Report No. 44

Assessment of the Status of Dairying in the Eastern States and Potential to Improve Socio-Economic Status of the Milk Producers and Convergence of All Central & State Schemes at District Level in Bihar

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Preface

The study entitled ***"Assessment of the Status of Dairying in the Eastern States and Potential to Improve Socio-Economic Status of the Milk Producers and Convergence of all Central & State Schemes at District Level in Bihar"*** *has been assigned by the Directorate of Economics & Statistics, Ministry of Agriculture & Farmers Welfare, Government of India to this Centre under the co-ordination of Agro-Economic Research Centre, Vallabh Vidyanagar, Anand, Gujarat.*

The study reveals that Bihar is one of the leading states in terms of quality of milch animal, milk production and the state ranks ninth among the milk producing states of India, achieving 82.88 thousand tones in 2015-16 and its procurement share in India is 4.06 per cent. The per capita availability of milk in the state has been increased from 88 gms/day in 2001-02 to 208 gms/day in 2014-15. The technology being used is now decades old with no primary processing /cooling facility at the farm/village level. Despite that, animal husbandry along with agriculture is one of the key sectors which provide massive employment and income opportunities for the rural population of the Bihar.

We deem it our duty to acknowledge the co-operation extended by all those who have greatly helped us in completion of this study. So, we wish to express our thanks to all the members of the project team for their hard efforts in bringing it in to perfect shape. We extend our heart full thanks to the co-ordinating centre i.e., AER Centre, Vallabh Vidyanagar, Anand, Gujarat for providing necessary guidelines and time to time suggestion through e-mail and telephonic contact during the conduct of the study. We are also thankful to Prof. (Dr.) S S Kalamkar, Director, AER Centre, Vallabh Vidyanagar, Gujarat for his valuable comments on the draft report.

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We will be failing in our duty, if we do not thank to the respondents for sparing their valuable time and providing information and data.

We do hope that the findings and suggestions made in this study would be useful to policy makers, functionaries, professionals and scholars as well.

Basant Kumar Jha
Rambalak Choudhary

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EXECUTIVE SUMMARY

Contribution of Livestock and Dairy Sector in Indian Economy

Livestock plays an important role in Indian Economy. About 20 million peoples depend upon livestock for their livelihood. Livestock contributed 16 per cent to the income of small farm households as against an average of 14 per cent for all rural households. Livestock provides livelihood to two-third of rural community. It also provides employment to about 8.8 per cent of the population in India. India has vast livestock resources. Livestock sector contributes 4.11 per cent GDP and 25.6 per cent of total agriculture GDP, Govt. of India, 2014, (www.vikaspedia.in).

Percentage share of GVA livestock to agricultural constant prices was increased to 26.7 per cent in 2014-15 from 23.80 per cent in 2011-12 whereas that of GVA-Agriculture to total GVA was decreased to 10.20 per cent in 2014-15 from 12.10 per cent in 2011-12. Thereafter analysis of GVA at current prices reveals that percentage share of GVA-livestock to agriculture and to total GVA was increased to 26.90 per cent in 2014-15 from 23.80 per cent in 2011-12 and increased to 4.40 per cent in 2014-15 from 4.00 per cent in 2011-12 respectively while that of GVA agriculture to total GV A was decreased to 10.90 per cent in 2014-15 from 12.10 per cent in 2011-12.

Percentage share of GVO-milk group to GVO from livestock was recorded highest 66.97 per cent followed by meat group (19.85%), Dung (6.75%) and Egg (3.40%) in the year 2011-12. Almost same trends were found in the year 2012-13 and 2013-14. Thereafter, percentage share of GVO-milk group to GVO from livestock sector was decreased to 65.30 per cent in 2013-14 from 66.97 per cent in 2011-12. It may due to decreasing the animals in milch. Whereas, percentage share of GVO-meat group to GVO-livestock sector was increased to 21.22 per cent in 2013-14 from 19.85 per cent in 2011-12. It may be a reason of animal slaughter is increasing day to day.

Plan wise Outlay and Expenditure under Dairying/Dairy Development Efforts

Plan outlay (at current prices) of central and centrally sponsored schemes under animal husbandry and dairying has increased from Rs. 22 crores in the 1st Five Year Plan to Rs. 5451 crores in the 11th Five Year Plan. The outlay for dairying has increased from Rs. 7.81 crores in the 1st Five Year Plan to Rs. 3751 crores in the 12th Five Year Plan then declined in the 9th Five Year Plan to Rs. 361 crores. The allocation to animal husbandry and dairying as a percentage of total plan outlay has decreased from 25.58 per cent in 1st Five Year Plan to 66.68 per cent in the 11th Five Year Plan. Although, the dairy sector occupies a pivotal position ad its contribution to the agricultural sector is the highest, the plan investment made so far does not appear commensurate with its contribution to future potential for growth and development. A sector which contribute 23.6 per cent at current prices to the GDP has not been provided an outlay as per with its contribution.

State of Gujarat is first accounting for 41.07 per cent in percentage share of milk procurement among all the major state of India followed by Karnataka (15.23%), Maharashtra (8.56%), Tamil Nadu (7.14%), Rajasthan (6.12%) and Bihar 4.06%). Further, Region wise analysis shows that Rajasthan study 1st position (6.12%) in percentage share of total milk procurement in North Zone of India while Bihar is occupied 1st position (4.06%) in East Zone of India. Thereafter, Gujarat shows 1st position (41.07%) in West Zone of India. Gujarat not only stay 1st position in West Zone of India but also play 1st in all over India followed by Maharashtra (8.56%) whereas Karnataka play 1st position with 15.23 per cent in South Zone of India followed by Tamil Nadu (7.14%).

State of Uttar Pradesh has play 1st stage in the percentage share of milch animal (18.18%) to all India milch animal population followed by Rajasthan (10.06%), Madhya Pradesh (8.41%) but state of Bihar has stay fourth place in the percentage share of milch animal (7.50%) to all India milch population. Meanwhile Jharkhand has stay 16th place in the percentage share of milch animal (2.27%)

to all India milch animals. Further, state wise analysis of total live stock reveals that Uttar Pradesh has highest percentage (13.42%) share of all India livestock followed by Rajasthan (11.27%), Andhra Pradesh (10.96%) and Madhya Pradesh (7.10%). Meanwhile, Bihar has 6.43 per cent of total livestock population and stay fifth place in India but Jharkhand has only 3.53 per cent share in all India livestock population. India continued to rank first in milk production at the global level for the last two decades and has production of 155.5 million tones of milk during 2015-16 With growth of 6.29 per cent over 2014-15 World milk production as estimated by FAO has reached 789 million tones in 2014 as against 765 million tones during 2013, with an increase of 3.1 per cent. The share of India in world milk production is 18.50 per cent. Its significance is seen in the context of per capita availability, which has shown sustained growth since 1950-51. The per capita availability of milk at 337 grams per day in India during 2015-16 is significantly higher than the world average per capita availability at 293.70 gram per day during 2014, a rare feat achieved in the last few years.

India has an area under fodder crops (9188 thousand ha) with percentage share of 2.8 to GCA of India whereas, Area under permanent pasture4s and other grazing land was recorded (10256 thousand ha) with 3.1 per cent to GCA of India. Later on, state wise analysis reveals that Rajasthan has highest area under fodder crop with 14.20 per cent to total gross cropped area of same state followed by Punjab (10.10%), Haryana (9.80%), Gujarat (4.3%), Uttar Pradesh (3.30%) and Bihar has only 0.30 per cent of its GCA while, Jharkhand has no area under fodder crops. However, Himachal Pradesh has highest area under permanent pasture and other grazing land accounting for 27.10 per cent to GCA followed by Chhattisgarh (6.50%), Rajasthan (4.90%), Karnataka (4.70%), Madhya Pradesh (4.20%) and Jharkhand has only 1.40 per cent and Bihar has so little 0.20 than other state. Total number of veterinary institutions was increased to 54906 in 2010 from 33323 in 1982 whereas; total number of veterinarians was also increased to 50772 in 2010 from 18000 in 1982. Later on, total number of cattle per veterinary institution was 8394 in 1982 , which came down to 6375 in 2010 accounting for 24.05 per cent decreases but, total number of cattle per veterinary was recorded 15540 in 1982, which came down to 6894 in 2010 with 55.63 per cent decreasing.

Role of Dairy Sector in State Economy of Bihar

Bihar produces about 2.9 MT of milk accounting for 3.28 per cent of the total milk production in the country. However, only 9-10 per cent of production is processed by COMPFED (Sudha Dairy) and only 2-3 per cent in the private sector. Milk processing capacity in India has grown at a CAGR of 4.00 per cent with almost negligible growth in Bihar. The technology being used is now decades old with no primary processing/cooling facility at the farm/village level. Bihar's estimated milk production was 7.2 million tones in 2013-14, which was 5.2 per cent of the national milk production and also stayed 9th ranked in the country. The cooperatives dairies procured 15 lakh kg per day in 2013-14. The state of Bihar has about 9 lakh producers' members pouring milk to around 15 thousand dairy cooperatives societies. The growth of livestock population in Bihar was depicted in table 2.5 and reveals that livestock population was increased to 9.19 per cent over previous census. The highest growth in population was recorded in goat population (19.54%) followed by buffalo (13.11%) and sheep (6.42%) while cattle population registered decline (1.42%). East Champaran (5.52%) has highest number of total livestock population followed by Araria (5.42%), Katihar (4.67%) and Gaya (4.56%). These four districts together accounted for 20.17 per cent of the total state livestock population in 2012. East Champaran has the highest number of in milk buffaloes and cows followed by Araria and Katihar districts. The percentage share of expenditure on dairy development has increased to 95.91 in 2006-07 from 17.61 per cent in 2002-03. The proportion of expenditure to outlay on dairy development was much better during corresponding period. The milk production has increased from 2.66 MT in 2001-02 to 8.29 MT in 2015-16 registering a growth of 211 per cent over base year. Milk production in the state of Bihar has been increasing continuously throughout the year from 2001- 2016. However, the per capita availability of milk in the state was increased from 88 gms/day in 2001-02 to 208 gms/day in 2014-15. The cooperatives have developed veterinary health and artificial insemination centre and these provide service to a large number of milk producers at low cost. An attempt has been made to analyse the animal health services available

to livestock in Bihar. The number of functional hospital increased from 852 in 2003-04 to 1114 in 2013-14 and number of veterinary doctor also increased from 912 in 2003-04 to 1154 in 2013-14. The number of livestock was also increased from 241 lakh to 270 lakh recording an annual increase of about 1.00 per cent in livestock population. Per hospital, livestock population increased from 26.26 thousand in 1991-92 to 31.69 thousand in 2003-04 and livestock population also increased from 18.37 thousand to 29.61 thousand per veterinary hospital during corresponding period. There are eight co-operative milk unions in the state of Bihar and have total 66.45 lakh litre per day milk processing capacity and they procure 44.56 LLPD milk. During the year 2012-13, 150 bulk milk coolers and 8 chilling centres with total chilling capacity of around 660 TLPD.

Milk Collection through Dairy Cooperative Societies

Dairy cooperatives are one of the strongest in Bihar and other adjoining state but share of Bihar in total milk procurement by cooperative sector to our country was very little and stay 9th rank in milk production. Among the different 06 milk cooperative unions and three projects, the annual growth rate for milk procurement was highest for Koshi Dairy Project (51.5%), followed by Magadh Dairy Project (44.8%). The milk procurement per functional society per day had also recorded an increase between 2010-11 and 2015-16. Begusarai has highest share of milk procurement (26.74%) to total state procurement followed by Samastipur (20.83%), Patna (13.29%) and Ara (11.45%), whereas Begusarai has also highest share of milk holding capacity (19.76%) to total state capacity, followed by Samastipur (19.48%), Ara (17.44%) and Patna (15.99%). COMPFED markets milk products under brand 'Sudha' was 11975 MT in 2010-11 increased to 19979 MT in 2014-15 accounting for 66.84 per cent increased during last five year. Among different product of COMPFED, dahi was highly sold about 6492 MT in 2014-15 followed by lassi (4412 MT) and paneer (3284 MT) during responding year. These three products together had been accounting 71.01 per cent of total state products in 2014-15.

There is some major weakness/inefficiency:

- *Infrastructure facility at village level is very weak and inadequate.*
- *Low dairy plants efficiency and in appropriate milk collection centre in few study areas.*
- *Frequently transfer of staff and also shortage of staff.*
- *Unavailability of good quality animal and price of milch animal is higher in Bihar than most of major states in India.*
- *Good quality breed for animal breeding is not appropriate.*
- *Increasing political interference and very delay payment to the farmers.*
- *Chilling facility at few areas is very week.*

Policy and Programme/Schemes for Dairy Development

Government has been implemented several policies to improve dairy development, by operating different programmes like operation flood, strengthening infrastructure for quality and clean milk production, assistance to cooperatives, intensive dairy development programme (IDDP), Rashtriya Krishi Vikas Yojana (RKVY), accelerated dairy development programme (ADDP), National project for bovine breeding and dairy development (NPBBDD), integrated dairy farm project (IDFP) and package like Vidharbh Vikas package, Marathwara Vikas package. As a result of operating these programme, substantial improvement in quality and increase in quality noticed.

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

The number of DCS was found highest in Nalanda district (7691 DCS) followed by Begusarai and Bhagalpur, while total livestock population was highest in Bhagalpur followed by Banka and Begusarai. Total bovine population was also found highest in Banka district followed by Bhagalpur and Begusarai. Total milk production was found highest (276.76 thousand T) in Begusarai district followed by Bhagalpur and Nalanda districts. Milk procurement per DCS per day was highest (241.17 litres) in Begusarai district followed by Nalanda districts. The total number of bulk milk

cooler was highest in Nalanda followed by Begusarai. Religion wise analysis reveals that above 95.00 per cent in DCS and above 92 per cent in non-DCS was Hindu and remaining was muslim in the both case in overall sample. Regarding distribution of social groups of milk producers among DCS, the majority were OBCs (56.67%), General (30.83%), and Scheduled Caste (12.50%) whereas in Non-DCS, 62.50% was OBCs followed by General (25%) and SC (12.50%). An overall average the GCA during 2015-16 was estimated 2.39 ha per milk producer in the category of DCS against 2.26 ha per milk producer in the category of NDCS. Thus, GCA per milk producer was comparatively little less in case of NDCS milk producers. The size group wise distribution shows that total areas coverage varied from 2.13 ha (small) to 3.55 ha in large milk producers of DCS category whereas, in NDCS category it varied from 2.31 (small) to 3.55 ha (large). However, coverage was comparatively higher in case of larger milk producers of DCS category. Among the seasons, the coverage was higher in kharif than in Rabi and summer season total number of milch animal was 2.86, out of total animal in DCS milk producers. Out of total 286 milch animals, cross breed cattle was 203 followed by buffalo (55) and local cattle (28). Whereas, total milch animal in case of NDCS was 184, out of total animal, it was cross bred milch cattle (121), buffalo (43) and local milch cattle (20). However, total milch animal in DCS category was higher than NDCS. Accordingly, the kuccha cattle shed were higher in DCS and NDCS than semi-pucca and pucca in DCS and NDCS category.

Main source of water available for dairy purpose with almost all the selected milk producers of DCS and NDCS category was Hand Pump in all the three seasons followed by village pond and river/streams at the distance of half to 200 meters. The supply of water is adequate as replied by 80.00 per cent of respondent of both DCS and NDCS in rainy and winter season but few replied as 'No' in summer season. They also replied about quality of water in favour of poor (42 % to 60%) followed by very poor (19 to 46%) and few replied in favour of normal quality of water in both the case of DCS and NDCS respondent. The alternative source of water were tube well, open well, pond and hand pump at the distance of 100 to 250 meters.

Labour use Pattern of DCS and NDCS Categories of Milk Producers

Under fodder management, 47 male and 24 female family workers were engaged at the rate of 4.5 hours and 2.5 hours respectively for whole activities under fodder management in DCS category of the milk producers. Total number of family labour including male and female were 134 while that of hired labour was 26 per day among whole sample size. DCS category of milk producer, 95.20 per cent of income from dairy was held-up by male member and remaining 4.80 per cent held by female member. Under NDCS category of milk producers, 93.97 per cent of income was held up by male member and remaining 6.03 per cent held by female member. Under the stall feeding, self cultivated dry fodder was fed at the rate of 3.5 kg/animal/day to the local cow. 4.5 kg/animal/day to the buffalo among DCS category of milk producers, almost similar rate of feeding was also found by all groups of milk producers under NDCS category. Rs. 800 was expenditure on FMD diseases of local cow including medicines and Doctor Charges by each DCS member, Rs. 1000/animal on crossbreed cow comprising different diseases like SH, BQ and FMD and Rs. 880/animal on buffalo under DCS member. Almost similar expenditure was also found under NDCS member. An average cost of Rs. 37.83 was incurred per animal on dry fodder and Rs. 22.07 on green fodder for DCS member. Rs. 29.65 on concentrate and Rs. 20.33 on supplement by small, medium and large milk producer respectively. Almost similar figure was also found under NDCS category of milk producers. The value of buffalo in both case NDCS and DCS members was comparatively higher than that of local and cross bred cow. About 60.00 per cent of dung was used as dung cake and remaining as manure in the both cases DCS and NDCS. In DCS category, the average yield/animal was found to be maximum as 15.50 litres/day/cross bred during summer season and local cow and buffalo have highest average yield during same season against lowest average milk yield during rainy season under all three breed of animal. Almost similar result was found in NDCS category of milk producers. However, lowest milk yields during rainy was found against summer and winter season. An average, awareness about different vaccinations schemes/programmes was replied as 'Yes' (65%) against as

'No' (35%) among DCS category of sample farmers while about that 66.67 per cent viewed as 'No' and 33.33 per cent viewed as 'Yes' among NDCS category of sample farmers.

Milk Consumption and Marketable Surplus of DCS and NDCS Category

In DCS category of sample milk producers, the average milk drawn per day per animal from all animals was estimated at 9.57 litres. Now, breed wise analysis of DCS category reveals that average milk production of local cow cross bred and buffalo was estimated at 4.00 litres, 14.71 litres and 10.00 litres per day/animal respectively. Whereas, in case of NDCS milk producers, that of same was calculated as 3.81 litres, 12.42 litres and 8.72 litres/day/animal. Thus, it is clear from data that milk drawn yesterday per animal in all three breeds was slightly higher in DCS members than that of NDCS members. The average milk drawn per farmer/day under DCS category was calculated as 30.46 litres while it was 16.28 litres per farmer/day under NDCS category of milk producers.

Under DCS category of milk producers, on an overall about 64.00 per cent had reported that there was always high cost of fodder seed followed by sometimes 36.00 per cent. 66.67 per cent had reported that there was always delay in payment of milk followed by sometimes (33.33%). Also 75.00 per cent has reported that always low price of milk offered followed by sometimes (25.00%). More than 90.00 per cent had reported as always high cost of cross bred cow followed by sometimes. An overall, more than 73.00 per cent had reported that there was always high cost of fodder seed followed by sometimes. About 75.00 per cent had replied as sometimes delay in payment of milk followed by Never and only 9.17 per cent replied as always. On an overall average, 56.67 per cent of milk producers in DCS category had reported that there was sometimes lack of technical guidance followed by always lack of technical guidance while in case of NDCS, more than 80.00 per cent had reported that there was always lack of technical guidance followed by sometimes lack. There was total restraint due to severe lack of technical knowledge and guidance in the dairy development in the state of Bihar. DCS and NDCS category of milk producers are presented in table 8.5 reveals that on an overall average, 50.83 per cent of DCS category had reported that there was sometimes lower socio-economic condition followed by always while in case of NDCS, more than 60.00 per cent had told that there was sometimes lower socio-economic condition followed by always. On an overall average, 36.66 per cent in DCS and 33.33 per cent in NDCS had replied that there was unavailability of chilling facilities at village level for milk preservation. About 43.00 per cent in DCS and 48.00 per cent in NDCS had viewed that there was majority of grazing lands are either degraded or encroached. 46.66 per cent in DCS and 43.33 per cent in NDCS had reported as poor access to organised markets deprive farmers in getting proper milk price.

On an overall, 82.5 per cent in DCS and 78.33 per cent in NDCS had been suggested to provide outlets of milk and milk product at village level. 93.33 per cent of both DCS and NDCS had suggested for providing technical knowledge to manage the dairy enterprises. About 95.00 per cent of both DCS and NDCS had suggested for regular and planned supply of vaccines. About 97.00 per cent of DCS and 99.00 per cent of NDCS had suggested for subsidy on veterinary medicines and fodder seeds. About 93.00 per cent of both DCS and NDCS had suggested for enhancing the price of milk for producers. About 65.00 per cent of DCS and 62.00 per cent of NDCS had also suggested for making easy procedure for sanctioning of loan.

CHAPTER – I

INTRODUCTION

1.1 Introduction

Dairying has been an integral part of the agriculture for thousands of years. The dairying's importee in our country hardly needs emphasizing. India has vast scope and resources of livestock, which play a key role in the national economy and also in the socio economic development for millions of rural households. India has one of the largest stocks of cattle and buffaloes accounting more than 50 per cent of the world's buffaloes and 20 per cent of its cattle. The Indian diary sector contributes a large share of the agriculture GDP.

Although the contribution of Agriculture and allied sectors to the national GDP has declined during the last few decades, the contribution of livestock sector has increased from less than 5 per cent in the early 1980 to over 6 per cent in the late 1990 (www.fao.org). India is the largest producers of the milk in the world with an annual output of 130 MT. It also has the largest milk producing animal population of over 118 million. Account to NDDB, demand for milk is expected to increase at a CAGR of 5 per cent from 138 MT in 2017 to 200 MT in 2022. According to report by CARE Ratings, the share of value added products in the milk and milk deliveries segment in India is growing at around 25 per cent every year and is expected to grow at the half rate until 2019-20 (www.indianmirror.com).

Almost 75 to 80 per cent of the Indian dairy market is under unorganized and even in the organized sector, large part of the market is occupied by liquid milk. However, there is a clear-cut shift from unorganized to organized industry and also a shift from liquid milk to products.

Account to Economic Survey 2015-16 presented in the Parliament by Finance Minister, Arun Jetaley that the Indian agricultural system is predominantly a mixed crop livestock farming system, with the livestock segment supplementing farm incomes by providing employment, draught animal and manures.

Above survey revealed that India ranks first in milk production, accounting for 18.5 per cent of world milk production, achieving an annual output of 146.3 MT during 2014-15 as compared to 137.69 MT during 2013-14 recording a growth of 6.26 per cent whereas, FAO has reported a 301 per cent increase in world milk production from 765 MT is 2013 to 789 MT in 2014.

The per capita availability of milk in India has increased from 176 grams per day in 1990-91 to 322 grams per day by 2014-15. It is more than the world average of 294 grams per day during 2013. This represents a sustained growth in availability of milk and milk products for the growing population, dairying has becomes an important secondary source of income for millions of rural households engaged in agriculture.

The success of the dairy industry has resulted from the integrated co-operative system of milk collection, transportation, processing and distribution, conversion of same to milk power all products, to minimize seasonal impact to suppliers and buyers, retail distribution of milk and milk products, sharing of profits with the farmers, which are ploughed back to enhance productivity ad needs to be emulated by other farm produce/producers.

1.2 Contribution of Livestock and Dairy Sector in Indian Economy

Livestock plays an important role in Indian Economy. About 20 million peoples depend upon livestock for their livelihood. Livestock contributed 16 per cent to the income of small farm households as against an average of 14 per cent for all rural households. Livestock provides livelihood to two-third of rural community. It also provides employment to about 8.8 per cent of the population in India. India has vast livestock resources. Livestock sector contributes 4.11 per cent GDP and 25.6 per cent of total agriculture GDP, Govt. of India, 2014, (www.vikaspedia.in).

India's livestock sector is one of the largest sectors in the world. It has 56.7 per cent of world's buffaloes, 12.5 per cent cattle, 20.4 per cent small ruminants, 2.4 per cent camel, 1.4 per cent equine, 1.5 per cent pigs and 3.1 per cent poultry. In 2010-11, livestock generated outputs worth of Rs. 2075 billion (at 2004-05 prices) which comprised 4 per cent of the GDP and 26 per cent of the agricultural GDP. The total output worth was higher than the value of food grain (www.insightsonindia.com).

The contribution of value output from Indian livestock sector to the GDP of the country was calculated as about 40.6 per cent of total contribution from Agricultural Allied Sector. As of 2000, the total value of output was estimated at about USD 35 million.

Livestock plays an important role in the socio-economic life of India. It is a rich source of high quality food such as milk, meat and eggs and a source for income and employment to millions of rural farmers, particularly women. With a large human population and about 250 million economically strong potential consumers, the domestic demand for these food products are increasing rapidly, the demand often exceeding the supply.

As per information produced by India today on 19 July, 2015-16, Government say that the country produced 155.5 million tones of milk last fiscal year while the per capita availability stood at 337 per gram. The government of India has a target of overall annual growth of 6.50 per cent for 2003-04 years. NABARD provides refinance long term loans disbursed by commercial and co-operative banks and Regional Rural Bank (RRB) for agriculture sector including dairy poultry and fisheries, non-farm sector activities and short term production credit for agricultural crops. It encourages banks to adopt project approach to lending.

India is the top most milk producing country in the world. It is estimated about 86.8 million tones of annual milk production from animals managed by 70 million farmers. The average annual growth is about 5.6 per cent. The per capita milk availability is about 214 grams per day as against the recommended requirement of 250 grams (www.fao.org).

The percentage contribution of livestock in total agriculture gross value added is depicted in table 1.1. Analysis of this table reveals that percentage share of GVA livestock to agricultural constant prices was increased to 26.7 per cent in 2014-15 from 23.80 per cent in 2011-12 whereas that of GVA-Agriculture to total GVA was decreased to 10.20 per cent in 2014-15 from 12.10 per cent in 2011-12. Thereafter analysis of GVA at current prices reveals that percentage share of GVA-livestock to agriculture and to total GVA was increased to 26.90 per cent in 2014-15 from 23.80 per cent in 2011-12 and increased to 4.40 per cent in 2014-15 from 4.00 per cent in 2011-12 respectively while that of GVA agriculture to total GV A was decreased to 10.90 per cent in 2014-15 from 12.10 per cent in 2011-12.

Table 1.1: Percentage contribution of Livestock in total Agriculture GVA

Year	GVA at Constant (2011-12) Basic Prices					GVA at Current Basic Prices				
	GVA Agriculture		GVA livestock			GVA Agriculture		GVA livestock		
	Rs. In Cr.	% to total GVA	Rs. In Cr.	% to total GVA	% to Agricul ture	Rs. In Cr.	% to total GVA	Rs. In Cr.	% to total GVA	% to Agricul ture
2011-12	982026	12.1	327301	4.0	23.8	982026	12.1	327301	4.0	23.8
2012-13	983873	11 .5	344333	4.0	24.6	1090587	11 .8	375254	4.1	24.3
2013-14	1025082	11 .3	363448	4.0	24.8	1232116	11 .9	429662	4.1	24.4
2014-15	992159	10.2	389846	4.0	26.7	1252412	10.9	500405	4.4	26.9

Source: www.dahd.gov.in

The value of output from livestock sector at current prices is shown in table 1.2. An analysis of this table reveals that percentage share of GVO-milk group to GVO from livestock was recorded highest 66.97 per cent followed by meat group (19.85%), Dung (6.75%) and Egg (3.40%) in the year 2011-12. Almost same trends were found in the year 2012-13 and 2013-14. Thereafter, percentage share of GVO-milk group to

GVO from livestock sector was decreased to 65.30 per cent in 2013-14 from 66.97 per cent in 2011-12. It may due to decreasing the animals in milch. Whereas, percentage share of GVO-meat group to GVO-livestock sector was increased to 21.22 per cent in 2013-14 from 19.85 per cent in 2011-12. It may be a reason of animal slaughter is increasing day to day.

Table 1.2: Value of Output from Livestock sector (at current prices)

Item	Value of Output from Livestock sector (at current prices)					
	2011-12		2012-13		2013-14	
	Rs. Crore	% to total	Rs. Crore	% to total	Rs. Crore	% to total
1 Milk Group	324895	66.97	368997	66.23	407396	65.30
2 Meat Group	96287	19.85	114402	20.54	132360	21 .22
3 Eggs	16470	3.40	19352	3.47	22423	3.59
5 Dung	32754	6.75	36936	6.63	41443	6.64
7 Increment in Stock	9854	2.03	11609	2.08	1 2964	2.08
Value of Output (Livestock Sector)	485103	100.00	557103	100.00	623861	100.00

Source: www.nddb.coop

1.3 Plan wise Outlay and Expenditure under Dairying/Dairy Development Efforts

An analysis of table 1.3 reveals that the plan outlay (at current prices) of central and centrally sponsored schemes under animal husbandry and dairying has increased from Rs. 22 crores in the 1st Five Year Plan to Rs. 5451 crores in the 11th Five Year Plan. The outlay for dairying has increased from Rs. 7.81 crores in the 1st Five Year Plan to Rs. 3751 crores in the 12th Five Year Plan then declined in the 9th Five Year Plan to Rs. 361 crores. The allocation to animal husbandry and dairying as a percentage of total plan outlay has decreased from 25.58 per cent in 1st Five Year Plan to 66.68 per cent in the 11th Five Year Plan. Although, the dairy sector occupies a pivotal position ad its contribution to the agricultural sector is the highest, the plan investment made so far does not appear commensurate with its contribution to future potential for growth and development. A sector which contribute 23.6 per cent at current prices to the GDP has not been provided an outlay as per with its contribution.

Table 1.3: Plan wise outlay and Expenditure of Central and centrally sponsored schemes under Animal Husbandry in India *(Rs. in crore).*

SN	Plan/ Year	Total Plan Outlay	Animal Husbandry		Dairying		Total (AH & Dairying)	
			Outlay	Expenses	Outlay	Expenses	Outlay	Expenses
1.	1st Plan (1951-56)	86.00	14.19	8.22	7.81	7.78	22.00	16.00
2.	2nd Plan (1956-61)	186.19	38.50	21.42	17.44	12.05	55.44	33.47
3.	3rd Plan (1961-66)	342.33	54.44	43.40	36.08	33.60	90.52	77.00
4.	Annual Plan (1966-69)	265.99	41.33	34.00	26.14	25.70	67.47	59.70
5.	4th Plan (1969-74)	551.69	94.10	75.51	139.00	78.75	233.10	154.26
6.	5th Plan (1974-79)	1122.32	---	178.43	---	---	437.54	232.46
7.	6th Plan (1980-85)	3150.00	60.46	39.08	336.10	298.34	396.56	337.42
8.	7th Plan (1985-90)	5750.00	165.19	102.35	302.75	374.43	467.94	476.78
9.	Annual Plan ((1990-91)	1450.00	43.71	36.18	79.67	41.43	123.38	77.61
10.	Annual Plan (1991-92)	1605.00	57.97	43.28	97.49	77.99	155.46	121.27
11.	8th Plan (1992-97)	10200	400.00	305.43	900.00	818.05	1300.00	1123.48
12.	9th Plan (1997-2002)	25000	1076.12	445.84	469.52	146.85	1545.64	592.69
13.	10th Plan (2002-07)	40000	1384.00	877.78	361.00	172.15	1745.00	1047.63
14.	11th Plan (2007-08)	8174	4870.53	2330.8	580	576.31	5450.53	2907.11
15.	2007-08	910	350.92	338.14	88.5	111.5	439.42	449.63
16.	2008-09	1000	481	444.54	98	97.9	579	542.64
17.	2009-10	1100	558.29	435.84	101.1	85.93	659.39	521.77
18.	2010-11	1300	792.15	668.75	87.76	84.77	879.91	753.52
19.	2011-12	1600	874.36	722.88	250.25	196.21	1124.61	919.09
20.	12th Plan	14179	7829	---	3781	---	---	---
21.	2012-13	1910	1063.1	881.45	392	523.51	1455.1	889.61
22.	2013-14	2025	1051.49	917.16	580	501.59	1631.49	1418.75
23.	2014-15	2174	1118.57	768.37	843.99	648.42	1962.56	1416.79
24.	2015-16	1491	400.43	395.35	116.44	119.13	516.87	514.48

Source: Basic Animal Husbandry Statistical 2007, Department of Animal Husbandry & Dairying, Ministry of Agriculture, Government of India Plan Document (GoI)

The public spending on livestock sector in India is presented in table 1.4. An analysis of this table reveals that percentage share of public spending to total agricultural spending was 13.60 per cent in TE 1992-93 which decreased to 9.90 per cent and 4.60 per cent in TE 2000-01 and TE 2008-09 respectively. Almost same trends of decreasing were found in public spending as (%) of livestock VOP, composition of public spending (%) dairy development, cattle and buffalo development, sheep and wool development, piggery development, poultry development and fodder development except veterinary services and animal health, direction and administration, and research, education and Extension.

