AERC, Jabalpur- Research Study No.-123

Assessment of the Status of Dairying and Potential to Improve Socio-Economic Status of the Milk Producers and Convergence of all Central and State Schemes at District Level in Chhattisgarh

Study sponsored by

Ministry of Agriculture & Farmers Welfare,
Government of India New Delhi

Agro- Economic Research Centre
for Madhya Pradesh and Chhattisgarh
Jawaharlal Nehru Krishi Vishwa Vidyalaya,
Jabalpur (M.P.)

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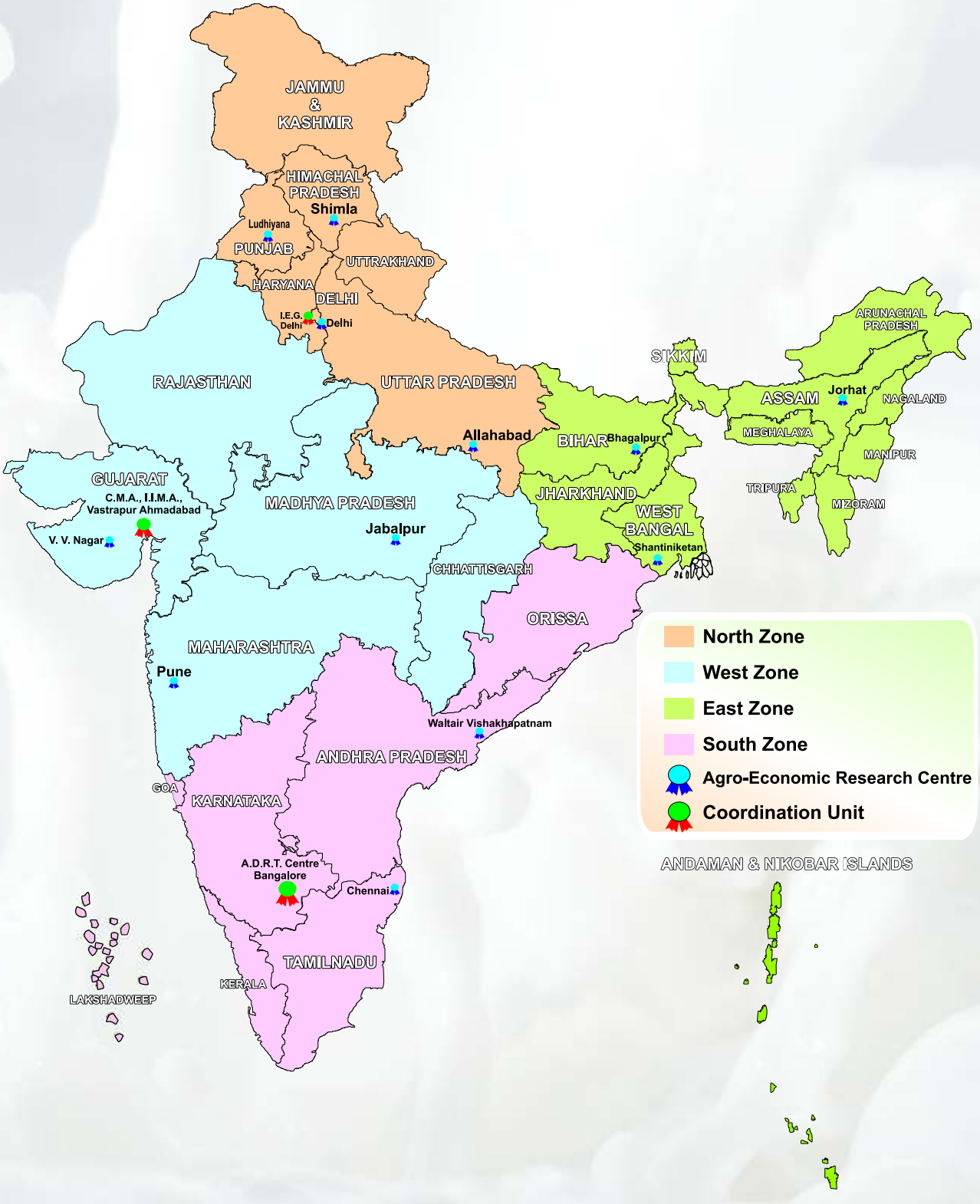

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AGRO- ECONOMIC RESEARCH CENTRE
FOR MADHYA PRADESH AND CHHATTISGARH

Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (M.P.)

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Report submitted to the
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Agro- Economic Research Centre
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Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur

PREFACE

The present study entitled 'Assessment of the Status of Dairying and Potential to Improve Socio-Economic Status of the Milk Producers and Convergence of all Central and State Schemes at District Level in Chhattisgarh" was sponsored by the Directorate of Economics & Statistics Department of Agriculture, Cooperation & Farmers Welfare Ministry of Agriculture & Farmers Welfare, Government of India, New Delhi.

The study comprises of 240, 120 DCS and 120 NDCS respondents of Durg, Bilashpur, Raipur and Rajnandgaon districts respectively. It is observed from the study that Chhattisgarh State occupied pivotal position in terms of goat population contributing nearly 60 per cent population of the country and still unorganized in the State. Hence, efforts are required to be made to organize this as an industry through cooperative or producers companies as goat milk has tremendous advantageous and better than the cow milk.

The present study was conducted by Dr. H. O. Sharma and Dr. Deepak Rathi of this centre. The field investigation, tabulation, analysis, interpretation and drafting of the report were performed by them. I wish to express my deep sense of gratitude to team members namely; Dr. Ravi Singh Chouhan, Dr. H. K. Niranjan Mr. C. K. Mishra, Mr. S. K. Upadhye, Mr. S. C. Meena, Mr. S. S. Thakur, Mr. R. S. Bareliya and Mr. Harishankar Kurmi for their unitiring efforts in bringing this innovative study to its perfect shape.

On behalf of the centre, I express deep sense of gratitude to Dr. V. S. Tomar, Hon'ble Vice-Chancellor and Chairmen Advisory Body of AERC, Jabalpur, Shri P.C. Bodh, Adviser, AERC Division, Ministry of Agriculture & Farmers Welfare, Govt. of India, New Delhi. Dr. D. Khare, Director Research Services & Director Instruction and Dr. P. K. Bisen, Director of Extension, Dr. N. K. Raghuwanshi, Prof. & Head (Dept. of Agri. Econ. & F. M.), Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur for providing the valuable guidance and all facilities during various stages in successful completion of this study of high importance.

I express sincere thanks to Dr. Manohar Singh Patel, Dy. General Manager/Field Officer, Devbhog, Chhattisgarh State Co operative Dairy Federation Limited, Urla, Raipur, Chhattisgarh and their staff for providing not only secondary data but also extending great assistance in collection of field data from the respondents.

I hope that the findings and suggestions made in the study would be useful to policy makers of the State and Govt. of India.

Date : 22.08.2017
Place: Jabalpur

(Hari Om Sharma)
Prof. & Director

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LIST OF ABRAVIATION

A.H.	Animal Husbandry
A.I.	Artificial Insemination
A.I.C.	Artificial Insemination Centre
AD	Assistant Director of Animal Husbandry
ADP	Annual Development Plan
APEDA	Agricultural and Processed Food Products Export Development Authority
ASMM	Area Specific Mineral Mixture
Av.	Average
AVI	Animal Vaccine Institute
B.Q.	Black Quarter
BDO	Block Development Officer
BEN	Beneficiary
BRGF	Backward Regions Grant Fund Programme
CB	Cross Breed
CBF	Cattle Breeding Farm
CG	Chhattisgarh
CGCDF	Chhattisgarh State Cooperative Dairy Federation
CGDDC	Chhattisgarh Diary Development Corporation
CL	Class
Co on AH	Capital Outlay on Animal Husbandry
Co on DD	Capital Outlay on Dairy Development
Cont/ Conti	Continuous
CSS	Centrally Sponsored Scheme
DADF	Department of Animal Husbandry, Dairying and Fisheries, New Delhi
DAH	Director of Animal Husbandry
DCS	Dairy Cooperative Society
DD	Deputy Director of Animal Husbandry
DES	Directorate of Economics and Statistics
DISP	Dispensary
Dist.	District
DM	Dry Matter
DPAP	Drought Prone Area Programme
E.T.	Enterotoxaemia
EIA	End Implementing Agency
F.A.V.C.	First Aid Veterinary Centre
F.M.D.	Foot and Mouth Disease
FDG	Focus Group Discussion
FIG	Figure
FPO	Food Product Order
GCA	Gross Cropped Area
GDP	Gross Domestic Product
GDP	Gross Domestic Product
GIA	Gross Irrigated Area
GNP	Gross National Product
GOC	Government of Chhattisgarh
GOI	Government of India
GSDP	Gross State Domestic Product
GVA	Gross Value of Agriculture
GVO	Gross Value of Output
H.S.	Hamorrhagic Septicemia
ha	Hectare
HH/hh	Household
I.I.	Irrigation Intensity
ICBP	Intensive Cattle Breeding Programme
ICDP	Intensive Cattle Development Programme
IDA	International Development Association

