	-
3	Lack of necessary space required for dairy operation								
	Never	0.0	25.0	0.0	0.0	-	-	-	-
	Sometime	12.5	0.0	12.5	25.0	-	-	-	-
	Always	12.5	0.0	12.5	0.0	-	-	-	-
4	Lack of training facilities								
	Never	0.0	25.0	0.0	0.0	-	-	-	-
	Sometime	12.5	0.0	0.0	25.0	-	-	-	-
	Always	12.5	0.0	25.0	0.0	-	-	-	-

Source: Field Survey Data.
Note: There were no PDU in the districts under consideration.

Table 7.12: Market related Constraints faced by the PDCS & Private Dairy Units

No.	Constraints	Market related Constraints faced by (% to total responses)							
		PDCS (% to total responses)				PDU (% to total responses)			
		Bankura	Nadia	South 24 Parganas	North 24 Parganas	Bankura	Nadia	South 24 Parganas	North 24 Parganas
1	Inability to market for value-added products								
	Never	0.0	0.0	0.0	0.0	-	-	-	-
	Sometime	0.0	0.0	0.0	0.0	-	-	-	-
	Always	25.0	25.0	25.0	25.0	-	-	-	-
2	Competition from private dairy								
	Never	25.0	0.0	0.0	0.0	-	-	-	-
	Sometime	0.0	0.0	12.5	25.0	-	-	-	-
	Always	0.0	25.0	12.5	0.0	-	-	-	-
3	Poor Road infrastructure								
	Never	0.0	25.0	0.0	0.0	-	-	-	-
	Sometime	12.5	0.0	0.0	25.0	-	-	-	-
	Always	12.5	0.0	25.0	0.0	-	-	-	-
4	Unstable prices of milk								
	Never	12.5	0.0	0.0	0.0	-	-	-	-
	Sometime	12.5	25.0	25.0	25.0	-	-	-	-
	Always	0.0	0.0	0.0	0.0	-	-	-	-
5	Competition from imported dairy product								
	Never	25.0	25.0	25.0	25.0	-	-	-	-
	Sometime	0.0	0.0	0.0	0.0	-	-	-	-
	Always	0.0	0.0	0.0	0.0	-	-	-	-

Source: Field Survey Data.
Note: There were no PDU in the districts under consideration.

Market related constraints included DCS's inability to market value added milk products in all districts. In fact there was no provision at the DCS level to process milk and produce value added products. The DCSs generally collected and chilled the milk in their chilling plant located centrally and transport it to the milk unions. The DCSs of Nadia, North and South Twenty Four Parganas faced competition from private dairy operating in the districts (Table 7.12). The primary dairy cooperatives of Bankura and North Twenty Four Parganas complained about occasionally poor roadway infrastructure. In South twenty Four Parganas roadway communication had long been difficult. Instability of milk price was another difficulty faced by DCSs.

7.11 Constraints faced by Milk Unions

There were, however, various issues as regards to functioning of the milk unions in the districts. First and foremost was deficiency in skilled manpower of which all the milk unions were suffering (Table 7.13). In Nadia skilled personnel in key positions like product marketing and managerial work for DCS were priority. Almost all the milk unions suffered from manpower shortage.

Technical constraints included unavailability of required inputs, technical knowhow and instruments to detect adulterants in milk, state of the art technology for quick fat detection. In view of poor electric supply in South Twenty Four Parganas, there was demand for bulk milk cooler runby solar energy. North Twenty Four Parganas, however, did not report any technical constraint.

As far as the governance issues were concerned, it was observed that some of the milk unions were looking for autonomy and staff recruitment for smooth functioning and monitoring of the MU and the DCSs. Formation of new Board of Directors was a necessity in Nadia for good governance. In Bankura, the political intervention must have been posing hindrance for effective operation of the MU.

Gradual increase in overhead expenditure coupled with decreasing quantum of milk procurement had resulted in a severe financial crisis in the districts of Nadia and North Twenty Four Parganas.

There were few valuable suggestions by the responsible administrative authorities of the milk unions so as to enhance the dairy practices. In the face of increasing price level and

intervention of private players in the sector, remunerative and competitive price for milk might be offered to motivate dairy farmers for production of quality milk. Processing plants are of urgent importance for production of value added milk products. Increasing awareness and imparting training as regards to milking own cow to the farmers was thought essential to get rid of their dependency on milk vendors.