Table 1.4: Public Spending on Livestock Sector in India

Particulars	TE1992-93	TE2000-01	TE2008-09
Total spending (Rs crore at 2004-05 prices)[8]	3,739.60	4,1 56.10	4,726.10
Public spending % of total agricultural spending	1 3.6	9.9	4.6
Public spending as % of livestock VOP	3.6	2.8	2.3
Composition of public spending (%) Dairy development	41.5	38.6	25.0
Veterinary services and animal health	23.7	24.1	29.1
Cattle and buffalo development	14.0	1 1.7	10.5
Sheep and wool development	2.7	2.4	2.0
Piggery development	1.8	0.5	0.4
Poultry development	3.1	2.4	2.4
Fodder development	0.9	1.0	1.0
Direction and administration	4.2	8.7	19.1
Research, education and extension	2.2	3.0	3.0
Others	5.8	7.6	7.5

Source: Birthal & Negi, 2012
NB: Spending includes both revenue and capital expenditure

1.4 Dairy Development in India

India ranks first among the world's milk producing nations since 1998 and it has the largest bovine population in the world. Milk production in India during the period 1950-51 to 2014-15, has increased from 17 million tones to 146.3 million tones as compared to 137.7 million tones during 2013-14 recording a growth of 6.26 per cent FAO reported 8.1 per cent increase in world milk production from 765 million tones in 2013 to 789 million tones in 2014. The per capita availability of milk in the country which was 130 gram per day during 1950-51 has increased to 322 gram per day in 2014-15 against the world average of 298.7 grams per day during 2013. This represents sustained growth in the availability of milk and milk product for our growing population. Dairying has become an important secondary source of income for millions of rural families and has assumed the most important role in providing employment and income generating opportunities particularly for marginal and women farmers. Most of the milk is produced by animals reared by small, marginal farmers and landless labourers. About 15.46 million farmers have been brought under the ambit of 165835 villages level dairy co-operatives societies up to March, 2015. Government of India is making efforts for strengthening the dairy sector through various central sector schemes like "National Programme for Bovine Breeding and Dairy Development," National Dairy Plan (Phase-1) and "Dairy Entrepreneurship Development Scheme." The restructured scheme National Programme for Bovine Breeding and Dairy Development (NPBBDD) was launched by merging four existing scheme i.e., Intensive Dairy Development Programme (IDDP), strengthening infrastructure for quality and clean milk production, Assistant to co-operatives and National Project for Cattle & Buffalo breeding with the budget provision of Rs. 1,800 crores for implementation of 12th Plan.

In order to meet the growing demand for milk with a focus to improve milch animal productivity and increase milk production, the government has approved National Dairy Plan Phase-1 (NDP-1) in February, 2012 with a total investment of Rs. 2242 crore to be implemented from 2011-12 to 2016-17. NDP-1 will help to meet the projected national demand of 150 million tones of milk by 2016-17 from domestic production through productivity enhancement, strengthening and expanding village level infrastructure for milk procurement and provide producers with greater access to markets. The strategy involves improving genetic potential of bovine, producing required number of quality bulls, and superior quality frozen semen and adopting adequate bio-security measures etc. The scheme is implemented by NDDB through and implementing agencies like State Dairy co-operative Federation Unions/Milk Producers Companies. NDP-1 would focus on 15 major milk producing states— Uttar Pradesh, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, West Bengal, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, Orissa, and Kerala which account for over 90 per cent of the country's milk production. Now the area of operation of NDP-1 has been extended to three more states i.e., Uttarakhand, Chhattisgarh and Jharkhand. Coverage of NDP-1 will be across the country in terms of benefits accruing from the schemes.

1.5 Co-operative Dairy Sector in India

National Co-operative Dairy Federation of India (NCDFI), based at Anand (Gujarat), is the apex organization for the co-operative dairy sector. Its members include federal dairy co-operatives of the states and union territories. Primary objectives of NCDFI are to facilitate the working of dairy co-operatives through co-ordination, networking and advocacy. The important activities of NCDFI include co-ordinating sale of milk and milk products of its members to the Ministry of Defence and other Para Military Organizations.

India's dairy sector is expected to triple its production in the 10 years in view of expanding potential for export Europe and West Indies. Moreover, with WTO regulation expected to come into force in coming years all the developed country which are among big exporters today would have to withdraw the support and subsidy to their domestic milk products sector. Also India today is the lowest cost producer of per litre of milk in the world, at 27 cents, compared with the US 63 Cents and Japan's $ 2.8. Also to take advantage of this lowest cost of milk production and increasing production in the country multinational companies are planning to expand their activities here. Some of these milk producers have already obtained quality standard certificates from the authorities. This will help them in marketing their product in foreign countries in processed form (www.aavinmilk.com).

The urban market for milk products is expected to grow at an accelerated pace of around 33 per cent per annum to Rs. 43,500 crores by year 2005. This growth is going to come from the greater emphasis on the processed food sector and also by increase in the conversion of milk into milk products. By 2005, the value of Indian dairy produce is expected to Rs. 10,00,000 million. Presently the market is valued at around Rs. 7,00,000 million.

India, with her sizeable dairy industry growing rapidly and on the path of modernization, would have a place in the sum of prosperity for many decades to come. The one Index to the statement is the fact that the projected total milk output over the next 15 years (1995-2010) would exceed 1457.6 million tones which is twice the total production of the past 15 years.

The growth of dairy cooperatives societies in India is presented in table 1.5. An analysis of this table shows that numbers of dairy cooperatives were increased to 170992 in 2015-16 from 13284 in 1980-81. The members of dairy cooperatives were also increased to 15835 (in thousands) in 2015-16 from 1747 thousand in 1980-81. The capacity of milk procurement was also increased to 42557 (000 kg/day) in 2015-16 from 2562 (000 kg/day) in 1980-81. The annually milk procured was also increased to 15.53 (MT) in 2015-16 from 0.94 (MT) in 1980-81. Therefore, the percentage of milk output procured was also increased to 10.00 per cent in 2015-16 which was only 3.00 per cent in 1980-81.

Table 1.5: Growth of Dairy Cooperatives Societies in India

Particulars	1 980-81	1990-91	2000-01	2013-14	2015-16
Dairy cooperatives (Nos.)	13284	6341 5	92206	165835	170992
Members (in thousands)	1747	7482	10738	15399	15835
Milk Procurement (000 kg/day)	2562	9702	16504	37953	42557
Milk procured (million tonnes)	0.94	3.54	6.02	13.85	15.53
% of milk output procured	3.0	6.6	7.5	9.5	10.0

Source: NDDB (2016, various issues)
http//www.nddb.coop/about/genesis, indiadairy.coop/index.html

An analysis of table No. 1.6 reveals that the state of Gujarat is first accounting for 41.07 per cent in percentage share of milk procurement among all the major state of India followed by Karnataka (15.23%), Maharashtra (8.56%), Tamil Nadu (7.14%), Rajasthan (6.12%) and Bihar 4.06%). Further, Region wise analysis shows that Rajasthan study 1st position (6.12%) in percentage share of total milk procurement in North Zone of India while Bihar is occupied 1st position (4.06%) in East Zone of India. Thereafter, Gujarat shows 1st position (41.07%) in West Zone of India. Gujarat not only stay 1st position in West Zone of India but also play 1st in all over India

followed by Maharashtra (8.56%) whereas Karnataka play 1st position with 15.23 per cent in South Zone of India followed by Tamil Nadu (7.14%)

Table1.6: Percentage Share of Major States in Total Milk Procurement by Cooperative sector in India

States/Regions	Percentage Share of Major States in Total Milk Procurement by Cooperative sector in India									
	1980-81	1990-91	2000-01	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Haryana	1.29	0.97	1.67	2.02	1.95	1.86	1.16	1.17	1.1 5	1.06
Himachal Pradesh	0.00	0.14	0.15	0.21	0.23	0.24	0.22	0.18	0.14	0.13
J & K	0.00	0.1 1	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
Punjab	2.93	4.06	5.53	3.68	3.96	3.87	3.75	3.37	3.37	3.27
Rajasthan	5.39	3.75	5.37	6.39	6.22	6.07	5.88	6.57	6.68	6.12
Uttar Pradesh	2.50	3.94	4.79	2.00	1.92	1.73	1.48	1.09	1.06	0.76
Uttarakhand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.41
North	12.10	12.98	17.51	14.31	14.29	13.76	12.49	12.38	12.81	11.77
Assam	0.00	0.04	0.02	0.02	0.02	0.02	0.05	0.07	0.06	0.05
Bihar	0.1 2	0.98	2.00	2.85	4.16	3.70	3.73	4.35	4.42	4.06
Jharkhand	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.03	0.04	0.14
Meghalaya	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03
Mizoram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
Nagaland	0.00	0.01	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.01
Odisha	0.00	0.42	0.57	0.93	1.05	1.05	1.16	1.14	1.16	1.23
Sikkim	0.00	0.04	0.04	0.05	0.07	0.05	0.04	0.04	0.04	0.07
Tripura	0.00	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
West Bengal	1.21	0.54	1.24	1.01	1.04	0.76	0.52	0.47	0.41	0.37
East	1.33	2.06	3.89	4.92	6.38	5.61	5.53	6.11	6.19	5.99
Chhattisgarh	0.00	0.00	0.00	0.09	0.10	0.10	0.11	0.13	0.14	0.17
Goa	0.00	0.16	0.19	0.14	0.15	0.14	0.14	0.18	0.17	0.16
Gujarat	52.46	31.97	27.67	35.00	34.97	36.40	37.91	39.68	40.30	41.07
Madhya Pradesh	2.65	2.64	1.93	2.03	2.25	2.51	2.43	2.41	2.91	2.42
Maharashtra	6.44	19.29	18.05	12.18	11.59	10.90	10.11	9.02	8.54	8.56
West	61.55	54.07	47.85	49.45	49.04	50.07	50.70	51.43	52.06	52.39
Andhra Pradesh	3.08	7.86	5.33	5.58	5.24	5.24	5.94	5.06	3.22	3.13
Karnataka	10.19	9.45	11.43	13.78	14.29	14.90	14.95	1 5.1	1 5.44	15.23
Kerala	0.00	1.91	3.91	2.97	2.63	2.79	2.71	2.82	2.68	2.58
Tamil Nadu	11.75	11.40	9.80	8.80	8.01	7.53	7.59	6.98	6.42	7.14
Telangana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.1 1	1.67
Pondicherry	0.00	0.27	0.27	0.19	0.13	0.10	0.10	0.11	0.07	0.10
South	25.02	30.89	30.75	31.33	30.29	30.56	31.28	30.08	28.94	29.86

Source: NDDB (Annual Reports, various issues).

1.6 Growth and Compositional Changes in Livestock and Bovine Population

The species wise livestock population in India (1951-2012) is depicted in table 1.7. Analysis of this reveals that total livestock has 74.90 per cent compositional change in the year 2012 over 1951 and total bovines have 50.78 per cent compositional change in the year 2012 over 1951. It further indicates that total livestock has much more compositional change accounting for 74.90 per cent in 2012 over 1951 as compare to percentage change in total bovines. Thereafter, buffalo has much higher compositional growth (150.46%) in 2012 over 1951 as compare to cattle (28.72%). It

may be reason of slaughtering of cattle higher than buffalo and no use of cattle for ploughing during this referred period. Also, female buffaloes have higher population growth accounting from 169.52 per cent in 2012 over 1951 as compare to female cattles (40.99%).

Table 1.7: Livestock Population in India by Species (1 951 -2012)

Species	Livestock Population in India by Species (In Million Number)													Compositional *Change in 2012 over 1951*	
	1951	1956	1961	1966	1972	1977	1982	1987	1992	1997	2003	2007	2012	1951	2012
Cattle	155.3	1 58.7	175.6	176.2	178.3	180	192.5	199.7	204.6	198.9	185.2	199.1	199.9	44.6	28.7
Adult Female Cattle	54.4	47.3	51	51.8	53.4	54.6	59.2	62.1	64.4	64.4	64.5	73.0	76.7	22.30	40.99
Buffalo	43.4	44.9	51.2	53	57.4	62	69.8	76	84.2	89.9	97.9	105.3	108.7	65.30	150.46
Adult Female Buffalo	21	21.7	24.3	25.4	28.6	31.3	32.5	39.1	43.8	46.8	51	54.5	56.6	35.6	169.52
Total Bovines	198.7	203.6	226.8	229.2	235.7	242	262.2	275.7	288.8	288.8	283.1	304.4	299.6	100.9	50.78
Sheep	39.1	39.3	40.2	42.4	40	41	48.8	45.7	50.8	57.5	61.5	71.6	65.1	26.0	66.49
Goat	47.2	55.4	60.9	64.6	67.5	75.6	95.3	110.2	115.3	122.7	124.4	140.5	135.2	93.01	92.03
Horses & Ponies	1.5	1.5	1.3	1.1	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.6	0.6	-0.9	-6.0
Camels	0.6	0.8	0.9	1	1.1	1.1	1.1	1	1	0.9	0.6	0.5	0.4	-0.2	- 3.33
Pigs	4.4	4.9	5.2	5	6.9	7.6	10.1	10.6	12.8	13.3	13.5	11.1	10.3	5.9	134.0
Mules	0.1	0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.1	100.0
Donkeys	1.3	1.1	1.1	1.1	1	1	1	1	1	0.9	0.7	0.4	0.3	-1.0	-76.92
Yak	NC	NC	0	0	0	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	NA	NA
Mithun	NA	NA	NA	NA	NA	NA	NA	NA	0.2	0.2	0.3	0.3	0.3	NA	NA
Total Livestock	292.9	306.6	336.5	344.5	353.2	369.4	419.6	445.2	470.9	485.4	485	529.7	512.1	219.4	74.90
Poultry *	73.5	94.8	114.2	1 1 5.4	138.5	159.2	207.7	275.3	307.1	347.6	489	648.8	729.2	655.70	892.11

Notes: *NC: Not Collected; NA: Not Available * Includes Chicken, ducks, turkey & other birds; $ Provisional derived from village level totals*

Source: *Livestock Censuses, Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, GoI*

The state wise milch animal population is presented in table No. 1.8. An analysis of table No. 1.8 shows that the state of Uttar Pradesh has play 1st stage in the percentage share of milch animal (18.18%) to all India milch animal population followed by Rajasthan (10.06%), Madhya Pradesh (8.41%) but state of Bihar has stay fourth place in the percentage share of milch animal (7.50%) to all India milch population. Meanwhile Jharkhand has stay 16th place in the percentage share of milch animal (2.27%) to all India milch animals. Further, state wise analysis of total live stock reveals that Uttar Pradesh has highest percentage (13.42%) share of all India livestock followed by Rajasthan (11.27%), Andhra Pradesh (10.96%) and Madhya Pradesh (7.10%). Meanwhile, Bihar has 6.43 per cent of total livestock population and stay fifth place in India but Jharkhand has only 3.53 per cent share in all India livestock population.

Table 1.8: Milch Animal Population by States (2012)

State / UT's	Adult Female Bovine Population by States (2012) (In thousands)						Total Livestock	
	Crossbred Over 2 1/2 years	Indigenous Over 3 years	Total Cows	Female Buffalo >3 years	Total Cows & Buffaloes	% to all India total	(000)	% to all India total
A & N Islands	8	10	18	2	20	0.02	1 55	0.03
Andhra Pradesh	1251	2228	3479	5763	9241	6.93	56099	10.96
Arunachal	11	133	144	1	145	0.11	1413	0.28
Assam	175	3335	3531	1 57	3688	2.77	19082	3.73
Bihar	2023	3959	5982	4017	9999	7.50	32939	6.43
Chandiqarh	5	1	6	10	16	0.01	24	0.00
Chhattisqarh	89	3238	3327	409	3736	2.80	1 5044	2.94
D & N Haveli	0	9	9	1	10	0.01	50	0.01
Daman & Diu	0	1	1	0	1	0.00	5	0.00
Goa	10	14	25	16	41	0.03	146	0.03
Gujarat	1048	3092	4141	5646	9787	7.34	27128	5.30
Haryana	522	322	844	2914	3758	2.82	8820	1.72
Himachal Pradesh	549	403	952	423	1375	1.03	4844	0.95
J& K	703	525	1228	417	1644	1.23	9201	1.80
Jharkhand	137	2486	2622	398	3020	2.27	18053	3.53
Karnataka	1829	2540	4369	2056	6425	4.82	27702	5.41
Kerala	630	36	666	10	676	0.51	2735	0.53
Lakshadweep	0	2	2	0	2	0.00	50	0.01
Madhya Pradesh	41 5	6538	6954	4251	11204	8.41	36333	7.10
Maharashtra	2138	3302	5440	3359	8799	6.60	32489	6.34
Manipur	20	77	96	23	119	0.09	696	0.14
Meqhalaya	19	333	352	4	357	0.27	1958	0.38
Mizoram	6	10	16	2	18	0.01	312	0.06
Naqaland	52	38	90	9	99	0.07	911	0.18
Nct Of Delhi	32	1 5	47	95	142	0.1 1	360	0.07
Odisha	575	2884	3459	250	3709	2.78	20732	4.05
Pondicherry	31	1	32	1	33	0.02	120	0.02
Punjab	1182	1 1 5	1297	2805	4101	3.08	8117	1.59
Rajasthan	929	5540	6470	6933	13403	10.06	57732	11.27
Sikkim	57	5	62	0	62	0.05	292	0.06
Tamilnadu	341 1	1074	4485	423	4908	3.68	22723	4.44
Tripura	54	289	343	4	347	0.26	1936	0.38
Uttar Pradesh	1828	7241	9069	1 5432	24501	18.38	6871 5	13.42
Uttarakhand	259	548	807	582	1389	1.04	4795	0.94
West Benqal	1270	5053	6323	172	6494	4.87	30348	5.93
ALL	21268	5541 7	76685	56586	133271	100.00	512057	100.0

Source: GOI (2016)

1.7 Growth in Milk Production and Productivity

India continued to rank first in milk production at the global level for the last two decades and has production of 155.5 million tones of milk during 2015-16 With growth of 6.29 per cent over 2014-15 World milk production as estimated by FAO has reached 789 million tones in 2014 as against 765 million tones during 2013, with an increase of 3.1 per cent. The share of India in world milk production is 18.50 per cent. Its significance is seen in the context of per capita availability, which has shown sustained growth since 1950-51.

The per capita availability of milk at 337 grams per day in India during 2015-16 is significantly higher than the world average per capita availability at 293.70 gram per day during 2014, a rare feat achieved in the last few years.

Table 1.9: Milk production and Per Capita Availability in India

Year	Production		Per Capita Availability	
	Million Tonnes)	Year to Year Growth in %	qms/day	Year to Year Growth in %
1 950-51	17.0	-	130	-
1 960-61	20.0	1.76	126	-0.31
1 968-69	21 .2	0.75	112	-1.39
1 973-74	23.2	1 .18	110	-0.22
1 980-81	31 .6	5.17	128	2.34
1 990-91	53.9	7.06	176	3.75
1 991-92	55.6	7.59	178	3.91
1 992-93	58.0	4.32	182	2.25
1 993-94	60.6	4.48	187	2.75
1 994-95	63.8	5.28	194	3.74
1 995-96	66.2	3.76	197	1.55
1 996-97	69.1	4.38	202	2.54
1 997-98	72.1	4.34	207	2.48
1 998-99	75.4	4.58	213	2.90
1 999-00	78.3	3.85	217	1.88
2000-01	80.6	2.94	220	1.38
2001-02	84.4	4.71	225	2.27
2002-03	86.2	2.13	230	2.22
2003-04	88.1	2.20	231	0.43
2004-05	92.5	4.99	233	0.87
2005-06	97.1	4.97	241	3.43
2006-07	102.6	5.66	251	4.15
2007-08	107.9	5.17	260	3.59
2008-09	112.2	3.99	266	2.31
2009-10	116.4	3.74	273	2.63
2010-1 1	121.8	4.64	281	2.93
201 1-1 2	127.9	5.01	290	3.20
201 2-1 3	132.4	3.52	299	3.10
201 3-14	137.7	4.00	307	2.68
2014-1 5	146.3	6.25	322	4.89
201 5-16	155.5	6.29	337	4.66

Source: GoI (2016).

The State wise milk production in India is presented in table 1.10. An analysis of this table reveals that production of milk of India has increased to 155491 ('000 tones) in 2015-16 from 84406 ('000 tones) in 2001-02. The state wise analysis shows that Uttar Pradesh has highest milk production (26387, thousand tones) with share of 17.00 per cent in India's milk production followed by Rajasthan with 11.90 per cent, Gujarat with 7.90 per cent and Bihar has stay 4th with 5.30 per cent share but Jharkhand has only 1.20 per cent share in India's milk production.

Table 1.10: State-wise Milk Production in India

State	Milk Production (000 tonnes)					% to all India Total
	2001-02	2005-06	201 0-11	2014-05	201 5-16	
Andhra Pradesh	5814	7624	11203	9656	1 081 7	7.0
Arunachal Pradesh	42	48	28	46	50	0.0
Assam	682	747	790	829	843	0.5
Bihar	2664	5060	6517	7775	8288	5.3
Goa	45	56	60	67	54	0.0
Gujarat	5862	6960	9321	11691	12262	7.9
Haryana	4978	5299	6267	7901	8381	5.4
Himachal Pradesh	756	869	1 102	1 1 72	1283	0.8
J & K	1 360	1400	1609	1 951	2273	1.5
Karnataka	4797	4022	5114	6121	6344	4.1
Kerala	2718	2063	2645	271 1	2650	1.7
Madhya Pradesh	5283	6283	7514	1 0779	12148	7.8
Maharashtra	6094	6769	8044	9542	1 01 53	6.5
Manipur	68	77	78	82	79	0.1
Meghalaya	66	73	79	83	84	0.1
Mizoram	14	1 5	1 1	20	22	0.0
Nagaland	57	74	76	76	77	0.0
Orissa	929	1 342	1 671	1903	1903	1.2
Punjab	7932	8909	9423	1 0351	1 0774	6.9
Rajasthan	7758	871 3	1 3234	16934	18500	1 1.9
Sikkim	37	48	43	50	67	0.0
Tamil Nadu	4988	5474	6831	71 32	7244	4.7
Tripura	90	87	1 04	141	1 52	0.1
Uttar Pradesh	14648	17356	21031	25198	26387	17.0
West Bengal	3515	3891	4471	4961	5038	3.2
A&N Islands	23	20	25	16	1 5	0.0
Chandigarh	43	46	45	44	43	0.0
D&N Haveli	8	5	1 1	9	9	0.0
Daman & Diu	1	1	1	1	1	0.0
Delhi	294	310	480	280	281	0.2
Lakshadweep	2	2	2	4	3	0.0
Pondicherry	37	43	47	48	48	0.0
Chhattisgarh	795	839	1029	1232	1 277	0.8
Uttarakhand	1066	1206	1 383	1 565	1656	1.1
Jharkhand	940	1 335	1 555	1 734	1812	1.2
Telangana	-	-	-	4207	4442	2.9
All India	84406	97066	121848	146314	155491	100.0

Source: Govt. of India, 2016

An analysis of table 1.11 reveals that India's cow milk yield is just half than world average but buffalo's milk yield shows few higher than world average; Despite highest production of milk, India's cow and buffalo milk yield is much lower than world's other country. Therefore, Israel has highest cow's milk yield (11579.70 kg/animal) followed by Saudi Arabia, Pakistan and USA.

Table 1.11: Milk yield in India and other selected countries (2012)

Country	Yield (kg/animal)	
	Cow	Buffalo
India	1196.0	1709.8
Israel	11579.7	NA
Canada	8816.8	NA
Denmark	8529.3	NA
USA	9841.3	NA
Saudi Arabia	10802.5	NA
South Korea	9895.8	NA
Pakistan	1263.5	1971.0
Sri Lanka	842.9	654.5
World average	2318.7	1612.4

Source: FAOSTAT. http://www.fao.org/faostat/es
Note: N.A. Not Available

1.8 Status of Availability of Feed and Fodder

An uninterrupted availability of fodder is a pre-requisite for improving the productivity of livestock and to make livestock production cost efficient. It is impossible to achieve the targeted growth of livestock sector in the coming years without adequate supply of quality feed and fodder. Grazing in pasture, commonly fallow lands and harvested grasses are the main fodder source of small ruminants like sheep and goat as well as large ruminants to limited extend. Mostly landless farmers, who do not have sufficient land to grow fodder for their animals, generally take their animals for grazing.

The state wise area under fodder cultivation, permanent pastures and grazing land in India was presented in table 1.12. An analysis of this table was clearly indicating that India has an area under fodder crops (9188 thousand ha) with percentage share of 2.8 to GCA of India whereas, Area under permanent pasture4s and other grazing land was recorded (10256 thousand ha) with 3.1 per cent to GCA of India. Later on, state wise analysis reveals that Rajasthan has highest area under fodder crop with 14.20 per cent to total gross cropped area of same state followed by Punjab (10.10%), Haryana (9.80%), Gujarat (4.3%), Uttar Pradesh (3.30%) and Bihar has only 0.30 per cent of its GCA while, Jharkhand has no area under fodder crops. However, Himachal Pradesh has highest area under permanent pasture and other grazing land accounting for 27.10 per cent to GCA followed by Chhattisgarh (6.50%), Rajasthan (4.90%), Karnataka (4.70%), Madhya Pradesh (4.20%) and Jharkhand has only 1.40 per cent and Bihar has so little 0.20 than other state.

Table 1.12: State-wise Area under Fodder Cultivation and Permanent Pastures and Other Grazing Lands in India ('000 ha)

States/UTs	Fodder Crops (2012-2013)*		Permanent Pastures and Other Grazing Land (2013-2014)	
	(000 ha)	% to GCA	(000 ha)	% to GCA
Andaman and Nicobar Islands		0.0	4	0.5
Andhra Pradesh	87	0.3	212	1.3
Arunachal Pradesh	---	0.0	18	0.2
Assam	10	0.1	168	2.1
Bihar	24	0.3	15	0.2
Chandiqarh	---	0.0	---	0.0
Chhattisqarh	1	0.0	882	6.5
Dadra and Naqar Haveli	1	2.0	1	2.0
Daman and Diu	0	0.0	---	0.0
Delhi	1	0.7	---	0.0
Goa	---	0.0	1	0.3
Gujarat	850	4.3	851	4.3
Haryana	432	9.8	26	0.6
Himachal Pradesh	8	0.1	1510	27.1
Jammu and Kashmir	53	0.2	114	0.5
Jharkhand	---	0.0	114	1.4
Karnataka	33	0.2	906	4.7
Kerala	5	0.1	0	0.0
Lakshadweep	0	0.0	---	0.0
Madhya Pradesh	406	1.3	1291	4.2
Maharashtra	901	2.9	1242	4.0
Manipur	---	0.0	1	0.0
Meqhalaya	---	0.0	---	0.0
Mizoram	---	0.0	5	0.2
Naqaland	---	0.0	---	0.0
Odisha	---	0.0	524	3.4
Pondicherry	0	0.0	---	0.0
Punjab	510	10.1	5	0.1
Rajasthan	4853	14.2	1694	4.9
Sikkim	---	0.0	---	0.0
Tamil Nadu	179	1.4	110	0.8
Telanqana	---	---	302	2.6
Tripura	---	0.0	1	0.1
Uttar Pradesh	800	3.3	65	0.3
Uttarakhand	32	0.6	192	3.6
West Benqal	3	0.0	2	0.0
India	9188	2.8	10256	3.1

Source: www.indiastat.com

The supply and demand of green and dry fodder was presented in table 1.13. The table was clearly indicating that there exist a gap between demand and supply of fodder. In 1995, the supply of green fodder and dry fodder was 379.30 and 421 MT against demand for 947 and 525 MT, respectively, with a deficit gap of 59.95 and 19.95 per cent in green fodder and dry fodder respectively. Later on, during 2005, the demand deficit gap for green fodder and dry fodder was recorded 61.96 and 22.08 per cent respectively. In 2015, the demand and supply deficit gap was also recorded to 63.50 ad 23.56 per cent for green and dry fodder. However, in 2025, the demand and supply deficit gap will be increased by 759 and 162 MT for green and dry fodder accounting for 64.87 and 24.92 per cent respectively. The growth rate of

deficit of demand during 1995 to 2025 was recorded 0.23 and 0.77 per cent for green and dry fodder respectively.

Table 1.13: Supply and Demand of Green and Dry Fodder *(Figures in MTs)*

Year	Supply		Demand		Deficit as % of Demand	
	Green	Dry	Green	Dry	Green	Dry
1995	379.3	421	947	526	59.95	19.95
2000	384.5	428	988	549	61.10	21 .93
2005	389.9	443	1025	569	61.96	22.08
2010	395.2	451	1061	589	62.76	23.46
201 5	400.6	466	1097	609	63.50	23.56
2020	405.9	473	11 34	630	64.21	24.81
2025	41 1.3	488	11 70	650	64.87	24.92
Growth rate (%) (1995 to 2025)	0.23	0.54	0.76	0.69	0.23	0.77

Report of the working group on Annual husbandry and dairying for 11th Five Year Plan 2007-12, Planning Commission, Government of India
Source: Agricultural Situation in India, April, 2016

The availability and requirement of crude protein (CP) and total digestible nutrients (TDN) from concentrates was presented in table 1.14. During 2000, the availability of crude protein was only 30.81 MT against requirement of 44.49 MT with deficit of 30.75 per cent and if we talk about the availability of TDN in concentrates, which was 242.42 MT against requirement of 321.29 MT with net deficit of 24.55 per cent. Later on, during 2015, there is net deficit of CP and TDN was 28.44 per cent and 24.04 per cent. In 2025, the availability and requirement gap will increase with deficit of 25.38 and 23.14 per cent for CP ad TDN from concentrates respectively. Therefore, available forages are poor in quality, and lack proper energy, protein and minerals. To compensate for the low productivity of the livestock, farmers maintain a large herd of animals, which adds to the pressure on land and fodder resources.

Table 1.14: Availability, Requirement & Deficit of Crude Protein (CP) & Total Digestible Nutrients (TDN) including CP & TDN from concentrates

Year	Crude Protein CP and Total Digestible Nutrients TDN *(Figures in million tonnes)*					
	Requirement		Availability		Deficit (%)	
	CP	TDN	CP	TDN	CP	TDN
2000	44.49	321.29	30.81	242.42	30.75	24.55
2005	46.12	333.11	32.62	253.63	29.27	23.86
2010	47.76	344.93	34.18	262.02	28.44	24.04
201 5	49.39	356.73	35.98	273.24	27.1 5	23.41
2020	51.04	368.61	37.50	281.23	26.52	23.70
2025	52.68	380.49	39.31	292.45	25.38	23.14

Source: www.indiastat.com, Handbook of Agriculture

The availability, requirement and deficit of concentrate for livestock were present in table 1.15. During 2002-03, the availability of concentrates was only 41.96 MT against requirement of 117.44 MT with deficit of 64.27 per cent. Later on, it was calculated 43.14 MT, 44.35 MT, 45.63 MT and 48.27 MT against requirement of 120.52 MT, 123.59 MT, 127.09 MT and 130.55 MT with deficit of 64.21 per cent, 64.12 per

cent, 64.10 per cent and 63.03 per cent respectively. However, availability of concentrate was increased to 48.27 MT with 15.03 per cent in 2006-07 over 2002-03.

Table 1.15: Availability, requirements and deficit of concentrates for livestock

Particulars	Availability, requirements and deficit of concentrates for livestock *(million tonnes)*					
	2002-03	2003-04	2004-05	2005-06	2006-07	NA
Available	41.96	43.14	44.35	45.63	48.27	NA
Required	11 7.44	120.52	123.59	127.09	1 30.55	NA
Deficit (%)	64.27	64.21	64.12	64.10	63.03	NA

Source: www.indiastat.com

The state wise availability and requirement of fodder in India was presented in Table 1.16. this table shows that availability of all India's green fodder was 142.82 MT against requirement of 221.63 MT, with deficit of 55.18 per cent whereas crop residues also shows 64.19 per cent deficit between availability (253.26 MT) and requirement (415.83 MT). Later on, state's analysis reveals that Rajasthan has highest amount of green fodder availability (33.53 MT) against requirement of 17.88 MT followed by Maharashtra 25.12 MT with surplus of 26.50 per cent, Uttar Pradesh (15.73 MT) with deficit of 93.89 per cent requirement and Bihar's state had 16.23 MT availability of green fodder against 12.53 MT of requirement with 22.79 per cent surplus amount. After that, crop residues analysis reveals that Uttar Pradesh had highest amount 42.07 MT of availability of crop residues against 57.19 MT of crop residues requirement with deficit of 35.94 per cent followed by Madhya Pradesh 24.30 MT, Maharashtra 22.21 MT, Rajasthan 21.67 MT and State of Bihar had 16.23 MT crop residues against requirement of 23.49 MT crop residues with 44.73 deficit of that.

The production of coarse cereals in India was presented in table 1.17. An analysis reveals that production of coarse cereals was increased to 38.40 MT in 2015.16 from 15.38 MT in 1950-51. There was 149.67 per cent increased recorded in coarse cereals in 2015-16 over 1950-51. However, total cereals were also increased to 235.83 Mt in 2015-16 from 219.90 MT in 1950-51 accounting for 7.24 per cent increased in 2015-16 over 1950-51. Further, the percentage share of coarse cereals to total cereals was also increased to 16.28 in 2015-16 from 6.99 in 1950-51 and that of maize was also increased to 8.90 in 2015-16 from 0.79 in 1950-51.