INAPH	Information Network for Animal Productivity and Health
ISP	International Organization for Standardization
JD	Joint Director of Animal Husbandry
kg	kilograms
Kg	Kilogram
Km	Kilometer
KVK	Krishi Vigyan Kendra
L.I. Centre	Livestock Inspector Centre
L.N. 2	Liquid Nitrogen
LC	Local Cow
LRP	Local Resource Person
Lt.	Litter
LTPD	Litres per day
M.T.	Metric Tone
M.V.Sc.	Master in Veterinary Science
MADM	Milk Adulteration Testing Machine
MFPO	Meat Food Product Order
Mha	Million hectares
MMPO	Milk and Milk Product Order
MOA	Ministry of Agriculture
Mt	Metric Tonnes
NA	Not Available
NBEN	Non Beneficiary
NCDFI	National Cooperative Dairy Federation of India
NDCS	Non Dairy Cooperative Society
NDDB	National Dairy Development Board
NDP	National Dairy Plan
NDP	National Dairy Plan
No.	Number
Nos	Numbers
OF	Operation Flood
OFP	Operation Flood Programme
PCs	Producers Company
PDO	Project Development Objective
PFA	Prevention of Food Adulteration
PMC	Project Management Cell
PMU	Project Management Unit
PSC	Project Steering Committee
R.P.	Rinderpest
RBP	Ration Balancing Programme
RKVY	Rastriya Krishi Vikash Yojna
Rs.	Rupees
S.C.A	Special Central Assistance
SC	Scheduled Caste
SF/MF/AL	Small Farmer, Marginal Farmer, Agricultural Laborer
SNF	Solid Not Fat
SNF	Solid but Not Fat
ST	Scheduled Tribe
SWOT	Strength, Weakness, Opportunity and Threat
T.B.	Tuberculosis
TASP	Tribal Area Sub Plan
TE	Triennium Ending
V.D	Veterinary Dispensaries
VAP	Village Awareness Programme
VO	Veterinary Officer
Y	Yield

EXECUTIVE SUMMARY

Dairy industry occupies key role in agriculture rural development. It embraces the production of milk, its preparation for sale as well as the manufacture of dairy products. The Central Statistical Organization, Department of Statistics, Government of India has under the annual survey of industries, classified dairy industry under industries major group-20, Food Manufacturing Industries. A dairy industry depends on milk. Milk is raw material for dairy product. Milk is the 'nature's perfect food' for all ages. It has almost all the vital nutrients needed for growth and well being of the human body. Milk is the richest source of calcium and essential amino acids which is good for bone formation. It is particularly beneficial for people recovering from sickness, children, sport person, aged ones, women etc. The dairy development in India has twin objectives of increasing total milk supply on commercial basis and diversifying agricultural structure by developing dairy as a supplementary or principal occupation which would help increasing the income of the small and marginal agriculturists and/or landless labourers. Dairy industry occupies an importance place in Indian economy. It embraces the production of milk, its preparation for sale as well as manufacture of dairy products. The growth of Indian dairy section has been spectacular during the past three decades. The Indian dairy industry is not only a vital producer of an essential food item but it also is one of the largest employers in the country in both the rural sector as well as the semi urban and urban region. It gives an opportunity to about eight crores families across India. Apart from the nutritional importance of milk for human consumption, dairying provides employment to the vest number of persons with no means of production of their own and put them to productive work so as to enable them to contribute to the national product and earn their share in it. It processes tremendous potential for providing employment to the massive rural population. It can equitably distribute the gain and thus assists even the weakest sections of our society. Further, milk is one of the few commodities which give the producer a large share of what the consumer pays for it. Thus, dairying is a very important instrument for the upliftmen of the rural economy of our country. Dairy development on modern lives will generate additional income and employment in rural areas itself and can act as an effective instrument for social change in rural India. Keeping these views in mind the present study was taken up in one of the eastern state of India .i.e. Chhattisgarh with following specific objectives:

Specific Objectives

- To assess the present status of dairying with reference to animal distribution, milk production, consumption and marketable surplus.
- To identify the constraints in dairy development from supply side, institutional deficiency and processing infrastructure.

- To identify different central and state government schemes related to dairy development at district level and document technical as well as operational details of the schemes and understand how convergence is ensured.
- To analyse cost of production and marketing across different size of dairy farms related to dairy co-operative societies and Non dairy co-operative societies.
- To determine awareness about various schemes among milk producers and suggest broad areas for focussed interventions for promoting dairy development.
- To suggest suitable policy measures for effective convergence of various schemes for the benefits of dairy farmers.

Data & Methodology

Both secondary and primary data were collected for the study. The secondary data on dairy development efforts, various schemes implemented and in force, changes in size and composition of livestock population and milch animals as well as milk production across regions, per capita milk availability, infrastructure available, related data were compiled from the offices of the NDDB and State Department of AH& D Chhattisgarh as well as from the government publications such as Livestock Census (Department of Animal Husbandry), Statistical Abstract of the State, Economic Surveys and related web sites of Chhattisgarh state.

The primary data were collected from the selected milk producers, Dairy Cooperative Societies and Private Dairies in Chhattisgarh State through structured and pre-tested schedules/questionnaires provided by the Coordinator, Agro-Economic Research Centre for the states of Gujarat and Rajasthan, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat. This interview schedule was translated into local language (Hindi) and pre-tested in the area under study.

Four districts viz. Raipur, Bilaspur, Rajnandgaun and Durg were selected on the basis of 100 potential districts list prepared by the NDDB, Anand from different regions/zones in order to capture holistic macro picture at the state. Four villages were selected from each selected district in which two villages nearer to the district headquarter (One village having dairy cooperative and one village without dairy cooperative) and two villages about 25-50 kms away from the district headquarter (One village having dairy cooperative and one village without dairy cooperative). Hence, total 16 numbers of villages was selected in Chhattisgarh State. 15 milk producers were selected randomly from each selected village. Thus, total sample size of milk producers in State was 240. The milk producers were further categorized as Small Milk Producers (1-2 Milch animal), Medium Milk Producers (3-5 Milch animal) and Large Milk Producers (above 5 Milch animal) as per holding of number of bovine population (cattle and buffalos)- random selection from total milk producers list (without village census). The primary data on various parameters related cost of milk production were collected from 03 milk producers from each village (one each from three categories)

Data collection from District Officials of every District and Dairy Cooperative Society through interviewed and office bearers of every Dairy Cooperative Society were interviewed and data were collected. The Secondary data of the study related to the year 2001-15, while primary data were collected for the year 2015-16.

Findings

The main findings which may be drawn from this study are as follows:

Dairy Development in Chhattisgarh

The Chhattisgarh contributed only 0.82 percent in total milk production (155491 thousand t) of India. The per capita availability of milk is also found too less in Chhattisgarh (132 g/capita) as compared to India (329 g/capita). However, milk production, showed increasing trend in Chhattisgarh with the magnitude of 37.657thousand t/year during the period 2001-15.

Chhattisgarh contributed only 3.93 percent of total livestock population of the country (382974 thousand).The state recorded maximum population of goats (52.93%) followed by cattles (5.14%), pigs (4.2%) and buffaloes (1.28%) of the country. Among different livestock species, cattle contributes highest share (65.25%) followed by goats (21.44%), buffaloes (9.24%), pigs (2.92%), and sheeps (1.12%) in total livestock population. The population of local cows, cross bred cows and goats were found to be increased with the magnitude of 2.07, 12.46 and 7.78 thousand/ year respectively, while the population of buffaloes were found to be decreased with the magnitude of -6.71 thousand/year during the period 2001 to 2015 in Chhattisgarh. The milk production of different livestock species was found to be increased with the magnitude of 24.92, 4.33, 7.67 and 0.75 thousand t/ year in local cows, cross breed cows, Buffaloes and goats.

The 9 breeds of cow and 4 breeds of buffaloes were found in Chhattisgarh, out of 9 breeds of cows Gir, Sahiwal, Red-Sindhi, Jersey, Holstein, Tharparker, Ongole and Hariyana were found in all the districts of Chhattisgarh. Out of 4 breeds of buffaloes Nagpuri and Mehsana were found in all the districts of Chhattisgarh. Gir and Jersey breed of cows were found to be used for milk purpose, while Sahiwal, Tharparkar, Ongole and Kosali used for dual purpose, the Holstein breed used for milk and meat purposes.