Table 7.13: Constraints faced by Milk Unions-West Bengal

Sr. No	Particulars	Constraints faced by Milk Unions in West Bengal			
1	**Milk Union (Name)**	**Bankura**	**Nadia**	**South 24 Parganas**	**North 24 Parganas**
2	Constraints faced				
a	Manpower Constraints (eg. Problems In Recruiting Staff, Etc.)	• There is acute shortage of skilled manpower. • Fresh recruitment is also a problem.	• Acute shortage of manpower in key positions like Product marketing, DCS Supervisory work and Milk Procurement etc. • Formationof Board of Directors is necessary.	• Skilled personnel for running the MU and DCSs are required. • New recruitments are necessary.	• Insufficiency of skilled manpower. • Fresh recruitment is not possible due to financial hardship.
b	Technical Constraints	• There is shortfall in technical assistance. • Availability of inputs remains a constant problem.	• Technical assistance with availability of instruments for detection of adulterants (like whey water, veg. oil) in milk on spot is highly needed during milk collection at reception centre	• Bulk milk cooler with solar panel are required for the district where the electricity connectivity and supply is poor. • Fat detection technique being used presently takes time. Updated technology for detection of fat is required. • For ensuring the cold chain for milk supply non-conventional sources of energy (e.g. solar panel) might be an alternative.	• No problem as regards to availability and supply of inputs.
c	Governance Issues	• Autonomy may be given to decide producers' and consumers' price for milk. • Autonomy in recruitment and transfer of staff is required for smooth functioning. • Political interference poses hindrance in functioning of the MU.	• The Milk Union is managed by its bye-laws, WBCS Act & Rules. Formation & functioning of Board of Directors as per bye-laws of the Milk Union is essential for good governance.	• As many areas of this district is very remote and is difficult to commute, day to day monitoring becomes a little difficult in view of scarcity of personnel. • Payment for milk procurement must be computerized with the central server at MU office so that the books of accounts could be maintained properly.	• The Milk Union functions as per rules of West Bengal Cooperative Society Act & Rules. • The Union operates under the technical and administrative guidance of West Bengal Milk Federation and NDDB.
d	Financial Constraints	• There is no financial constraint.	• Gradual enhancement of overhead expenditure, decreasing quantum of milk procurement and low milk price retention are the major financial constraints. • Acute financial	• At present there is little financial hardship.	• With decrease in the quantity of milk procurement the Union is faced with severe financial hardship.

			stringency is posing hindrance in day to day functioning.		
3	Any Other suggestion	-	• The MU is facing an uneven competition in milk procurement in the face of higher milk price offered by private units irrespective of the quality of milk. • Competitive milk price is needed to ensure the quality & quantity of milk supplied by the farmers and motivating them to join DCS. • Increasing awareness and imparting training as regards to milking own cow to the farmers is essential to get rid of their dependency on milk vendors.	• Farmers are to be motivated for improving the quality of milk through remunerative price. • Value added dairy products should be produced with establishment of processing plant. • Farmers are to be motivated to insure the cattle.	-
4	Potential For Future	-	• Extension of input distribution and transfer of modern technology through DCS would add impetus to better entrepreneurship. • Creation of extensive infrastructure for milk reception centres through DCS would help the farmers to cope with exploitation by the middlemen. • Extension of plants for milk processing and manufacturing value added milk products might be helpful in offering better price for liquid milk to the farmers.	• Improvement of roadway infrastructure to Kolkata can open up new marketing avenues.	-

Source: As reported by the Managing Directors of the Milk Unions.

7.11 Chapter Summary

Constraint faced by Producers

As regards to delivery of cattle feed from the DCS and private agents it was found inadequate. Most of the households could purchase cattle feed on credit from private agents only. There was no provision of credit from the dairy cooperatives. Cattle feed and mineral mixtures, when purchased from open market or private agents had been much costlier than that been supplied by the cooperatives.

Emergency veterinary service in general was made available by the private agents in all the villages though charges for such had been high. Vaccines too, been supplied by the private agents, were inadequate in supply and poor in quality. Semen had also been insufficient in supply.

All the milk producers found the milk procurement price to be low whether being disposed with cooperatives or private vendors. However, the regularity of payment differed between the societies and vendors. There had been no incentive bonus and advance payment to the producers either by cooperative societies or the private agents for supplying milk.