Table 1.16: State-wise Availability and Requirement of Fodder in India (2008)

(Dry Matter in Million Tonnes)

States/UTs	Availability		Requirement	
	Crop Residues	Greens	Crop Residues	Greens
Andhra Pradesh	15.69	4.88	31.71	16.91
Arunachal Pradesh	0.47	1.57	1	0.53
Assam	5.82	0.95	12.39	6.61
Bihar	16.23	0.81	23.49	12.53
Chhattisgarh	9.93	2.83	14.93	7.96
Goa	0.13	0.05	0.1 5	0.08
Gujarat	10.61	14.48	22.32	1 1.9
Haryana	8.75	6.57	9.95	5.31
Himachal Pradesh	2.3	1.98	4.6	2.45
Jammu and Kashmir	2.53	0.64	6.79	3.62
Jharkhand	4.1	0.88	1 3.59	7.25
Karnataka	14.59	3.55	20.66	11.02
Kerala	0.71	0.39	2.91	1.55
Madhya Pradesh	24.3	1 1.65	37.41	19.95
Maharashtra	22.21	25.12	33.68	17.96
Manipur	0.36	0	0.72	0.38
Meghalaya	0.31	0.4	1.17	0.62
Mizoram	0.1 5	0.5	0.06	0.03
Nagaland	0.56	0.3	0.74	0.4
Orissa	12.25	2.46	22.27	11.88
Punjab	1 3.71	7.38	10.58	5.64
Rajasthan	21.67	33.53	33.53	1 7.88
Sikkim	0.23	0.01	0.25	0.13
Tamil Nadu	7.01	3.7	16.46	8.78
Tripura	0.53	0.19	1.09	0.58
Uttar Pradesh	42.07	1 5.73	57.19	30.5
Uttarakhand	2.05	1.73	4.9	2.61
West Benqal	1 3.77	0.51	30.3	16.16
A& N Islands	0.02	0	0.1 1	0.06
Chandiqarh	0	0	0.04	0.02
Dadra & Naqar Haveli	0.04	0.2	0.8	0.4
Daman and Diu	0.01	0	0.1	0
Delhi	0.09	0.1	0.43	0.23
Lakshadweep	0	0	0.1	0
Pondicherry	0.06	0.01	0.1 1	0.06
India	253.26	142.82	415.83	221.63

Source: www.indiastat.com

Table 1.17: Production of Coarse Cereals in India

Crops	Production of Coarse Cereals in India (Figures in million tonnes)							
	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2015-16
Coarse Cereals	15.38	23.74	30.55	29.02	32.7	31.08	43.4	38.4
Total Cereals	219.9	203.5	226.3	242.2	236.9	185.74	226.25	235.83
Coarse cereals % to total cereals	6.99	11.67	13.50	11.98	13.80	16.73	19.18	16.28
Maize % to total coarse cereals	0.79	2.00	3.31	2.87	3.76	6.48	9.60	8.90

Source: GoI (201 5, various issues) Agricultural Statistics at a Glance, GoI.

Table 1.18: Reason wise Cattle Feed Production in India

Region	States	Private Sector (million MT/year)	Cooperative Sector (million MT/year)	Total (million MT/year)	% Share
Western	Gujarat, Maharashtra, Goa, Madhya Pradesh	1.80 (51.42%)	1.70 (48.58%)	3.50 (100%)	48%
Northern	Punjab, Haryana, UP, Uttarakhand, Rajasthan	0.80 (65.57)	0.42 (34.43)	1.22 (100)	1 7%
Southern	Karnataka, AP,TN, Kerala, Pondicherry	1.20 (51.95)	1.11 48.05)	2.31 (100)	31%
Eastern	Bihar, Jharkhand, Odisha, WB, Assam	0.20 (66.67)	0.10 (33.33)	0.30 (100)	4%

Source: FASR (2015), Yes Bank (https//www.yesbank.in/Indian_feed_industry_revitalizing_nutritional_security pdf)

The region wise cattle feed production in India is shown in table 1.18. An analysis reveals that western region had highest percentage share (48.00%) of cattle feed production followed by Southern (31.00%), Northern (17.00%) and Eastern (4.00%). The percentage share of private and cooperative sector in total cattle feed production in western region was recorded 51.42 and 48.58 per cent respectively. That was 65.57 and 34.43 per cent respectively in Northern region. Thereon, that of Southern region was 51.95 and 48.05 per cent whereas, that of Eastern region was 66.67 and 33.33 per cent.

1.9 Veterinary Infrastructure and Manpower

The veterinary and animal science services is a highly specialized area that involves management and health care of the livestock and poultry, prevention of the diseases, diseases diagnosis, meat and food inspection, including milk and milk products, quarantine, animal welfare, feed formulation and testing, dissemination of technologies besides administration and management. Globalization and implementation of world trade agreements (WTA) has increased the scope for export of livestock and hygienically produced livestock product manifolds. The role of the veterinarian has become multifaceted as a clinician, researcher and an advisor. There were 9527 veterinary hospitals, 20,897 veterinary dispensaries, 24482 veterinary aid centres and 67,048 artificial inseminations centres offering quality veterinary services to millions of farmers and livestock owners. Against the requirement of 57, 000 veterinarians, only 34,500 are available. Similarly, against the requirement of 7500 veterinary and animal science specialists for teaching and research, only 3050 are available. Similarly, availability of Para-vets and other supporting staff is only 52,000 against the requirement of 2,59,000. The shortage of manpower is a major concern. Further, veterinary infrastructure is very poor, inadequate and need strengthening it.

The veterinary infrastructure and manpower in India was presented in table 1.19. An analysis reveals that total number of veterinary institutions was increased to 54906 in 2010 from 33323 in 1982 whereas; total number of veterinarians was also

increased to 50772 in 2010 from 18000 in 1982. Later on, total number of cattle per veterinary institution was 8394 in 1982 , which came down to 6375 in 2010 accounting for 24.05 per cent decreases but, total number of cattle per veterinary was recorded 15540 in 1982, which came down to 6894 in 2010 with 55.63 per cent decreasing.

Table 1.19: Veterinary Infrastructure and Manpower in India

Year	No. of Veterinary Institutions	No. of Veterinarians	Cattle equivalent units per Veterinary Institutions	Cattle Equivalent Units per Veterinaries
1982	33323	1 8000	8394	15540
1992	40586	33600	7632	9219
1997	50846	37200	61 29	8377
2003	51973	38100	5926	8084
2007	52757	40421	6310	8236
2010	54906	50772	6375	6894

Source: Birthal and Negi (2012).

1.10 Need and Scope of the Study

Dairying is an important source of subsidiary income to small/marginal farmers and agricultural labourers. In addition to milk, the manure from animals provides a good source of organic matter for improving soil fertility and crop yields. The gobar gas from the dung is used as fuel for domestic purposes, as also for running engines for drawing water from well. Almost all draught power for farm operation and transportation is supplied by bullocks. Since, agriculture is mostly seasonal; there is a possibility of finding employment throughout the year for many persons through dairy farming. Thus, dairy also provides employment throughout the year. The main beneficiaries of dairy programmes are small/marginal farmers and landless labourers.

There is huge scope of dairy farming in India for marginal and small farmers as such India is endowed with the largest livestock population in the world. It accounts for 57.3 per cent of the world's buffalo population and 14.7 per cent of the cattle population. The value of output of milk is Rs. 3,05,484 crore in 2011-12. The total milk production in the country is 127.9 million tones per annum at the end of the 11th Plan (2011-12) and the demand is expected to be 180 million tones by 2020. To achieve this demand, annual growth rate in milk production has to be increased from the 2.5 per cent to 5 per cent. The annual growth rate for production of milk is about 5 per cent in 2011-12. Thus, there is a tremendous scope/potential for increasing the milk production through profitable dairy farming.

1.11 Objectives of the Study

There are various important objectives of the study as given below:

i. *To prepare an outline of socio economic status of the region with respect to standard economic, social and infrastructural parameters.*
ii. *To assess present status of dairying with reference to typology of animal distribution, yield, milk production, consumption and marketable surplus.*
iii. *To identify the constraints in dairy development from supply side, institutional deficiency and processing infrastructure.*
iv. *To high light facilitating factors that could help promoting dairying development to improve socio-economic status of the milk producers.*
v. *To suggest broad areas for focused interventions for promoting dairy development in the region and the way forward.*
vi. *To identify different Central and State Government Schemes related to dairy development at the district level and document technical as well as operational details of the schemes, correspondent wise, and guidelines to implement them and ascertain controlling department, implementing department and monitoring department and understand how convergence is ensured.*
vii. *To suggest possible measure to ensure compliance of effective convergence of various schemes by central and state government for the benefits of dairy farmers.*

1.12 Data, Methodology and Sample Area

The present study is mainly based on secondary and primary data. As per Methodology, we had selected four milk unions:

Table 1.20 (A): Selection of Milk Union falling each in different categories in Bihar

SN	Districts	Milk Union	Category
1.	Begusarai	Dr. Rajendra Prasad Milk Union Ltd., Barauni, Begusarai	High
2.	Nalanda	Vaishali Patliputra Milk Union Ltd., Patna	Moderate
3.	Bhagalpur	Vikramshila Milk Union Ltd., Bhagalpur	Low
4.	Banka	Banka Chilling Centre under Vikramshila Milk Union	Uncovered

Selections of village--- four villages have been selected from each respective sample district. Two villages nearest to sample milk union and two 25-50 kms away from sample milk union. One DCS and other non-DCS village from each selected/respective taluka have been considered. It is also predicted in table No. 1.20 (B).

Selection of Milk Producers

From each selected village, 15 milk producers comprising 5 each from small, medium and large milk producers have been selected randomly so, 60 milk producers falling in each sample milk union, therefore, total sample size of milk producers in each state will be 240.

Table 1.20 (B): Selection of Villages as per the Methodology

BIHAR			
SN	**District Milk Union**	**Selected Villages Nearest to Milk Union**	**Selected Villages 25-50 kms away from Milk Unions**
1.	Dr. Rajendra Prasad Dugdh Utpadak Sahkari Sangh Ltd., District Begusarai	1. Raghunandanpur (DCS) 2. Bhagwanpur (Non-DCS)	1. Kiratpur (DCS) 2. Ratanmon Babhangama (Non-DCS)
2.	Banka Chilling Centre under Vikramshila Milk Union, Dist.-Banka	1. Laskari (DCS) 2. Mahesachanda (Non-DCS)	1. Kalyanpur (Non-DCS) 2. Dudhari Samittee (DCS)
3.	Vikramshila Dugdh Utpadak Sahkari Sangh Ltd., Bhagalpur	1. Ranuchak (DCS) 2. Raghopur (Non-DCS)	1. Tilakpur (DCS) 2. Payin (Non-DCS)
4.	Vaishali Patliputra Phulwari Sarif Dugdh Uptadak Sangh Ltd., Dist. - Nalanda	1. Ranipur (DCS) 2. Burdih (Non-DCS)	1. Narayanpur (DCS) 2. Keshopur (Non-DCS)

Table 1.21 Sampling Frameworks

DU/D	District Unions/District				DU2/D2				DU3/D3				DU4/D4			
Rank	High				Moderate				Low				Uncovered			
Villages	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V1 1	V12	V13	V14	V1 5	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
Larqe	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Total sample	1 5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	1 5
	60				60				60				60			

Note: DU- District Union; If PDCS (primary Diary Cooperative Society) members are not available, take Non DC. Villages: 16; Milk Producers- 240; PDCS- 08 (or whatever available); Milk Unions-04 (or whatever available).

Table 1.22: Total numbers of selected DCS and NDCS Milk Producers in the Bihar state

Districts/ Milk Unions	DCS				NDCS			
	Small	Medium	Large	Total	Small	Medium	Large	Total
Begusarai	1 0	10	10	30	10	10	10	30
Nalanda	1 0	10	10	30	10	10	10	30
Bhagalpur	1 0	10	10	30	10	10	10	30
Banka	1 0	10	10	30	10	10	10	30
Bihar	40	40	40	1 20	40	40	40	1 20

1.13 Limitations of the Study

1. The study area was confined to only two DCS villages under each sample district, more number of DCS villages would have been better for the preciseness given it more reliable results.
2. The study was confined to only one agricultural year, that is, 2015-16 as mentioned in milk producer's questionnaire and households' survey schedule. It would have better to have the data at least for 2 or 3 years to reduce the variation.
3. The survey method of data collection was used, which could not be free from memory bias, particularly in case of uneducated farmers.
4. The information obtained from DCS members and Non-members farmers, particularly relating to their expenditure and income statements was are not tree from certain margin of errors because they were hesitating in responding such types of questions and enquires.
5. Because of the large sample size of sample and paucity of time and other resources of the pact of the researchers the findings of the study may have its limited acceptability. However, it raises many vital issues of practical importance, which may be pursued for future research. The conclusions drawn may not have universal applicability an account of diverse agro-economic and physical environments. It is however, felt that the value of the study would have increased many fold, had a large size of sample drawn from a wider area formed the base of the study.

CHAPTER – II

DAIRY DEVELOPMENT IN BIHAR

2.1 Introduction

Livestock sector plays an important role in socio-economic development of rural households of Bihar. During last 6 (six) years, milk production increased by two folds from 2.63 million tonnes in 2001-02 to 5.45 million tones in 2006-07 against the milk production at national level increasing from 84 MT to 100 MT during the respective period. During past three year, increase in milk production in Bihar was much higher than that at national level. Meat and egg production also increased but have not kept pace with milk production in the state of Bihar *(Dynamics of Livestock Sector in Bihar: A temporal analysis, 14 Jan., 2010).*

State Profile

Bihar with geographical area of 93.6 lakh hectares with share of 2.8 per cent of land mass of India. It is divided by Ganga in to two parts, the North Bihar with an area of 53.3 thousand square km and the South Bihar with an area of 40.9 thousand square km. It has 38 districts, 534 blocks/taluka and 44,874 villages. It falls in four agro-climatic zone which is further classified in to Zone-I, Zone-II, Zone-IIIA and Zone-IIIB. As per census 2011, Bihar has population of 10.41 crores which was 8.30 crore in 2001 census. Out of that, female was 4.98 crores. The literacy rate in the state was 61.80 per cent. Out of total population of Bihar, 11.29 per cent people live in urban regions with 76.86 per cent literacy rate in which males were 82.56 per cent while females were at 61.95 per cent. The state contribution to country's GDP at current prices during 2013-14 & 2014-15 were Rs. 402283 crore and Rs. 343663 crore respectively. Per capita income at current price in Bihar during 2013-14 & 2014-15 were Rs. 31199 crore and Rs. 36143 crore respectively *(www.pib.nic.in).*

2.2 Role of Dairy Sector in State Economy of Bihar

Bihar produces about 2.9 MT of milk accounting for 3.28 per cent of the total milk production in the country. However, only 9-10 per cent of production is processed by COMPFED (Sudha Dairy) and only 2-3 per cent in the private sector. Milk processing capacity in India has grown at a CAGR of 4.00 per cent with almost negligible growth in Bihar. The technology being used is now decades old with no primary processing/cooling facility at the farm/village level. Despite it, animal husbandry along with agriculture is one of key sector which provide massive employment and income opportunities for the rural population of the Bihar. This sector contributes about 1/5th of the total rural income and also creates large scale of

employment to women and workers of marginalised section of the society. Therefore, the state government of Bihar has taken step to treat it at par with agriculture. This is for the first time in the country that such a step has been taken by any state government. The state government of Bihar has sanctioned the creation of a separate **"Animal Science University,"** namely *Bihar Pashu Vigyan Vishwavidyalaya* in 2016 (Economic Survey – 2017, Government of Bihar).

The National Dairy Development Board's scientifically planned National Dairy Plan - I, (NDP-I) would boost dairy farming in Bihar. As on 14 October, 2014, under NDP-I, the total outlay for Bihar was Rs. 10.86 crore. The focussed approach would emphasise on Ration Balancing Programme (RBP) and Fodder Development. Meanwhile, till September 2014, 7 sub-projects from 6 End Supplementing agencies (ELAs) have been approved under NDP-I. It includes 4 Ration Balancing Sub-projects and 3 fodder Development sub projects.

Bihar's estimated milk production was 7.2 million tones in 2013-14, which was 5.2 per cent of the national milk production and also stayed 9th ranked in the country. The cooperatives dairies procured 15 lakh kg per day in 2013-14. The state of Bihar has about 9 lakh producers' members pouring milk to around 15 thousand dairy cooperatives societies.

As per 19th livestock census (2012), Bihar has 198 lakh bovines (female 157 lakh and male 41 lakh). The state has 6.41 per cent and 6.96 per cent of our country's total cattle and buffalo population respectively (www.nddb.coop/node/11362).

2.3 Trend in Contribution of Dairy in GSDP

The economy of Bihar is largely service oriented, but it also has a significant agriculture base. Animal husbandry is key sector of Bihar contributing about one-fifth of the total rural income. However, livestock contributing 5.2 per cent to the state GDP in 2013-14 while the contribution of agriculture to total GSDP was 18.00 per cent. The contribution of agriculture and livestock together to total GSDP was estimated to be 23.20 per cent. However, livestock accounts for 35 per cent of the total value of output from agriculture and allied activities (TE 2008-09), almost 10 per cent higher than national average of 25 per cent. Milk is the most important livestock product in Bihar with a share of 71 per cent of the livestock output (TE 2008-09). Bihar produces about 5.4 MT of milk annually, almost 5.4 per cent of milk produced in the country, and since 2004-05, milk production in Bihar has grown at 6.8 per cent as compared with 4.3 per cent at the national level. Thus, the share of GVO from livestock to agriculture sector has been fluctuating over last five year and remains between 19-29 per cent. However, the contribution of GVA from agriculture

and livestock to total GSDP has decreased from 30 per cent in 1999-2000 to 21 per cent in 2013-14.

Table 2.1: Contribution of Gross Value of Output and Gross Value Added from Agriculture and Livestock Sector to total GSDP at Current Prices of Bihar 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 (%)	Contribution 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	50174	28.22	11.87	40.09	30.30	40.09
2	2000-01	57242	31.79	11.26	43.05	34.47	43.05
3	2001-02	57657	30.92	11.98	42.90	30.64	42.90
4	2002-03	64965	28.60	11.66	40.26	32.55	40.27
5	2003-04	66174	32.24	12.60	44.84	28.77	44.83
6	2004-05	77781	19.08	13.02	32.10	26.58	40.56
7	2005-06	82490	22.43	12.71	35.14	25.25	36.17
8	2006-07	100737	21.28	11.18	31.46	26.95	34.44
9	2007-08	113680	21.06	11.00	32.06	23.79	34.32
10	2008-09	142279	21.65	10.93	32.58	25.77	33.54
11	2009-10	163800	18.31	10.95	29.26	22.56	37.42
1 2	2010-11	203555	16.51	9.87	26.38	23.29	33.42
1 3	2011-12	243269	18.32	9.08	27.40	23.83	38.15
14	2012-13	293616	18.49	9.17	27.66	24.32	33.13
1 5	2013-14	343663	15.08	4.00	19.08	21.11	20.97

Source: Economic Survey of Bihar (2012-13).

The percentage share of value of output from livestock was recorded 32.62 per cent to the GVO of agriculture and allied, whereas that of agriculture was 54.55 in 2010-11 for the state of Bihar so that livestock is one of the biggest sector for supporting livelihood of marginal and small milk producer in the state. The livestock output at constant price was recorded at Rs. 13364 crore in 2010-11 (at constant price). Out of which, milk contributes about 73 per cent or Rs. 9769 crore (table 2.2).

Table 2.2: Value of Output: Agriculture and Livestock

Item	Value of Output: Agriculture and Livestock in Bihar							
	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-1 1	2011-12
Value of Output at Current Prices (Rs. crore)								
Agriculture & Allied*	29449	33358	37895	41740	52658	54449	61601	NA
Agriculture	14842	18506	21441	23941	30801	29996	33604	NA
Livestock	10129	10488	11262	12501	15545	17391	20096	NA
Share of Value of Output to Agriculture and Allied* (%)								
Agriculture	55.40	55.55	56.67	57.36	58.49	55.09	54.55	NA
Livestock	34.40	31.44	29.77	29.95	29.52	31.94	32.62	NA
Value of Output at Constant Prices (Rs. crore) (2004-05)								
Agriculture & Allied*	29450	31202	34256	34546	37094	35264	35703	NA
Agriculture	14842	15883	18457	18022	20297	18136	18083	NA
Livestock	10129	10848	11483	12178	12420	12825	13364	NA
Share of Value of Output to Agriculture and Allied* (%)								
Agriculture	50.40	50.90	53.88	52.17	54.72	51.43	50.65	NA
Livestock	34.39	34.77	33.52	35.25	33.48	36.37	37.43	NA
Value of Livestock Output at Current Prices (Rs. crore)								
Milk	7102	7102	7652	8400	10894	12715	14503	NA
Meat	1675	1879	1854	2127	2646	3016	3099	NA
Egg	133	154	148	176	223	228	283	NA
Dung	887	966	1054	1155	1247	1338	1439	NA
Others^	46	54	58	51	167	165	187	NA
Share of Livestock Output at Current Prices (%)								
Milk	70.12	67.72	67.95	67.19	70.10	73.11	72.17	NA
Meat	16.54	17.92	17.35	17.08	16.38	17.34	15.42	NA
Egg	1.31	1.47	1.31	1.41	1.43	1.31	1.41	NA
Dung	8.76	9.21	9.36	9.24	8.02	7.69	7.18	NA
Others^	0.45	0.51	0.52	0.41	1.07	0.95	0.93	NA
Value of Livestock Output at Constant Prices (Rs. crore) (2004-05)								
Milk	7102	7577	8164	8662	8890	9172	9769	NA
Meat	1675	1784	1749	1797	1831	1867	1784	NA
Egg	133	175	159	161	181	185	125	NA
Dung	887	919	957	1002	1043	1079	1118	NA
Others^	46	45	51	46	93	89	88	NA
Share of Livestock Output at Constant Prices (%)								
Milk	70.12	69.85	71.10	71.13	71.58	71.52	73.10	NA
Meat	16.54	16.45	15.23	14.76	14.74	14.56	13.35	NA
Egg	1.31	1.61	1.38	1.50	1.46	1.44	0.94	NA
Dung	8.76	8.47	8.33	8.23	8.40	8.41	8.37	NA
Others^	0.45	0.41	0.44	0.38	0.75	0.69	0.66	NA

Source: Economic Survey of Bihar 2012-13 & 2013-14.

*Notes: P: Provisional Estimates, Q: Quick Estimates, * Includes Livestock, Forestry & Fisheries, [A] Includes Wool and Hair, Silkworm Cocoons & Honey, Increment in Stock*

2.4 Composition of Livestock and details on Cow and Buffalo Bred/Genetic Improvement in the State

The state of Bihar has a remarkable position in our country with regards to livestock wealth and development. As per 19th livestock census (2012), India has total

livestock population of 51.2057 crore, out of which, 3.29 crore livestock (6.43%) population was in the state of Bihar. The state accounts for 6.41 per cent share in cattle population, 6.96 per cent of buffalo population, 0.36 per cent of sheep population and 8.99 per cent goat population of the country. The significant share of donkeys (6.58%) and camels (2.50%) in national population has also been recorded (2012). There was a marginal increased in livestock population over 2007 to 2012 from 3.02 crores to 3.29 crores accounting for 9.18 per cent growth in the total number of animals of the various species (2.3). In fact, the percentage share of Bihar in all India total livestock has also increased by 0.73 per cent in 2012 over 2007.

Table 2.3: Growth of the Livestock in Bihar and India

Sr. No	Livestock Census Year	Total Livestock (000)		% Share of Bihar to All India	% Growth of Bihar State between two Census
		All India	Bihar		
1	1951	NA	NA	NA	NA
2	1956	NA	NA	NA	NA
3	1961	NA	NA	NA	NA
4	1966	NA	NA	NA	NA
5	1972	NA	NA	NA	NA
6	1977	NA	NA	NA	NA
7	1983	NA	NA	NA	NA
8	1987	NA	NA	NA	NA
9	1993	470830	22154	4.71	---
10	1997	485385	24600	5.07	11.04
1 1	2003	485002	26957	5.56	9.58
1 2	2007	529698	30167	5.70	11.91
1 3	2012	512057	32939	6.43	9.19

Source: Economic Survey of Bihar 2015-16

As per census of 2012 (19th livestock census), Among the different species, the cattle contributes highest share (37.14%) in total livestock population of the state followed by goat (36.9%), buffalo (22.97%), besides it, marginal contribution is attributed by other livestock species such as camels, males, donkeys, horses and pigs.

Table 2.4: Species-wise Livestock population & its Share in total livestock

Sr. No.	Particulars	Bihar -2012				India 2012	
		Livestock-2012	% share in India	% share in total Livestock	Rank in All India	Livestock - 2012	% share in Total Livestock
1	Cattle	12232	6.41	37.14	NA	19090	37.28
2	Buffaloes	7567	6.96	22.97	*NA*	10870	21 .23
3	Sheep	232	0.36	0.70	*NA*	65069	12.71
4	Goats	12154	8.99	36.90	*NA*	13517	26.40
5	Pigs	650	6.31	1.97	*NA*	10294	2.01
6	Horses & Ponies	49	12.64	0.24	*NA*	625	0.12
7	Mules	25	12.76	0.08	*NA*	196	0.04
8	Donkeys	21	6.58	0.06	*NA*	319	0.06
9	Camel	10	2.50	0.03	*NA*	400	0.08
10	Yaks	*NA*	*NA*	*NA*	*NA*	77	0.02
1 1	Mithun	*NA*	*NA*	*NA*	*NA*	298	0.06
1 2	Total Livestock	32939	6.43	100.00	*NA*	51205	100.00

Source: Compiled from Economic Survey of Bihar (2016-17) & Agricultural Statistics at a Glance, Govt. of India, 2016

The growth of livestock population in Bihar was depicted in table 2.5 and reveals that livestock population was increased to 9.19 per cent over previous census. The highest growth in population was recorded in goat population (19.54%) followed by buffalo (13.11%) and sheep (6.42%) while cattle population registered decline (1.42%). No livestock census had been conducted in the state of Bihar since 1982.

The data were projected on the basis of animal growth rate of various animals. The 17th livestock census was conducted in both the state of Bihar and Jharkhand. The combined data shows that 9.93 per cent of cattle, 7.24 per cent of the buffaloes, 1.73 per cent of sheep, 11.68 per cent of goat and 13.17 per cent of pigs of the country's livestock population is in Bihar. The total livestock is to the tune of 8.86 per cent of the country's livestock population.

Table 2.5: Growth in Livestock Population in Bihar- 1951 to 2012 (Figure in '000)

Sr. No.	Year	Cattle		Buffalo		Sheep		Goat		Total Livestock	
		Nos.	GR *(%)*	Nos.	GR (%)	Nos.	GR (%)	Nos.	GR (%)	Nos.	GR (%)
1	1951	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	1956	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3	1961	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4	1966	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5	1972	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6	1977	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	1982	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8	1988	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9	1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10	1997	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11	2003	10476	---	5766	---	346	---	96.6	---	26957	---
12	2007	12408	18.44	6690	16.02	218	-36.99	10167	5.84	30167	11.91
13	2012	12232	-1.42	7567	13.11	232	6.42	12154	19.54	32939	9.19

Source: Economic Survey of Bihar, 2015-16

The district wise percentage share of animal in total state livestock population (table 2.6) shows that East Champaran (5.52%) has highest number of total livestock population followed by Araria (5.42%), Katihar (4.67%) and Gaya (4.56%). These four districts together accounted for 20.17 per cent of the total state livestock population in 2012. East Champaran has the highest number of in milk buffaloes and cows followed by Araria and Katihar districts.

Table 2.6: District wise Percentage share of Animals in Total Livestock Population

District	District wise Percentage share animals in Total livestock population in Bihar-2012										
	Crossbred	Indigenous	Total Cow	Buffalo	Total Sheep	Goat	Total Pigs	Horses & Ponies	Mules	Donkey	Camel
Patna	6.57	0.52	2.30	2.55	5.93	1.20	6.81	3.53	2.03	1.64	NA
Bhojpur	4.29	0.66	1.72	2.95	7.22	0.74	3.57	5.12	12.29	11.93	88.11
Nalanda	2.90	0.88	1.47	3.86	3.27	1.05	3.68	3.39	0.12	0.09	NA
Buxar	2.43	0.91	1.35	2.51	9.85	0.52	2.24	2.94	5.37	27.02	0.99
Rohtas	2.57	1.88	2.05	4.41	7.73	1.09	1.87	3.14	9.19	11.91	*NA*
Kaimur	1.11	2.04	1.74	3.22	16.97	0.74	1.30	2.01	3.82	19.97	*NA*
Gaya	1.50	7.22	5.42	4.67	6.23	2.90	16.99	0.36	*NA*	1.49	*NA*
Jehanabad	1.11	0.55	0.71	2.00	0.67	0.49	3.09	0.22	*NA*	0.02	*NA*
Arwal	1.35	0.10	0.47	1.10	---	0.35	0.71	0.22	*NA*	0.42	*NA*
Nawada	0.75	3.73	2.79	2.04	1.42	2.16	7.50	0.15	*NA*	NA	*NA*
Aurangabad	1.31	4.00	3.14	2.96	11.36	1.27	2.05	0.39	24.94	0.54	*NA*
Saran	4.32	2.37	2.91	2.77	1.98	1.81	1.48	3.78	10.74	8.38	*NA*
Siwan	2.11	2.37	2.26	2.32	1.11	2.14	1.90	0.59	0.48	8.14	*NA*
Gopalganj	1.95	1.52	1.63	1.72	0.54	1.38	1.22	0.42	3.70	4.21	5.94
Muzaffarpur	7.46	0.83	2.78	4.61	0.50	5.19	1.08	0.25	*NA*	0.14	NA
Vaishali	5.89	0.19	1.87	2.64	0.54	2.95	0.27	0.32	*NA*	0.58	1.98
Sitamadhi	1.11	1.37	1.27	2.51	0.10	3.42	1.01	0.51	0.12	*NA*	*NA*
Sheohar	0.59	0.40	0.45	0.65	NA	0.83	0.22	0.71	NA	*NA*	*NA*
Champaran (E)	1.66	3.97	3.23	5.33	0.71	7.12	3.24	3.34	1.31	0.95	0.99
Champaran (W)	2.52	3.23	2.97	3.89	0.93	5.00	5.02	8.37	NA	0.36	*NA*
Darbhanga	1.89	2.41	2.22	3.38	0.17	2.88	1.47	1.40	1.67	0.35	*NA*
Madhubani	0.34	5.54	3.92	4.50	1.39	3.50	2.90	1.10	0.72	NA -	*NA*
Samastipur	12.44	0.47	4.01	3.50	1.17	3.70	0.61	1.44	*NA*	0.75	*NA*
Munger	1.68	1.21	1.52	0.78	NA	1.51	1.29	5.13	*NA*	*NA*	*NA*
Begusarai	3.35	0.30	0.27	1.43	0.08	2.48	1.24	10.54	*NA*	*NA*	1.98
Sheikhpura	0.95	0.46	0.61	0.70	0.58	1.01	0.72	4.70	*NA*	*NA*	*NA*
Lakhisarai	2.37	0.58	1.10	0.91	0.59	0.62	0.90	0.64	0.48	*NA*	*NA*
Jamuie	0.05	0.62	0.44	0.19	0.30	0.37	0.71	*NA*	*NA*	*NA*	*NA*
Khagaria	5.97	0.88	2.37	1.51	0.01	2.32	0.91	10.91	8.11	*NA*	*NA*
Bhagalpur	5.40	2.74	3.49	3.00	0.21	4.72	1.55	4.29	8.71	0.13	*NA*
Banka	1.00	6.20	4.57	2.15	5.60	3.43	4.04	0.30	NA	*NA*	*NA*
Saharsa	0.79	3.55	2.68	2.50	0.03	3.26	2.00	8.25	0.24	*NA*	*NA*
Supaul	0.09	5.74	3.98	3.55	6.38	3.94	1.43	0.45	NA	*NA*	*NA*
Madhepura	0.39	4.81	3.43	3.45	1.08	4.49	1.36	4.84	3.10	*NA*	*NA*
Purnea	1.34	5.67	4.31	2.56	0.20	4.77	3.70	2.30	1.91	0.06	*NA*
Araria	0.25	8.21	7.03	4.27	1.35	5.40	3.60	1.40	*NA*	*NA*	*NA*
Kishanganj	0.41	5.11	3.65	0.75	0.03	3.68	2.18	0.07	NA	0.44	*NA*
Katihar	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*

Source: Economic Survey of Bihar, 2014-15 & 2015-16

Agro-climatic zone wise density of livestock and bovine presented in table 2.7 and analysis reveals that the highest livestock density was found in zone-II (North-East) accounting for 351 livestock per sq. Km followed by zone-IIIA, zone-I and zone-IIIB

(lowest 210 livestock per sq. km whereas, bovine density was also highest in zone-II accounting for 204 bovine per sq km followed by zone-I and zone-IIIB.

Table 2.7: Agro-Climatic Zone wise Density of Livestock and Bovine (2003)

Agro-Climatic Zone	Livestock (Per Sq. Km)	Brovine (Per Sq. Km
Zone – I (North-West)	274	173
Zone – II (North-East)	351	204
Zone – IIIA (South East)	326	163
Zone – IIIB (South West)	210	171
Bihar	275	178

Source: Dynamics of livestock sector in Bihar: A temporal analysis, 14 January, 2010

There are 137 breeds of domesticated animal has been found in our country. Out of which, about 12 breeds are available in Bihar. The state of Bihar has high quality, high yielding breeds of cattle and buffaloes (table 2.8). Holstein Friesen and Gir in cows, and Mehsana and Jafarabadi in buffaloes were well known for their high milk yielding breeds. All mentioned breed in Bihar are used as milk purpose.

Table 2.8: Distribution of Bihar's Cattle Breeds

Breeds	Breeding Tract	Utility	Distribution
A) Cattle			
Sahiwal	Nalanda, Sheikhpura, Lakhisarai, Munger, Jamuie, Banka, Bhagalpur, Begusarai, Muzaffarpur, Darbhanga, Vaishali, Khagaria, Buxar, Kaimur, Rohtas	Milch	
Hariyana	Vaishali, Khagaria, Buxar, Kaimur, Rohtas	Milch	
Jersy	Supaul, Saharsa, Madhepura & Katihar	Milch	Madhya Pradesh, Bihar, Rajasthan
Holstein F.	Bhagalpur, Begusarai, Samastipur, Patna, Siwan	Milch	
B) Buffalo			
Mehsana	Saharsa, Supaul, Madhepura, Katihar, Begusarai, Bhagalpur, Banka & Munger	Milch	Northern Gujarat
Jafarabadi	Begusarai, Bhagalpur, Patna, Samastipur, Siwan, Saran, Bhojpur, Nalanda & Banka		

Source: Draft Report on Breeding Policy for Dairy Animal Improvement in Bihar, April, 2008

The bovine per 100 households across landholding size in Bihar has been presented in table 2.9 and analysis reveals that bovine per 100 households was declined (24%) in landless categories of households during 1991-2003. The decline in number of bovine was also identical on large size of households. The number of that was increased from 64 in 1991 to 116 in 2003 on medium size of households accounting for 81.25 per cent change followed by small (52.17%) and marginal (51.35%) size of households.