Chhattisgarh State had 15040.34 numbers of livestock. Out of which, Rajnandgaon (6.05%) was to have maximum number of livestock followed by, Juspur (5.70%) and Bilaspur (5.58%). As for as density of population of livestock per sq. km is concerned, the maximum density of livestock was found in Durg (203/km) followed by Raipur (187/km), Bemetra (170/km), Jangir (165/km) and Kondagaon (157/km). The maximum density of bovines population was also found in Durg (175/km) followed by Raipur (160/km), Bemetra (144/km) and Janjgir (141/km). Chhattisgarh produces 1277.753 thousand t of milk production in (2015-16), out of which the maximum milk was obtained through Indian breed cow (39%) followed by degraded native cow (25%), buffalo native breed (16%) and buffalo advance breed (8%).

Out of total milk production (1277.753 thousand t) the highest milk production was also found in Durg (6.90%) followed by Raipur (6.78%), Rajnandgaon (6.45%), Bilaspur (6.24%), Janjgeer (5.83%), Balodbajar (5.63%), Raigarh (5.28%), Mahasamund (4.63%), Kabirdham (4.55%), Balod (4.44%), Bemetra (4.29%) and Dhamtari (4.26%).

There were 6546 dairy units were found in Chhattisgarh, out of which 25.65 percent were found in urban and sub urban area and rest 74.35 percent were located in rural areas. Out of total urban dairies, highest were found in Raipur (22.33%) followed by Durg (19.12%), Korba (9.83%), Rajnandgaon (8.93%), Bastar (5.36%), Dhamtari (5%), Jushpur (4.41%), Koriya (4.11%), Bilashpur (3.99%) and Raigarh (3.45%) districts of Chhattisgarh.

Policies and Programmes for Dairy Development in Chhattisgarh

Apart from the Central and State government programs, the state milk federations have evolved a variety of schemes that provide incentives to the milk producers through milk cooperative societies. National Livestock Policy 2013 formulated by Central Government aim at increasing livestock productivity and production in a sustainable manner, while protecting the environment, preserving animal bio-diversity, ensuring bio-security and farmers' livelihood. Chhattisgarh has achieved 3.84 per cent per year impressive growth in milk production during 2001-02 to 2015-16. It is suggested that on the line of suggestive measures made by the working group for 12th five year plan (GOI) all the ongoing schemes should be converged and put under three mega schemes a) Animal Production, b) Livestock Health and c) Dairy Development. In addition to this fodder development programme should also be included in the state livestock development programme in priority basis to accelerate live stock development and milk production in the State.

Socio-economic characteristics of milk producers

The gender of decision maker of maximum households (HHs) under DCS was found to be male (96.67%) and belonged to Hindu (100%) community and majority of them were from OBC (87.50%) social group. Their primary source of income was found to be agriculture (90.00%) followed by dairying (5.00%), agriculture labour (4.12%) and services (0.83%). Their average size of holding was found to be 2.97 ha out of which 1.73 ha (58.25 %) was under irrigation. They have 27 year experience of rearing cattle. The majority of them belong to Above Poverty Line (57.50 %) income group with kaccha (45.00%) followed by pucca (28.33%) and semi-pucca (26.67%) house structure. As for as socio-economic profile of NDCS HHs is concerned, the similar findings were observed, however their experience in dairy (32 years) was found to more as compared to DCS HHs (27 years) and majority of them reported that their primary source of income was found to be dairy (63.72%) followed by agriculture (18.61%) service (10.96%) and labour (6.71%).

The majority of HHs related to DCS (96.7%) or NDCS (98.3%) have male gender and they have approximately 50 years of age. Their average size of family was found to be of 7 members

constituted of 3 male, 3 female and a child. The average age of the family was found to be approximately 20 years. The average education of the respondent was between 5 (NDCS) to 6 years (DCS) of schooling. Out of total members 7, 3 were found to work in their dairy farms as family labour.

Kharif was found to be major crop season in the area under study, in which an average HH whether related to DCS (61.30%) and NDCS (51.29%) devoted their maximum Gross Cropped Area. On an average level in kharif paddy (95.66%) followed by soybean (3.77%) were found to be major crops, while paddy (43.14%) followed by wheat (27.80%) and Gram (27.80%) were found to be major Rabi crops in DCS HHs farms. The similar finding was observed in case of NDCS HHs farms. However, cropping intensity of an average HH related to NDCS (181%) farm was more as compared to DCS (156%) farm, while HHs related to DCS (4.76 ha) found to have more Gross Cropped Area as compared to HHs related to NDCS (3.63 ha). The no/negligible area under fodder cultivation confirmed that the cropping pattern of dairy owners was not found to be matched with their farming system.

Cost of Milk Production & Awareness

The herd strength and types, no. of cattle sheds and present value of cattle shed a crossed different size of dairy farms related to DCS & NDCS indicates that at over all level the population of local cows (4.17 & 4.01) was found to be more as compare to buffaloes (1.38 & 3.68), cross breed cows (0.28 & 0.89) and others (0.72 &1.24) with 65.7 & 38.2, 57.1 & 50.6, 55.1 & 53.5, and 56.0 & 0 percent milch animals, respectively.

At over all level on average small, medium and large size dairy farms have 3.13 & 5.13, 5.38 & 8.38, 11.3 & 15.28 animals at their farms out of which milch cattle were found to be 46.3 & 25.72, 62.8 & 43.11 and 55.3 & 44.17 percent in case of DCS & NDCS respondents, respectively. As far as different types and number of cattle shed are concerned, kachha, semi pucca & pucca cattle shed were found to be in similar proportion that is 1/3rd, with their average present value of Rs. 11700 & 16058, 19850 & 28167, and 35792 & 51583 different respondents of DCS & NDCS among at overall level, respectively.

The majority of respondents whether related to DCS or NDCS have deshi, Sahiwal, Gir, Tharparker, Hariyana, Redsindhi & Kosali breed of local/ indigenous cows. Some of them were found to rear Jersey, Holstein & Ongole Crossbreed Cows. In buffaloes Murrah, Surti, Nagpuri, Niliravi, Mehsana & Deshi breed were found to be common breed in the study area.

The feature of breedable animals viz. age at 1st calving, lactation order, length of lactation period, peak yield at last and previous lactation among different species such as local cow, cross breed and buffalo on an average at overall were found to be 6.6, 6.8, and 6.8 years with 36.1,37.9 and 47 months at Ist calving and IIIrd lactation order with length of lactation period of 189.1, 224.1 and 262.5

days including peak yield at last (1.3,3.0 and 2.5) and previous (1.7,3.8 and 3.3) lactation in case of DCS, respectively. While in NDCS it was found to be average at overall were found to be 6.3, 5.9, and 7.0 years with 34.1,39.1 and 48.3 months at Ist calving and IVth lactation order except buffalo with length of lactation period of 164.3, 233.0 and 268.6 days including peak yield at last (1.4,3.7 and 3.2) and previous (1.8,4.9 and 4.4).

Major source of water availability during rainy and winter season in case of DCS was found to be tube well (58.33%), followed by open well (26.67%) and village talawadi (15%). An average HH used to cover 203.08 m distance to carry water, while in summer season the major source of water availability for dairy purpose was found to be village talawadi (8.20%) followed by open well (10.83%) and tube well (6.67%) and the distance cover carry water was found to be 526.42 m. The alternative source of water supply in across all the season was found to be village talawadi followed by tube well.

In case of NDCS the major source of water availability for dairy purpose was found to be tube well (43.33%) followed by village talawadi (25.00%), open well (16%) and canal (16%) during rainy and winter season with an average distance of about 200 meters to carry water. During summer season the major source of water availability was found to be tube well (56.67%) followed by open well (22.5%), village talawadi (12.50%) and canal (8.33%) with an average distance of 130 meter to carry water. The alternative source of water supply during rainy season was found to be tube well (50%) followed by village talawadi (29.17%) open well (16.67%) and canal (4.17%), during the winter season tube well (79.17 %) followed by Open well (12.50%) village talawadi (7.50%) and canal (0.83 %) while in summer season it was tube well (83.33 %) followed by open well (15.83%) & canal (0.83%).

The majority of HHs reported that the supply of water during all the season was found to be adequate and of normal quality. At overall level an average HH reported to fed 15.7, 11.1 and 11.7 kg./animal/day of green fodder, 4.6, 5.1, and 7.2 kg/animal/day dry fodder & 1.0, 1.5 and 2.1 kg/animal/day concentrates to the local cow, cross breed cow and buffalo, respectively in case of DCS. While in NDCS an average HH reported to fed 16.1, 5.9 & 0.9; 18.7, 8.9 & 1.6; 22.9, 13.2 & 2.3 kg/animal/day green fodder, dry fodder and concentrates to local cow, cross breed cow and buffalo, respectively. An average bovine was fed 8 kg/day grasses grazing in both the case of DCS & NDCS.