As of infrastructure, it was found that the households mainly suffered from lack of improved equipment and training facilities, irregularity of supply of cattle feed, vaccines, semen at AI centre and infrequent visit of veterinary staff.

High cost of feed and mineral mixture, veterinary medicines emergency veterinary services added with low price of milk are major economic hurdles.

The households in general seemed unaware about marketing strategies of their own. Lack of time for marketing or risk taking behavior had been none of their concern.

Both DCS and NDCS households were complaining against poor conception rate through AI, poor knowledge about proper feeding and health care and cheap and scientific housing for animals.

Main constraints for DCS and NDCS farmers turned out to be lack of purchasing power resulting out of lower socio-economic conditions.

Among other constraints lack of awareness about quality milk production, lack of finance for investment, lack of veterinary services and proper medicines and equipment, knowledge about mastitis and lack of poor milk testing facilities were found important.

As suggested by the farmers there were urgent need to improve the service delivery along with reducing the cost of medical and veterinary services including AI. Moreover, regular and timely availability of these services should be ensured. Farmers felt that provisions could be extended to impart scientific and technical knowhow to them.

Constraints faced by DCS

All the DCS were of the opinion that the average milk yield in the respective areas was sometimes low. Unavailability of emergency veterinary services and infrequent visit by veterinary staff had been a serious obstacle in Nadia, North and South Twenty Four Parganas. Large number of small producers in Nadia and South Twenty Four Parganas posed serious problem of monitoring and follow-up activities by the DCSs.

Among the infrastructural constraints lack of training facilities and necessary space for diary activities turned out to be major constraints.

Market related constraints included DCS's inability to market value added milk products in all districts. In fact there was no provision at the DCS level to process milk and produce value added products.

Constraints faced by MU

There was deficiency in skilled manpower of which all the milk unions were suffering.

Technical constraints included unavailability of required inputs, technical knowhow and instruments to detect adulterants in milk, state of the art technology for quick fat detection.

As far as the governance issues were concerned, it was observed that some of the milk unions were looking for autonomy and staff recruitment for smooth functioning and monitoring of the MU and the DCSs. Formation of new Board of Directors and reduction in political intervention was also necessary.

Gradual increase in overhead expenditure coupled with decreasing quantum of milk procurement had resulted in a severe financial crisis in the districts of Nadia and North Twenty Four Parganas.

Suggestions

In the face of increasing price level and intervention of private players in the sector, remunerative and competitive price for milk might be offered to motivate dairy farmers for production of quality milk. Processing plants are of urgent importance for production of value added milk products. Increasing awareness and imparting training is also a necessity.

Chapter VIII

Conclusions and Recommendations

8.1 Conclusions

On the basis of the discussions made in the preceding chapters we come to the conclusions that

- The State and Central Government policy has been providing necessary support for dairy development in the state of West Bengal through co-operative sector.
- However, as against the estimated animals' requirements, feed resources available in West Bengal are lower.
- In West Bengal, however, there exists high incidence of non-descript cows in comparison with the crossbred varieties.
- In terms of socio-economic parameters villages of four districts (both DCS and NDCS villages) reveal more or less similar pattern. Families were mostly farming families pursuing cultivation as their principal occupation. Most of the households took up dairy enterprise as their subsidiary source of income. In the villages dairy enterprise was being run solely by family labour. It is noteworthy to mention participation of women family members remained crucial for such operation.
- Poor state of awareness about various dairy developments schemes were observed among the NDCS households. For the DCS farmers knowledge had been imparted by the milk cooperatives and milk unions functioning in the area. For the NDCS farmers, however, source of their awareness had been fellow farmers and neighbours. A dismal scenario was observed as regards to insurance coverage for the cattle in all the villages regardless of DCS or NDCS.
- It is observed that labour cost has been the main component of total cost in all cases. There might be over optimal use of family labour.
- The milk cooperatives, though operating in every district, were too small in number to wrap the large number of small milk producers in respective areas. Moreover, their procurement capacity had been rather small as compared to the supply of liquid milk. And these cooperatives were faced with competition from the

enumerable private intermediaries who collected the milk from producer's door steps.