Table 2.9: Bovine per 100 Households across Landholding Size of Bihar

SN	Land holding Size (ha)	Bovine per 100 households across Landholding Size in Bihar		
		1991	2003	% change
1.	Landless (<0.5 ha)	25	19	-24.00
2.	Marginal (0.5-1.0 ha)	37	56	51.35
3.	Small (1-2 ha)	46	70	52.17
4.	Medium (2-4 ha)	64	116	81.25
5.	Large (4 & above)	82	27	-67.07

Source: Dynamics of livestock sector in Bihar: A temporal analysis, 14 January, 2010

The livestock population per 100 households across landholding size in Bihar has been presented in table 2.10 and analysis reveals that bovine population in milk (both cows and buffaloes) per 100 households declined in landless categories of households during 1991-92 to 2002-03. The decline in number of cows and buffaloes was almost identical on landless categories of households but number of goats per 100 households increased during the same period from 46 to 56 accounting for 21.74 per cent on the particular category of households. It is clearly indicates a further scope to promote goats on landless households in Bihar who constitute more than 3/4th of rural households in Bihar. The number of bovine (both cows and buffaloes) per 100 households increased during 1991-2003 on marginal, small and medium sized households in Bihar. However, there was decline in number of goats per 100 households under these categories. Among the different categories of households, the increase in number of bovine in milk was much higher on medium (from 64 to 116 per 100 households) followed by small and marginal. It may be pointed out that higher decline in number of goats per 100 households was noticed on large households and medium households who achieved higher increased in number of bovine during that period. Despite increase in number of bovine in Bihar, their household wise number declined in all the categories of households. It was mainly due to increase in number of households from 80 lakh in 1997 to 117 lakh in 2003 in Bihar. But goat population per household increased on landless which clearly suggest special efforts in creating production and marketing management of goats to improve the socio-economic status of weaker section of society in Bihar. Table 2.11 represents the number per 1000 of households reporting owing livestock of different types for each size class of households' operational landholding in Bihar (rural) as per NSSO-59th round conducted in 2003.

Table 2.10: Livestock per 100 Households across Landholding Size: Bihar

Landholding Size (Ha) No.	Cow in Milk			Buffalo in Milk			Goat		
	1991	2003	% Change	1991	2003	% Change	1991	2003	% Change
Landless (<0.5 ha)	15	12	-20	10	7	-30	46	56	21.74
Marginal (0.5-1.0 ha)	26	33	26.92	11	23	109.09	83	39	-53.01
Small (1-2 ha)	27	29	7.41	19	41	115.79	59	39	-33.90
Medium (2-4 ha)	28	67	139.28	36	49	36.11	143	19	-86.71
Large (4 & above)	26	27	3.85	56	---	---	214	15	-92.99

Source: Handbook of Agriculture, Govt. of Bihar, 2007-08

Table 2.11: Number per 1000 of households reporting owing livestock of different types for each size class of households operational holdings in Bihar (Rural) 2003

size class of operational holding (ha)	Bihar (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	2	2	2	0	49	26	4	6
^ 0.002	0	493	493	228	0	342	89	59	69
0.002 - 0.005	45	397	442	318	7	323	101	7	42
0.005 - 0.040	23	23	432	210	1	353	152	40	3
0.040 - 0.5	52	347	393	236	3	168	46	10	5
0.5-1.0	44	555	593	347	1	144	42	11	0
1.0-2.0	90	587	654	435	4	131	56	7	2
2.0-3.0	54	640	675	357	2	97	61	38	8
3.0-4.0	29	695	695	323	0	95	6	0	0
4.0-5.0	79	902	974	377	0	107	59	0	0
5.0-7.5	25	654	690	623	0	0	120	0	0
7.5-10.0	338	232	518	599	0	0	0	0	0
10.0-20.0	338	300	688	0	0	0	0	0	0
> 20.0	0	0	0	0	0	0	0	0	0
all sizes	36	315	347	206	2	150	53	12	7

Source: Livestock ownership across operational holdings classes in India, NSS Report No. 493

Note: includes hens, cocks and chickens.

2.5 Plan wise Outlay and Expenditure under Dairy Development

Livestock is a core sector of the state economy of Bihar, as it provides opportunities for poverty alleviation, development of the rural economy, combating rural unemployment and reducing the gap between the poor, rural and affluent, urban societies. This sector contributes 16 per cent to the GDP of Bihar but receives only 0.75 per cent allocation of the total state budget. Around 89 per cent of the population of the state is directly or indirectly linked with this sector. Apart from rural livelihood, the health, life style and safety of people is linked to this sector through their dependence on milk, meat, egg, wool, leather and other products. The state government policy has been providing necessary support for dairy development in the state through cooperative sector. Table 2.12 gives details regarding plan wise outlay and expenditure on animal husbandry and dairy development by the government of Bihar (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. The outlay and expenditure on diary development has also increased over the period of time. However, the percentage share of expenditure on dairy development has increased to 95.91 in 2006-07 from 17.61 per cent in 2002-03. The proportion of expenditure to outlay on dairy development was much better during corresponding period.

Table 2.12: Annual Plan-wise Outlay and Expenditure under Dairy Development in Bihar

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	2002-03	273.00	50.00	323.00	223.28	47.73	271.01
2	2003-04	270.70	90.00	360.70	200.35	31.80	232.15
3	2004-05	273.55	97.45	371.00	198.20	92.56	290.76
4	2005-06	206.35	102.50	308.85	198.88	81.53	280.41
5	2006-07	225.88	5207.00	5432.88	221.95	5203.85	5425.80

Source: 11th Five Year Plan, 2007-12, Government of Bihar

2.6 Growth in Milk Production and productivity (Regional trend)

Bihar is one of leading state in terms of quality milk animal and milk production. Bihar ranks ninth among the milk producing state of India, achieving 82.88 lakh MT in 2015-16 which has increased from 50.60 lakh MT during 2005-06. The various initiatives have been taken by government of Bihar help to improve the milk productivity in coming era. A trend showing the increase in milk production over the past one and half decades is shows in table 2.13. An analysis of this table reveals that there is a consistent increase in the production of milk over the year. The milk production has increased from 2.66 MT in 2001-02 to 8.29 MT in 2015-16 registering a growth of 211 per cent over base year. Milk production in the state of Bihar has been increasing continuously throughout the year from 2001- 2016. However, the per capita availability of milk in the state was increased from 88 gms/day in 2001-02 to 208 gms/day in 2014-15.

Table 2.13: Milk Production in Bihar: 2000-01 to 2015-16

Sr. No	Year	Milk Production in thousand 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		
		Indi genous	C.B.						
1	2000-01	NA	NA	NA	NA	NA	NA	NA	NA
2	2001-02	NA	NA	NA	NA	NA	2664	NA	88
3	2002-03	NA	NA	NA	NA	NA	2869	7.70	92
4	2003-04	NA	NA	NA	NA	NA	3180	19.36	100
5	2004-05	NA	NA	NA	NA	NA	4743	78.04	147
6	2005-06	NA	NA	2473	2345	212	5060	89.94	154
7	2006-07	NA	NA	2654	2582	214	5450	104.58	163
8	2007-08	1958	986	2616	2935	216	5767	116.57	170
9	2008-09	1991	1024	2722	3016	196	5934	122.75	172
10	2009-10	1074	2023	2807	3098	219	6124	129.88	175
1 1	2010-11	NA	NA	2798	3561	158	6517	144.63	184
12	2011-12	NA	NA	2797	3652	176	6625	148.69	175
1 3	2012-13	NA	NA	2899	3763	182	6844	156.91	188
14	2013-14	NA	NA	3015	3986	196	7197	170.16	195
1 5	2014-15	NA	NA	NA	NA	NA	7775	191.85	208
16	2015-16	NA	NA	NA	NA	NA	8288	211.11	219

Source: Handbook of Agriculture, Government of Bihar, 2007-08, nddb.coop/information/state/in
Department of animal husbandry, dairy & fisheries, Govt. of India

Out of total milk production, about 45.84 per cent of the milk is contributed by indigenous buffaloes followed by 33.03 per cent of crossbreed cattle. The indigenous cattle contribute 17.54 per cent of the total milk production in the state during 2009-10 whereas goat contributes 2.72 per cent to the total milk production during 2013-14. Out of total bovine milk production, 75.45 per cent milk shared by buffalo milk and remaining shared by cattle milk.

District wise and category wise percentage share of milk production in Bihar for the year 2013-14 is presented in table 2.15 and analysis reveals that Patna is highest milk producing district in the state with estimated share (5.52%) of total milk production in the state followed by Gaya (5.14%), Samastipur (4.75%), Bhojpur (4.27%) and Begusarai (3.85%). The top 10 districts together out of 38 districts, contributes about 40.14 per cent of total milk production in the state, those are Patna, Bhojpur, Rohtas, Gaya, Aurangabad, Bhagalpur, Muzaffarpur, Darbhanga, Samastipur and Begusarai. The category wise share of milk production in Bihar clearly indicate that some top milk producing district in Bihar are dominated by the production of milk by buffaloes (41.88%) of total milk production in the state during 2013-14, followed by indigenous cows (34.16%) and crossbreed cows (21.23%). However, Sheohar has

lowest percentage share of milk (only (0.4%) to total milk production in the state of Bihar.

Table 2.14: District wise & category wise Percentage share of Milk Production in Bihar (2013-14)

Name of the District	District wise & category wise Percentage share of Milk Production in Bihar					
	% share of Crossbred Cow	% share of Indigenous Cow	% share of Total Cattle	% share of Buffalo	Goat	% share to total Milk
Patna	9.71	2.71	5.06	6.32	2.55	5.52
Bhojpur	5.92	2.73	3.95	4.84	1.90	4.27
Nalanda	2.00	1.64	1.78	4.26	2.08	2.83
Buxar	3.25	1.95	2.45	3.54	0.61	2.85
Rohtas	2.21	2.78	2.56	5.05	2.77	3.61
Kaimur	0.16	2.18	1.41	3.34	0.52	2.30
Gaya	1.72	7.25	5.31	5.10	5.78	5.14
Jehanabad	0.57	0.77	0.65	1.67	0.59	1.07
Arwal	0.43	0.59	0.53	1.03	0.49	0.74
Nawada	0.47	3.34	2.24	2.76	3.25	2.28
Aurangabad	0.83	4.22	2.92	3.10	3.11	3.00
Saran	5.69	2.40	3.66	3.31	2.50	3.48
Siwan	1.32	2.58	2.10	2.31	0.93	2.16
Gopalganj	2.24	1.59	1.84	2.45	1.65	2.09
Muzaffarpur	4.55	2.51	3.29	3.71	3.56	3.48
Vaishali	8.03	0.83	3.60	2.03	2.98	2.92
Sitamadhi	0.75	0.75	0.75	2.93	3.80	1.75
Sheohar	0.10	0.36	0.26	0.56	0.76	0.48
Champaran (E)	0.55	3.64	2.45	3.41	4.81	2.95
Champaran (W)	0.74	3.29	2.31	2.62	5.53	2.53
Darbhanga	1.21	3.30	2.50	3.82	1.88	3.03
Madhubani	0.62	3.13	2.71	4.03	2.66	2.96
Samastipur	12.61	1.88	5.99	5.28	2.29	4.75
Munger	2.69	1.74	2.11	1.00	2.11	1.64
Begusarai	14.93	0.29	5.90	1.27	1.59	3.85
Sheikhpura	0.35	0.60	0.51	0.65	0.48	0.57
Lakhisarai	1.74	0.85	1.19	0.93	0.60	1.06
Jamuie	1.32	5.36	3.81	1.73	3.39	2.92
Khagaria	6.04	1.40	3.18	1.99	1.58	2.59
Bhagalpur	3.88	4.14	4.04	2.72	4.23	3.49
Banka	0.15	4.48	3.05	1.47	3.08	2.56
Saharsa	0.99	3.16	2.33	2.62	3.51	2.48
Supaul	0.12	4.05	2.55	3.14	3.58	2.82
Madhepura	0.60	2.41	1.72	2.26	3.58	1.99
Purnea	0.30	3.94	2.54	1.52	3.90	2.15
Araria	0.20	3.10	1.97	1.36	4.05	2.00
Kishanganj	0.16	3.62	2.29	0.61	3.93	1.63
Katihar	0.36	5.02	3.21	0.97	3.43	2.28

Source: Department of Animal Husbandry & Fisheries, Government of Bihar, 2013-14.

2.7 Status of Availability of Feed and Fodder

Adequate and balance availability of feed and fodder is pre-requisite for increasing livestock production in Bihar, crop residue and by product of crops are the main sources of fodder for livestock whereas goats are generally maintained on tree leaves

and grazing. In Bihar, about 20 lakh hectare of land is available for grazing throughout the year which includes wasteland, culturable waste land, pasture trees and groves, fallow land and some part of forest. Due to low cropping intensity, there is huge land area is fallow in rabi and summer season which is used for grazing of animal in Bihar. Hence, theoretical demand and supply position of fodder does not match with actual fodder supply demand scenario. Bihar state planning board has made an estimate of supply-demands for fodder and concentrate in late eighties and came out with conclusion that the state was deficient in concentrate by 8.37 million tones, dry fodder, and green fodder with 18.81 million tones each. Government of Bihar estimated the normal demand for concentrate, green fodder and dry fodder for livestock in Bihar which is given below:

Table 2.15: Demand for Concentrate, Green Fodder and Dry fodder for Livestock in Bihar

SN	Particular	Quantity (In MT)
1.	Concentrate	5.88
2.	Green Fodder	38.17
3.	Dry Fodder	2.48

Source: Department of Animal Husbandry & Fisheries, Government of Bihar, 2013-14.

The state producing 12 million tones of food grain cannot afford to allocate nearly half of food grain for feed purpose. However, Bihar is now self sufficient in dry fodder. During flood, dry fodder was supplied by other states but it is not normal feature. Bihar will remain deficient in green fodder because it is grown in about one lakh hectare only. Crop weeds, tops of sugarcane and tree leaves are extensively used for green fodder in Bihar. To meet the green fodder requirement, about 5 lakh hectare of land is required to be cropped green fodder crops. There is no any specific programme of green fodder production in Bihar. However COMPFED supplies fodder seed to farmers through DCS. Hence, there is an urgent need to decrease the number of unproductive/uneconomic animals for improving the per capita availability of feed, fodder and concentrate in the state. An intensive research is also required to evolve HYV of fodder so that the higher economic returns can be obtained for land, labour and capital used for fodder production in comparison to other use of land. Government is trying to promote private sector to establish feed factories in area where maize production is at large scale.

Table 2.16 Demand and Supply of Feed and Fodder in Bihar

Eastern States	Dry Fodder Requirement	Availability (MT)	Deficit (%)	Green Fodder Requirement (MT)	Availability (MT)	Deficit (%)
Bihar	25.95	15.61	39.83	42.90	1.35	96.85
Eastern Region	150.80	84.03	44.27	213.19	51.77	75.72

Source: Calculated based on 2001 Census data.

Table 2.17: Demand and Supply of Concentrate in Bihar

Eastern States	Concentrate Requirement (MT)	Availability (MT)	Deficit (%)
Bihar	6.63	1.19	82.05
Eastern Region	39.44	6.14	84.43

Source: Calculated based on 2001 Census data.

2.8 Infrastructure Development

Bihar is 9th largest milk producing state in our country. This could result with one of the strongest network of dairy cooperatives and development of infrastructure at the village as well as district level. The cooperatives have developed veterinary health and artificial insemination centre and these provide service to a large number of milk producers at low cost. An attempt has been made to analyse the animal health services available to livestock in Bihar. The number of functional hospital increased from 852 in 2003-04 to 1114 in 2013-14 and number of veterinary doctor also increased from 912 in 2003-04 to 1154 in 2013-14. The number of livestock was also increased from 241 lakh to 270 lakh recording an annual increase of about 1.00 per cent in livestock population. Per hospital, livestock population increased from 26.26 thousand in 1991-92 to 31.69 thousand in 2003-04 and livestock population also increased from 18.37 thousand to 29.61 thousand per veterinary hospital during corresponding period.

Table 2.18: Infrastructure for Dairy Health Care.

Year	No. of Hospital	No. of Veterinary Doctor	Livestock Population		Bovine Population	
			Per Hospital ('000)	Per Veter. Doctor ('000)	Per Hospital ('000)	Per Veter. Doctor ('000)
1981-82	766	746	28.20	28.95	16.97	17.43
1991-92	904	1312	26.66	18.37	16.04	11.05
2003-04	852	912	31.69	29.61	19.01	17.76
2010-11	814	853	*NA*	*NA*	*NA*	*NA*
2011-12	814	853	*NA*	*NA*	*NA*	*NA*
2012-13	814	853	*NA*	*NA*	*NA*	*NA*
2013-14	1114	1154	*NA*	*NA*	*NA*	*NA*

Source: Economic Survey of Bihar, 2010-11 & 2014-15, GoB.

The animal health care is an important factor for economic growth in field of livestock and animal husbandry in Bihar. There are 39 veterinary polyclinic, 1114 veterinary dispensaries, 1595 veterinary aid centre, 1948 artificial insemination centres and only 3 cattle breeding farm in the state of Bihar. The number of veterinary hospital and veterinary doctors declined during the period 1991 -91 to 2003-04. The state is yet to achieve the standard fixed in this regard by Royal Commission on Agriculture (1928). The National Commission on Agriculture (1976) also suggested having one veterinary doctor for 10 thousand livestock. In Bihar, number of veterinary hospital and veterinary doctors need to increase by two fold for proper care of animal health in the state. Bihar government is now making

sincere efforts to make available veterinary services to door of the farmers. The expansion of health service facilities would be much expensive and it could only be done in different phases in the state of Bihar. The efforts of COMPFED, BAFE, J K Trust and some NGOs is proving animal health service are satisfactory. But activities of most of these NGO are concentrated around the urban areas and not providing services in remote and backward areas of the state. In Bihar, cattle vaidya (Quacks) dominate in providing treatment to animals. They rely on naturotheoraphy but do not hesitate in Suggesting modern medicine to animals. At this juncture, it may be suggested to organise training on animal health services to rural youth, especially to them who are performing job of cattle vaidya in rural area.

In Bihar, there were 462 government (AI) centres in the year 1985-86 which increased to 1948 in 2010-11 but less than one-third of these centres are functional. As so as 584 thousand of artificial insemination were performed in 1985-86, covering about 12 per cent of breedable bovine in Bihar but there was an increase in number of A-I from 584 thousand in 1985-86 to 951 thousand in 1991-92 but covered only 15 per cent of breedable bovine population. During last 15 year, public artificial insemination system collapsed and about 400 AI centres are operation, which are short of staff and resources, making them unreliable source of AI. As co-operative and NGOs are operating in Bihar for providing AI services. Presently, about 20 lakh artificial inseminations is performed by government and NGO which cover about 29 per cent of breed able bovine in Bihar. Hence, it may be said that about 71 per cent of breed able bovine are still served by natural breeding system. The details about growth in infrastructure facilities for animal husbandry in Bihar is presented in table 2.19 and number of veterinary institutions in Bihar during 2015-16 is presented in table 2.20.

Table 2.19: Growth in Infrastructure Facilities for Animal Husbandry in Bihar

Year	Vet. Hospital/ Polyclinic	Vet. Dispensaries	Vet aid centre/ stockmen centre/ Mobile dispensaries	Artificial Insemination
1986-87	*NA*	766	*NA*	77
1996-97	*NA*	904	*NA*	91
2006-07	*NA*	852	*NA*	120
2007-08	*NA*	*NA*	*NA*	251
2008-09	*NA*	*NA*	*NA*	514
2009-10	*NA*	*NA*	*NA*	950
2010-11	*NA*	*NA*	*NA*	1948
2011-12	39	783	1595	*NA*
2012-13	*NA*	814	*NA*	*NA*
2013-14	*NA*	1114	*NA*	*NA*

Source: Basic Animal Husbandry Statistics, Govt. of Bihar, Dept. of Animal & Fisheries resources Bihar, Patna - 2012

The details on cattle and development programme during 2015-16 are presented in table 2.20 and analysis reveals that Bihar has 23 intensive cattle development

programme/project with three cattle breeding farm in the state of Bihar which are aimed at improving the breed of cattle and buffaloes.

Table 2.20: Cattle and Dairy Development Programme in Bihar

SN	Particulars	Items	Nos
1.	No. of Buffalo Breeding Farm	Under Animal Husbandry Deptt.	---
2.	No. of Gaushala	Under Animal Husbandry Deptt	86
3.	No. of Liquid Nitrogen Plant	Under Animal Husbandry Deptt	03
4.	No. of ICDP	Under Animal Husbandry Deptt	23
5.	Semen Production Centre	Under Animal Husbandry Deptt	01
6.	Frozen Semen Bank	Under Animal Husbandry Deptt	03
7.	No. of AI Centre	Under Animal Husbandry Deptt	1401
8.	No. of Cattle Breeding Farm	Under Animal Husbandry Deptt	03

Source: Calculated from difference source

There are eight co-operative milk unions in the state of Bihar and have total 66.45 lakh litre per day milk processing capacity and they procure 44.56 LLPD milk. During the year 2012-13, 150 bulk milk coolers and 8 chilling centres with total chilling capacity of around 660 TLPD. The details on number of societies with bulk cooler, Automatic milk collection system and number of chilling centre with dairy cooperative society in Bihar is presented in table 2.21. Patna, Muzaffarpur, Begusarai, Arrah and Samastipur have larger number of infrastructure than other districts in the state.

Table 2.21: Details about Bulk Cooler, Automatic Milk Collection Systems and Chilling Centres facility with Dairy Cooperative Societies in Bihar

Sr. No.	Name of Milk Producers' Co- op. Union Ltd.	No. of Societies with		No. of Chilling Centre- Installed Capacity (1 000 litres/day)
		Bulk Milk Cooler (BMC)	Automatic Milk Collection System (AMCS)	
1	Vaishal Patliputra Milk Union, Patna	34	318	97
2	Rajendra Prasad Millk Union Begusarai, Barauni	22	409	89
3	Mithila Milk Union, Samastipur	19	354	85
4	Tirhut Milk Union, Muzaffarpur	26	197	41
5	Shahbad Milk Union, Arrah	18	260	47
6	Vikramshila Milk Union, Bhagalpur	17	70	57
7	Magadh Dairy Project, Gaya	08	40	32
8	Kosi Dairy Project, Purnea	07	29	32

Source: Collected from different Milk Unions

CHAPTER – III

STATUS OF DAIRY DEVELOPMENT INSTITUTIONS IN BIHAR

1. Introduction

Making dairying a more lucrative and income generating occupation for farmers will require different types of institutional and infrastructure facilities. These would include credit institutions, farmers training facilities, milk collection centres, marketing facilities, milk processing facilities and veterinary institutes at villages' level. It will be require an increase in the productivity of milch animals and reduction in the cost of production of milk to get more benefit from dairy and make it more intensive. This will be only done by providing better breeding, animal health and feeding inputs to milk producers. This overall strategy will be to increase the production of clean milk, strengthen the cooperatives, and enhance the skills of milk producers for better management of stock, increase the capacity to process milk and set-up a marketing chain for the output. There is also need to expand the cooperative network to cover more farmers. At present, the dairy sector in the state of Bihar is being served by 5,123 dairy cooperative societies with 2.54 lakh farmer members, largest among the eastern part of the states. However, dairy development in the state of Bihar should be leverage the existing cooperative network, as well as focus on expanding and strengthening its coverage in terms of area and processing infrastructure.

3.2 Dairy Development Institutions

Dairy development in Bihar was initiated during the 1st Five Year Plan but sincerely effort to organise dairy cooperatives was made much later during 4th Five Year Plan. However, Bihar State Dairy Development Corporation was established in 1972 to accelerate the process of dairy development in general and organization of dairy cooperatives in particular. The process of replicating the 'AMUL Pattern' of dairy cooperatives, got momentum in the state of Bihar only during the mid 1980s after the establishment of the Bihar State Co-operative Milk Producers Federation Ltd. (COMPFED) in 1983. Dairy cooperative is only successful organization in Bihar but covers less than 15 per cent of the villages during 30 years. The dairy cooperative system has lost its steam in Bihar. Moreover, it should not be allowed to monopolize the milk marketing system. During survey, several farmers showed concern about low prices paid by cooperative milk marketing needs more emphasis but private milk processing and marketing organizations are not getting institutional support in Bihar which could be done by promoting private entrepreneurs through institutional financing and government support. The Price of milch animal is higher in Bihar

than most of major states in India. It is only due to unavailability of good quality animals. All the animal breeding farms established to multi ply good quality breeds under public sector have already been closed. There is no any private organization engaged in multiplication of good quality breed of animals in Bihar. Hence, an arrangement should be made in public – private partnership to establish animal breeding farms for purposeful so that the good quality breed of livestock are made available to the farmers at reasonable prices.

The dairy cooperative structure is not much more found in the region of our state. The majority of milk producers of these regions sell their milk directly to milk vendors/middlemen whereas, few producers sell their milk through milk cooperative societies. The exploitation of milk producers by milk vendors/middlemen is found low due to the existence of cooperative societies in the some villages but they offer to sell their milk directly to consumer, milk vendor/middlemen since most of the milk producer of these region are marginal and small need money every day and weekly payment whereas payment by cooperative society is very delay as such monthly or bimonthly. Despite it, milk producers have an opportunity to access all types of veterinary and health care services available in cooperative milk union and in nearby government veterinary clinic.

3.2.1 Dairy Development Board/Cooperative Federation/Corporations

The Bihar State Milk Co-operative Federation Ltd. (COMPFED) was established in 1983 as the implementing agency of operation flood (OF) programme of dairy development on 'Anand' pattern in Bihar. All the operation of erstwhile Bihar State Dairy Corporation was handed over to COMPFED (www.sudha.coop). It markets its products under the label "Sudha Dairy." There are six district level milk producers' cooperative unions affiliated to the milk federation. These milk unions are covering 26 districts and in addition 5 districts are being covered by the federation, out of 38 districts. The average capacity of these dairies is to procure 14 lakh litres of milk per day. COMPFED has linked more than 06 lakh farmers in its networking and has about 12,000 village level dairy cooperative societies to assist in milk procurement. COMPFED has 6 affiliated milk unions, including Rajendra Prasad Milk Union (Barauni), Vaishali-Patliputra Milk Union (Patna) Mithila Milk Union (Samastipur) and Tirhut Milk Union (Muzaffarpur). There are 10 dairy plant under cooperation federation with capacity of 780 thousand litre per day and about 150 bulk milk coolers and eight chilling centres with total chilling capacity of 660 TLPD are functional at village and town level. It has been proposed to set up 230 new bulk coolers of 5000 litres capacity and 115 new bulk milk coolers of 10,000 litres capacity in the village till 2016-17. COMPFED markets milk products under brnad names like Sudha Gold, Sudha Shakti, Sudha Healthy, sudha Smart and Sudha Lite.

The cooperative also facilitates the procurement, processing and marketing of the dairy products produced, provides education to the unions on successful dairy processing, and assists with animal care including artificial insemination, vaccination, and feeding.

Sudha Brand

The 'Sudha' is also working on the AMUL Model/Pattern in Bihar. It is mainly three tiered structure with dairy cooperative societies (DCS) at the village level, milk union at district level and federation at state level. These help in establishment of direct linkage between milk producers and consumer by eliminating middlemen; milk producers control procurement, processing and marketing and also help in professional management.

Description of three tier structure of dairy development

1. **1st tier–Primary Village Cooperative Society (DCS)**

   Village dairy cooperative society (DCS) is generally formed by milk producers at village level. Any producer can become a DCS member by registration and committing to sell milk only to the society. Each DCS has a milk collection centre where members take milk every day. Each member's milk is tested by lactometer for quality with payments based on the percentage of fat and SNF. At the end of every year, a portion of DCS profits is used to pay each member as bonus based on the quality of milk poured.

2. **2nd tier-District Milk Union**

   This is mainly managed by itself (Dairy Cooperative Society) at district level. The union purchases all the societies milk, then processes and market fluid milk and product. This also provides various inputs and services to village DCS and their members like feed, veterinary health care, artificial insemination to improve the growth of milk production and cooperatives business.

3. **3rd tier-State Federation**

   This is an apex marketing body responsible for marketing of milk and milk product of union members. This also helps for overall development of district unions federated to it.

3.2.2 Primary Dairy Co-operative Societies

The milk cooperative sector in Bihar was started in 1983 by government of Bihar to coordinate the work of various local milk unions. There are six district level milk producers' cooperative unions affiliated to the milk federation. These milk unions are covering 26 districts and in addition 5 districts are being covered by federation. It has grown positively and includes 19483 organised societies, 13940 working

societies and 6030 registered societies comprising 8 districts level milk unions with 151.95 billion membership (2015-16) contributing milk twice a day and procurement of 319460 litre of milk. Further, women have been played an integral part in this flood revolution. Therefore, 580 women cooperative societies exclusively managed and run by rural women folk. In last five years, the milk pouring of cooperatives has increased from 10.70 lakh litres to 17.23 lakh litres per day with effort of government. Nowadays, Bihar is not only self sufficient but also expand to market to eastern UP, Jharkhand, Delhi and NCR.

The district wise distribution of primary dairy cooperative societies in the state is presented in tale 3.1 indicate that the highest number of dairy cooperatives societies are in Patna (19.48% to state total) followed by Ara (17.33%), Muzaffarpur (15.27%), Begusarai (13.24%) and Samastipur (13.13%). These five together account for more than 78.00 per cent of total dairy cooperatives societies in the state.

Table 3.1: Number of Dairy Cooperative Societies under Different Milk Union/Project in Bihar (2015-16)

SN	Location of Union/Project	Organized Societies	Working Societies	Registered Societies	Total No. of Societies
1	Vaishal Patliputra Milk Union, Patna	3973	2490`	1228	7691
2	Rajendra Prasad Millk Union Begusarai, Barauni	2162	1970	1094	5226
3	Mithila Milk Union, Samastipur	2305	1841	1036	5182
4	Tirhut Milk Union, Muzaffarpur	3181	1904	947	6032
5	Shahbad Milk Union, Arrah	3206	2432	1205	6843
6	Vikramshila Milk Union, Bhagalpur	1616	1027	250	2893
7	Magadh Dairy Project, Gaya	1656	1319	183	3158
8	Kosi Dairy Project, Purnea	1384	1987	87	2458
9.	Total	19483	13940	6030	39483

Source: Economic Survey of Bihar, 2012-13 &2014-15.

3.2.3 Bihar Co-operative Milk Marketing Federation Ltd.

The COMPFED is most successful implementing agency in Bihar that covers 629.20 thousand DCS members, 11638 DCS organisation and 8823 functional DCS. It has 8 districts milk unions as member (Box 3.1). COMPFED is the apex marketing agency of the dairy network in the state of Bihar and it is manage the physical delivery and distribution of milk and dairy products from all the milk unions to the final users. This is also responsible for all decisions confined to market development and customer management.

Bihar State Dairy Cooperative Ltd. (BSCL) Coverage

Bihar state dairy cooperative Ltd. is one of the important food product marketing organisations. Its daily milk procurement is around 16.90 lakh litres per day from 9.42 lakhs village dairy cooperative society, 8 members of milk unions covering 29 districts and 10.08 lakhs milk producer members in Bihar state. It is the apex organisation of the dairy cooperatives of Bihar, which; provides remunerative price to the milk farmers. It is exclusive marketing organization of 'Sudha' branded

products. Its product comprises milk, Ghee, Ice-cream, Lassi, Misti-dahi, Peda, Paneer, Sudha Special Kalakand, Rasogolla, Gulabjamun, Plain-curd and Balusahi, etc.

District Milk Unions in Bihar.

1. Vaishali-Patliputra Milk Union, Patna.
2. Deshratna Dr. Rajendra Prasade Milk Union, Barauni.
3. Mithila Milk Union, Samastipur.
4. Tirhut Milk Union, Muzaffarpur.
5. Shahabad Milk Union, Ara.
6. Vikramshila Milk Union, Bhagalpur.
7. Magadh Dairy Project, Gaya.
8. Koshi Dairy Project, Purnea.

Table 3.2: Overview of COMPFED, Bihar

1.	Year of Establishment	1983
2.	Member	08 District Cooperative Producers' Unions
3.	No. of Producer Members	1008 (In thousand)
4.	No. of Village Societies	9.42 Lakhs
5.	Total Milk handling capacity per day	1228 litres per day
6.	Milk Collection (Total (2015-16)	4.48 billion litres
7.	Milk collection (Daily Average 2015-16)	16.90 lakh litres/day
8.	Cattle feed manufacturing capacity	260 MT per day
9.	Sale Turnover (2015-16)	1500 crores

Source: COMPFED, GoB.

Presently, milk collection through dairy cooperative was recorded 17.23 lakh kg in Bihar with growth of 61.00 per cent during last five years, which was 10.74 lakh kg in 2011-12. Magadh dairy project has highest CAGR 55.8 per cent followed by Koshi dairy project (51.5%) and Vikramshila milk union (19.7%).

Table 3.3: Progress of Unions and Projects in Daily Milk Collection

('000 kgs)

SN	Union/Project	2011-12	2012-13	2013-14	2014-15	2015-16	CAGR
1	Vaishal Patliputra Milk Union, Patna	210.15	224.85	282.09	318.91	307.73	11.80
2	Rajendra Prasad Millk Union Begusarai, Barauni	314.12	383.80	375.20	409.72	457.52	9.70
3	Mithila Milk Union, Samastipur	250.98	282.99	340.57	354.51	353.67	9.50
4	Tirhut Milk Union, Muzaffarpur	11.12	133.53	181.87	196.87	191.55	15.10
5	Shahbad Milk Union, Arrah	129.44	176.17	206.24	257.57	258.29	19.40
6	Vikramshila Milk Union, Bhagalpur	35.73	48.34	54.88	70.13	72.94	19.70
7	Magadh Dairy Project, Gaya	7.50	13.19	22.55	39.53	39.82	55.80
8	Kosi Dairy Project, Purnea	7.13	15.55	20.98	29.24	41.48	51.50
	Total	1070.19	1238.27	1484.52	1676.40	17234.00	13.50

Source: COMPFED, Govt. of Bihar.