An average a dairy owner respondents earn approximately 3 days (male) and 3 days (female) per day employment irrespective to DCS/NDCS or small/medium and large size group. The main activities of employment were found to be fodder management followed by shed management milk by. None of the respondents was found to spend their time on animal health.

An average DCS farmers reported that they did not expend for vaccination as these facilities made available by Dairy Co-Operative Societies at free of cost, the same with the case of NDCS where it is made available by the State Government & Veterinary Hospitals. The medicine only Rs.1.8, Rs.

2.0 & Rs. 0.8 in case of DCS and Rs. 206, Rs. 252 & Rs. 139 in case of NDCS were used in local cow, cross breed cow & buffaloes, respectively.

The majority of dairy owner were found to use natural services instead of artificial insemination. On an average a HH serviced his local cow & buffalo 2.0 & 1.0 times respectively in a year & spend Rs. 340 (local cow) & Rs. 250 (buffalo) per year as service charge. On an average he found to be spend Rs. 115-233/ year for visit of doctor for treatment of their local cow, cross breed and buffaloes, respectively.

The milk obtained through local cows, cross breed cows & buffaloes were found to be more in rainy season as compared to winter & summer season amongst both the respondents whether related to DCS & NDCS across different size of dairy farms.

Amongst different species of cattle, cross breed cows gave more milk in all seasons as compared to buffaloes & local cow in dairy farms of DCS respondents, while buffaloes gave more milk in all the season as compared to cross breed & local cow in NDCS respondents dairy farms. However, cross breed cow (3.50 l/day) gave more milk as compared to buffaloes (3.21 l/day) in winter season in case of dairy farm related to NDCS respondents.

Out of total respondents more than 60 per cent were awared from different vaccination, artificial insemination and dairy development programmes of the State Govt. Cent per cent DCS respondents reported that main sources of information was dairy cooperative societies, while majority of NDCS respondents reported their main sources of information was neighbour (38.3%) followed by media (30.0%).

Raring of cross bread cows was found more economical as compared to buffalos and local cows across different size of farms, whether related to DCS and NDCS respondents.

Production & Marketing of Milk

Out of total milk production the maximum milk was obtained from local cow (145.1 l) as compared to buffalo (80.6 l) and cross breed cow (22.1 l) in the dairy farms of the respondents related to DCS, while in NDCS dairy farms the quantum of buffalo milk (249.0 l) was found to be more as compared to local cow (78.6 l) and cross breed (69.2 l) milk. The size of dairy farms positively related to total production as well as marketable surplus of milk from all the spices of cattle.

The HHs used to receive more price for buffalo milk (Rs.24.26/l) as compared to local cow (Rs.22.5/l) and cross breed cow (Rs.20.86/l) milk in DCS, while in NDCS price of Buffalo milk (Rs.30.66/l) was found to be more as compared to local cow (Rs. 23.49/l) and Cross breed (Rs.25.33/l) milk. The respondents related to NDCS covered more distance as compared to DCS respondents accordingly their cost of transportation was also found to be more as compared to DCS respondents.

At overall level, majority of male (above 80%) received income from sale of milk followed by female (below 20%) in the family of sample HHs, whether they were related to DCS or NDCS. As

regards to family expenses and expenses incurred in animal feed and health showed that as the size of dairies increases the income spent on family expenses and animal feed and health were about found to be increased.

Constraints faced in Production & Marketing of Milk

The DCS & private dealers were found to be main service provider for cattle feed, mineral mixtures etc to the respondents. The majority of respondents reported that the supply of cattle feed was found to be adequate in the area. However, the cost of cattle feed and mineral mixture was found to be high. All the respondents informed that cattle feed and desired varieties of fodder seed was available on time. The Emergency Veterinary Services (EVS) was not found to be adequate it is poor and not available to them on time. The cost incurred in visit of doctor varied from {Rs. 150 (DCS) - 209 (NDCS) per visit} was found to be high under NDCS but comparatively low under DCS. However, all the respondents appreciated the delivery and application of quality and quantity of vaccine and semen along with its timely availability. The majority of respondents reported that the provision of loan in the society for purchasing cattle is inadequate. The most of the households mentioned that the charges for insurance (Rs./animal) is very high.

As far as output delivery system is concerned, the milk was found to be delivered through agent/milk parlour and milk vendor in case of DCS and NDCS respectively. The majority of respondents related to DCS (98%) reported that the price received by them is low, while NDCS (89%) respondents felt that it is adequate. The majority of them were found to receive the payment of milk within 15 days. The majority of respondents reported that incentives/bonus for supplying milk in cooperative societies was adequate (59%), while no such provision exists in case of NDCS. The system for advance payment of milk was not prevailed in the area under study.

The various constraints which are faced by the milk producers have been classified into infrastructural, economic, marketing, technical, socio-psychological and other constraints.

The most important infrastructural constraints which producer respondents faced always are low average milk yield of the milk animals, unavailability of cattle feed and fodder seed on credit, unavailability of green/dry fodder throughout the year, lack of training facilities and infrequent visit of veterinary staff.

The high cost of fodder seed, low price of milk offered, high cost of veterinary medicines, cross bred cow, cattle feed and mineral mixture, low provision of loan in society or govt. for purchasing cattle, low incentives or bonus for supplying milk and high charges of emergency veterinary services & insurance are found to be most important economic constraints and occurred always as reported by the majority of sample producers related to DCS and NDCS.

The unavailability to market for value added products, no or less advance payment for milk by society/vendors, low risk taking behaviour and less knowledge about marketing strategies were

found to be most important marketing constraints reported by the producers majority of respondents related to DCS & NDCS.

Lack of knowledge about cheap & scientific housing of animal, poor conception rate through artificial insemination and lack of technical guidance about the animal husbandry and dairy management were found to be the most important technical constraints as reported by majority of producer respondents related to DCS, while respondents related to NDCS reported that they had no specific constraints that they felt always however, 33 and 34 percent of them reported that unavailability of high genetic merit bull and poor conception rate through AI were important technical constraints faced by them sometimes in the area under study.

The most important socio-psychological constraints that majority of milk producers related to DCS felt always in production and marketing of milk were their lower socio- economic conditions, lack of cooperation and coordination among members, poor purchasing power, lack of time due to busy in domestic/agricultural work and milk of cross-bred cow has poor acceptability in family member, while the respondents related to NDCS the majority of them not reported any most important socio-psychological constraints except milk of cross-bred cow has poor acceptability in family members. It is also clear from the results of the study that the majority of respondents related to DCS reported that they never meant for influential people, while majority of respondents related to NDCS felt that they are always meant for influential people in the area under study.

The unavailability of medicine and equipment required for quality milk unavailability of chilling facilities at village level for milk preservation (100%), low acceptability of AI in buffalo (100%), poor housing to milch animals (89%),poor access to organized markets deprive farmers in getting proper milk price (89%), non availability of improved fodder seed (89%), poor access to organized markets deprive farmers in getting proper milk price (89%), lack of ecto parasites control programmes (89%), uneconomical capital investment on quality milk production (89%), ecological factors- high heat/temperature, high cold etc (89%), competition from established and large units (89%), dirty politics in Cooperative (89%)poor irrigation facility to grow fodder crops (76%), poor knowledge about scientific animal husbandry practices and dairy farming (78%), unavailability of medicine and equipment required for quality milk production (76%) and lack of milk testing and animal screening facilities (78%) were found to be other constraints faced by majority of HHs in production, processing and marketing of milk in the study area.

The constraints faced by Milk Cooperative Societies and Private Dairy Units in supply of milk, infrastructure and marketing of milk were also assessed for the study area. A large numbers of small producers, no/less provision for advance payment for milk by the societies/vendors, unavailability of cattle feed and fodder seed on credit, unavailability of emergency veterinary services, infrequent visit of veterinary staff, unsuitability of time of delivery of milk during winter

due to bitter cold in early hours of the day, unavailability of green/dry fodder throughout the year, occasional availability of semen at AI centres and low average yield of milch animals were found to be major constraints always faced by the majority of milk cooperative societies/private dairy units in the area under study.

An unavailability to market for value added products, competition from private dairy farms and unstable price of milk are major constraints in marketing of milk were found to be always faced by majority of milk cooperative societies, while private dairy units were never found to be faced these constraints in the study area.