- Service delivery of cattle feed and fodder was found inadequate. Moreover, there was no provision of credit from the dairy cooperatives. Cattle feed and mineral mixtures, when purchased from open market or private agents had been much costlier.
- Procurement price of milk had been non-remunerative for the farmers whether purchased by cooperatives or private vendors.
- As of infrastructure, the households suffered from lack of improved equipment, training facilities, irregularity of supply of cattle feed, vaccines, semen at AI centre and infrequent visit of veterinary staff. Charges for emergency veterinary service provided by private agents had been high.
- Lack of awareness about quality milk production and lack of finance for investment had been important problems.
- All the DCS were of the opinion that the average milk yield in the respective areas was sometimes low. Unavailability of emergency veterinary services and infrequent visit by veterinary staff had been a serious obstacle. Large number of small producers also posed serious problem of monitoring and follow-up activities by the DCSs.
- There was severe deficiency in skilled manpower of which all the milk unions were suffering. Technical constraints included unavailability of required inputs, technical knowhow and instruments to detect adulterants in milk, state of the art technology for quick fat detection. As far as the governance issues were concerned, it was observed that some of the milk unions were looking for autonomy and staff recruitment for smooth functioning and monitoring of the MU and the DCSs. Gradual decrease in quantum of milk procurement has posed serious threat.
- Over and above all, there exists deficiency in secondary information as regards to dairy sector development in villages, districts and the state in West Bengal.

8.2 Suggestions

- Innumerable small dairy farms are to be fastened in some sort of milk chain by the cooperative societies. So, there is urgent need to enhance the number of PDCS in each district to reduce the exploitation by private vendors.
- The infrastructure for milk procurement and transportation should be improved at the DCS level.
- Enhanced operation of DCS offering remunerative price to farmers can motivate them in joining the society and at the same time this partnership would be able to make a dent in farmers' economic hardship.
- Service delivery of feed and fodder to be enhanced. Provision for vaccinations and emergency veterinary services including AI needed to be boosted. In this aspect DCSs working at the village level could play an important role.
- Re-orientation and proper implementation of government policies for dairy development at the grassroots must be taken care of. And in view of such re-orientation more autonomy and funds are to be provided to DCS.
- For increasing awareness regarding scientific dairy farming new training programmes need to be arranged especially for the women. These might be able serve twin purposes of imparting improved consciousness among women regarding dairy farming and might as well be supportive for women empowerment in the village society. Department of Animal Husbandry of the State Government along with the milk unions could take up such programmes.
- It remained essential that the farmers be motivated to insure their cattle for it minimized the risk. Procedural changes, if necessary, can be thought of so that the farmers can avail these benefits. Outreach of the facility needs to be provided at the village level. For DCS membership insuring cattle might be made a mandatory criterion.
- The DCSs were of opinion that there had been fluctuations in milk yield across seasons. Proper and scientific dairy practices backed by better awareness supported by government veterinary and DCS staff might be able to bring about a change in such paucity.

- The milk unions be provided with skilled manpower for proper implementation and monitoring of the operations of DCS. More autonomy in MUs' functioning might be necessary and political intervention must be restricted.
- Establishing milk processing plants in the districts are of urgent importance for production of value added milk products that would ensure higher return.
- Offering remunerative price for milk is a decision that depends on the policy of the government. In face of rising cost a hike in procurement price may be thought of which in turn would motivate and improve economic conditions of the farmers.
- As such there are ample central and state sector schemes for development of animal husbandry in general and dairy expansion in particular. Convergences of many of such schemes were found in the survey area of this present study. But the scope and coverage seemed somewhat restrictive. Policy re-orientation might be sought for rejuvenating the dairy sector in the villages of West Bengal.

Bhattacharya D. (1976). India's Five Year Plan : An Economic Analysis, Progressive Publishers, Calcutta, 1976,P.46

Birthal, Pratap S. (2016). Innovations in Marketing of Livestock Products in India, Indian Journal of Agricultural Marketing, Vol. 30, No. 3, September – December, pp.88-107.

Birthal, Pratap S. and Digvijay S. Negi (2012). Livestock for Higher, Sustainable and Inclusive Agricultural Growth, Economic and Political Weekly, Vol. XLVII, Nos. 26 & 27, pp. 89-99.

GOI (1984).Report of working group on Animal Husbandry Conference, Calcutta, 1984.

GOI (2010). Basic animal husbandry statistics, Dept. of Animal Husbandry, Dairying and Fisheries, Govt. of India (2010)

GOI (2011).Census of India 2011, Office of the Registrar General and Census Commissioner, India.