3.2.4 Milk Producer Company Ltd. In Bihar

There are various milk producer companies in Bihar:

(i) Anuj Dairy Pvt. Ltd

(ii) Ganga Dairy Ltd.

The profile of Anuj Dairy Pvt. Ltd. (producer of milk and manufacturer of milk products), this was established in the year 1992. This is one of the leading private dairy players in Bihar with brand name of Raj milk and milk product and snow ball ice-cream. It has two plants, one in Patna and another in Hazipur with processing capacity of 1.5 lakh litre of milk per day. It sells his product across Bihar through distributor and dealer network. This is one of the reputed dairy companies in Bihar offer milk product, dairy product, ghee, desi ghee, milk with its brand name Raj milk and milk product. Exclusive company outlet in Patna at premium location (www.anujdairy.com)

Major Contribution to the Success of Anuj Dairy Product Ltd.:

- Milk procurement with more than thousand societies all across Bihar. It is certified under ISO 9001 & ISO 22000 (HACCP).
- Superior sales and marketing force.
- Strategic technological and infrastructural advantage.
- Efficient human investment.

Advantage of its Company:

- Procurement of quality buffalo and cow milk through a strong network of VLC across Bihar.
- Strong roots in local markets and first-hand knowledge of the local culture.
- Business intelligence and technical expertise that is applied to serve our consumer.
- Strong management focus.

Vision and Mission

They provide quality food and beverages to consumers at affordable prices while ensuring fair return to the produces. Anuj dairy's heritage is intrinsically linked to the dairy movement in Bihar. With determination and price, they will continue to serve his farmers, rural areas and his consumers.

Ganga Dairy Ltd. Located in Begusarai since 1997, established as manufacturer of milk product, exporter and importer of milk powder product. This committed to deliver his product which meets all regulatory, industrial, consumer, quality and food safety requirement to his consumers. They sell different products like toned milk, standard milk, ice-cream, dahi, milk powder, milk products and sweets (gangadairyltd.com).

3.3 Institution's Role in Milk Collection, Milk Pricing and Marketing

3.3.1 Milk Collection through Dairy Cooperative Societies

Milk procurement by dairy cooperative is an important ideas, and because well successful agency in Bihar. Dairy cooperatives are one of the strongest in Bihar and other adjoining state but share of Bihar in total milk procurement by cooperative sector to our country was very little and stay 9th rank in milk production. Among the different 06 milk cooperative unions and three projects, the annual growth rate for milk procurement was highest for Koshi Dairy Project (51.5%), followed by Magadh Dairy Project (44.8%). The milk procurement per functional society per day had also recorded an increase between 2010-11 and 2015-16. Begusarai has highest share of milk procurement (26.74%) to total state procurement followed by Samastipur (20.83%), Patna (13.29%) and Ara (11.45%), whereas Begusarai has also highest share of milk holding capacity (19.76%) to total state capacity, followed by Samastipur (19.48%), Ara (17.44%) and Patna (15.99%).

Table 3.4: Procurement and Distribution of Milk by DCS in 2015-16

SN	Districts	No. of Coop. Dairy	Capacity (TLPD)	Quantity of Milk Procured (LLPD)	Quantity of Milk Sold Distributed (TLPD
1.	Patna	1	275.00	119.88	186.72
2.	Begusarai	1	340.00	241.17	81.91
3.	Samastipur	1	335.00	187.87	110.51
4.	Muzaffarpur	1	290.00	91.80	102.51
5.	Arrah	1	300.00	103.26	27.36
6.	Bhagalpur	1	60.00	87.65	23.67
7.	Gaya	1	100.00	31.18	38.64
8.	Purnea	1	20.00	38.97	31.46
9.	Total	8	1720.00	901.78	612.78

Source: COMPFED, Govt. of Bihar.

3.3.2 Marketing of Milk and Milk Products

The milk procured by COMPFED is sold either as milk or milk products under brand 'Sudha'. Table 3.5 and 3.6 shows that over the year, COMPFED has been steadily expanding its marketing operation to strengthen dairy industry in Bihar. It cover 60 per cent village of the state, like milk output to 44 lakh litres. Bihar's rural landscape has undergone a silent revolution under umbrella organization that involves around six lakh farmers and provides indirect employment to many others.

COMPFED had been started with just 1030 cooperatives in 1983, today the number of cooperatives have risen to 11,400. The milk production was 11.52 lakh litres per day in 2014-15 increased to 12.20 lakh litres per day in 2015-16 and their annual turnover in 2010-11 was Rs. 1337.67 crores increased to Rs. 1503 crores in 2011-12 accounting for 11.00 per cent more than previous year. This is remarkable for any cooperation. In 2011-12, the COMPFED marketed 8.17 lakh litres milk per day, which is a record in its history. COMPFED was committed to serve its customers

and reliase the dream of having at least one 'Bihari dish' in the plate of every Indian. COMPFED also procure milk from farmers at Rs. 25.58 per litre, which is higher than the cooperative of Haryana, Rajathan, Punjab, Karnataka and Maharashtra, apart from other. *(Times of India Report).*

An analysis of table 3.6 reveals that COMPFED markets milk products under brand 'Sudha' was 11975 MT in 2010-11 increased to 19979 MT in 2014-15 accounting for 66.84 per cent increased during last five year. Among different product of COMPFED, dahi was highly sold about 6492 MT in 2014-15 followed by lassi (4412 MT) and paneer (3284 MT) during responding year. These three products together had been accounting 71.01 per cent of total state products in 2014-15.

Table 3.5: Details on COMPFED Turnover, Milk Procurement and Milk Marketing

Year	Turnover (In Crore)	Milk Procurement (LLPD)	Milk Marketing (LLPD)
2010-11	1337.67	11.92	7.21
2011-12	1503.00	10.37	8.17
1012-13	1500.00	9.61	9.20
2013-14	*NA*	12.05	10.76
2014-15	*NA*	11.60	11.50
2015-16	*NA*	12.28	12.21

Source: COMPFED, Govt. of Bihar.

Table 3.6: Marketing of Milk and Milk Product

SN	Particular	2010-11	2011-12	2012-13	2013-14	2014-15
1.	No. of Retail Outlets	7677	8388	9558	10944	12299
2.	Milk (LLPD)	721	8.17	9.20	10.76	11.52
3.	Ghee (MT)	1270	1329	1717	1638	1756
4.	Lassi (MT)	4094	3242	6426	5846	4412
5.	Peda (MT)	770	745	1242	1273	1173
6.	Paneer (MT)	1936	2090	3022	3087	3284
7.	Dahi (MT)	2857	3252	4628	6003	6492
8.	Gulab Jamum (MT)	463	566	1105	1331	1160
9.	Ice-Cream (MT)	585	841	1083	1321	1702

Source: COMPFED, Govt. of Bihar.

3.4 Institutional Weakness/Deficiency/Inefficiency:

The dairy cooperative is itself an autonomous body of the peoples and united voluntarily it to meet their essential economic, social and cultural needful through jointly owned and democratically controlled enterprises. However, day to day, these societies have unsuccessful to achieve competency, and interference of political leaders have increased and thus its autonomy is going down. Despite of significant growth in dairy, cooperative sector in Bihar are in few weakness.

The dairy cooperative has lost its steam in Bihar. Moreover, it should not be allowed to monopolise the milk marketing system. Several farmers showed concern about

low prices paid and no bonus provide to the farmers by cooperative. Milk marketing needs more emphasis but private milk processing and marketing organization are not getting institutional support in Bihar which could be done by promoting private entrepreneurs through institutional financing and government support.

There is some major weakness/inefficiency

- Infrastructure facility at village level is very weak and inadequate.
- Low dairy plants efficiency and in appropriate milk collection centre in few study areas.
- Frequently transfer of staff and also shortage of staff.
- Unavailability of good quality animal and price of milch animal is higher in Bihar than most of major states in India.
- Good quality breed for animal breeding is not appropriate.
- Increasing political interference and very delay payment to the farmers.
- Chilling facility at few areas is very week.

CHAPTER – IV

POLICIES AND PROGRAMMES/SCHEMES FOR DAIRY DEVELOPMENT AND CONVERGENCE OF SCHEMES

4.1 Introduction

Government has been implemented several policies to improve dairy development, by operating different programmes like operation flood, strengthening infrastructure for quality and clean milk production, assistance to cooperatives, intensive dairy development programme (IDDP), Rashtriya Krishi Vikas Yojana (RKVY), accelerated dairy development programme (ADDP), National project for bovine breeding and dairy development (NPBBDD), integrated dairy farm project (IDFP) and package like Vidharbh Vikas package, Marathwara Vikas package. As a result of operating these programme, substantial improvement in quality and increase in quality noticed.

In order to raise the quality standards of milk produced by the farmers, central government has also introduced *"strengthening of infrastructure for quality and clean milk production scheme."* The scheme started in 2004-05 for creation of necessary infrastructure for production of quality milk and milk products at the farmers' level up to the points of consumption by improvement of milking procedure at the farmers' level, training and strengthening of infrastructure to create mass awareness about importance of clean milk production. The scheme is implemented through the state government by district/taluka cooperative milk unions/state level milk federation. Over the period, government policies have major impact on dairy development in India. It is impossible to strengthen and expanded dairy development without supportive of government policies to dairy farming. There are several state and central government schemes that provide forward and backward linkages for promotion of dairy farming. Department of animal husbandry and dairying is the parental department for dairy development, mandatory to implement several schemes and programmes of the government. The state budget and central grants are main resources to implement several schemes and programmes. There are many other government welfare schemes are implemented for dairy development which is funded through budgetary provisions of multiple departments like department of rural development and Panchayati Raj, agriculture and cooperation, tribal welfare, scheduled caste and scheduled tribe finance cooperation, women and child welfare are also engaged in the promotion of dairy development.

Besides, various government programmes, the state milk federation and milk unions have also evolved many schemes that provide incentives to the milk producers. Rajendra Prasad Milk Union (Barauni) of Bihar had evolved 12 different schemes to their producer members. It is needless to say that the schemes are intended to provide paroxysm for milk production. Moreover, convergence of different state and central government schemes provides forward and backward linkage to any development schemes enhancing efficiency in implementation and sustainability. The milk producer will get benefit when both state and central government programmes converge over a given domain so that linkage among these programme speed up realization of programmes benefits.

However, convergence of all the state and central government schemes and programmes at the implementation level in a given areas would bring improvement in milk production sector that will be sustainable, ensuring social and economic improvements of the dairy farmers.

4.2 Regulatory Framework for Dairy Processing Sector

Food processing sector or industry is one of the titanic significance for economy, industry and agriculture development in India. Different laws and order govern the food processing sector in India to verify the quality of food and drugs. The multiple laws/regulation to verify the standard of food additives, contaminants, food colours, preservation and labelling. The food laws in India are enforced by Director General of Health Services, Ministry of Health and Family Welfare, Government of India.

Different Food laws applicable to food and related products in India

- Prevention of Food Adulteration Act (PFA), 1954 and Rules (Ministry of Health & Family Welfare.
- The Standards of Weights and Measures Act, 1976 and Standards of Weights and Measures (Packaged Commodities) rules, 1977.
- Agriculture Produce (Grading & Marketing) Act (Ministry of Rural Development).
- Essential Commodities Act, 1955 (Ministry of Food & Consumer Affairs).
- Fruit Products Order (EPO), 1995.
- Meat Food Products Order (MFPO), 1973.
- Milk and Milk Products Order, 1992
- The Infant Milk substitutes, Feeding Bottles and Infant foods (Regulation of Production Supply and Distribution) Act, 1992 and Rules 1993.
- The Insecticide Act, 1968.
- Export (Quality Control and Inspection) Act, 1963.
- Environment Protection Act, 1986.
- Pollution Control (Ministry of Environment and Forests).

- Industrial Licenses under Industries (Development & Regulation), Act, 1951 for Liquor Manufacture.
- Bureau of Indian Standards Act, 1986 which is the largest body for formulating standards for various food items.
- Vegetable Oil Control Orders 1998.
- The Solvent Extracted Oil, Deoiled Meal and Edible flow (Control order 1967).

Milk is the Primary Source of nutrition for infant mammals before they are able to digest other types of food. Despite it, a dairy product is also good source of vitamin A and provides a wide range of essential nutrients to the diet. The dairy industry can be divided into the organised sector and unorganised sector. The organised dairy sector mainly confined to the dairy unit registered under the milk and milk product order, 1992.

These dairies have each capacity of handling over 10000 litres of milk per day. These organised dairies are under cooperative, private and other (under government) sector. In India, the dairy sector plays an important role in the country's socio-economic development, and constitutes an important segment of the rural economy. Dairy industry provides livelihood to the millions of homes in villages, ensuring supply of quality milk and milk product to people in both urban and rural area.

India in the early 1950 was importing around 55000 tones of milk powder per annum to meet the urban milk demand. Most of the significant developments in dairy industry have taken place in this country only now.

Co-operative Movement of Dairying in India

Immediately after India gained independence in 1947, the milk control board was established to control the dairy supply and distribution chain. However, a number of issues emerged. First, the middlemen got hold of the sale profit and the share of producers in the sales declined. Secondly, as processing units were set up in the cities, it became difficult for the milk to be procured and transported the production centres in the rural area. Consequently, the yield of milk declined and imports of milk powder set up. Dairying in India was largely unorganised before independence but in recent years, dairying has emerged as an important instrument for providing employment and additional income to rural house holding.

The organised dairying has been started in a small way when military dairy forms and creameries were established toward the end of 19th century to meet the demand of armed forces and their hospitals; some private dairies such as 'co-venture' and 'POLSOMS' with more or less processing facilities were encouraged to make pasteurised butter. In the past dairy farming was basically carried out and managed

at the household level. Milk and milk product were produced mainly for home consumption and to some extent for the local market.

At present, there are 678 registered dairy processing units processing 12-15 per cent (26.63 tones) of the milk produced in the country each year. Of the total unit registered under the MMPO, 403 are private dairies processing around 11.83 tones per year, whereas 212 cooperative diaries process 10.36 tones per year. The remaining 63 Government plant process 4.44 tones per year. These dairy plants are registered in the different state of India. There is immense scope to increase the processing capacity and direct a greater share of milk and milk products through the formal channels.

Table 4.1: Dairy Plants Registered under MMPO 1992 in Bihar State as on 31/03/2006

SN	Agencies	No. of Registration	Under Govt. of Bihar	Under Govt. of India
1.	Cooperative	07	01	06
2.	Private	02	01	01
3.	Other	NA	NA	NA
4.	Total	09	02	07

Source: Basic Animal Husbandry Statistics 2006, MoA & FW, Govt. of India.

Milk and Milk Product Order 1992

The Government of India had promulgated the milk and milk product order (MMPO) 1992 on 06/09/1992 under the provisions of Essential Commodities Act, 1955 consequent to de-licensing of Dairy Sector in 1991. As per the provisions of this order, any person/dairy plant handling more than 10,000 litres per day of milk or 500 MT of milk solids per annum needs to be registered with the Registering authority appointed by central government. The objective of the order is to maintain and increase the supply of liquid milk of desired quality in the interest of the general public and also for regulating the production, processing and distribution of milk and milk products.

Recognizing the necessity suitable amendments in milk and milk product order, 1992 for faster pace of growth in dairy sector, Government of India has amended milk and milk product order 1992 from time to time in order to make it more liberal and oriented to facilitate the dairy entrepreneurs. The government of India has notified the last amendment proposals in the official Gazette on 26/03/2002. Now there is no restriction on setting up of new milk processing, while noting that the requirement of registration is for enforcing the prescribed sanitary, hygienic conditions and quality and food safety measures as specified in the Vth Schedule of MMPO, 1992.

Silent Features of the New Amendments Made

- The provision of assigning milk shed has been done away with
- The registrations under MMPO, 92 will now cover sanitary, hygienic condition, quality and food safety measures as specified in Vth Schedule of MMPO, 1992.
- The provision of inspection of dairy plant has been made flexible.
- The provision to grant registration in 90 days has been reduced to 45 days subject to submission of application in complete form.
- The power or registration of State Registering Authority has been raised from one lakh litres per day to 2.00 litres per day.
- Altogether the Central and the State Registering Authorities have registered 818 units with combined milk processing capacity 952.93 lakh litre per day in cooperative Private and Government Sector as on 11/03/2007, www.amul.com, www.indiadairy.com

4.3 Impact of Operation Flood and Reasons for Failure

Operation flood, launched in 1970, has been instrumental in helping the farmers would their own development. It was carried out in different parts of country into three phases i.e., Phase-I (1970-80), Phase-II (1981-85) and Phase – III (1985-96). The achievement growth in production of milk in Bihar and India is depicted in table 4.2. The milk production in Bihar and India has registered significant rate of growth during second phase of operation flood programme.

Table 4.2: Growth of Production of Milk during Operation Flood Programme in Bihar and India

SN	Operation Flood Programme	Bihar (MT)	India (MT)
1.	1970-71 To 1979-80 (OF Phase – I	0.78	3.37
2.	1980-81 to 1984-85 (Phase – II)	0.67	5.60
3.	1985-86 to 1995-96 Phase – III)	NA	3.78
4.	1995-96 to 2015-16 (Post OF)	NA	4.15
5.	1980-81 to 1989-90	NA	5.62
6.	1990-91 to 2000-01	0.67	4.21
7.	2000-01 to 2015-16	-0.19	4.17

Source: Calculated from different State & Central survey

i Phase-I of operation flood was financed by the sale within India of skimmed milk powder and butter oil gifted by the EC countries via the World Food Programme. During its first phase, the project aimed at linking India's 18 best milk sheds with the milk markets of the four metropolitan cities of Delhi, Mumbai, Kolkata and Madras.

ii. Phase-II of the project, implemented during 1981-85 raised to some 136 milk shed linked to cover 290 urban markets. The seed capital rose from the sale of WFP/EEC gift production and World Bank loan had created by end of 1985, a self-sustaining system of 43,000 village cooperatives covering 4.25 million

milk producers. Milk powder production went-up from 22,000 tones in the pre-project year to 1,40,000 tones in 1989. It is direct marketing of milk by producers' cooperatives resulting in the transfer of profit from milk contracts increased by several million litre/day.

iii. Phase – III of operation flood (1985-1996), enabled dairy cooperatives to rapidly build up the basic infrastructure required to procure and market more and more milk daily. Facilities were created by the cooperatives to provide better veterinary first aid health care services to their producer members.

4.4 Government Policies on Quality Semen Import, Export of Meat and Milk Product

There are various successful histories in genetic improvement of animal of different milk producing countries. We have to be achieved remarkable increase in average lactation yields because Indian's bovine has low capacity to give milk. So, there is a need to breed the farmer's herd with improved germ plasm. The import and export of the cattle/ buffalo germ plasm is under the restricted list and is allowed against license(s) issued by the Directorate General of Foreign Trade, MOC on the recommendation of the Department of Animal Husbandry, Dairying and Fisheries. Introduction of temperate dairy breed in the country for crossbreeding indigenous non-descript cattle has been accepted for quite some time now. In pursuance to this need has been felt by a number of state governments/organizations to import exotic germ plasm to produce quality cross bred animals. With the extension of the breeding programme and the artificial breeding network, a surge in demand for exotic germ plans is also expected. Accordingly import of germ plasm must be from the sires, which have been progeny tested or genomically tested and are in active use in cattle breeding.

There is a definite demand for the germ plasm of Indian breeds of cattle and buffaloes in South-America, South-Asia and other countries. Keeping in view our responsibility toward conservation of the rich diversity, of indigenous breeds, it is important to broadly identify germ plasm of cattle and buffalo meant for breeding purposes and for the export. Imposing a complete ban on the export of indigenous germ plasm because of conservation concerns could be counterproductive, since such a ban may encourage the flow of germ plasm through illegal trade which is not desirable. Accordingly, it is essential to have guidelines in place for processing such applications for import and export of bovine germ plasm, in order to streamline procedures and ensure efficient and transparent processing (Guidelines for export/import of bovine germ plasm, *(Revised April, 2016).*

Table 4.3: Agency wise Semen Production is given below:

Agency	Semen Station	No. of Bulls	Semen Production (Lakh doses)
Government	47	1700	181.70
NDDB	02	198	39.40
Dairy Cooperative	09	332	54.70
NGO's/Private	02	167	15.00
Total	60	2397	290.80

Source: Department of Animal Husbandry & Dairying, Ministry of Agriculture, GoI.

In state of Bihar, 1.46 lakhs of AI have been done during past three years from 2001-02 to 2003-04 under NPCBB programmes.

Export of Meat and Milk Products

An animal product plays an important role in the socio-economic life of India. It is a rich source of high quality of products such as milk, meat and eggs. India has emerged as the largest producer of milk with 17.64 per cent share in total milk production in the world. India accounts for about 5.19 per cent of the global egg production and also the largest population of milk animals in the world. India's exports of animal products was Rs. 30,137.08 crores in 2015-16, the major products are buffalo meat (Rs. 26,681.56 crores), sheep/goat meat (Rs. 837.76 crores), poultry products (Rs,. 768.72 crores), dairy products (Rs. 754.20 crores), animal carrying (Rs. 17.02 crores), processed meat (Rs. 6.18 crores) and Natural honey (Rs. 705.87 crores). The demand for Indian buffalo meat in international market has sparked a sudden increase in the meat exports. The main markets for Indian buffalo meat and other animal products are Vietnam Social Republic, Malaysia, Saudi Arabia, Egypt, Arab Republic and UAE. In term of export from India, poultry products 18.00 per cent growth during the financial year 2015-16 over the last year. The major importing countries of these products were Oman, USA, Saudi Arabia, Japan, UAE and Germany (apeda.gov.in/apeda web site/six).

4.5 Maintenance of Progeny History of Dairy Animal

The climatic variability and availability of feed emerging as major constraints, more emphasis is required to promote indigenous breed in India. Indigenous bovine breeds of our country are robust and possess the genetic potential to play a crucial role in the national economy. In the absence of a programme to develop and conserve indigenous breeds, their population has been declining and their performance is below the potential at present. Hence, there is an urgent need to take up a scientific programme for their development and conservation. For development and conservation of indigenous cattle and buffalo breeds, the following initiatives have been taken by government as given below:

i. Rashtriya Gokul Mission has been launched by the government for conservation and development of indigenous breeds in a focused and scientific manner.

ii. National Kamdhenu Breeding Centre is being set up as centre of excellence. An allocation of Rs. 50.00 across has been made to establish two National Kamdhenu breeding centre, one each in the northern and southern region of the country.

The programme (breeding policy for dairy animal improvement) of cross breeding in cattle using bulls of Holstein Friesian, Jersey and Indigenous dairy cattle breeds and upgrading of buffalo population with Murrah were introduced in the State of Bihar a few decades ago. However, the impact of these programmes is seen only in areas where milk unions exist. These programmes were aimed at evolving a new breed, combining the adoptability traits of indigenous cattle and superior milk production potential of the exotic/other indigenous dairy breeds. In the cross breeding programme using exotic breeds, it was envisaged that an exotic level of 50 per cent be maintained. However, due to large scale indiscriminate breeding, there are a large number of animals with a very high level of exotic inheritance, which is a cause of concern to many farmers due to their poor adaptability to local harsh environmental condition. Of late attempt are being made by some private A1 agencies to introduce semen of two to three sahiwal bulls in some of the districts to improve the adaptability. (Draft Report of breeding policy for dairy animal improvement in Bihar has been completed by NDDB, April 2008).

Table 4.4: Cluster wise Classification of Districts based on climate and Resources

SN	Harsh Climate Zone		Relatively better Climate zone	
	Poor Resources	Relatively better Resources	Relatively poor Resources	Better Resources
1.	**North-Eastern Zone**	**South Western Zone**	**Central Zone**	
	Araria, Purnea, Kishanganj	Arwal, Aurangabad, Gaya, Jehanabad, nawada	Kaimur, Buxar, Rohtas, Muzaffarpur, Vaishali, Darbhanga, Khagaria	Saran, Siwan, Bhojpur, Patna, Samastipur, Begausarai, Bhagalpur
2.	**North Western Zone**	**North-Eastern Zone**		
	West Champaran, East Champaran, Gopalganj	Supaul, Saharsa, Madhepura, Katihar		
3.	**North Eastern Zone**	**South Eastern Zone**		
	Madhubani	Banka, Jamui, LaKHISARAI, Munger, Nalanda, Sheikhpura		
4.	**North-Western Zone**			
	Sheohar, Sitamarhi			

Source: Breeding Policy for Dairy Animal Improvement in Bihar, NDDB, April, 2008

Realising the existing dairy production scenario, the government of Bihar constituted an expert committee in 2005 to examine the objective and priorities of the

livestock breeding programme in the state. The committee submitted its report in July 2005, which was later reviewed in March, 2007. The recommendation made by the committee on cattle breeding was very broad based. Considering the importance of dairying in the state and the need to attain higher genetic gain in the cattle and buffalo population, the state government requested NDDB to help them in preparing suitable breeding policies that would be enable farmers to produce own animals suited to their environmental and resources constraints. NDDB constituted a committee in August, 2007 on recommendation of state government of Bihar and appreciated that it was a challenging task to develop breeding policies which reflect the needs and suitability to the cross section of farmers. On one side, the farmers who are risk averse and happy with small, gradual and sustainable improvement thus favouring indigenous breeds of animal, while on the other farmers who are ready to take risks and having the confidence of owing high grade cross breeds or even purebred exotic stock for spectacular achievement in a short period of time.

Table 4.5: Recommended Cluster wise Bovine Breeding Policy for Bihar State.

Clusters	Districts	Breeding Cluster	Improved Exotic Dairy Cattle Breed (Max. Inheritance level in population %)	Improved Indigenous Cattle Breed	Improver Buffalo Breed	Remarks
1.	West Champaran, East Champaran, Gopalganj	North-West	Nil	Bachaur, or Hariana	1. Mehsana 2. Murrah	Crossbreeding with 50 % Jersey in the herd of progressive farmers with good resources CB should have very low priority
2.	Araria, Kishanganj, Purnea	North-East	Nil	Red Sindhi or Gir	1. Mehsana 2. Murrah	Crossbreeding should not be taken up
3.	Arwal, Jehanabad, Aurangabad, Gaya, Nawada	South-West	Jersey (50%)	Hariana or Tharparkar`	1. Mehsana 2. Murrah	Exotic breeding bulls to be used. Jersey pure bred and jersey 50 per cent. However, crossbreeding a low priority.
4.	Sheohar and sitamarhi	North-West	Jersey (50%)	Bachaur or Hariana	Mehsana	Jersey 50 per cent. However, crossbreeding a low priority.
5.	Madhubani	North-East	Jersey (50%)	Red Sindhi or Gir	Mehsana	Jersey 50 per cent and higher grades under better resources.
6.	Supaul, Saharsa, Madeepura & Katihar	North-East	Jersey (50%)	Red Sindhi or Gir	Mehsana`	Jersey 50%. However, crossbreeding a low priority
7.	Nalanda, Sheikhpura, Lakhisarai, Munger, Jamui, Banka	South-East	Jersey (50%)	Sahiwal	Murrah	Exotic breeding bulls to be used. Jersey pure bred and Jersey 50%.
8.	Mezaffarpur, Darbhanga, Vaishali, Khagaria, Buxar, Kaimur, Rohtas	Central	1. Jersey (62.5%) 2. HF (50%)	Sahiwal Hariana	Murrah	Exotic breeding bulls to be used Jersey pure bred, Jersey 62.5%/Jersey 50%.
9.	Siwan, Saran, Bhojpur, Patna, Samastipur, Begusarai, Bhagalpur	Central	1. Jersey (75%) 2.HF (62.5%)	Sahiwal	Murrah	Exotic breeding bulls to be used Jersey pure bred, Jersey 75%/Jersey 50%. HF purebred, HF 62.5%/ HF 50%.

Source: Breeding Policy for Dairy Animal Improvement in Bihar, NDDB, April, 2008

4.6 Suggestions for Effective Implementation of the Breeding Policy

The success of any breeding policy depends on its effective implementation. Many programmes fall due to faulty implementation despite the policy being formulated with great care. The suggestions below could facilitate the effective implementation of a recommended policy.

1. Farmers should be involved in the process of declining and implementing a breeding policy.
2. Animal identification system is essential for recording individual animals' ownership pedigree breed/blood level, breeding history etc.
3. The source of quality bulls and semen doses should be identified with care for use in the state pedigree details of bulls should be made known to farmers.
4. Semen doses of bulls of a particular breed or breed combination recommended for a particular cluster must be made available to all AI technicians at all times.
5. AI technicians should be made aware of the Breeding Policy. Their proficiency in carrying out AIs should be assessed and only then should they be registered.
6. In places when AI facilities are not feasible at present, bulls for natural service should be made available. But while making bulls available for natural service. It should be ensured that the bulls of the particular breed or breed combination recommended for the particular cluster only are supplied.
7. Field performance recording system should be initiated in some pockets to monitor, evaluate and undertake an impact assessment of the breeding policy.
8. A Regulatory Authority should be established and made responsible for :

    Education of farmers regarding the Breeding Policy
    Registration of services providers and AI Technicians
    Enforcement of the approved breeding policy in the state
    Monitoring quality control of AI delivery services provided by all service providers
    Authorising the use of semen and bulls from other states on quality considerations alone
    Under taking a periodic review of breeding policies and programmes, suggesting and implementing appropriate measures for further improvement.

4.7 Policies and Schemes for Dairy Development (Central, State & Union)

Dairying has become an important secondary source of income for millions of rural families and has assumed the most important role in providing employment and income generating opportunities particularly for marginal and women farmers. Most of the milk is produced by animals reared by small, marginal farmers and landless labours. About 15.46 million farmers have been brought under the ambit of 165835 villages' level dairy cooperative societies up to March, 2015.

Government of India is making efforts for strengthening the dairy sector through various Central Sector Schemes like: "National Programme for Bovine Breeding and Dairy Development," National Dairy Plan (Phase – I) and "Dairy Entrepreneurship Development Scheme." The Restructured Scheme National Programme for Bovine Breeding and Dairy Development (NPBBDD) was launched by merging four existing schemes i.e., Intensive Dairy Development Programme (IDDP), Strengthening Infrastructure for Quality and Clean Milk Production (SIO & CMP), Assistant to Cooperatives and National Project for Cattle and Buffalo Breeding with the budget provision of Rs. 1,800 crores for implementation during 12th Plan. In order to the growing demand for milk with a focus to improve milch animal productivity and increase milk production, the Government has approved National Dairy Plan Phase – I (NDP – I) in February, 2012 with a total investment from 2011-12 to 2016-17. NDP – I will help to meet the projected national demand of 150 million tones of milk by 2016-17 from domestic production through productivity enhancement, strengthening and expanding village level infrastructure for milk procurement and provides producers with greater access to markets. The strategy involves improving genetic potential of bovines, producing required number of quality bulls, and superior quality frozen semen and adopting adequate bio-security measures etc. The scheme is implemented by NDDB through end implementing agencies like State Dairy Cooperatives Federation/Unions/Milk Producers Companies. NDP – I would focus on 15 major milk producing states including Bihar which account for over 90.00 per cent of the country's milk production. Now the area of NDP-I of operation flood has been extended to three more states like Uttarakhand, Chhattisgarh and Jharkhand. Coverage of NDP – I will however be across the country in term of benefits accruing from the schemes. www.dahd.nic.in, *Department of Animal Husbandry, Dairying & Fisheries.*

CHAPTER – V

SOCIO-ECONOMIC PROFILE OF SELECTED MILK UNION, PDCS/PRIVATE UNITS AND MILK PRODUCERS

5.1 Agro-climatic Zone wise Distribution of District in Bihar

After the bifurcation of Bihar from Jharkhand in 2001, the state of Bihar has made rapid growth in its agriculture sector including agri-business sub-sector during recent past. The growth of agriculture sector assumes greater significance for overall growth of Bihar's economy. The state government is also trying utmost to bridge the rural-urban gap by promoting higher agricultural growth through implementing of various programmes. The state government has recently introduced a strong agricultural monitoring system to ensure the sector's continuous growth. The various programmes confined to irrigation, seeds, fertilizer, farm mechanization, agricultural credit and awareness are being stressed to make agriculture more productive. The state of Bihar has three district agro-climatic zone i.e., north-west, north-east and south zone. The North West zone has 13 districts and receives an annual rainfall of 1040- 1450 mm. The north-east zone has 8 districts and it receives rainfall ranging from 1200-1700 mm. Finally, the south zone, having 17 districts and it receives an annual rainfall of 990-1300 mm. The state government of Bihar has an efficient team of extension workers go a long way in transferring the most modern technology to the farmers at the field level. The working of the extension services has grown manifold in Bihar recently with introduction of "subject matter specialist" and "Kisan Salahakar" at the Sub-Block level.

The details about the selected milk producer's cooperative unions in Bihar are shown in Table 5.1 & 5.2.