Conclusions and Policy Recommendation

The following conclusions and policy recommendation are drawn from the above findings:

1. Chhattisgarh State occupied pivotal position in terms of goat population contributing more than 50 per cent population of the country but it is still unorganized sector in the State. Hence, efforts are required to be made to organize this as an industry through cooperative or producers companies as goat milk has tremendous advantageous and better than the cow and buffalo milk.
2. The convergence of all the State and Central Government Schemes under the umbrella of Chhattisgarh Cooperative Dairy Federation Limited. This will not only bring the improvement in milk production in a sustainable manner but also ensure social and economic improvement of the milk producers with equity. As suggested by the working group for 12th five year plan, all the ongoing scheme should be classified under the mega scheme a) Animal Production, b) Live stock Health and c) Dairy Development. Apart from this it is also suggested that Fodder Development should also be included as a separate sub head for the development of dairy sector in real sense.
3. Cropping pattern of the milk producers was not found to be tuned with fodder production. None of the selected respondent cultivates fodder in a scientific manner as they have lack of knowledge about the package and practices of fodder cultivation in the area under study. Hence, efforts should be made to popularize the recent fodder technology to ultimate milk producer because without fodder development a dairy industry will not get its proper shape in the State.
4. At village level, infrastructure of dairy cooperative was not found up to the mark. Therefore, there is an urgent need to support all the cooperative societies running in the village level for balance development of dairy sector.
5. Several constraints which were found to prevail in infrastructure, economic, marketing, technology, socio-psychological, quality services etc. in the study area. Hence, utmost efforts are required to be made to remove these constraints not only for the development of dairy

sector in the State but also to ensure and enhance the income of the milk producers and to stabilize it at higher level.

6. It was also observed that awareness about the dairy and other development programmes including live stock insurance etc. among the HHs was very poor. Therefore, there is a need to increase publicity of these schemes on mobiles etc. in local language for effective dissemination of livestock related information in general and dairying in particulars.

7. There is a need of more modern semen stations across all the districts of the State operated by both private and Government agencies. Dairy cooperatives and private players must be allowed to start their own centre to supply quality semen. Milk producers must be trained about the profile of available semen to make them more educated about the artificial insemination.

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CHAPTER-I

INTRODUCTION

Animal husbandry in India is closely interwoven with agriculture and obviously plays an important role in the national economy and also in the socio-economic development of millions rural households (Vaidyanathan, 1989; Mishra, 1995; Chawla, et al., 2004; Sharma, 2004; Birthal, 2016). Livestock rearing is one of the most important economic activities in the rural areas of the country providing supplementary income for most of the families dependent on agriculture. In many cases, livestock is also a central component of small holder risk management strategies (Randolph et al., 2007). Apart from providing, a subsidiary income to the families, rearing of livestock such as cattle, buffaloes, sheep, goats, pigs, poultry etc. is a source of protein supplement to the family members of the household in the form of milk, eggs and meat. This sector has created a significant impact on equity in terms of employment and poverty alleviation as well. In fact level of rural poverty is significantly higher in states where livestock sector is under developed (Singh and Meena, 2012). This is the sector where the poor contribute to growth directly instead of getting benefit from growth generated elsewhere. Importance of livestock in general and dairying in particular hardly needs emphasis in a country like India. It is one of the important sub sectors of agriculture, next only to field crops (Saxena, et al., 2002). The growth of the dairy sector during the last three decades has also been impressive, at more than 5 percent per annum; although the country has emerged as the largest producer of milk only in the '90s (Jha, 2004). This has not only placed the industry first in the world, but also represents sustained growth in the availability of milk and milk products for the burgeoning population of the country. Most important dairying has become an important secondary source of income for millions of rural families and for millions more, has assumed the most important role in providing employment and income. India is endowed with a significant proportion of the world's livestock population (Prabaharan, 2002; Sharma and Sharma, 2002).

India stands at first position in terms of cattle and buffalo population in the world. The population of cattle and buffalo in India was 218 million and 115 million in 2012, which accounts for 14.7 per cent and 58 per cent share respectively of world cattle and buffalo population, most of which are milch cows and milch buffaloes (GOI, 2004). This sector provides regular employment to 9.8 million peoples in principal status and 8.6 million people in subsidiary status. More importantly, women constitute 71 per cent of the labour force in livestock farming (GOI, 2002a). Livestock sector of India has grown tremendously in the past five decades. From a subsistence activity until 1970s, animal husbandry has grown to emerge as the largest agricultural activity accounting for over one fourth of the agricultural gross domestic product. Its value of output now equals to that of food grains. By controlling 64 per cent of the

bovine, 70 per cent of ovine, 73 per cent of caprice and 70 per cent of the poultry population, the small holders make a substantial contribution to livestock production (GOI, 2014).

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 Agriculture	(Rs. in Cr.)	% to total GVA	(Rs. in Cr.)	% to total GVA	% to Agriculture
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.

Animal husbandry and dairying sector contributes about 26.9 per cent of the gross value added from total agriculture, forestry and fishing sectors and its overall contribution to the total GVA of the country was about 4.4 per cent in 2014-15, at current prices. The share of GVA of livestock sector to total agriculture (crops & livestock) has increased from 23.8 per cent in 2011-12 to 26.7 per cent in 2014-15 at constant prices. At Current prices, same share has increased from 23.8 per cent in 2011-12 to 26.9 per cent in 2014-15 (Table 1.1).

The dairy subsector occupies an important place in the agricultural economy of India as milk is the second largest agricultural commodity in contributing to Gross National Product (GNP), next only to rice. Among the sub-sectors of livestock sector, dairy and meat group (poultry meat) are high growth sectors and is reflected in the growing importance of the contribution of these sub-sectors in the livestock economy. While the two third of total value of output from livestock sector during 2013-14 was accounted by milk group followed by one fifth share by meat group. The use of dung as fuel also significantly contributed in total value of out of livestock sector by 6.64 per cent (Table 1.2).

Table 1.2: Value of output from livestock sector (at current prices)

Item	2011-12		2012-13		2013-14	
	Rs. Crore	% to total	Rs. Crore	% to total	Rs. Crore	% to total
Milk Group	324895	66.97	368997	66.23	407396	65.30
Meat Group	96287	19.85	114402	20.54	132360	21.22
Eggs	16470	3.40	19352	3.47	22423	3.59
Dung	32754	6.75	36936	6.63	41443	6.64
Increment in Stock	9854	2.03	11609	2.08	12964	2.08
Value of Output (Livestock Sector)	485103	100.00	557103	100.00	623861	100.00

Source: www.nddb.coop

Development efforts animal husbandry and dairying programme have attained considerable importance in various Five Year Plans (FYP) and several schemes/projects have been taken up by the States and the Centre for the development of this sector. Animal husbandry and dairying is a state subject, and bulk of the investment for their development comes from the state governments (GOI, 2012). The central government contributes about 10 per cent to the total investment through central and centrally-sponsored schemes as to supplement state governments' resources. In absolute terms, total outlay for animal husbandry and dairying increased over the plan periods. However, as per cent of the total plan outlay, the share of animal husbandry and dairy development declined from 1.1 per cent during first Five Year Planning (FYP) to 0.4 per cent during VI FYP and further to 0.3 per cent in the subsequent FYPs. As proportion of the total outlay for the agricultural sector, the share of livestock fell from 11.2 per cent in II FYP to 3.6 per cent in IX FYP but increased to 9.3 per cent during XI FYP. The share of livestock in the planned investment has never been commensurate with its contribution to GDP or Ag GDP (Table 1.3).