GOI (2012a). Economic Survey, Ministry of Finance, Govt. of India (2011-12)

GOI (2012b). Report of the Working Group on Animal Husbandry and Dairying 12th Five Year Plan (2012-17), Planning Commission, Government of India, New Delhi.

GOI (2013). Statewise Estimates of Value of Output from Agriculture and Allied Activities with New Base Year 2004-2005, CSO, MOSPI, Government of India.

GOI (2014).Basic Animal Husbandry & Fisheries Statistics, AHS Series-15,Department of Animal Husbandry, Dairying and Fisheries , Ministry of Agriculture, Krishi Bhawan, New Delhi.

GOI (2014). Key Indicators of land and livestock holdings in India, National Sample Survey Office, Ministry of Statistics and Programme Implementation, Delhi.

GOI (2015). Basic Animal Husbandry & Fisheries Statistics-2016, Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Government of India.

GOI (2016a). Statewise Estimates of Value of Output from Agriculture and Allied Activities with New Base Year 2011-2012, CSO, MOSPI, Government of Indai (2016).

GOI (2016b). Basic Animal Husbandry & Fisheries Statistics-2016, Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Government of India.

GOI (2016c). Integrated Sample Survey, Basic Animal Husbandry and Fisheries Statistics, 2016, Department of Animal Husbandry, Ministry of Agriculture and Farmers Welfare, Government of India

GOWB (2000). Statistical Abstract, Bureau of Applied Economics and Statistics, Government of West Bengal

GOWB (2004). Statistical Abstract, Bureau of Applied Economics and Statistics, Government of West Bengal

GOWB (2011). Annual Administrative Report-2010-11, Animal Resources Development Department, Government of West Bengal

GOWB (2013). Statistical Abstract, Bureau of Applied Economics and Statistics, Government of West Bengal

GOWB (2014a). Statistical Abstract, Bureau of Applied Economics and Statistics, Government of West Bengal

GOWB (2014b). Annual Administrative Report-2013-14, Animal Resource Development Department, Government of West Bengal

Gupta, H.C. (2011). Dairying in India, Bombay: ASIA Publishing House, p.125.

Kalamkar, S. S.; H. Sharma and M. Makwana (2017). Assessment of the Status of Dairying and Potential to Improve Socio-Economic Status of the Milk Producers and Convergence of all Central & State Schemes at District level in Gujarat, AERC Report No. 168, Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat.

Khurody, D.N. (1974). Dairying in India, Bombay: ASIA Publishing House, p.105.

Kishore, Avinash; Pratap S. Birthal; P. K. Joshi; Tushaar Shah and Abhishek Saini (2016). Patterns and Drivers of Dairy Development in India: Insights from Analysis of Households and District-level Data, Agricultural Economics Research Review, Vol. 29 (No. 1), January-June 2016, pp. 1-14.

Meena, G. L. and D. K. Jain (2012). Economics of Milk Production in Alwar District (Rajasthan): A Comparative Analysis, *International Journal of Scientific and Research Publications*,2(8): 1-5.

Mishra, Prachi and Devesh Roy (2011).Explaining Inflation in India: The Role of Food Prices, (Mime), International Monetary Fund, Washington, D.C.

NAAS (2003).“Export Potential of Dairy Products, Policy Paper 23, National Academy of Agricultural Sciences, India, December.

NABARD (1999). Annual Report, National Bank for Agriculture and Rural Development, Mumbai

NDDB (2011).Annual Report– 2010-11, New Delhi.

NDDB (2014). Compendium of Documents on Dairy development and Animal Husbandry Schemes being implemented by different departments of Government of India, NDDB, August 2004, Mimeo.

NDDB (2017). Dairying in West Bengal, A Statistical Profile 2017, Salt Lake, Kolkata.

NSSO (1987).Estimates of livestock and Agricultural Implements Classified by Household Operational Holding, 37th Rounds, Report No.338, National Sample Survey Office, Ministry of Statistics and Programme Implementation, GOI.

NSSO (1997). Livestock & Agricultural Implements in Household operational holdings, 1991-92, 48th Rounds, Report No. 408, National Sample Survey Office, Ministry of Statistics and Programme Implementation, GOI.

NSSO (2006). Livestock ownership across operational land holding classes in India, 2002-03, 59th Rounds, Report No. 493, National Sample Survey Office, Ministry of Statistics and Programme Implementation, GOI.