Table 5.1: Agro-Climatic Zone-wise Distribution of districts in Bihar

Agro-Climatic Zones	Districts	Soil	Ph	Initiation/ Cessation of Rainfall	Total Rainfall (mm)	Temperature (dg. Celsius		Important Cropping Sequence
						Maximum	Minimum	
Zone – I (North West alluvial plane zone, Pusa)	Saran, Siwan, Gopalganj, E Champaran, W Champaran, Sheohar, Sitamarhi, Madhubani, Darbhanga, Muzaffarpur, Vaishali, Samastipur, Begusarai	Sandy Loam, Loam	6.5 8.4	12th June/30th Sept. To 10th Oct.	1040-1450 (1245.00)	36.6	7.7	Rice, wheat, rice, rai, rice sweet, potato, rice, maize (Rabi), maize, wheat, maize sweet, potato, maize, rai, rice, lentil
Zone – II (North-East Alluvial plain zone, Purnea)	Supaul, Khagaria, Saharsa, Madhepura, Purnea, Katihar, Kishanganj, Araria, Naugachia	Sandy Loam, Clay Loam	6.5 7.8	7th June/ 30th Sept. to 10th Oct.	1200-1700 (1450)	36.8	8.8	Jute-Rice, Jute-Wheat, Jute-Potato, Jute-Kalai, Jute-Mustard, Rice-Wheat, Moong, Rice-Toria
Zone – III	---	Sandy Loam, Clay Loam, Loam, Clay	6.8 8.0	---	990-124 (1115)	37.8	7.8	Rice-Wheat, Rice-Gram, Rice-Lentil, Rice-Rai
Zone-IIIA (South Alluvial Plane Zone, Sabour)	Sheikhpura, Lakhisarai, Jamui, Banka, Munger, Bhagalpur	---	---	15th June / 30th Sept. to 10th Oct.	---	---	---	---
Zone–IIIB (South Alluvial Plane Zone, Sabour)	Bhabhua, Rohtas, Aurangabad, Buxar, Bhojpur, Jehanabad, Gaya, Nalanda, Patna, Nawada	---	---	10th June/ 30th Sept. to 10th Oct.	---	---	---	---

Source: Deptt. of Agriculture, Government of Bihar

Tale 5.2: Selected Region, District Milk Unions/Districts and Villages for Dairy Project Work

Agro-Climatic Sub Zone					
SN	Agro-climatic Zone	District Milk Union	Taluka/Taluk/Block	Selected Villages Nearest to Milk Union	Selected Villages away from Milk Union
1.	North-West Zone	Deshratna Dr. Rajendra Prasad Dugdh Utpadak Sahkari Sangh, Ltd., Begusarai (High)	Begusarai, Teghra	Raghunandanpur (DCS), Bhagawanpur (NDCS)	Kiratpur (DCS), Ratanmon Babhangama (NDCS)
2.	South-East Zone	Banka Chilling Centre, Banka (Uncovered)	Rajaun, Banka	Laskari (DCS), Mahesachjanda (NDCS)	Kalyanpur (NDCS), Dudhari Samitee (DCS)
3.	East-South Zone	Vikramshila Dugdh Utpadak Sahkari Sangh, Ltd., Bhagalpur (Low)	Naugachia, Sultanganj	Rannuchak (DCS), Raghopur (NDCS)	Tilakpur (DCS), Payin (NDCS)
4	South-West Zone	Vaishal Patliputra, Phulwarisharif, Dugdh Utpadak Sahkari Sangh, Ltd. Patna (Moderate)	Islampur, Ekangarsarai	Ranipur (DCS), Burdih (NDCS)	Narayanpur (DCS), Keshopur (NDCS)

Source: Self calculated as per Methodology

In selected districts, survey reveals that small and medium farmer prefer to rear one or two livestock for milk purpose. Cows are preferred over the buffalo. Some scheduled caste families prefer to rear pigs and goats because of high cost of cows and buffaloes.

5.2 Sample District wise Production of Milk and Population of Livestock

An analysis of table 5.2 reveals that the population of indigenous cattle was found highest in Bhagalpur district followed by Buffalo and cross breed cow while annual milk production of indigenous cattle was found highest followed by buffalo and cross breed cow. An analysis of Banka district reveals that the population of indigenous cattle was found highest followed by buffalo, and milk production of indigenous cattle was highest followed by buffalo and cross breed cow. Now, Begusarai reveals that the population of cross breed cow was highest followed by buffalo and the production of milk was found highest in cross breed cow followed by buffalo. Whereas in case of Nalanda district, the population of buffalo was highest followed by cross bread cow and the production of milk was found highest in buffaloes followed by indigenous cattle. Thus, details of this analysis may be seen in table 5.3

Table 5.3 Production and Population of Livestock in Sample District

SN	Category of Animal	Population (In No.)	Production (Annual in Kg)
Bhagalpur			
1.	Cross breed cow	180107	59328504
2.	Indigenous cattle	212453	101756361
3.	Buffalo	192054	82064206
Banka			
1.	Cross breed cow	33400	11491681
2.	Indigenous cattle	480947	110219969
3.	Buffalo	137741	56340783
Begusarai			
1.	Cross breed cow	345050	228065883
2.	Indigenous cattle	23385	7211413
3.	Buffalo	91863	38351563
Nalanda			
1.	Cross breed cow	96755	30529408
2.	Indigenous cattle	68558	40317433
3.	Buffalo	247282	128489290

Source: Bihar Statistical Hand Book, 2014

5.3 Selected Primary Dairy Cooperative Societies and Sample Milk Union/ Districts

As per methodology, 8 DCS and 8 NDCS villages were undertaken from the 4 selected district milk unions for the present study table 5.4. As the details are already described in Chapter – III and also may see in table 5.2. The number of DCS was found highest in Nalanda district (7691 DCS) followed by Begusarai and Bhagalpur, while total livestock population was highest in Bhagalpur followed by Banka and Begusarai. Total bovine population was also found highest in Banka

district followed by Bhagalpur and Begusarai. Total milk production was found highest (276.76 thousand T) in Begusarai district followed by Bhagalpur and Nalanda districts. Milk procurement per DCS per day was highest (241.17 litres) in Begusarai district followed by Nalanda districts. The total number of bulk milk cooler was highest in Nalanda followed by Begusarai.

Table 5.4: Details about Sample Milk Union/District

SN	Items	Begusarai	Bhagalpur	Nalanda	Banka, (Chilling Centre)
1.	No. of DCS, 2015-16	5226	2893	7691	Uncovered District
2.	Total Livestock (In No.)	833835	1358660	598962	1198700
3.	Bovine Population (In No. cattle + buffalo)	458185	653847	414010	658804
4.	Milk Production (2013-14) '000MT	276.76	251.45	203.42	184.10
5.	Milk Procurement per Functional DCS (Kl. Per day)	241.17	87.65	119.88	NA
6.	Geographical area (In hectare)	187828	254300	232732	305621
7.	District Cover (No.)	04	05	06	Under BGP Union
8.	Selected Village	Raghunandanpur, Kiratpur, Ratanman & Babhanganma	Rannuchak, Tilakpur, Raghopur & Payin	Rampur, Bardih, Narayanpur & Keshopur	Laskari, Maheshichandra, Kalyanpur & Dudhari
9.	Veterinary Hospitals	1	1	1	1
10.	Veterinary dispensaries (2013-14)	27	37	35	27
11.	Bulk Milk Cooler (No) BMC	22	17	34	NA

Source: Collected from different Milk Unions

5.4 Socio-Economic Characteristic of Selected Milk Producer

The socio-economic characteristic of selected milk producers is presented in table 5.5 and reveals that among the sample milk producers of DCS category, 100 per cent decision maker were male members in the large category followed by small and medium category while female has few share in decision making in both DCS and Non-DCS households. Religion wise analysis reveals that above 95.00 per cent in DCS and above 92 per cent in non-DCS was Hindu and remaining was muslim in the both case in overall sample.

Regarding distribution of social groups of milk producers among DCS, the majority were OBCs (56.67%), General (30.83%), and Scheduled Caste (12.50%) whereas in Non-DCS, 62.50% was OBCs followed by General (25%) and SC (12.50%).

Table 5.5: Socio-Economic Characteristics of Selected Households (BIHAR)

Sr. No.	Particulars	DCS (n=120)				NDCS (n=120)			
		S	M	L	T	S	M	L	T
1	Gender of Decision Maker (%)								
	Male	91.94	93.48	100	93.33	91.94	100	100	94.17
	Female	8.06	6.52	---	6.67	8.86	---	---	5.83
2	Religion (% to total)								
	Hindu	93.55	97.83	100	95.83	89.87	96.77	100	92.50
	Muslim	6.45	2.17	---	4.17	7.60	3.23	---	5.83
	Christian	NA	NA	NA	NA	NA	NA	NA	NA
	Sikh	NA	NA	NA	NA	NA	NA	NA	NA
	Other	NA	NA	NA	NA	2.53	NA	NA	1.67
3	Social Group (% to total)								
	Scheduled Tribe	NA	NA	NA	NA	NA	NA	NA	NA
	Scheduled Caste	14.52	13.04	---	12.50	15.19	9.68	---	12.50
	Other Backward Class	53.23	60.87	58.33	56.67	63.03	67.74	50.00	62.50
	General/Open	32.25	26.09	41.67	30.83	22.78	22.58	50.00	25.00
4	Occupation (%)								
	(a) Principal								
	i. Cultivator	77.42	76.09	75.00	76.67	86.07	77.42	70.00	82.50
	ii. AH & Dairying	14.52	17.39	25.00	16.67	10.13	12.90	20.00	11.67
	iii. Agri. Labour	NA	NA	NA	NA	NA	NA	NA	NA
	iv. Non-Farm	NA	NA	NA	NA	NA	NA	NA	NA
	v. Own Non-Farm	NA	NA	NA	NA	NA	NA	NA	NA
	vi. Trade	8.06	4.35	---	5.83	2.53	6.45	10.00	4.16
	vii. Employee in	---	2.17	---	0.83	1.27	3.23	---	1.67
	viii. Others	NA	NA	NA	NA	NA	NA	NA	NA
	(b) Subsidiary								
	i. Cultivator	4.84	10.87	16.67	8.33	6.33	12.90	20.00	9.17
	ii. AH & Dairying	85.48	82.61	83.33	84.17	89.87	83.87	80.00	87.50
	iii. Agri. Labour	6.45	4.35	---	5.00	3.80	---	---	2.50
	iv. Non-Farm Labour	NA	NA	NA	NA	NA	NA	NA	NA
	v. Own Non-Farm Establishment	NA	NA	NA	NA	NA	NA	NA	NA
	vi. Trade	3.23	2.17	---	2.50	---	3.23	---	0.83
	vii. Employee in Service	NA	NA	NA	NA	NA	NA	NA	NA
	viii. Others	NA	NA	NA	NA	NA	NA	NA	NA
5	Av. Operational land holding (area in ha)								
	Irrigated	1.42	1.53	2.12	1.60	1.43	1.37	1.42	1.41
	Un irrigated	0.22	0.32	0.69	0.41	0.29	0.22	0.26	0.27
	Total	1.64	1.86	2.81	2.10	1.71	1.59	1.67	1.68
6	Av. Experience in Dairy (years)	19.74	17.88	21.00	19.15	17.23	20.40	21.66	18.42
7	Income Group (%)								
	BPL	64.52	58.70	75.00	63.33	82.29	64.52	60.00	75.83
	APL	35.48	41.30	25.00	36.67	17.72	35.48	40.00	24.17
8	House Structure (%)								
	Pucca	12.90	10.87	33.33	14.17	6.33	19.35	10.00	10.00
	Semi-Pucca	50.00	52.17	58.33	51.67	59.49	64.52	70.00	61.67
	Kuccha	37.10	36.96	8.33	34.16	34.18	16.13	20.00	28.33

Source: Field Survey

5.5 Family Profile of Selected Milk Producers

The family profile of selected milk producers is analysed in table 5.6 reveals that in the category of DCS, the household size was 6.32 per milk producer against 6.86 per milk producer in NDCS category. The number of males was 1.81 per family in DCS against 1.69 per family in NDCS, whereas the number of female were equal (1.53) in both the categories. The percentage of respondents was 100 per cent male among DCS categories whereas that was 97.50 per cent male and 2.50 per cent female among NDCS category. Finally, Average number of family member works in dairy was 2.61 among DCS against 234 in NDCS.

Table 5.6: Family Profile of Selected Households

Sr. No.	Particulars	DCS (n=120)				NDCS (n=120)			
		S	M	L	T	S	M	L	T
1	Av. Household Size (Nos.)								
	Male	1.50	2.11	2.25	1.81	1.32	2.48	2.20	1.69
	Female	1.62	1.35	1.75	1.53	1.25	2.19	1.60	1.53
	Children (Below 15 Year)	2.97	3.04	2.75	2.96	4.41	2.00	2.70	3.64
	Total	6.10	6.50	6.75	6.32	6.97	6.68	6.50	6.86
2	Gender of Respondent/HH (%)								
	Male	98.39	97.83	100	98.33	96.20	100	100	97.50
	Female	1.61	2.17	---	1.67	3.80	---	---	2.50
3	Av. Age of respondent/HH (years)								
	Male	49.02	54.00	53.00	51.32	55.82	50.26	44.80	53.47
	Female	37.00	40.67	---	38.38	42.00	---	---	42.00
4	Av. Age of family (years)	25.27	30.04	25.42	27.11	24.94	21.10	21.50	23.66
5	Av. Education of respondent/HH (years)	9.53	11.00	10.50	10.19	10.00	9.27	10.10	9.82
6	Av. No. of Family members works in dairy	2.98	2.00	3.00	2.61	2.27	2.26	3.20	2.34

Source: Field Survey

5.6 Cropping Pattern of Sample Milk Producers

The cropping pattern of sample milk producers is presented in table 5.7 reveals that an overall average the GCA during 2015-16 was estimated 2.39 ha per milk producer in the category of DCS against 2.26 ha per milk producer in the category of NDCS. Thus, GCA per milk producer was comparatively little less in case of NDCS milk producers. The size group wise distribution shows that total areas coverage varied from 2.13 ha (small) to 3.55 ha in large milk producers of DCS category whereas, in NDCS category it varied from 2.31 (small) to 3.55 ha (large). However, coverage was comparatively higher in case of larger milk producers of DCS category. Among the seasons, the coverage was higher in kharif than in Rabi and summer season.

Table 5.7: Cropping Pattern of Sample Household (2015-16)

SN	Season	Cropping Pattern (2015-16)	DCS (n=120)				NDCS (n=120)			
			S	M	L	T	S	M	L	T
A	Kharif	Food grains Crop								
		Paddy	1.48	1.65	1.25	1.46	1.61	1.32	1.50	1.52
		Maize	0.05	0.05	0.17	0.06	0.02	0.10	0.18	0.05
		Cash Crop								
		Vegetables	0.03	0.05	0.10	0.05	0.02	0.07	---	0.03
		Fodder Crop	NA	NA	NA	NA	NA	NA	NA	NA
		Other crops	NA	NA	NA	NA	NA	NA	NA	NA
B	Rabi	Food grains Crop								
		Wheat	0.21	0.28	0.79	0.29	0.26	0.27	0.30	0.26
		Pulses	0.15	0.23	0.62	0.22	0.25	0.23	0.20	0.24
		Maize	---	0.04	---	0.02	0.02	0.03	---	0.02
		Cash Crop								
		Vegetables	0.05	0.04	0.07	0.04	---	---	---	---
		Oilseeds	0.03	0.08	0.16	0.06	0.04	0.06	0.09	0.05
		Fodder Crop	NA	NA	NA	NA	NA	NA	NA	NA
		Other crops	NA	NA	NA	NA	NA	NA	NA	NA
C	Summer	Food grains Crop								
		Moong	0.06	0.03	0.23	0.07	0.05	0.06	0.13	0.06
		Cash Crop								
		Vegetables	0.02	---	---	0.02	0.02	---	---	0.02
		Fodder Crop								
		Sudan	0.02	---	0.09	0.06	0.02	---	---	0.01
		Jaiee	0.03	0.04	0.07	0.04	---	0.02	---	0.01
		Other crops	NA	NA	NA	NA	NA	NA	NA	NA
D	All		2.13	2.49	3.55	2.39	2.31	2.16	2.40	2.26

Source: Field Survey

5.7 Details on Herd Strength and Cattle shed

The details on herd strength and cattle shed is presented in table 5.8 reveals that total number of milch animal was 2.86, out of total animal in DCS milk producers. Out of total 286 milch animals, cross breed cattle was 203 followed by buffalo (55) and local cattle (28). Whereas, total milch animal in case of NDCS was 184, out of total animal, it was cross bred milch cattle (121), buffalo (43) and local milch cattle (20). However, total milch animal in DCS category was higher than NDCS. Accordingly, the kuccha cattle shed were higher in DCS and NDCS than semi-pucca and pucca in DCS and NDCS category.

Table 5.8: Details on Herd Strength & Cattle Shed

Sr. No.	Particulars	DCS (n=120)		NDCS (n=120)	
		Total Animal (No.)	Milch Animal (No)	Total Animal (No)	Milch Animal (No)
1	Local Cattle (Indigenous)	42	28	26	20
2	Cross Bread	240	203	148	121
3	Buffalo	80	55	62	43
4	Others	NA	NA	NA	NA
	Total	362	286	236	184
	Cattle Shed				
	i. Pucca	67	52	31	28
	ii. Semi-Pucca	120	93	96	70
	iii. Kuccha	175	141	109	86
	Total	362	286	236	184

Source: Field Survey

CHAPTER – VI

COST OF MILK PRODUCTION AND AWARENESS ABOUT THE SCHEMES

6.1 Details of Animal Breeds

The analysis of animal breeds is presented in table 6.1 reveals that average yield (lit/day) per crossbred cow was 14.75 followed by buffalo (10 litre per day) and local cow (indigenous) only 4.0 litre in DCS milk producers whereas that was 12.42 litre per day in cross bred, 8.72 litres per day of buffalo and 3.81 litres per day of local cow in NDCs member. Thus, in all cases, average milk production per day was higher among DCS member than Non-DCS members.

Table 6.1: Details of Animals Breeds

Sr. No.	Particulars	Name of breeds	Av. Yield (lit/day)/ Animal	
			DCS	Non-DCS
1	Local Cow (Indigenous)	Deshi Shaiwal, Haryana breed	4.00	3.81
2	Crossbred Cow	Jersy, H. Friegen	14.75	12.42
3	Buffalo	Murrah, Mahisana	10.00	8.72
4	Others	NA	NA	NA

Source: Field Survey

6.2 Details of Breedable Animal on Survey date

The details of breedable animal of study area is presented in table 6.2 reveals that the average age of all animal was estimated 3.66 years on an overall among DCS member against 3.70 year in NDCS members. Average age at first calving among DCS member was 34.0 month against 32.00 month among NDCS member. The length of lactation on period (days) was estimated 253.33 among DCS members against 246.67 in NDCS members. The last lactation of peak yield was 3.82 in DCS member against 3.58 in NDCS members while present lactation of peak yield was 7.68 among DCS members against 7.68 NDCS members.

Table 6.2: Details of Breedable Animals on Survey Date

(In Average)

Sr. No.	Particulars	Animal (DCS)				Animal (NDCS)			
		Local Cow	Crossbred Cow	Buffalo	Total	Local Cow	Crossbred Cow	Buffalo	Total
1	Age (year)	3.43	3.38	4.17	3.66	3.50	3.61	4.00	3.7
2	Age at First Calving (Month)	36	30	36	34.00	32	30	34	32.00
3	Lactation Order @ Lit/day	3.75	12.00	9.00	8.25	4.00	10.10	9.25	7.78
4	Length of Lactation on Period (Days)	240	260	260	253.33	230	260	250	246.67
5	Peak Yield-								
	a. Last Lactation	2.20	4.50	4.75	3.82	2.75	4.00	4.00	3.58
	b. Present Lactation	3.50	10.38	9.16	7.68	3.55	10.25	9.25	7.68
6	Covered Under Insurance (Y/N)	NA	NA	NA	NA	NA	NA	NA	NA
	If yes, 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

6.3 Availability of water for Dairy in DCS and NDCS Category of Milk Producers

The table 6.3 reveals that the main source of water available for dairy purpose with almost all the selected milk producers of DCS and NDCS category was Hand Pump in all the three seasons followed by village pond and river/streams at the distance of half to 200 meters. The supply of water is adequate as replied by 80.00 per cent of respondent of both DCS and NDCS in rainy and winter season but few replied as 'No' in summer season. They also replied about quality of water in favour of poor (42 % to 60%) followed by very poor (19 to 46%) and few replied in favour of normal quality of water in both the case of DCS and NDCS respondent. The alternative source of water were tube well, open well, pond and hand pump at the distance of 100 to 250 meters.

Table 6.3: Availability of Water for Dairy

Sr. No.	Particulars	DCS (120)			NDCS (120)		
		Season			Season		
		Rainy	Winter	Summer	Rainy	Winter	Summer
A	Source of Water Available for Dairy Purpose						
1	Open Well	4.17	7.50	14.17	9.17	6.67	15.83
2	Tube well	15.83	10.84	13.33	14.17	16.67	15.00
3	River/Streams	19.17	23.33	16.67	13.33	22.50	17.50
4	Canal	NA	NA	NA	NA	NA	NA
5	Village Talawadi/Pond	21.67	23.33	24.17	17.77	23.33	22.50
6	Farm Pond	8.33	1.67	---	10.83	5.00	---
7	Hand pump	30.83	33.33	31.66	33.33	25.83	29.17
	Av. Distance (Meters)	67.00	91.67	216.17	72.01	89.31	207.00
B	Supply of Water is adequate						
1	Yes	87.50	69.17	8.33	84.17	80.83	9.17
2	No	12.50	30.83	91.67	15.83	19.17	90.83
C	Water Quality						
1	Normal	4.16	38.33	10.00	10.83	32.50	8.33
2	Poor	49.17	42.50	50.83	59.17	42.50	57.50
3	Very Poor	46.67	19.17	39.17	30.00	25.00	34.17
D	Alternative source of Water supply in shortage						
1	Open Well	14.17	8.33	10.00	11.67	11.67	8.33
2	Tube well	20.83	19.17	22.50	6.67	15.83	17.50
3	River/Streams	6.67	16.67	17.50	15.83	21.67	21.67
4	Canal	NA	NA	NA	NA	NA	NA
5	Village Talawadi/Pond	25.00	19.17	21.67	23.33	18.33	20.83
6	Farm Pond	NA	NA	NA	8.33	NA	NA
7	Hand pump	33.33	36.66	28.33	34.17	32.50	31.67
	Av. Distance (Meters)	100	210.25	260.67	99	201.80	220
E	Payment Made for Water, If any (Rs)	NA	NA	NA	NA	NA	NA

Source: Field Survey

6.4 Labour use Pattern in Involvement of Family (Men and Women) in Dairy Activities under DCS and NDCS Categories of Milk Producer

6.4.1 Labour use Pattern of Family of DCS Categories of Milk Producers

The table 6.4 reveals that under fodder management, 47 male and 24 female family workers were engaged at the rate of 4.5 hours and 2.5 hours respectively for whole activities under fodder management in DCS category of the milk producers. The total number of male hired labour was 32.00 among total sample size involved indifferent activities of dairy per day and female hired labour was 15.00. Hired labour of male worked 7.5 hours per day and female hired worked 7.00 hours per day. Further analysis reveals that total number of male and female family labour was 101.00 and 63.00 per day respectively among whole sample size. Male and

female family labour worked daily was reported as 8.00 hours and 7.00 hours per day respectively for different activities of dairy management. For the same activities of dairy, total number of male and female hired labour per day was reported as 32.00 and 15.00 respectively among whole sample size and they worked individually 7.5 hours and 7.00 hours per day. However, average involvement of male either family labour or hired labour were higher per day than that of female family and female hired labour. Therefore, total family labour including male and female were 164 while total hired labour including male and female were 47. So, more than one (1.37) family labour per household was engaged in different activities of dairy while less than one (0.39) hire labour per household was involved in different activities of dairy. Comparatively less hired labour was involved in dairy activities than family labour.

6.4.2 Labour use Pattern in involvement of Rural Men and Women in Dairy Activities of Non-DCS Sample

An analysis of NDCS sample farmers in table 6.4 reveals that total number of family labour including male and female were 134 while that of hired labour was 26 per day among whole sample size. The family labour of male and female were worked as 8.00 hours and 7.5 hours per person per day respectively while hired labour of male and female were worked as 8.00 hour each per day for different activities of dairy. Therefore, more than one family labour was engaged in different activities of dairy per day. But in case of hired labour, less than one person was engaged in different activities of dairy. However, most of respondent worked itself for various activities of dairy farming.

Table 6.4: Labour Use Pattern in Involvement of Rural Men and Women in Dairy activities

Sr. No.	Type of Labour	Family labours				Hired Labour			
		No. of Workers / Day		Total Hours Worked / Person / Day		No. of Workers / Day		Total Hours Worked / Person / Day	
		Male	Female	Male	Female	Male	Female	Male	Female
	DCS (120)								
A	**Fodder Management**	47	24	4.5	2.5	12	8	4.5	3.5
	Grazing								
	Grass Collection								
	Animal Feeding								
B	**Shed Management**	12	29	1.5	3.5	---	7	---	3.5
	Cleaning the shed /house								
	Washing of animal								
	Watering								
	Dung Collection								
C	**Milking**	22	10	1.0	1.0	9	---	1.5	---
	Milking								
	Milk/Milk preparation								
D	**Animal Health**	20	---	1.0	---	11	---	1.5	---
	Breeding								
	Veterinary Health Care								
	NDCS (120)								
A	**Fodder Management**	30	17	4.5	2.5	9	2	2.5	3.5
	Grazing								
	Grass Collection								
	Animal Feeding								
B	**Shed Management**	12	40	1.5	3.5	4	2	3.5	4.5
	Cleaning the shed /house								
	Washing of animal								
	Watering								
	Dung Collection								
C	**Milking**	16	4	1.0	1.5	6	---	1.0	---
	Milking								
	Milk/Milk preparation								
D	**Animal Health**	15	---	1.0	---	3	---	1.0	---
	Breeding								
	Veterinary Health Care								

Note: If needed, mention labour use in group of activities (A, B, C, D).

Source: Field Survey

6.5 Details about Income Received from Dairying and its use among DCS and NDCS Category of Sample Farmer

6.5.1 Details about Income received from dairying and its use among DCS Category of Sample Farmers

An analysis of table 6.5 reveals that under DCS category of milk producer, 95.20 per cent of income from dairy was held-up by male member and remaining 4.80 per cent held by female member. Maximum percentage about 66.00 per cent of male members' income was expended on animal feed and health and remaining 40.00 per cent on family expenditure. Whereas, 43.24 per cent of female income was expended on family expenditure and 35.12 per cent on animal feed and health, and remaining shaved as future.

6.5.2 Details about Income received from Dairying and its use under NDCS Category

An analysis of table 6.5 reveals that under NDCS category of milk producers, 93.97 per cent of income was held up by male member and remaining 6.03 per cent held by female member. 62.58 per cent of total income of male member was expended on animal feed and health, and remaining 37.42 per cent on family expenditure while, in case of female respondent, she expend maximum about 41.00 per cent on animal feed and its health. Therefore, female has more responsibility of her family than male one.

Table 6.5: Details about Income received from Dairying and its use (In Rs.)

Sr. No.	Particulars	Income from dairy (sale of milk)	Income from Dairy per respondent per day	Income sale of dung/ FYM	Income spent on (In %)	
					Family Exp	Animal Feed /and Health
A	**DCS (120)**					
1	Male	95132.18 (95.20)	849.39	---	33.99	66.01
2	Female	4795.12 (4.80)	660.62	490.00	43.24	35.12
3	Both	99927.30 (100.00)	832.72	---	34.63	64.64
B	**NDCS (120)**					
1	Male	64269.23 (93.97)	568.75	---	37.42	62.58
2	Female	4126.85 (6.03)	639.55	350.00	41.21	34.65
3	Both	68396.08 (100.00)	569.97	---	44.62	55.38

Source: Field Survey

6.6 Feed and Fodder per Animal at the Time of Survey (Kg/Anil/day)

Table 6.6 reveals that under the stall feeding, self cultivated dry fodder was fed at the rate of 3.5 kg/animal/day to the local cow. 4.5 kg/animal/day to the buffalo among DCS category of milk producers, almost similar rate of feeding was also found by all groups of milk producers under NDCS category. Along with dry fodder, the self cultivated green fodder was also fed at the rate of 4.5 kg/animal/day to local cow, 5.6 kg/animal/day to crossbreed cow and 7.5 kg/animal/day to the buffalo. Self collected green grass was also fed to the buffalo in both the case of DCS and NDCS members. After that, home prepared concentrates was also fed at the rate of 1.56 kg/animal/day to the local cow, 2.15 kg/animal/day to the cross breed cow and 3.20 kg/animal/day to the buffalo among the DCS member while slightly lower quantity of these fed to milch animals by all the milk producers of NDCS category. As per the producers viewed, the supplement salt was also fed varied from 50 gram to 100 gram/animal/day to all types of animal under DCS and NDCS category. Molasses was also given at the rate of 200 gram to 250 gram/animal/day among both the cases. Mustard oil was also given at the rate of 50 gram to 100

gram/animal/day in both cases. But feeding grazing was also providing to the local cow and buffalo at the rate of 2 to 3 hours per day in both cases.

Table 6.6: Feed and Fodder per Animal at the time of Survey (Kg/Ani./day)

Sr. No.	Stall-Feeding Quantity Fed (Kg) / animal	DCS (120)			NDCS (120)		
		Animal type			Animal type		
	Dry Fodder	LC	CB	B	LC	CB	B
A	Self-Cultivated	3.5	4.5	6.75	3.41	4.45	6.68
	Purchased	NA	NA	NA	NA	NA	NA
	Green Fodder						
B	Self-Cultivated	4.5	5.6	7.5	4.15	5.25	7.45
	Purchased	NA	NA	NA	NA	NA	NA
	Collected (Grass, Tree Leaves,)	---	---	2.5	---	---	2.65
	Concentrates						
C	Home Prepared	1.56	2.15	3.20	1.50	2.10	3.15
	prepared Cattle Feed	NA	NA	NA	NA	NA	NA
	Supplements						
	Mineral Mixture	1	1	1	½	1	1
D	Salt	50gms	100 gms	100 gms	50 gms	50 gms	100 gms
	Molasses	200 gm	250 gm	250 gm	200 gm	200 gm	200 gm
	Mustard Oil	50 gm	100 gm	100 gm	50 gm	100 gm	100 gm
	Any Other (Specify)	NA	NA	NA	NA	NA	NA
E	**Out feeding Grazing** (No of Hours/day)	2 hrs.	---	3 hrs.	2.5 hrs.	---	3 hrs.

Source: Field Survey

6.7 Veterinary and Breeding Expenditure during Last Year (2015-16) under DCS and NDCS Category of Milk Producers

An analysis of 6.7 tables reveals that Rs. 800 was expenditure on FMD diseases of local cow including medicines and Doctor Charges by each DCS member, Rs. 1000/animal on crossbreed cow comprising different diseases like SH, BQ and FMD and Rs. 880/animal on buffalo under DCS member. Almost similar expenditure was also found under NDCS member. After that, average number of visit by veterinary doctor in reference year was found 1 to 2 times. Generally first artificial insemination (AI) was succeeded but sometime repeats it. Artificial insemination was generally found in all the breeds of animal but some local cow was also breaded by natural breeding. Doctor's charge per visit was found at the rate of Rs. 200 under DCS and NDCS category of milk producers.

Table 6.7: Veterinary and Breeding Expenditure during Last year (2015-16)

SN	Expenditure **(Rs**)	DCS (120)			NDCS (120)		
		Animal type			Animal type		
A	Vaccination	LC	CB	B	LC	CB	B
	HS	---	286	---	---	290	---
	BQ	---	286	---	---	291	---
	FMD	250	258	---	---	273	270
B	Medicines + Doctor(Rs)	800	1000	890	825	950	1020
C	Av. No. of Visit By Vet./Year	1	2	2	1	2	2
D	Service						
	Artificial Insemination AI	---	2	---	---	2	---
	Natural service	1	---	1	1	---	1
	Amount	---	100	---	---	150	---
E	No. of AI Per conception	---	2	---	---	2	---
F	Per visit rate paid to vet. Doctor (Rs/visit)	200	200	200	200	200	200

Source: Field Survey

6.8 Cost Details of Feed and Fodder per Animal at the time of Survey under DCS and NDCS Categories of Milk Producers

An analysis of table 6.8 reveals that DCS member on an average cost Rs. 37.83 was incurred per animal on dry fodder, Rs. 22.07 on green fodder. Rs. 29.65 on concentrate and Rs. 20.33 on supplement by small, medium and large milk producer respectively. Almost similar figure was also found under NDCS category of milk producers. Labour wages for dairy activities were reported to be almost similar for men as well as women varied from Rs 120 to 140 per day in all the category of milk producers. The permanent labours in DCS and NDCS category were reported to be paid as 100.00 per cent in cash. The rental value of land and water charged were not reported to be paid.

As regards the present value of adult animal on an average, the value of cross breed cow was reported Rs. 38638.46 in DCS category and Rs. 40375.00 in NDCS category. The value of local cow was estimated as Rs. 17692.30 and Rs. 11250 in DCS and NDCS category of milk producers respectively whereas, the value of buffaloes was calculated as Rs. 40623 and Rs. 41000 in DCS and NDCS sample farmers of study area respectively. Therefore, the value of buffalo in both case NDCS and DCS members was comparatively higher than that of local and cross bred cow. About 60.00 per cent of dung was used as dung cake and remaining as manure in the both cases DCS and NDCS. However, other information may be seen in table 6.8.