Table 1.3: Planned and actual expenditure on animal husbandry and dairy development during various five-year plan periods (Rs. Crores at current prices)-All India

Plan	Animal Husbandry		Dairy Development		Total		% AH&D to total agriculture outlay	% AH&D to total outlay
	Planned	Actual	Planned	Actual	Planned	Actual		
First (1950-55)	14.2	8.2	7.8	7.8	22	16	6.2	1.1
Second (1955-60)	38.5	21.4	17.4	12.1	55.9	33.5	11.2	1.2
Third (1960-65)	54.4	43.4	36.1	33.6	90.5	77	8.3	1.1
Fourth (1967-72)	94.1	75.5	139	78.8	233.1	154.3	10	1.5
Fifth (1975-80)	NA	178.4	NA	NA	437.5	232.5	9	1.1
Sixth (1980-85)	60.5	39.1	336.1	298.3	396.6	337.4	7	0.4
Seventh (1985-90)	165.2	102.4	302.8	374.4	467.9	476.8	4.4	0.3
Eighth (1992-97)	400	305.4	900	818.1	1300	1123.5	5.8	0.3
Ninth (1997-2002)	1076.1	445.8	469.5	146.9	1545.6	592.7	3.6	0.3
Tenth (2002-07)	1384	1419.4	361	285.8	1745	1705.2	11.87	0.12
Eleventh (2007-12)	4323	1101.3	580	262.4	4903	1363.7	9.23	

Source: GOI (2012)

Since IV FYP the emphasis had been on dairy development to support the 'Operation Flood' programme. With the end of Operation Flood program, the allocation to dairy development slowed down, reaching to about 30 per cent in the XI FYP. Animal health and veterinary services now receive about 30 per cent of the total funds. In XI Plan, the centrally sponsored schemes (animal health and disease control and National Project for Livestock Development) accounted for a major share of the outlay for animal husbandry. Small

ruminants, piggery, feed and fodder development, research, education and training did not receive adequate financial support. There has been a large gap between planned and actual expenditure in case of animal husbandry in most plan periods, except during Xth FYP

Table 1.4: Outlay and expenditure of central and centrally sponsored schemes under animal husbandry and dairying sector from first plan - all India (Rs. In crore)

Particulars	Total Plan	Animal Husbandry		Dairy Development		Total (AH & DD)	
	Outlay	Outlay	Exp.	Outlay	Exp.	Outlay	Exp.
First Plan (1950-55)	1960	14.19	8.22	7.81	7.78	22	16
Second Plan (1955-60)	4600	38.5	21.42	17.44	12.05	55.94	33.47
Third Plan (1960-65)	8576.5	54.44	43.4	36.08	33.6	90.52	77
Annual Plan (1966-67)	6625.4	41.33	34	26.14	25.7	67.47	59.7
Fourth Plan (1967-72)	15778.8	94.1	75.51	139	78.75	233.1	154.26
Fifth Plan	39426.2	-	178.43	-	-	437.54	232.46
Sixth Plan (1980-85)	97500	60.46	39.08	336.1	298.34	396.56	337.42
Seventh Plan (1985-90)	180000	165.19	102.35	302.75	374.43	467.94	476.78
Annual Plan (1990-91)	-	43.71	36.18	79.67	41.43	123.38	77.61
Annual Plan (1991-92)	-	57.97	43.28	97.49	77.99	155.46	121.27
Eighth Plan (1992-97)	434100.1	400	305.43	900	818.05	1300	1123.48
Ninth Plan (1997-2002)	1677.88	772.02	445.84	251.95	146.85	1023.97	592.69
Tenth Plan (2002-07)	2500	1425.87	1421.89	289.54	285.79	1715.41	1707.68
Eleventh Plan	8174	4870.53	2330.8	580	576.31	5450.53	2907.11
2007-08	910	350.92	338.14	88.5	111.5	439.42	449.63
2008-09	1000	481	444.54	98	97.9	579	542.64
2009-10	1100	558.29	435.84	101.1	85.93	659.39	521.77
2010-11	1300	792.15	668.75	87.76	84.77	879.91	753.52
2011-12	1600	874.36	722.88	250.25	196.21	1124.61	919.09
Twelfth Plan	14179	7829	-	3781	-	-	-
2012-13	1910	1063.1	881.45	392	523.51	1455.1	889.61
2013-14	2025	1051.49	917.16	580	501.59	1631.49	1418.75
2014-15	2174	1118.57	768.37	843.99	648.42	1962.56	1416.79
2015-16	1491	400.43	395.35	116.44	119.13	516.87	514.48

Source: GOI (2016).

However, despite of its rising share in agricultural GDP, the livestock sector has not received as much policy attention as it deserves. Its share in the total public spending on agricultural and allied activities has never been in congruence with its income contribution. In absolute terms, spending on the livestock sector increased by about 27 percent between TE 1992-93 and TE 2008-09, but as a share of the total spending on the agricultural sector it declined continuously, from 13.6 percent in TE 1992-93 to 4.6 per cent in TE 2008-09 (Table 1.5). Livestock expenditure as a proportion of the value of output of livestock also declined from 3.6 per cent to 2.3 per cent during this period.

Table 1.5: Public spending on livestock sector in India

Particulars	TE1992-93	TE2000-01	TE2008-09
Total spending (Rs crore at 2004 -05 prices)a	3,739.60	4,156.10	4,726.10
Public spending % of total agricultural spending	13.6	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	11.7	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

Note: a: Spending includes both revenue and capital expenditure.
Source: Birthal and Negi, 2012.

The public spending on livestock has to be raised and prioritised, for faster growth and holistic development of the livestock sector, taking into consideration the emerging challenges and regional imbalances. During the 1990s and also earlier, the allocation of livestock investment was biased towards dairy development, which, however, was corrected to a large extent during the 2000s. The share of dairy development in total livestock expenditure fell from about 40% in the 1990s to 25 per cent towards the late 2000s.

1.2 Need of the Study

In spite of sustained growth in milk production, the demand for milk is outpacing its supply. Gandhi and Zhou (2010) have projected the demand for milk to grow faster than its annual production. The increasing demand-supply gap may lead to sharp rise in the prices of milk. Mishra and Roy (2011) have shown that rising price of milk has been the most important contributor to food price inflation in India since 1998. The demand for milk and dairy products is expected grow at a higher rate compared to the previous decade due to accelerated economic growth. According to various estimates, the demand for milk and milk products is expected to grow at an annual incremental rate of 8-9 million tonnes, as against the present rise of about 5 million tonnes. Datta and Ganguly (2002) estimated Indian milk demand for 2020 under various GDP growth rates. The study reported that if the current growth continues for the next twenty years (the nation has been growing at a rate between 5 and 7 percent over past five years), milk consumption is likely to more than double by 2020.To achieve the above growth, it is believed that the growth has to be inclusive and geographically more diffused. Quantum jump in milk production is possible through increase in productivity, and linking small holders to dairy cooperatives/ producer groups/SHGs with forward linkages with milk

processing. This means that the areas which have low levels of productivity, preponderance of low yielding nondescript animals, but rich in resource endowment and presence of good markets would require attention of the policy makers for initiating a focussed program for the study area. It is well recognised that western, northern and southern parts of India have progressed significantly in dairy development while the eastern part of the country has lagged far behind in dairy development. Therefore, a comprehensive assessment of the present status of dairy development in the study area and potential for growth from the perspective of regional and national consideration needs to be drawn up for dairy development. Beside, despite of impressive growth in milk production during the past three decades, productivity of dairy animals continues to remain very low and milk marketing system is primitive (Rajendran and Mohanty, 2004; Sarkar and Ghosh, 2010). Currently, more than 80 per cent of the milk produced in the country is marketed by the unorganised sector (private organisations) and less than 20 per cent is marketed by the organised sector (government or cooperative societies). But, both organised and unorganised sectors in the dairy industry of the country face a lot of constraints. Therefore, it is essential to study the various types of constraints faced by the both cooperative and non-cooperative dairy producers. Besides, the need for ascertaining different program of the central and state government relating to dairying, at the localised level (say, district level), arises from the fact that (i) there is presently no documentation on the different schemes of the state and central governments related to dairying, (ii) how far these schemes are mutually related, (iii) what is the system to converge them at the local level and how is the convergence process is enforced. This need to be studied from the perspective of a district so that the multiplicity of different schemes are known, target population are identified, conditions for their implementation are specified and who are the coordinating and controlling departments of the government. The convergence of all state and central government schemes at the implementation level, in a given territory would bring about improvement in milk production sector in a manner that will be sustainable, while ensuring social and economic improvements of the dairy farmers. Therefore, the present study was undertaken in the State of Chhattisgarh a eastern State of India with following specific objectives;

1.3 Objectives of the Study

- To assess the present status of dairying with reference to animal distribution, milk production, consumption and marketable surplus.
- To identify the constraints in dairy development from supply side, institutional deficiency and processing infrastructure.
- To identify different central and state government schemes related to dairy development at district level and document technical as well as operational details of the schemes and

understand how convergence is ensured.

- To analyse cost of production and marketing across different size of dairy farms related to dairy co-operative societies and non dairy co-operative societies.
- To determine awareness about various schemes among milk producers and suggest broad areas for focussed interventions for promoting dairy development.
- To suggest suitable policy measures for effective convergence of various schemes for the benefits of dairy farmers.

1.4 Data and Methodology

Both secondary and primary data were collected for the study. The secondary data on dairy development efforts, various schemes implemented and in force, changes in size and composition of livestock population and milch animals as well as milk production across regions, per capita milk availability, infrastructure available, related data were compiled from the offices of the NDDB and State Department of AH& D Chhattisgarh as well as from the government publications such as Livestock Census (Department of Animal Husbandry), Statistical Abstract of the State, Economic Surveys and related web sites of Chhattisgarh state.