Rajendran, K. and Samarendu Mohanty (2004). Dairy Cooperatives and Milk Marketing in India: Constraints and Opportunities, Journal of Food Distribution Research, Vol. 35, No. 2, July, pp.34-41.

Rajeshwaran, S. & Gopal Naik (2016). Milk production in India rises by a historic 6.25% in 2014-15: A boon or a bane?, IIMB-WP N0. 518

Randolph T.F. , Schelling E., Grace D., Nocholson C F, Leroy J K, Cole D C, Demment M W, Omore A, Zinsstag J, Rule M (2007). Role of Livestock in human Nutrition and Health for Poverty Reduction in Developing Countries, Journal of Animal Sciences, Vo. 85, pp. 2788-2800.

Sarkar, Debnarayan and Bikash Kumar Ghosh (2010). Constraints of Milk Production: A Study on Cooperative and Non-cooperative Dairy Farmers in West Bengal, Agricultural Economics Research Review, Vol. 23, July December 2010, pp. 303-314.

Saxena, R. Et al (2002), "Life Cycle Assessment of Milk Production in India", *Int J LCA*, Vol.7 (3), Pp. 1- 89.

Sharma, Vijay Paul (2004). Livestock Economy of India: Current Status, Emerging Issues and Long Term Prospects, Keynote Paper, Indian Journal of Agricultural Economics, Vol. 59, No. 3, p. 512-554 July-September 2004.

Shiyani, R.L. (1996). An Economic Inquiry into the Impact of Dairy Cooperatives on Milk Production, Indian Journal of Agricultural Economics, Vol. 51, no. 3, July-September, pp. 396 –406.

Singh, K. M. And M. S. Meena (2012). Livestock Value Chains: Prospects, Challenges and Policy Implications, in Eds: B. P. Bhatt, A. K. Sikka, Joydeep Mukherjee, Adlul Islam, A. Dey, Status of Agricultural Development in Eastern India, pp. 493-508.

Websites visited:

http://dahd.nic.in

http://dahd.nic.in/sites/default/files/BAHS-2016%20Updated%20on%2016.08.16.pdf.

http://dahd.nic.in/dahd/division/cattle-and-dairy-development.aspxhttp://www.fao.org/wairdocs/lead/x6170e/x6170e2z.htm

http://data.gov.in/keywords/capita-availability

http://www.nddb.org/sites/default/files/pdfs/guidelines/PIP-Vol-VGuidelines-on-RBP-FD.pdf

Annexure I

Comments on draft report

Assessment of the status of Dairying and Potential to improve Socio-Economic Status of the Milk Producers and Convergence of all Central & State Schemes at District Level in West Bengal

Comments received from the Coordinating Centre

Agro-Economic Research Centre
For the states of Gujarat and Rajasthan
(Ministry of Agriculture & Farmers Welfare, Govt. of India)
Sardar Patel University, Vallabh Vidyanagar, Dist. Anand, Gujarat

1.	Title of report	Assessment of the status of Dairying and Potential to improve Socio-Economic Status of the Milk Producers in **West Bengal**
2.	Date of receipt of the Draft report	28/08/2017
3.	Date of dispatch of the comments	29/09/2017
4.	Comments on the Objectives of the study	Objectives of the study have been satisfied.
5.	Comments on the methodology	As suggested, proper sampling and methodology have been used.
6.	Comments on analysis, organization, presentation etc.	Detailed analysis is undertaken and organized as suggested. Add Executive Summary.
7.	References:	Source of data is mentioned
8.	General remarks:	The study is a comprehensive study on dairy sector in West Bengal and suggested appropriate and feasible policy measures.

9. Overall view on acceptability of report: The report is acceptable after incorporation of executive summary as mentioned above.

Annexure II

Action Taken based on Comments on draft report

Assessment of the status of Dairying and Potential to improve Socio-Economic Status of the Milk Producers in West Bengal

1.	Title of report	**Necessary changes in the title have been incorporated.**
2.	Date of receipt of the comments	29/09/2017
3.	Date of dispatch of the final report	21/10/2017
4.	Comments on the Objectives of the study	No changes were suggested.
5.	Comments on the methodology	No changes were suggested.
6.	Comments on analysis, organization, presentation etc.	Executive Summary has been incorporated.
7.	References:	No changes were suggested.
8.	General remarks:	No changes were suggested.
9.	Acceptability of report:	As proposed the Executive Summary has been added and the final report is being submitted.

Authors