Table 6.8: Cost details of Feed and Fodder per Animal at the Time of Survey

(Rs./livestock)

SN	Particulars	DCS (120)				NDCS (120)			
		S	M	L	T	S	M	L	T
A	Fodder								
	1. Dry Fodder	38.20	38.98	36.32	37.83	37.96	38.40	35.50	37.29
	2.Green Fodder	19.77	20.50	23.63	22.07	20.00	22.20	23.80	22.15
	3.Concentrate	30.38	37.93	20.65	29.65	38.25	28.69	30.79	32.58
	4.Supplements	15.79	17.98	28.05	20.33	15.83	21.25	20.92	19.33
B	Grazing Contract								
	Daily basis	NA	NA	NA	NA	NA	NA	NA	NA
	Monthly basis	NA	NA	NA	NA	NA	NA	NA	NA
	Yearly basis	NA	NA	NA	NA	NA	NA	NA	NA
C	Labour Wages (for Dairy activities)								
	Men	120.97	136.66	140.00	132.54	120.10	135.50	140.00	131.83
	Women	120.10	130.00	140.00	130.03	120.00	125.00	135.00	126.67
D	Permanent Labour (for Dairy activities)								
	Cash (Monthly)	2333.33	2562.50	2541.67	1481.67	---	2000.00	3000.00	2500.00
	Kind	---	---	---	---	---	---	---	---
E	Rental Value of Land (*Rs./ha)*	*10 lakh*	*12.25*	*12.00*	*10.58*	10.00	8.50	10.00	10.00
F	Water Charges paid if any	NA	NA	NA	NA	NA	NA	NA	NA
G	Present Value of Adult Animals								
	Crossbred Cow	33916.66	37975.00	42275.00	38638.46	39666.67	40375.00	40800.00	40375.00
	Local Cow	18050.00	17362.50	17733.33	17692.30	15166.67	15875.00	15200.00	11250.00
	Buffalo	40933.33	40675.00	40433.33	40623.08	40833.33	41250.00	40900.00	41000.00
H	Dung*								
	% of Dung used as - Manure	30.00	36.68	50.77	41.83	40.00	36.00	55.00	43.67
	Dung Cakes	70.00	61.32	49.23	58.17	60.00	64.00	45.00	56.33
I	Equipments								
	Chaff Cutter	6583.33	6775.00	6550.00	6626.92	5083.33	4875.00	2083.33	3615.38
	Bucket	200.00	206.25	208.33	205.77	233.33	368.75	340.00	322.92
	Hoe	179.17	209.37	208.33	201.92	175.00	178.13	180.00	178.13
	Milk Cane	720.00	1002.50	1415.83	820.38	516.67	537.50	580.00	550.00
	Measurement	91.67	101.25	111.67	103.85	78.33	82.50	93.00	85.83
	Any Other	NA	NA	NA	NA	NA	NA	NA	NA

Source: Field Survey

6.9 Season wise Milk Yield (Per day) of Sample Household during 2015-16 under DCS and NDCS Category of Milk Producers

An analysis of table 6.9 reveals that in DCS category, the average yield/animal was found to be maximized as 15.50 litres/day/cross bred during summer season and local cow and buffalo have highest average yield during same season against lowest average milk yield during rainy season under all three breed of animal. Almost

similar result was found in NDCS category of milk producers. However, lowest milk yields during rainy was found against summer and winter season.

Table 6.9: Season wise Milk Yield (Per day) of Selected HH 2015-16

Sr. No.	Av. Yield (Lit/animal)	Animal (DCS) n=120			Animal (NDCS) n=120		
		Local Cow	Crossbred Cow	Buffalo	Local Cow	Crossbred Cow	Buffalo
1	Rainy Season	3.50	10.88	8.25	3.70	10.20	9.10
2	Winter Season	3.65	12.71	9.25	3.50	13.35	9.50
3	Summer Season	4.00	15.50	10.15	4.25	15.18	11.27

Source: Field Survey

6.10 Awareness about Various Schemes among Milk Producers of DCS and NDCS Categories

An analysis of table 6.10 reveals that on an average, awareness about different vaccinations schemes/programmes was replied as 'Yes' (65%) against as 'No' (35%) among DCS category of sample farmers while about that 66.67 per cent viewed as 'No' and 33.33 per cent viewed as 'Yes' among NDCS category of sample farmers. Awareness about artificial insemination (AI) programmes, 95.00 per cent of total sample farmers were viewed as 'Yes' against 5.00 per cent as 'No' among DCS sample farmer while few lesser than DCS members, about 69.00 per cent of total NDCS sample farmers were replied as 'Yes' against 31.00 per cent as 'No'. Correspondingly, 70.83 per cent of total DCS members were replied as 'No' about dairy development schemes/programmes against 29.17 per cent as 'Yes' whereas slightly more 78.33 per cent were viewed as 'No' against 21.67 as 'Yes' by NDCS sample farmers. Dairy cooperative/milk union was emerged as major source of information about these schemes as mentioned above as replied by both of DCS and NDCS member of sample farmers. However, much more information about others may be seen in table 6.10.

Table 6.10: Awareness about various schemes (Response In %)

Particulars	DCS (120)				NDCS (120)			
	S	M	L	T	S	M	L	T
1. Awareness about different Vaccinations schemes/programmes (%)								
Yes	61.29	67.39	75.00	65.00	39.24	22.58	20.00	33.33
No	38.71	32.61	25.00	35.00	60.76	77.42	80.00	66.67
2. Awareness about Artificial Insemination (AI) programmes (%)								
Yes	95.16	33.48	100	95.00	64.56	80.65	70.00	69.17
No	4.84	6.52	---	5.00	35.44	19.35	30.00	30.83
3. Awareness about any dairy development scheme/programmes (%)								
Yes	16.13	36.96	66.67	29.17	21.52	19.35	30.00	21.67
No	83.87	83.04	33.33	70.83	78.48	80.65	70.00	78.33
4. Sources of information about these scheme (%)								
a. Govt. Animal Husbandry	6.45	6.52	25.00	8.33	---	6.45	---	1.67
b. Dairy Cooperative/Milk Union	37.10	41.31	41.67	39.17	53.16	45.16	40.00	50.00
c. Media (Press/TV)	NA	NA	NA	NA	NA	NA	NA	NA
d. Fellow farmer/dairy	56.45	52.17	33.33	52.50	46.84	48.39	60.00	48.33
e. other	NA	NA	NA	NA	NA	NA	NA	NA
5. Have you benefited with any dairy development scheme/programmes (%)								
Yes	12.90	36.96	16.67	22.50	---	---	---	---
No	87.10	63.04	83.33	77.50	100	100	100	100
a) If benefited, please provide following								
i) Av. No. of visits to concern office	2	2	2	2	NA	NA	NA	NA
ii) Wage days lost, if any (Rs.)	200	200	200	200	NA	NA	NA	NA
iii) Total Expenditure to avail scheme (doc/travel/etc)	175	150	150	150	NA	NA	NA	NA
iv) Bribe paid to any one	NA	NA	NA	NA	NA	NA	NA	NA
v) Quality of material received								
Good	63	60	60	60	NA	NA	NA	NA
Bad	NA	NA	NA	NA	NA	NA	NA	NA
vi) Satisfied with benefit received (%)								
Yes	50	53	50	52	NA	NA	NA	NA
No	NA	NA	NA	NA	NA	NA	NA	NA
If no, give reason	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA

Source: Field Survey

CHAPTER – VII

MILK CONSUMPTION AND MARKETABLE SURPLUS

7.1 Milk Production, use of Produced Milk at Home and Processing and Sale (yesterday) in DCS and NDCS Category of Milk Producers

7.1.1 About DCS Category of Milk Producers

An analysis of table 7.1 shows that in DCS category of sample milk producers, the average milk drawn per day per animal from all animals was estimated at 9.57 litres. Now, breed wise analysis of DCS category reveals that average milk production of local cow cross bred and buffalo was estimated at 4.00 litres, 14.71 litres and 10.00 litres per day/animal respectively. Whereas, in case of NDCS milk producers, that of same was calculated as 3.81 litres, 12.42 litres and 8.72 litres/day/animal. Thus, it is clear from data that milk drawn yesterday per animal in all three breeds was slightly higher in DCS members than that of NDCS members. The average milk drawn per farmer/day under DCS category was calculated as 30.46 litres while it was 16.28 litres per farmer/day under NDCS category of milk producers. Average uses of milk at home as direct consumption in all breeds were estimated at 1.56 litres per day/farmer of DCS category. Where, it was 1.65 litres/day/farmer of NDCS category. Thus, consumption was slighter lower in DCS member than NDCS member. The liquid milk sold per farmer per day under DCS category was calculated as 28.72 litres while it was 14.46 litres under NDCS members. It is just half than DCS members. Further analysis reveals that the liquid milk sold to the cooperative society in all group of animal was estimated at 28.72 litres/day/farmer at the rate of Rs. 29.28/litre.

The maximum quantity of milk about 2904 litres/day were sold to the cooperative society by all sample DCS farmer at the rate of Rs. 27.60 in case of crossbred cow followed by buffaloes 490 litres/day at the rate of Rs. 32.10 and local cow 52 litres/day at the rate of Rs. 28.15. However, the price of milk is calculated based on milk fat percentage and SNF. So, the price of buffalo milk is little higher than milk priced of other milch animal. The payment was made monthly and forth nightly among all the milk producers. The distance of cooperative society was to be one to one and half kms. The WAP (weighted average price) on an overall average was calculated to be Rs. 28.15 per litre for all animals. Whereas, it was Rs. 28.15/litre for local cow, Rs. 27.60 for cross bred cow and Rs. 32.10 for buffalo.

7.1.2 About Non-DCS Member of Milk Producers

The total marketable milk i.e., 14.46 litres per milk producer was sold to the different channel at the rate of various prices comprising 3.21 litres at the rate of Rs. 32.00 to the consumers, 3.13 litres at the price of Rs. 34.00 to the private vendor/middlemen/ shop and 8.13 litres at the rate of Rs. 34.50 to the sweetshop/catering/others. Moreover, total milk of local cow was sold to the consumer at the rate of Rs. 30/litres. Out of total milk production of cross bred cow (1406.82) litres, about 306.07 litres sold to the consumer @ Rs. 28.00/litre, 250.00 litres to the private vendor/middlemen @ Rs. 28.00/litre and 850.75 litres @ Rs. 28.00 to the sweetshop/catering. Similarly, out of total milk production of buffalo (302.96) litres, about 53 litres @ of Rs. 38.00/litre was sold to the consumer, 125 litres @ of Rs. 40.00/litre to the private vendor/middlemen/shop and 124.46 litres @ of Rs. 41.00 / litre/day to the sweetshop/catering. However, maximum quantity of cross bred milk was sold to the sweetshop/catering and maximum quantity of buffalo was sold to the private vendor/maximum.

Table 7.1: Milk Production, Use and Sale (Yesterday)

Sr. No.	Particulars	DCS (120)				NDCS (120)			
		LC	CB	B	Total Avg per Farmer	LC	CB	B	Total Avg per Farmer
1	Milk Drawn (Lt./day/animal)	4.00	14.75	10.00	9.57	3.81	12.42	8.72	8.32
	(Lit/Day) (120)	112.00	2994.25	550.00	30.46	76.20	1502.82	374.96	16.28
2	Use of Milk at Home (lit)	60.00	90.00	60.00	1.75	50.20	96.00	72.00	1.81
	For Direct Consumption	60.00	90.00	38.00	1.56	50.20	96.00	52.00	1.65
	For Processing	---	---	12.00	0.10	---	---	10.00	0.08
3	Raw/Liquid Milk sold (Lit)	52.00	2904.25	490.00	28.72	26.00	1406.82	302.96	14.46
4	Agency (may be multiple)	1	1	1	---	2, 3	2, 3	2, 3,4	---
i)	**Cooperative Society**								
	Total Quantity (Lit)	52.00	2904.25	490.00	28.72	---	---	---	---
	Price (Rs./Lit)	28.15	27.60	32.10	29.28	---	---	---	---
	Payment								
	Daily	---	---	---	---	---	---	---	---
	Weekly	√	√	√	---	---	---	---	---
	Monthly	√	√	√	---	---	---	---	---
	Distance (Kms)	1.75	1.25	1.50	1.48	---	---	---	---
	Transport Charges (Rs.)	---	---	---		---	---	---	---
ii)	**Consumer**								
	Total Quantity (Lit)		---	---	---	26.00	306.07	53.00	3.21
	Price (Rs./Lit)		---	---	---	30.00	28.00	38.00	32.00
	Payment								
	Daily	---	---	---	---	---	---	---	---
	Weekly	√	---	---	---	---	---	---	---
	Monthly	√	---	---	---	√	√	√	---
	Distance (Kms)	0.5	---	---	---	1.50	2.00	2.25	---
	Transport Charges (Rs.)	NA	NA	NA	NA	NA	NA	NA	NA
iii)	**Private Vendor/ Middlemen/Shop**								
	Total Quantity (Lit)	---	---	---	---	---	250.00	125.50	3.13
	Price (Rs./Lit)	---	---	---	---	---	28.00	40.00	34.00
	Payment								
	Daily	---	---	---	---	---	---	---	---
	Weekly	---	---	---	---	---	√	√	---
	Monthly	---	---	√	---	---	√	√	---
	Distance (Kms)	---	---	---	---	---	---	---	---
	Transport Charges (Rs.)	---	----	---	---	---	---	---	---
iv)	**Sweet Shop/ Creameries/ Catering Services/others**								
	Total Quantity (Lit)	---	---	---	---	---	850.75	124.46	8.13
	Price (Rs./Lit)	---	---	---	---	---	28.00	41.00	34.50
	Payment								
	Daily	---	---	---	---	---	---	---	---
	Weekly	---	---	---	---	---	√	√	---
	Monthly	---	---	---	---	---	√	√	---
	Distance (Kms)	---	---	---	---	---	8	9.50	---
	Transport Charges (Rs.)	---	---	---	---	---	50 p/L	50 p/L	---
5	Weighted average price WAP (Rs./litre)	28.15	27.60	32.10	28.25	30.00	28.00	40.06	32.68
6	How many cooperative dairy members did not sale milk to dairy? Why-specify reasons).	NA	NA	NA	NA	NA	NA	NA	NA

Note: WAP= Total amount received through milk sale using all channels /total quantity sold.

Source: Field Survey

7.2 Marketing Constraint Reported by Sample Milk Producers of DCS and Non-DCS Category

7.2.1 Marketing Constraints of DCS Sample Farmers

An analysis of table 7.2 reveals that out of total sample milk producer in DCS group, 85 milk producers has reported as an irregular sell of milk in favour of sometimes accounting for 82.50 per cent and remaining 15 milk producers' in favour of never accounting for 17.50 per cent. Lack of time for marketing had reported by milk producers in favour of sometimes accounting for 55.00 per cent followed by in favour of always accounting for 25.83 per cent and remaining 9.17 in favour of never. Less knowledge about marketing strategies had also reported by 100.00 per cent milk producers comprising 58.00 per cent in favour of always and 42.00 per cent in favour of sometimes. Low risk taking behaviour constraint had to be reported by 100 per cent respondent, (66.67 per cent in favour of sometimes and 33.33 per cent in favour of always). No or less advance payment for milk by society/vendor had also reported by 55.00 per cent respondent in favour of sometimes and 45.00 per cent in favour of always. Thereafter, inability to market for value added product constraint had also reported by 87.50 per cent of sample farmers and 12.50 per cent in favour of sometimes.

7.2.2 Marketing Constraints of Non-DCS Sample Farmers

The table 7.2 shows that on an overall sample size, 73.33 per cent of farmer had reported in favour of sometimes of irregular sell of milk constraints followed by 15.00 per cent in favour of never and 11.67 per cent in favour of always. Lack of time for marketing constraint was also reported by 56.67 per cent of sample farmers in favour of sometimes followed by 43.33 per cent in favour of always. Less knowledge about marketing strategies constraints was replied by 61.67 per cent of sample farmer in favour of always followed by 38.33 per cent in favour of sometimes. Low risk taking behaviour was also viewed by 74.17 per cent farmer in favour of always followed by 25.83 per cent of sample farmer in favour of sometimes. After that No or less advance payment for milk by vendor has also reported by 51.67 per cent of total sample size in favour of always followed by 48.33 per cent of sample size in favour of sometimes. Therefore, last constraint was inability to market for value added product replied by 79.17 per cent of sample size in favour of always followed by 20.83 per cent in favour of some times and nobody replied in favour of never.

Table 7.2 Marketing Constraints (MC) (In %)

SN.	Constraints	DCS (120)				NDCS (120)			
		S	M	L	T	S	M	L	T
1	Irregular sell of milk								
	Never	17.74	17.39	16.67	17.50	12.66	19.35	20.00	15.00
	Sometime	82.26	82.61	83.33	82.50	75.95	70.97	60.00	73.33
	Always	NA	NA	NA	NA	11.39	9.68	20.00	11.67
2	Lack of time for marketing								
	Never	8.06	13.04	---	9.17	NA	NA	NA	NA
	Sometime	67.74	63.05	58.33	55.00	60.76	48.39	50.00	56.67
	Always	24.20	23.91	41.67	25.83	39.24	51.61	50.00	43.33
3	Less knowledge about marketing strategies								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	37.10	45.65	50.00	41.67	37.97	38.71	40.00	38.33
	Always	62.90	54.35	50.00	58.33	62.03	61.29	60.00	61.67
4	Low risk taking behaviour								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	67.74	36.96	66.67	55.83	18.99	41.94	30.00	25.83
	Always	32.26	63.04	33.33	44.17	81.01	58.06	70.00	74.17
5	No or less advance payment for milk by society/venders								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	50.00	60.87	58.33	55.00	44.30	54.84	60.00	48.33
	Always	50.00	39.13	41.67	45.00	55.70	45.16	40.00	51.67
6	Inability to market for value added products								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	8.06	15.24	25.00	12.50	18.99	22.58	30.00	20.83
	Always	91.94	84.78	75.00	87.50	81.01	77.42	70.00	79.17

Source: Field Survey

CHAPTER – VIII

CONSTRAINTS FACED IN PRODUCTION AND MARKETING OF MILK AND ITS SUGGESTIONS FOR IMPROVEMENT

8.1. (A) Service Delivery System in DCS Category of Milk Producers

An analysis of table 8.1 reveals that in DCS category, 43.33 per cent of total sample size replied as supply of cattle feed under input delivery system was not available followed by inadequate (37.50%). 75.00 per cent replied as cattle feed and fodder seed on credit was not available and only 1/4th of respondent replied as available. About 68.00 per cent of milk producers told that the cost of cattle feed and mineral mixture was high. 66.67 per cent replied as EVS (Emergency Veterinary Service were not available and 33.33 per cent told it available. Biggest percentage (87.50) replied as charges of EVS to be high and told to pay Rs. 300 fee per visit. 55.00 per cent had replied that vaccines were not available, 30.83 per cent replied as vaccines inadequate and remaining replied as adequate. About 29.00 per cent had replied as 'Yes' for quality and requisite quantity and 71.00 per cent told 'No' for it. 54.16 per cent had replied as semen at AI Centre was inadequate, 26.67 per cent told as not available and 19.17 per cent as available. About 66.00 per cent replied as the provision of loan was not available and only 2.00 per cent replied as provision of loan was available. About 100.00 per cent replied as charges for insurance was very high. However, it was obvious that input delivery was inadequate and costly under DCS category of milk producer. Now regarding to output delivery, more than 80.00 per cent of milk producers had viewed as price of milk was low and payment made to the milk producer on 15 days and somewhere on 30 days. 76.67 per cent had viewed as incentives or bonus for supplying milk was low and 23.33 per cent replied as 'No'. 74.17 per cent had viewed as acceptability of crossbred cow milk in family was acceptable. 100.00 per cent of milk producers had told that no advance payment was made for milk by society. Thus, it was obvious that output delivery under DCS category was extremely poor.

8.1.(B) Details about Service Delivery System in NDCS Category of Milk Producer

Its analysis may been seen in table 8.1 reveals that in NDCS category, 68.34 per cent had replied as the supply of cattle feed was not available followed by inadequate (28.33%). 79.17 per cent of milk producers were replied as cattle feed and fodder seed on credit was not available. About 68.00 per cent replied as cost of cattle feed and mixture were high and only 5.00 per cent told 'OK.' 67.00 per cent viewed as EVS (Emergency Veterinary Services) was not available and only 33.00 per cent

replied as available. 80.00 per cent replied as charges for EVS was high as Rs. 350 charges per visit to be paid fee by milk producers. 53.33 per cent replied as supply of vaccines were inadequate followed by 34.17 per cent of not available. 79.17 per cent of total sample size viewed as delivery and application of quality and requisite quantity of vaccines were 'No' and only 20.83 per cent replied as 'Yes.' Maximum 56.83 per cent of sample size had told that semen at AI Centre was not available followed by inadequate (40.83%). Nobody had replied about provision of loan and charges for animal insurances.

About output delivery, 70.00 per cent of milk producers had replied that the price of milk was low and payment of milk to the producers was made on 15 days and on weekly. Incentives or bonus facilities for supplying of milk was not available in case of NDCS category (30.00%). More than 85.00 per cent of milk producers replied as acceptability of cross bred cow in family was acceptable. About 60.00 per cent replied as advance payment for milk by vendors were available followed by not available (40.00%).

Table 8.1 Service Delivery (Response in %)

S. N.	Particulars	DCS (120)				NDCS (120)			
		S	M	L	T	S	M	L	T
A	**INPUT DELIVERY (%)**								
1	Supply of Cattle Feed								
	Adequate	16.13	23.91	16.67	19.17	---	6.45	20.00	3.33
	Inadequate	19.35	56.52	58.33	37.50	24.05	29.03	60.00	28.33
	Not Available	64.52	19.57	25.00	43.33	75.95	64.55	20.00	68.34
2	Cattle feed and fodder seed on Credit								
	Available	35.48	10.87	25.00	25.00	12.66	35.48	40.00	20.83
	Not Available	64.52	89.13	75.00	75.00	87.34	64.52	60.00	79.17
3	Cost of cattle feed and mineral mixture								
	High	69.35	69.57	58.33	68.33	70.89	67.74	50.00	68.33
	OK	NA	NA	NA	NA	5.06	---	20.00	5.00
	Not Available	30.65	30.43	41.67	31.67	24.05	32.26	30.00	26.67
4	**Emergency Veterinary Services (EVS)**								
	Available	32.26	32.61	41.67	33.33	27.85	41.94	50.00	33.33
	Not Available	67.74	67.39	58.33	66.67	72.15	58.06	50.00	66.67
	Charges for EVS								
	High	83.87	93.48	83.33	87.50	87.34	67.74	70.00	80.83
	Medium	16.13	6.52	16.67	12.50	12.66	32.26	30.00	19.17
	Low	NA	NA	NA	NA	NA	NA	NA	NA
	Rs/Visit	300	300	350	300	350	350	350	350
5	Vaccines								
	Adequate	11.29	10.87	41.67	14.17	15.19	9.68	---	12.50
	Inadequate	22.58	39.13	41.67	30.83	53.16	54.84	50.00	53.33
	Not Available	66.13	50.00	16.66	55.00	31.65	35.48	50.00	34.17
6	Delivery and applications of quality and requisite quantity of vaccines								
	Yes	22.58	32.61	50.00	29.17	24.05	29.03	60.00	20.83
	No	77.42	67.39	50.00	70.83	75.95	70.97	40.00	79.17
7	Semen at the AI centre								
	Adequate	16.13	19.57	33.33	19.17	2.53	6.45	---	3.34
	Inadequate	56.45	47.83	66.67	54.16	39.24	35.48	70.00	40.83
	Not Available	27.42	32.61	---	26.67	58.23	58.06	30.00	55.83
8	Provision of loan in society or govt. for Purchasing cattle								
	Adequate	---	---	25.00	2.50	NA	NA	NA	NA
	Inadequate	22.58	41.30	33.33	30.83	NA	NA	NA	NA
	Not Available	77.42	58.70	41.67	66.67	NA	NA	NA	NA
9	Charges for insurance (Rs. /animal)								
	Very high	NA	NA	NA	NA	NA	NA	NA	NA
	High	99.00	98.00	98.00	99.00	NA	NA	NA	NA
	Medium	1.00	2.00	2.00	1.00	NA	NA	NA	NA
10	Technical Guidance	NA	NA	NA	NA	NA	NA	NA	NA
B	**OUTPUT DELIVERY**								
1	Milk Price(Rs./lit)								
	Adequate	17.74	15.22	25.00	17.50	24.05	38.71	50.00	30.00
	Low	82.26	84.78	75.00	82.50	75.95	61.29	50.00	70.00
2	Payment of Milk								
	Immediate	NA	NA	NA	NA	NA	NA	NA	NA
	Within 2 days	NA	NA	NA	NA	NA	NA	NA	NA
	Within 15 days	NA	NA	NA	NA	59.49	67.74	70.00	62.50
3	incentives or bonus for supplying milk								
	No	14.52	25.81	25.00	23.33	26.58	35.48	40.00	30.00
	Low	85.48	65.22	75.00	76.67	73.42	64.52	60.00	70.00
4	Acceptability cross-bred cow milk in family								
	Poor	12.90	10.87	---	10.83	11.39	---	10.00	8.33
	Acceptable	82.26	82.61	100.00	74.17	82.28	90.32	90.00	85.00
	Not acceptable	4.84	6.52	---	5.00	6.33	9.68	---	6.67
5	Advance payment for milk by society/vendors								
	Available	17.74	17.39	25.00	18.33	62.03	54.84	40.00	58.33
	Not available	82.26	82.61	75.00	81.67	37.97	45.16	60.00	41.67

Source: Field Survey

8.2 Infrastructural Constraints under DCS and NDCS Category of Milk Producers

8.2.1 Infrastructural Constraints under DCS Category of Milk Producers

An analysis of table 8.2 reveals that on an overall, 63.33 per cent of total sample size replied as 'lack of improved equipment was major constraint for sometimes followed by always. About 60.00 per cent replied as irregular and inadequate supply of cattle feed was considered as major constraints for always followed by sometimes (40.00%). More than 50.00 per cent replied as unavailability of emergency veterinary services were major constraints for always followed by sometimes. 65.83 per cent had told that there was sometimes infrequent visit of veterinary staff followed by always. ½ of total sample size had told that there was sometimes unavailability of vaccines followed by always.

More than 70.00 per cent had replied that there was sometimes occasional availability of semen at AI Centre followed by always. More than 50.00 per cent had replied that there was never lack of training facilities followed by sometime lack of training facilities. More than 70.00 per cent had also replied as sometimes unavailability of time for delivery of milk during winter season in early hours of day followed by always of that. About 60.00 per cent had replied as sometimes unavailability of green/dry fodder throughout the year followed by never unavailability of green/dry fodder throughout the year. After that, 46.67 per cent had replied as some times unavailability of cattle feed and fodder seed on credit followed by always. More than 90.00 per cent had also replied as sometimes low average milk yield of milch animals during rainy season followed by never.

8.2.2 Details about Infrastructural Constraints under NDCS Category of Milk Producers

Its analysis may seen in table 8.2 reveals that more than 75.00 per cent of total sample farmers had replied as sometimes lack of improved equipment followed by always. More than 67.00 per cent had replied as some times irregular and inadequate supply of cattle feed followed by always and only 8.00 per cent as never. More than 64.00 per cent had also replied as some times unavailability of EVS followed by always. More than 62.00 per cent had replied as sometimes infrequent visit of veterinary staff followed by always. More than 54.00 per cent had reported as sometimes unavailability of vaccines followed by always while only 5.00 per cent replied as never. More than 50.00 per cent had replied that sometimes occasional availability of semen at A1 Centre was available followed by always. However, more analysis may be seen in table 8.2.

Table 8.2 Infrastructural Constraints (IC) % to total responses

SN	Particulars	DCS				NDCS			
		S	M	L	T	S	M	L	T
1	Lack of improved equipments								
	Never	4.84	21.73	16.67	12.50	6.33	---	---	4.17
	Sometime	62.90	58.70	83.33	63.33	74.68	70.97	100.00	75.83
	Always	32.26	19.57	---	24.17	18.99	29.03	---	20.00
2	Irregular & inadequate supply of cattle feed								
	Never	---	---	16.67	1.67	12.66	---	---	8.33
	Sometime	20.97	56.52	66.67	39.17	63.29	77.42	70.00	67.50
	Always	79.03	43.48	16.66	59.16	24.05	22.58	30.00	24.17
3	Unavailability of emergency veterinary services								
	Never	6.45	13.04	---	8.34	21.52	---	---	14.17
	Sometime	16.13	60.87	66.67	38.33	62.03	67.74	70.00	64.17
	Always	77.42	26.09	33.33	53.33	16.45	32.26	30.00	21.66
4	Infrequent visit of veterinary staff								
	Never	NA	NA	NA	NA	15.19	---	---	10.00
	Sometime	72.58	58.70	58.33	65.83	60.76	61.29	80.00	62.50
	Always	27.42	41.30	41.67	34.17	24.05	38.71	20.00	27.50
5	Unavailability of vaccines								
	Never	---	---	16.67	1.66	8.86	---	---	5.83
	Sometime	33.87	65.22	66.67	49.17	49.37	67.74	50.00	54.17
	Always	66.13	34.78	16.66	49.17	41.77	32.26	50.00	40.00
6	Occasional Availability of semen at the AI centre								
	Never	16.13	---	---	8.33	12.66	---	---	8.33
	Sometime	75.81	67.39	66.67	71.67	50.63	61.29	50.00	53.33
	Always	8.06	32.61	33.33	20.00	36.71	38.71	50.00	38.34
7	Lack of training facilities								
	Never	83.87	21.74	16.66	53.33	74.68	70.97	100.00	75.83
	Sometime	16.13	71.74	83.33	44.17	25.32	29.03	---	24.17
	Always	---	6.52	---	2.50	NA	NA	NA	NA
8	Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day								
	Never	---	6.52	16.67	4.17	NA	NA	NA	NA
	Sometime	87.10	56.52	58.33	72.50	75.95	35.48	60.00	64.17
	Always	12.90	36.96	25.00	23.33	24.05	64.52	40.00	35.83
9	Unavailability of green/dry fodder throughout the year								
	Never	46.77	36.96	41.67	42.50	21.52	29.03	---	21.67
	Sometime	53.23	63.04	58.33	57.50	78.48	70.77	100.00	78.33
	Always	NA	NA	NA	NA	NA	NA	NA	NA
10	Unavailability of cattle feed and fodder seed on credit								
	Never	38.71	10.87	---	24.17	8.86	---	---	5.84
	Sometime	45.16	43.48	66.67	46.67	50.63	61.29	50.00	53.33
	Always	16.13	45.65	33.33	29.16	40.51	38.71	50.00	40.83
11	Low average milk yield of the milk animals								
	Never	---	13.04	16.67	6.67	2.53	19.35	---	6.67
	Sometime	100.00	86.96	83.33	93.33	74.68	80.65	80.00	76.67
	Always	NA	NA	NA	NA	22.78	---	20.00	16.66

Source: Field Survey

8.3 Economic Constraints under DCS and NDCS Category of Milk Producers

8.3.1 Economic Constraints among DCS Category of Milk Producers

An analysis of table 8.3 reveals that under DCS category of milk producers, on an overall about 64.00 per cent had reported that there was always high cost of fodder seed followed by sometimes 36.00 per cent. 66.67 per cent had reported that there was always delay in payment of milk followed by sometimes (33.33%). Also 75.00 per cent has reported that always low price of milk offered followed by sometimes (25.00%). More than 90.00 per cent had reported as always high cost of cross bred cow followed by sometimes. More than 85.00 per cent had reported that there was always high cost of cattle feed and mineral mixture followed by sometimes (14.00%). About 70.00 per cent had viewed that there was always low provision of loan in society or government for purchasing cattle followed by sometimes 30.00 per cent. More than 88.00 per cent had reported that there was an always low incentive or bonus for supplying of milk followed by sometimes. More than 83.00 per cent had reported that there was always high charges of EVS and insurance of cattle followed by sometimes.

8.3.2 Economic Constraints under NDCS Category of Milk Producers

Its analysis may be seen in table 8.3 reveals that on an overall, more than 73.00 per cent had reported that there was always high cost of fodder seed followed by sometimes. About 75.00 per cent had replied as sometimes delay in payment of milk followed by Never and only 9.17 per cent replied as always. More than 55.00 per cent had also replied that there was sometimes low price of milk offered followed by always and only 4.00 per cent replied in favour of never.

More than 67.00 per cent had replied that there was always high cost of cross bred cow followed by sometimes. More than 65.00 per cent had replied that there was always high cost of veterinary medicines followed by sometimes while nobody replied in favour of Never. About 65.00 per cent had also reported that there was always high cost of cattle feed and mineral mixture followed by sometimes. About 74.00 per cent had reported that there was always low provision of loan in government for purchasing of cattle followed by sometimes. After that, more than 70.00 per cent had replied that there were always low incentives or bonus for supplying of milk followed by sometimes. About 80.00 per cent had reported as always high charges of EVO and insurance of cattle followed by sometimes. Thus, there were severe and major economic constraints among the majority of milk producers in Bihar.