The primary data were collected from the selected milk producers, Dairy Cooperative Societies and private dairies in Chhattisgarh through interview schedules provided by the Coordinator, Agro-Economic Research Centre for the states of Gujarat and Rajasthan, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat. This interview schedule was translated into local language (Hindi) and pre-tested in the area under study.

Four districts viz. Raipur, Bilaspur, Rajnandgaun and Durg were selected from 100 potential districts of India (list prepared by the NDDB) Anand from different regions/zones in order to capture holistic macro picture at the state. (Fig. 1.1)

Table 1.6: Selected region, district milk unions/districts and villages in Chhattisgarh

S. No.	Region Name	Districts	Tahsils	Villages
1	North	Bilaspur	Takhatpur, Bilaspur	Khairi, Lakhasar, Akhantari, Lakhram
2	South	Durg	Patan	Ashoga, Armari Khurd, Batrel, Teligunda
3	East	Raipur	Abhanpur, Raipur	Bendri, Pond, Tarra, Mujgahan
4	West	Rajnandgaon	Chhuikhadan,Dhamansarra, Rajnandgaon	Dhamansarra, Aamgaon, hhuikhadan, Mudpar,

Four villages were selected from each selected district in which two villages nearer to the district headquarter (One village having dairy cooperative and one village without dairy cooperative) and two villages about 25-50 kms away from the district headquarter (One village having dairy cooperative and one village without dairy cooperative). Hence, total 16 numbers of villages was selected in Chhattisgarh. (Table 1.6) 15 milk producers were selected randomly from each selected village. Thus, total sample size of milk producers in State was 240. (Table 1.7)

The milk producers were categorized as Small Milk Producers (1-2 milch animals), Medium Milk Producers (3-5 milch animals) and Large Milk Producers (above 5 milch animals) as per holding of number of bovine population (cattle and buffalos) and 5 respondents have been selected randomly from each categories.

The primary data on various parameters related cost of milk production were also collected from 03 milk producers from each village (one each from three categories). The secondary data were collected from District Officials of every District and Dairy Cooperative Society and Office bearers of every Dairy Cooperative Society. The Secondary data of the study related to the year 2001-15, while primary data were collected for the year 2015-16.

Table 1.7: Selection of the respondents

Districts	Raipur				Bilaspur				Rajnandgaun				Durg			
Rank	High				Moderate				Low				Not Classified/Low			
Villages	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16
Location	close	close	away	away	close	close	away	away	close	close	away	away	close	close	away	away
DC/NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC	DC	NDC
Small	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Medium	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Large	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Total sample	60				60				60				60			
240																

V1 to V16 Selected Villages

1.5 Concept Used

The following concepts were used for the study

a) Lactation-Length

The lactation-length is a period for which milch animal remains in milk.

b) Dry-Period

The interval from the end of lactation period to the next calving is known as dry-period.

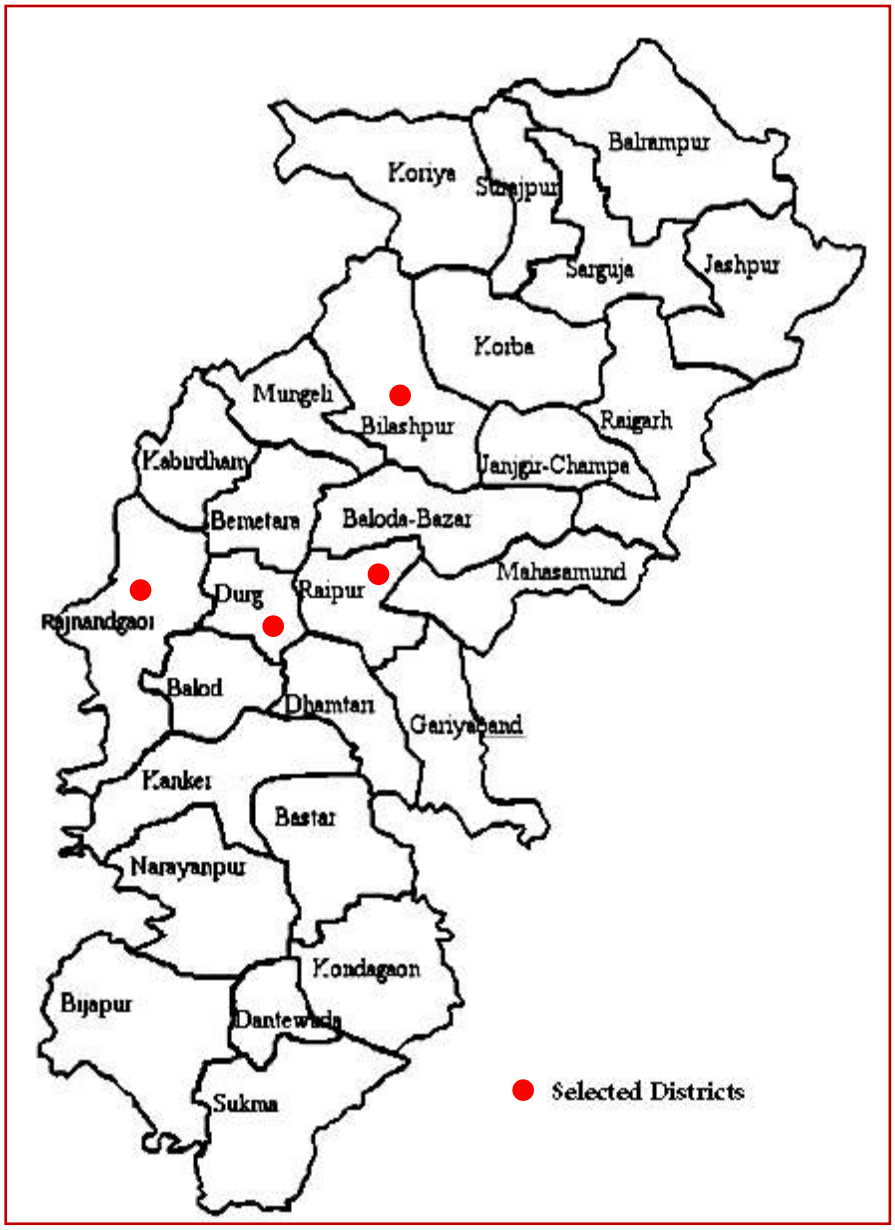

Fig 1.1: Selected Districts in Chhattisgarh

c) Inter-Calving Period

Inter-calving period is the simple arithmetic sum of lactation length and dry-period.

d) Service

The process in which mature male covers the female i.e. in heat with the object to deposit spermatozoa in the female genital tract is called service.

e) Conception

The successful union of male and female gametes & implantation of zygote is known as conception.

f) Gestation

It is the condition of female when developing foetus in present in the uterus.

g) Gestation Period

The period from the date of service (actual conception) to the date of parturition is termed as parturition period or pregnancy period. This

period varies according to species of animals e.g. is cows 279-283 days, in buffalo 310 days, sheep 148-152 days, goat 150-152 days.

h) Herd

It is a group of cattle or buffalo.

i) Milk Processor

Who transformation of raw milk into processed milk and products.

1.6 Limitations of the Study

The study is based on both primary and secondary data and hence the accuracy of results depends on the accuracy with which the data were generated. Due to paucity of decentralized data, certain analyses have been limited to some extent level. For instance, growth in milk consumption or employment related data are truly aggregative and therefore the link with macro observation with that of the primary data could not be established. This apart, to understand the process of industrialization, time series data on milk production and incidence of milch animal holding at either village or district level is not available. Due to unwillingness of the officers of some selected District Milk Cooperative Unions and Milk Producer Company, various aspects such as association of milk producer, sale of processed product and benefits given to milk producer could not be covered in the study.

1.7 Organization of Report

The present study report is divided into 8 chapters including this introductory chapter. The introductory chapter presents the introductory notes, need and scope of the study and sets out the main objectives of the study. It is also present the data and methodology used for selection of districts/blocks/sample households, sample size, analytical and concepts used in the study. Chapter two presents macro overview of dairy development in the state of Chhattisgarh and the selected districts/milk unions. It also analyse major trends in dairy sector, GDP, livestock production and milk productivity in selected state/districts using secondary data. Chapter III covers government programmes & policies for development of dairy/ animal husbandry sector in Chhattisgarh. It is also deals with the convergence of the government schemes. Chapter IV presents the socio-economic background of surveyed milk producers, selected milk unions and selected primary dairy cooperative society of the state. Chapter V covers the issues related to milk production in the selected households, while issues related to marketing of milk is discussed in Chapter VI. Chapter VII presents the various kinds of constraints faced by selected households in production and marketing of milk and suggestions given and the last chapter i.e. VIII presents the conclusions and recommendations emerged from the study.