Table 8.3 Economic Constraints (EC) (In %)

S N.	Particulars	DCS				NDCS			
		S	M	L	T	S	M	L	T
1	High cost of fodder seed								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	32.26	39.13	41.67	35.83	22.78	35.48	30.00	26.67
	Always	67.74	60.87	58.33	64.17	77.22	64.52	70.00	73.33
2	Delay in payment of milk								
	Never	NA	NA	NA	NA	11.39	19.35	40.00	15.83
	Sometime	37.10	32.61	16.67	33.33	82.28	61.29	60.00	75.00
	Always	62.90	67.39	83.33	66.67	6.33	19.35	---	9.17
3	Low price of milk offered								
	Never	NA	NA	NA	NA	NA	9.68	20.00	4.17
	Sometime	24.19	21.74	41.67	25.00	50.63	58.06	80.00	55.00
	Always	75.81	78.26	58.33	75.00	49.37	32.26	---	40.83
4	High cost of cross bred cow								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	4.84	10.87	25.00	9.17	30.38	35.48	40.00	32.50
	Always	95.16	89.13	75.00	90.83	69.62	64.52	60.00	67.50
5	High cost of veterinary medicines								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	8.06	8.70	25.50	10.00	36.71	29.03	30.00	34.17
	Always	91.94	91.30	75.00	90.00	63.29	70.97	70.00	65.83
6	High cost of cattle feed and mineral mixture								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	11.29	10.87	41.67	14.17	32.91	38.71	40.00	35.00
	Always	88.71	89.13	58.33	85.83	67.09	61.29	60.00	65.00
7	Low provision of loan in society or govt. for purchasing cattle								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	41.94	13.04	33.33	30.00	22.78	32.26	30.00	25.83
	Always	58.06	86.96	66.67	70.00	77.22	67.74	70.00	74.17
8	Low incentives or bonus for supplying milk								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	6.45	10.87	41.67	11.67	24.05	35.48	50.00	29.17
	Always	93.55	89.13	58.33	88.33	75.95	64.52	50.00	70.83
9	High charges of emergency veterinary services								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	14.52	17.39	25.00	16.67	20.25	19.35	20.00	20.00
	Always	85.48	82.61	75.00	83.33	79.75	80.65	80.00	80.00
10	High charges for insurance								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	12.90	19.57	25.00	16.67	13.92	25.81	40.00	19.17
	Always	87.10	80.43	75.00	83.33	86.08	74.19	60.00	80.83

Source: Field Survey

8.4 Technical Constraints under DCS and NDCS Category of Milk Producers

A comparative analysis of table 8.4 reveals that on an overall average, 56.67 per cent of milk producers in DCS category had reported that there was sometimes lack of technical guidance followed by always lack of technical guidance while in case of NDCS, more than 80.00 per cent had reported that there was always lack of technical guidance followed by sometimes lack. 63.33 per cent of milk producers in DCS

category had reported that there was always unavailability of high genetic merit bull followed by sometimes unavailability of that while in case of NDCS category, more than 75.00 per cent had reported as always unavailability of high genetic merit bull followed by sometimes unavailability of that. After that 49.37 per cent of DCS category had also reported that there was sometimes poor conception rate through Artificial Insemination followed by always poor conception rate through AI and only 13.00 per cent told that there was never poor conception rate whereas, in case of NDCS, 49.17 per cent had reported that there was sometimes poor conception rate through AI followed by always poor conception rate. More than 60.00 per cent of DCS category had reported that there was sometimes poor knowledge about feeding and health care followed by always poor knowledge about that and only 17.00 had told as never poor knowledge about that while about 60.00 of NDCS category had viewed that there was sometimes poor knowledge about feeding and health care followed by always poor knowledge about that. Therefore, about last technical constraints, more than 66.00 per cent of DCS category had reported that there was sometimes lack of knowledge about cheap and scientific housing of animal followed by always lack of knowledge about that whereas, just inverse in case of NDCS category, more than 60.00 per cent had reported that there was always lack of knowledge about cheap and scientific housing of animal followed by sometimes lack of knowledge about that. However, there was total restraint due to severe lack of technical knowledge and guidance in the dairy development in the state of Bihar.

Table 8.4 Technical Constraints (TC) (In %)

SN.	Constraints	DCS (120)				NDCS (120)			
		S	M	L	T	S	M	L	T
1	Lack of technical guidance								
	Never	19.35	13.04	25.00	17.50	NA	NA	NA	NA
	Sometime	48.39	63.05	75.00	56.67	11.39	32.26	20.00	17.50
	Always	32.26	23.91	---	25.83	88.61	67.74	80.00	82.50
2	Unavailability of high genetic merit bull								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	43.55	28.26	33.33	36.67	25.32	16.13	40.00	24.17
	Always	56.45	71.74	66.67	63.33	74.68	83.87	60.00	75.83
3	Poor conception rate through artificial insemination								
	Never	9.68	15.22	25.00	13.33	12.66	29.03	30.00	18.22
	Sometime	58.06	60.87	58.33	59.17	49.37	48.39	50.00	49.17
	Always	32.26	23.91	16.67	27.50	37.97	22.58	20.00	32.50
4	Poor knowledge about Feeding and health care								
	Never	12.90	19.57	33.33	17.50	13.92	12.90	20.00	14.17
	Sometime	66.13	58.70	41.67	60.83	60.76	58.06	60.00	60.00
	Always	20.97	21.73	25.00	21.67	25.32	29.04	20.00	25.83
5	Lack of knowledge about cheap & scientific housing of animal								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	69.35	63.04	66.67	66.67	36.71	35.48	70.00	39.17
	Always	30.65	36.96	33.33	33.33	63.29	64.52	30.00	60.83

Source: Field Survey

8.5 Socio-psychological Constraints under DCS ad NDCS Category of Milk Producers

An comparative analysis of DCS and NDCS category of milk producers are presented in table 8.5 reveals that on an overall average, 50.83 per cent of DCS category had reported that there was sometimes lower socio-economic condition followed by always while in case of NDCS, more than 60.00 per cent had told that there was sometimes lower socio-economic condition followed by always. About 60.00 per cent of DCS category had viewed that there was sometimes lack of purchasing power followed by always and only 16.00 per cent had told that there was never lack of purchasing power while in case of NDCS category, 58.33 per cent had viewed as sometime lack of purchasing power followed by always and only 4.00 per cent had told as never lack of purchasing power. 53.33 per cent of DCS category

had reported that there was sometimes lack of time due to busy in domestic/agricultural work followed by always and only 4.00 per cent had told as never while in case of NDCS category, 50.00 per cent had reported that sometimes lack of time due to busy in domestic/agriculture work followed by always lack of time due to that and only 11.00 per cent had told as never.

About 49.00 per cent of DCS category had reported that there was always lack of cooperation and coordination among member followed by sometimes lack of that among members and only 13.00 had told as never while in case of NDCS category, about 60.00 per cent had reported as sometimes lack of cooperation and coordination among members followed by always lack of that among members and only 14.00 per cent had replied as never. About 50.00 per cent of DCS category had reported that there was always milk producers are meant for influential people followed by sometime and only 12.00 per cent had told as never while in case of NDCS category, 55.00 per cent had reported that there was sometimes milk producers are meant for that followed by always and only 7.00 per cent had viewed as never. About 51.00 per cent of DCS category had reported that there was never poor acceptability of cross bred milk followed by sometimes and 9.00 per cent had reported always poor acceptability of cross bred milk while in case of NDCS. Category, 45.00 per cent had reported that there was never poor acceptability of cross bred milk among family followed by sometimes and only 11.00 per cent had viewed that there was poor acceptability of cross bred milk among family. Thus, it is clear from analysis that there were superabundant socio-psychological constraints in the milk production under DCS and NDCS category in Bihar.

Table 8.5: Socio-Psychological Constraints (SC) (In %)

SN.	Constraints	DCS (120)				NDCS (120)			
		S	M	L	T	S	M	L	T
1	Lower socio-economic conditions								
	Never	NA	NA	NA	NA	NA	NA	NA	NA
	Sometime	46.77	52.17	66.67	50.83	60.76	64.52	50.00	60.83
	Always	53.23	47.83	33.33	49.17	39.24	35.48	50.00	39.17
2	Lack of purchasing power								
	Never	---	---	16.67	16.67	---	6.45	30.00	4.17
	Sometime	61.29	58.70	58.33	60.00	58.23	61.29	50.00	58.33
	Always	38.71	41.30	25.00	38.33	41.77	32.26	20.00	37.50
3	Lack of time due to busy in domestic/ agricultural work								
	Never	8.06	---	---	4.17	15.19	6.45	---	11.67
	Sometime	51.62	54.35	58.33	53.33	45.57	58.06	60.00	50.00
	Always	40.32	45.65	41.67	42.50	39.24	35.48	40.00	38.33
4	Lack of cooperation and coordination among members								
	Never	8.06	19.57	16.67	13.33	12.66	12.90	30.00	14.17
	Sometime	32.26	36.96	66.67	37.50	60.76	64.52	40.00	60.00
	Always	59.68	43.48	16.66	49.17	26.58	22.58	30.00	25.83
5	Milk producers are meant for influential people								
	Never	16.13	10.87	---	12.50	11.39	---	---	7.50
	Sometime	35.48	41.30	33.33	37.50	51.90	67.74	40.00	55.00
	Always	48.39	47.83	66.67	50.00	36.71	32.26	60.00	37.50
6	Milk of cross-bred cow has poor acceptability (family members)								
	Never	56.45	45.65	50.00	51.67	49.37	35.48	40.00	45.00
	Sometime	37.10	43.48	33.33	39.17	37.97	58.07	40.00	43.33
	Always	6.45	10.87	16.67	9.16	12.66	6.45	20.00	11.67

Source: Field Survey

8.6 Other Constraints under DCS and NDCS Category of Milk Producers

An analysis of table 8.6 reveals that on an overall average, 36.66 per cent in DCS and 33.33 per cent in NDCS had replied that there was unavailability of chilling facilities at village level for milk preservation. About 43.00 per cent in DCS and 48.00 per cent in NDCS had viewed that there was majority of grazing lands are either degraded or encroached. 46.66 per cent in DCS and 43.33 per cent in NDCS had reported as poor access to organised markets deprive farmers in getting proper milk price. Also 46.66 per cent in DCS and 44.16 per cent in NDCS had reported that there was irregular quality electricity supply. About 40.00 per cent in DCS and 37.00 per cent in NDCS had reported that there was poor irrigation facility to grow fodder crops. Only 39.16

per cent in DCS and 25.83 per cent in NDCS had reported that there were poor livestock extension services. About 40.00 per cent in DCS and 43.00 per cent in NDCS had reported that there was poor knowledge about scientific husbandry and dairy farming. 37.00 per cent in DCS and 40.00 per cent in NDCS had reported that there was poor knowledge of mastitis. Moreover, about all the remaining other constraints, less than 50.0 per cent of respondent in DCS and NDCS category had reported. So that analysis may be seen in table 8.6. However, there were various major other constraints which intercept dairying in the state of Bihar.

Table 8.6: Other Constraints (OC) (In %)

SN.	Constraints	DCS (120)				NDCS (120)			
		S	M	L	T	S	M	L	T
1	Unavailability of chilling facilities at village level for milk preservation	47.72	36.36	15.90	36.66	47.50	32.50	20.00	33.33
2	Diversion of feed and fodder ingredients for industrial use	NA	NA	NA	NA	NA	NA	NA	NA
3	Majority of grazing lands are either degraded or encroached	57.69	34.61	7.69	43.33	63.79	25.86	10.34	48.33
4	Poor access to organized markets deprive farmers in getting proper milk price	48.21	39.28	12.06	46.66	57.69	32.69	9.61	43.33
5	Irregular quality electricity supply	51.78	37.50	10.71	46.66	56.60	33.96	9.43	44.16
6	Poor irrigation facility to grow fodder crops	47.91	41.66	10.41	40.00	40.90	45.45	13.63	36.36
7	Non availability of improved fodder seed	NA	NA	NA	NA	NA	NA	NA	NA
8	Poor livestock extension services	44.68	40.42	14.89	39.16	32.25	48.38	19.35	25.83
9	Poor knowledge about scientific animal husbandry practices and dairy farming	50.00	39.58	10.41	40.00	55.76	38.46	5.76	43.33
10	Poor knowledge of mastitis (mastitis in dairy animal) in dairy animals	44.44	46.66	8.88	37.50	46.93	42.85	10.20	40.83
11	Lack of awareness about quality milk production	57.14	28.57	14.28	29.16	57.40	61.29	7.40	45.00
12	Poor housing to milch animals	58.92	33.92	7.14	46.66	58.62	36.20	5.17	48.33
13	Unavailability of medicine and equipment required for quality milk production	40.42	48.93	10.63	39.16	47.61	42.87	9.52	35.00
14	Lack of milk testing and animal screening facilities	44.44	48.88	6.66	37.50	46.93	40.81	12.24	40.83
15	Lack of veterinary services in village for quality milk production	46.80	40.42	12.76	39.16	48.07	38.46	13.46	43.33
16	Lack of nutrition's feed for quality milk production	46.29	42.59	11.11	45.00	45.45	43.18	11.36	36.66
17	Lack of ecto parasites control programmes	55.31	36.17	8.51	39.17	44.00	28.00	8.00	41.67
18	Lack of finance to invest in dairy business for quality milk production/ Inadequate finance	53.85	38.46	7.69	43.33	55.55	35.18	9.25	45.00
19	Lack of necessary space required for tying the milking animals	50.00	41.66	8.33	20.00	53.57	35.71	10.71	23.33
20	Lack of marketing facility for dairy business	46.34	43.90	9.75	34.16	55.76	38.46	5.76	43.33
21	Uneconomical capital investment on quality milk production	42.00	46.00	12.00	41.66	50.00	39.58	10.41	40.00
22	Lack of water supply	NA	NA	NA	NA	NA	NA	NA	NA
23	Inadequate labour supply	36.58	48.78	14.63	34.16	42.85	40.47	9.52	35.00
24	Ecological factors- High heat/temperature, High cold, etc	42.55	42.55	14.89	39.16	50.00	36.84	13.15	31.66
25	Competition from established and large units	NA	NA	NA	NA	NA	NA	NA	NA
26	Difficulty to store milk in summer	48.78	39.02	12.19	34.16	43.18	40.90	15.90	36.66
27	low acceptability of AI in buffalo	33.33	50.00	16.66	30.00	32.25	41.93	25.80	25.83
28	Disease outbreak: mortality and morbidity	NA	NA	NA	NA	NA	NA	NA	NA
29	Politics in Cooperative is not good	47.50	40.00	12.50	33.33	NA	NA	NA	NA

Source: Field Survey

8.7 Suggestions for Improvement in Adoption of Dairy Schemes by Milk Producers under DCS and NDCS Category

An analysis of table 8.7 reveals that on an overall, 82.5 per cent in DCS and 78.33 per cent in NDCS had been suggested to provide outlets of milk and milk product at village level. 93.33 per cent of both DCS and NDCS had suggested for providing technical knowledge to manage the dairy enterprises. About 95.00 per cent of both DCS and NDCS had suggested for regular and planned supply of vaccines. About 97.00 per cent of DCS and 99.00 per cent of NDCS had suggested for subsidy on veterinary medicines and fodder seeds. About 93.00 per cent of both DCS and NDCS had suggested for enhancing the price of milk for producers. About 65.00 per cent of DCS and 62.00 per cent of NDCS had also suggested for making easy procedure for sanctioning of loan. Less than 50.00 per cent of both DCS and NDCS had suggested for increasing the loan amount for purchasing dairy animals. About 88.00 per cent of both had reported that there should be cheaper rate of concentrates. 100.00 per cent of sample respondent had suggested that AI facility should be provided at village level/door step. About 97.00 per cent of DCS and 90.00 per cent of NDCS had also suggested that there is need to reduce the cost of veterinary services. About 82.00 per cent of DCS and 77.00 per cent of NDCS had suggested that there is need to provide veterinary literature in the villages. About 90.00 in both DCS and NDCS had suggested that there is need to encourage the small scale dairy industries at village level. 80.00 per cent of DCS and 68.00 per cent of NDCS had suggested that there is also needs to improve service delivery. However, these are valuable suggestions for adoption of dairy schemes by milk producers.

Table 8.7: Suggestions for Improvement in Adoption of Dairy Schemes by Milk Producers under DCS and NDCS Categories

SN	Suggestion for Improvement (%)	DCS (%)				NDCS (%)			
		S	M	L	All	S	M	L	All
1.	Marketing facilities be provided at village level for the outlet of milk and milk products	83.87	86.96	75.00	82.50	79.75	77.42	70.00	78.33
2.	Providing technical knowledge of manage the dairy enterprise	96.77	89.13	91.66	93.33	93.67	93.55	90.00	93.33
3.	There should be regular and planned supply of vaccines (100%)	100.00	93.48	83.33	95.83	96.20	96.77	80.00	95.00
4.	Subsidies should be given oh certain inputs like veterinary medicines, fodder seed, etc.	98.39	97.83	83.33	96.67	100.00	96.77	100.00	99.16
5.	Enhanced milk price for the producers	93.55	95.65	75.00	92.50	76.20	87.10	90.00	93.33
6.	Loan sanction procedure should be made easy	66.12	65.21	58.33	65.00	63.29	61.29	60.00	62.50
7.	The loan amount for the purchase dairy animals need to be increased	32.26	50.00	41.67	40.00	27.85	54.84	40.00	35.83
8.	Concentrates should be made available at cheaper rate and in time	96.77	82.61	66.67	88.33	87.34	90.32	80.00	87.50
9.	Providing proper AI facility at village level/door step	100	100	100	100	100	100	100	100
10.	Cost of veterinary services need to be reduced	98.39	95.65	91.67	96.67	100	96.77	90.00	90.00
11.	Provide veterinary literature in village	85.48	82.61	58.33	81.67	73.41	87.10	70.00	76.67
12.	Small scale dairy industries be encouraged at village level	93.55	89.13	83.33	90.83	89.87	90.32	80.00	89.17
13.	Need to improve service delivery	75.80	84.78	83.33	80.00	89.62	64.52	60.00	67.50

Source: Field Survey

CHAPTER – IX

Summary Conclusion & Policy Implications

Livestock plays an important role in Indian Economy. About 20 million peoples depend upon livestock for their livelihood. Livestock contributed 16 per cent to the income of small farm households as against an average of 14 per cent for all rural households.

Percentage share of GVA livestock to agricultural constant prices was increased to 26.7 per cent in 2014-15 from 23.80 per cent in 2011-12 whereas that of GVA-Agriculture to total GVA was decreased to 10.20 per cent in 2014-15 from 12.10 per cent in 2011-12.

Percentage share of GVO-milk group to GVO from livestock was recorded highest 66.97 per cent followed by meat group (19.85%), Dung (6.75%) and Egg (3.40%) in the year 2011-12.

Plan outlay (at current prices) of central and centrally sponsored schemes under animal husbandry and dairying has increased from Rs. 22 crores in the 1st Five Year Plan to Rs. 5451 crores in the 11th Five Year Plan.

State of Gujarat is first accounting for 41.07 per cent in percentage share of milk procurement among all the major state of India followed by Karnataka (15.23%), Maharashtra (8.56%), Tamil Nadu (7.14%), Rajasthan (6.12%) and Bihar 4.06%). Further, Region wise analysis shows that Rajasthan study 1st position (6.12%) in percentage share of total milk procurement in North Zone of India while Bihar is occupied 1st position (4.06%) in East Zone of India.

Uttar Pradesh has play 1st stage in the percentage share of milch animal (18.18%) to all India milch animal population followed by Rajasthan (10.06%), Madhya Pradesh (8.41%) but state of Bihar has stay fourth place in the percentage share of milch animal (7.50%) to all India milch population.

India continued to rank first in milk production at the global level for the last two decades and has production of 155.5 million tones of milk during 2015-16 With growth of 6.29 per cent over 2014-15.

India has an area under fodder crops (9188 thousand ha) with percentage share of 2.8 to GCA of India whereas, Area under permanent pasture4s and other grazing land was recorded (10256 thousand ha) with 3.1 per cent to GCA of India. Later on, state wise analysis reveals that Rajasthan has highest area under fodder crop with 14.20 per cent to total gross cropped area of same state followed by Punjab (10.10%), Haryana (9.80%), Gujarat (4.3%), Uttar Pradesh (3.30%) and Bihar has only 0.30 per cent of its GCA while, Jharkhand has no area under fodder crops.

Total number of veterinary institutions was increased to 54906 in 2010 from 33323 in 1982 whereas; total number of veterinarians was also increased to 50772 in 2010 from 18000 in 1982. Later on, total number of cattle per veterinary institution was 8394 in 1982 , which came down to 6375 in 2010 accounting for 24.05 per cent decreases but, total number of cattle per veterinary was recorded 15540 in 1982, which came down to 6894 in 2010 with 55.63 per cent decreasing.

Bihar produces about 2.9 MT of milk accounting for 3.28 per cent of the total milk production in the country. However, only 9-10 per cent of production is processed by COMPFED (Sudha Dairy) and only 2-3 per cent in the private sector. Milk processing capacity in India has grown at a CAGR of 4.00 per cent while almost negligible growth in Bihar.

Bihar's estimated milk production was 7.2 million tones in 2013-14, which was 5.2 per cent of the national milk production and also stayed 9th ranked in the country.

The cooperatives dairies procured 15 lakh kg per day in 2013-14. The state of Bihar has about 9 lakh producers' members pouring milk to around 15 thousand dairy cooperatives societies.

The highest growth in population was recorded in goat population (19.54%) followed by buffalo (13.11%) and sheep (6.42%) while cattle population registered decline (1.42%). East Champaran (5.52%) has highest number of total livestock population followed by Araria (5.42%), Katihar (4.67%) and Gaya (4.56%). These four districts together accounted for 20.17 per cent of the total state livestock population in 2012.
East Champaran has the highest number of in milk buffaloes and cows followed by Araria and Katihar districts.

The percentage share of expenditure on dairy development has increased to 95.91 in 2006-07 from 17.61 per cent in 2002-03. The proportion of expenditure to outlay on dairy development was much better during corresponding period.

The milk production has increased from 2.66 MT in 2001-02 to 8.29 MT in 2015-16 registering a growth of 211 per cent over base year. Milk production in the state of Bihar has been increasing continuously throughout the year from 2001- 2016. However, the per capita availability of milk in the state was increased from 88 gms/day in 2001-02 to 208 gms/day in 2014-15.

The number of functional hospital increased from 852 in 2003-04 to 1114 in 2013-14 and number of veterinary doctor also increased from 912 in 2003-04 to 1154 in 2013-14. The number of livestock was also increased from 241 lakh to 270 lakh recording an annual increase of about 1.00 per cent in livestock population.

Per hospital, livestock population increased from 26.26 thousand in 1991-92 to 31.69 thousand in 2003-04 and livestock population also increased from 18.37 thousand to 29.61 thousand per veterinary hospital during corresponding period.

There are eight co-operative milk unions in the state of Bihar and have total 66.45 lakh litre per day milk processing capacity and they procure 44.56 LLPD milk. During the year 2012-13, 150 bulk milk coolers and 8 chilling centres with total chilling capacity of around 660 TLPD.

Dairy cooperatives are one of the strongest in Bihar and other adjoining state but share of Bihar in total milk procurement by cooperative sector to our country was very little and stay 9th rank in milk production.

Among the different 06 milk cooperative unions and three projects, the annual growth rate for milk procurement was highest for Koshi Dairy Project (51.5%), followed by Magadh Dairy Project (44.8%).

The milk procurement per functional society per day had also recorded an increase between 2010-11 and 2015-16. Begusarai has highest share of milk procurement (26.74%) to total state procurement followed by Samastipur (20.83%), Patna (13.29%) and Ara (11.45%), whereas Begusarai has also highest share of milk holding capacity (19.76%) to total state capacity, followed by Samastipur (19.48%), Ara (17.44%) and Patna (15.99%).

COMPFED markets milk products under brand 'Sudha' was 11975 MT in 2010-11 increased to 19979 MT in 2014-15 accounting for 66.84 per cent increased during last five year. Among different product of COMPFED, dahi was highly sold about 6492 MT in 2014-15 followed by lassi (4412 MT) and paneer (3284 MT) during responding year. These three products together had been accounting 71.01 per cent of total state products in 2014-15.

Government has been implemented several policies to improve dairy development, by operating different programmes like operation flood, strengthening infrastructure for quality and clean milk production, assistance to cooperatives, intensive dairy development programme (IDDP), Rashtriya Krishi Vikas Yojana (RKVY), accelerated dairy development programme (ADDP), National project for bovine breeding and dairy development (NPBBDD), integrated dairy farm project (IDFP) and package like Vidharbh Vikas package, Marathwara Vikas package.

As a result of operating these programme, substantial improvement in quality and increase in quality noticed. The number of DCS was found highest in Nalanda district (7691 DCS) followed by Begusarai and Bhagalpur, while total livestock population was highest in Bhagalpur followed by Banka and Begusarai. Total bovine population was also found highest in Banka district followed by Bhagalpur and Begusarai. Total milk production was found highest (276.76 thousand T) in Begusarai district followed by Bhagalpur and Nalanda districts.
Milk procurement per DCS per day was highest (241.17 litres) in Begusarai district followed by Nalanda districts. The total number of bulk milk cooler was highest in Nalanda followed by Begusarai.

Religion wise analysis reveals that above 95.00 per cent in DCS and above 92 per cent in non-DCS was Hindu and remaining was muslim in the both case in overall sample. Regarding distribution of social groups of milk producers among DCS, the majority were OBCs (56.67%), General (30.83%), and Scheduled Caste (12.50%) whereas in Non-DCS, 62.50% was OBCs followed by General (25%) and SC (12.50%).

An overall average the GCA during 2015-16 was estimated 2.39 ha per milk producer in the category of DCS against 2.26 ha per milk producer in the category of NDCS.

GCA per milk producer was comparatively little less in case of NDCS milk producers. The size group wise distribution shows that total areas coverage varied from 2.13 ha (small) to 3.55 ha in large milk producers of DCS category whereas, in NDCS category it varied from 2.31 (small) to 3.55 ha (large).

Coverage was comparatively higher in case of larger milk producers of DCS category. Among the seasons, the coverage was higher in kharif than in Rabi and summer season total number of milch animal was 2.86, out of total animal in DCS milk producers. Out of total 286 milch animals, cross breed cattle was 203 followed by buffalo (55) and local cattle (28).

Total milch animal in case of NDCS was 184, out of total animal; it was cross bred milch cattle (121), buffalo (43) and local milch cattle (20). However, total milch animal in DCS category was higher than NDCS. Accordingly, the kuccha cattle shed were higher in DCS and NDCS than semi-pucca and pucca in DCS and NDCS category.

Main source of water available for dairy purpose with almost all the selected milk producers of DCS and NDCS category was Hand Pump in all the three seasons followed by village pond and river/streams at the distance of half to 200 meters. The supply of water is adequate as replied by 80.00 per cent of respondent of both DCS and NDCS in rainy and winter season but few replied as 'No' in summer season.

They also replied about quality of water in favour of poor (42 % to 60%) followed by very poor (19 to 46%) and few replied in favour of normal quality of water in both the case of DCS and NDCS respondent. The alternative source of water were tube well, open well, pond and hand pump at the distance of 100 to 250 meters.

Under fodder management, 47 male and 24 female family workers were engaged at the rate of 4.5 hours and 2.5 hours respectively for whole activities under fodder management in DCS category of the milk producers.

Under NDCS category of milk producers, 93.97 per cent of income was held up by male member and remaining 6.03 per cent held by female member.

Under the stall feeding, self cultivated dry fodder was fed at the rate of 3.5 kg/animal/day to the local cow. 4.5 kg/animal/day to the buffalo among DCS category of milk producers, almost similar rate of feeding was also found by all groups of milk producers under NDCS category.

Rs. 800 was expenditure on FMD diseases of local cow including medicines and Doctor Charges by each DCS member, Rs. 1000/animal on crossbreed cow comprising different diseases like SH, BQ and FMD and Rs. 880/animal on buffalo under DCS member. Almost similar expenditure was also found under NDCS member.

DCS member on an average cost Rs. 37.83 was incurred per animal on dry fodder, Rs. 22.07 on green fodder. Rs. 29.65 on concentrate and Rs. 20.33 on supplement by small, medium and large milk producer respectively. Almost similar figure was also found under NDCS category of milk producers.

The value of buffalo in both case NDCS and DCS members was comparatively higher than that of local and cross bred cow.

About 60.00 per cent of dung was used as dung cake and remaining as manure in the both cases DCS and NDCS.

In DCS category, the average yield/animal was found to be maximum as 15.50 litres/day/cross bred during summer season and local cow and buffalo have highest average yield during same season against lowest average milk yield during rainy season under all three breed of animal.

Almost similar result was found in NDCS category of milk producers. However, lowest milk yields during rainy was found against summer and winter season. An average, awareness about different vaccinations schemes/programmes was replied as 'Yes' (65%) against as 'No' (35%) among DCS category of sample farmers while about that 66.67 per cent viewed as 'No' and 33.33 per cent viewed as 'Yes' among NDCS category of sample farmers.

In DCS category of sample milk producers, the average milk drawn per day per animal from all animals was estimated at 9.57 litres. Now, breed wise analysis of DCS category reveals that average milk production of local cow cross bred and buffalo was estimated at 4.00 litres, 14.71 litres and 10.00 litres per day/animal respectively. Whereas, in case of NDCS milk producers, that of same was calculated as 3.81 litres, 12.42 litres and 8.72 litres/day/animal.

Milk drawn yesterday per animal in all three breeds was slightly higher in DCS members than that of NDCS members. The average milk drawn per farmer/day under DCS category was calculated as 30.46 litres while it was 16.28 litres per farmer/day under NDCS category of milk producers.

Under DCS category of milk producers, on an overall about 64.00 per cent had reported that there was always high cost of fodder seed followed by sometimes 36.00 per cent. 66.67 per cent had reported that there was always delay in payment of milk followed by sometimes (33.33%).
Also 75.00 per cent has reported that always low price of milk offered followed by sometimes (25.00%). More than 90.00 per cent had reported as always high cost of cross bred cow followed by sometimes.

On an overall average, 56.67 per cent of milk producers in DCS category had reported that there was sometimes lack of technical guidance followed by always lack of technical guidance while in case of NDCS, more than 80.00 per cent had reported that there was always lack of technical guidance followed by sometimes lack.

DCS and NDCS category of milk producers, on an overall average, 50.83 per cent of DCS category had reported that there was sometimes lower socio-economic

condition followed by always while in case of NDCS, more than 60.00 per cent had told that there was sometimes lower socio-economic condition followed by always.

On an overall average, 36.66 per cent in DCS and 33.33 per cent in NDCS had replied that there was unavailability of chilling facilities at village level for milk preservation.

About 43.00 per cent in DCS and 48.00 per cent in NDCS had viewed that there was majority of grazing lands are either degraded or encroached.

About 46.66 per cent in DCS and 43.33 per cent in NDCS had reported as poor access to organised markets deprive farmers in getting proper milk price. On an overall, 82.5 per cent in DCS and 78.33 per cent in NDCS had been suggested to provide outlets of milk and milk product at village level.

About 93.33 per cent of both DCS and NDCS had suggested for providing technical knowledge to manage the dairy enterprises. About 95.00 per cent of both DCS and NDCS had suggested for regular and planned supply of vaccines. About 97.00 per cent of DCS and 99.00 per cent of NDCS had suggested for subsidy on veterinary medicines and fodder seeds. About 93.00 per cent of both DCS and NDCS had suggested for enhancing the price of milk for producers.
About 65.00 per cent of DCS and 62.00 per cent of NDCS had also suggested for making easy procedure for sanctioning of loan.

Policy Implications
There are following policy implications based on main findings of the study, being intimated to Ministry of Agriculture & Farmers Welfare, Government of India; NDDB and all concerned, given as below:

i. The average yield of all types of milch animals was extremely low in Bihar. Hence, state department of animal husbandry and dairying should play decisive roles to raise the milk yield rates of all milch animals in Bihar.
ii. The larger milk producers should be persuaded to adopt dairying as a small scale dairy industry in study areas.
iii. The costs of veterinary services and medicines were reported to be high by almost all the milk producers. Hence, Government, as well as, other concerned departments, should pay attention to reduce these costs.
iv. Extension services on dairying should be strengthened by providing it on doorstep of milk farmers as majority of milk producers were not at all aware about dairy schemes in Bihar.

v. The average price of milk sold was found to be lower than the cost incurred in its production. So, price of milk should be enhanced for milk producers by dairy cooperatives in proportion to the increase in total inputs cost.

vi. Marketing facilities should be made available at village level for outlets of milk and milk products to removing irregular sales of milk under both DCS and NDCS systems.

vii. The procedure for sanctioning loans should be made easier and amount of loan for purchasing dairy animals should be increased in proportion to the values of dairy animals.

viii. The provisions of advance and bonus from cooperative societies and vendors should be properly and regularly designed to boost up milk producers for continuing in milk production enterprise.

ix. Infrastructure for dairy was very poor at village levels. So, it should be improved to boost-up milk producers.

x. Awareness about insurance of animal was found very poor in the study area. So, there is need to increase awareness among farmers explain them about and mandatory provisions of the companies that provide livestock insurance to desired milk producers.

xi. Milk productivity of the buffaloes and local cows were found lower than crossbred cows across all the categories of dairy farmers. So, there is need to make efforts to increase the productivity of buffaloes and local cows by biologically upgrading the animals and encouraging farmers to adopt scientific dairy practices.

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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 Bihar

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 **Bihar**
2.	Date of receipt of the Draft report	28/08/2017
3.	Date of dispatch of the comments	28/09/2017
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. Following suggestion are made: • Start 'Introduction' from page 1 • Do not break table, get it on one page by adjusting text, page 3 • Remove gap in year and data figures , page 12 • References are missing, e.g. 1.10, 1.11 • If data figures are not available, write NA. • Try to get latest data figures (table 2.2, 2.5, 2.13, 2.18) • Write appropriate policy implications relevant to study • Revise the policy implication (e.g. policy prescription No. 1 & 2)
7.	References:	Some references list is missing. Source of data under each table is not given.
8.	General remarks:	The study is a comprehensive study on dairy sector in Bihar, however, **appropriate and feasible policy measures need to be suggested**. Revise the policy suggestions.

9. Overall view on acceptability of report: The report is acceptable after incorporation of the comments/suggestions as mentioned above.

Annexure - II

Action Taken Report

1.	Name of the Study	:	Assessment of the Status of Dairying in the Eastern States and Potential to Improve Socio-Economic Status of the Milk Producers and Convergence of All Central and State Schemes at District level in Bihar
2.	Date of receipt of comment	:	03/10/2017
3.	Date of dispatch of report	:	10/11/2017
4.	Comments on the Objectives of the study	:	No action required
5.	Comments on Methodology	:	No action required.
6.	Comments on analysis, Organization & Presentation, etc.	:	All suggestions addressed
7.	References	:	Missing references list added
8.	General remarks	:	Appropriate and feasible Policy measures added
9.	Overall view of acceptability Of report	:	Incorporated all the comments/ Suggestions as mentioned at S N. 6 to 8 in the Annexure-I.

Rambalak Choudhary
Research Officer-Cum-Project Leader