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CHAPTER-II

DAIRY DEVELOPMENT IN CHHATTISGARH

This chapter deals with general information of Chhattisgarh which includes location, trend and growth of livestock population & milk production and development different breeds of the livestock and milk products in Chhattisgarh.

2.1 Profile of Chhattisgarh

The Chhattisgarh State came into existence and carved out of Madhya Pradesh on November 1, 2000. Chhattisgarh borders the States of Madhya Pradesh in the North West, Maharashtra in the South West, Telangana in the South, Odisha in the South East, Jharkhand in the North East and Uttar Pradesh in the North. The total area of the State is 1, 35,191 Sq. km, with Raipur as the State capital. The climate of the State is mainly tropical, humid and sub-humid. Mahanadi is the principal river of the State and the other rivers are the Godavari and the Narmada.

Chhattisgarh state located in Central India between latitudes 17°46' to 24°5' North and longitude 80°15' to 84°20' East with a total geographical area of 13.5 million hectares. In terms of population (255.4 lakh) it occupies 16th position in India (2011).

It has 04 revenue divisions (Sarguja, Bilashpur, Raipur and Bastar) divided into 27 districts, 149 tehsil, 146 blocks & 182 towns and 20126 villages. (Table 2.1) The region has great variety and diversity of weather conditions.

According to distribution of rainfall the entire State has been divided into five major categories namely very high rainfall zone (rainfall >1600 mm), high rainfall zone (1500-1600 mm), medium rainfall zone (1400-1500), low rainfall zone (1300-1400) and very low rainfall zone (<1300mm). The spatial distribution of rainfall shows that south eastern Bastar region comprising of some part of Jagdalpur and Dantewara, eastern part of northern hills zones comprising of most part of Jashpur and some part of Sarguja and north eastern parts of Chhattisgarh plains zone comprising of most part of Raigarh and some part of Janjgir, Raipur and Mahasamund receive high to very high rainfall. The reason being that in these parts of State onset of monsoon is bit early than other parts of the State, thus monsoon remains active for longer period in these parts. Other regions contributing high rainfall have thick forest cover and aerographic sector of rainfall due to undulating area. The whole districts of Bijapur and parts of Dantewara, Narayanpur, Jagdalpur, Koriya, Sarguja, Korba, Bilaspur, Janjgir, Raipur, Mahasamund and Raigarh receive medium rainfall. The remaining district received very low to low rainfall.

The State experiences sub-tropical climate characterized by extreme summer and moderate winter. The summer extends from March to mid June and May is the hottest month. The mean daily maximum temperature during the month of May goes up to 46°C. The winter season lasts till end of February. January

Table 2.1: Location of Chhattisgarh

Particulars	Census 2011
Area (In Sq.Km)	1,35,191
Latitude (Degree Min.)	17°46' N to 24°5'N
Longitude (Degree Min.)	80°15' E to 84°20'E
Total Population Persons	2,55,40,196
Males	1,28,27,915
Females	1,27,12,281
Decadal Population Growth (%)	22.59
Population Density	189
Sex Ratio	991
Literacy rate (%)Persons	71.04
Males	81.45
Females	60.59
Average rainfall (MM)	1299.4
Cropping Intensity (%)	137
(i) Revenue Divisions	4
(ii) No. of Districts	27
(iii) No. of tehsils	149
(iv) No. of CD Blocks	146
(v) Towns	182
(a) Statutory towns	168
(b) Census towns	14
(v) No. of total villages	20126

Sources: Census 2011, http://aps.dac.gov.in/LUS/Index.htm, http://www.agridept.cg.gov.in/performance.html.

is the coldest month with the mean daily maximum temperature at 30^{0}C and the mean daily minimum temperature at 10.2^{0}C. In Raipur, the average temperature varies from 13^{0}C during winter to 46^{0}C in summer. However, in the plateau areas on the Northern part, the variation was from 10^{0}C in winters to 39^{0}C in summers.

Physiographically, Chhattisgarh can be divided into three distinct units i.e. Bastar plateau region on the Southern part, Chhattisgarh Plain region on the central part and Northern hilly region on the Northern parts of the State. (Fig. 2.1)

1. **Bastar Plateau Region** covers Bastar, Kondagaon, Narayanpur, Kanker, Bijapur, Sukma and Dantewada districts lying on the Southern parts of the State. Except Indravati River plains, most of the area is covered by evergreen dense reserve forests and hilly tracts. The major landforms are high-level plateaus, structural hills and valleys and pediments and pediplains. The altitude varies from 400 to 600 m MSL. In the plains of Indravati River covering central parts, and along the Shabri River, covering South Eastern parts the altitude varies from 250 to 300 m MSL.

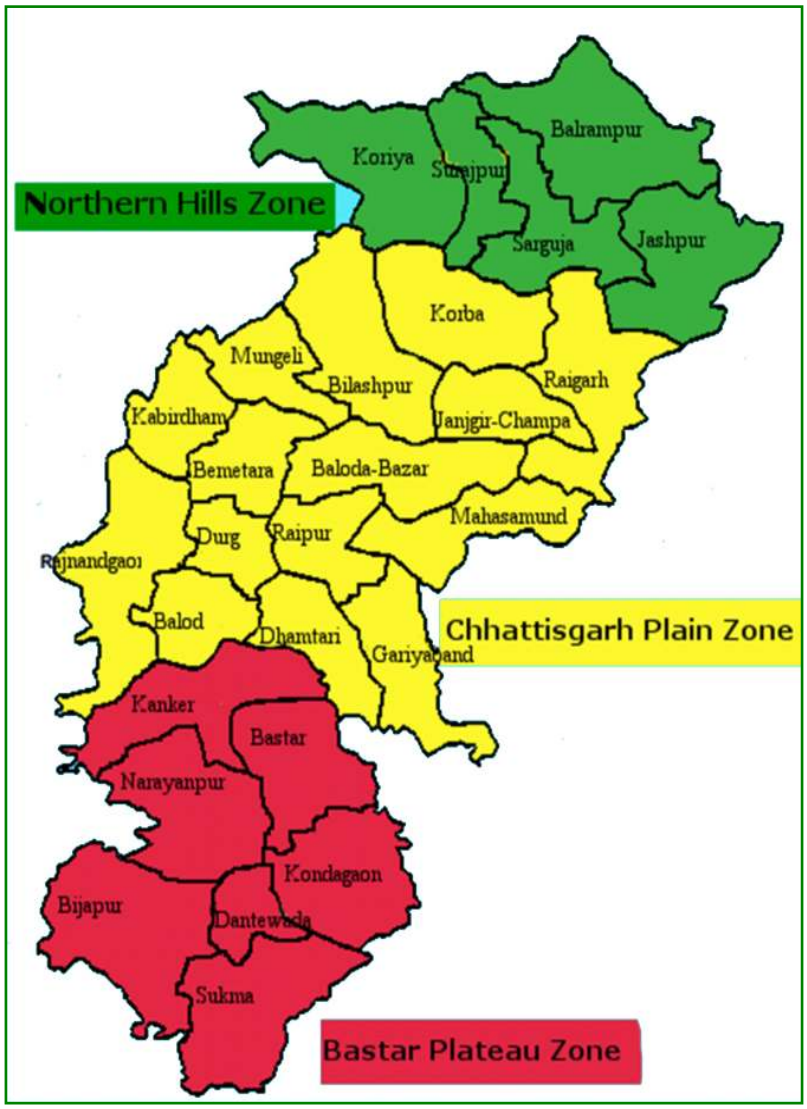

Fig. 2.1: Agro-Climatic Zones of Chhattisgarh

2. Chhattisgarh Plain Region spread over the central part of the State and covers parts of Bilaspur, Mungeli, Janjgir-Champa, Mahasamund, Dhamtari, Raipur, Balodabazar, Gariyaband Durg, Balod, Bemetara, Rajnandgaon and Kawardha districts. It forms the structural plains on Proterozoic rocks and mature pediplain with remnants of few isolated hills and ridges in between flood plains of numerous tributaries of Mahanadi River system. It is characterised by a gently undulating and flat terrain. The overall altitude varies from 750 m MSL on north western parts of the area to 284 m MSL on south eastern parts.

3. Northern Hilly Region covers north to the north central part of the state and occupies parts of Sarguja, Balrampur, Surajpur Koriya, Korba, Bilaspur, Jashpur and Raigarh districts. It is a part of Maikal and Hazaribagh hill ranges of Central India. It represents structural plains of Gondwana rocks, pediment/ pediplains, structural & denudational plateaus, structural & denudational hills and valleys.

It supports north flowing tributaries of Son River and south flowing Hasdeo and other tributaries of Mahanadi River. The Narmada,

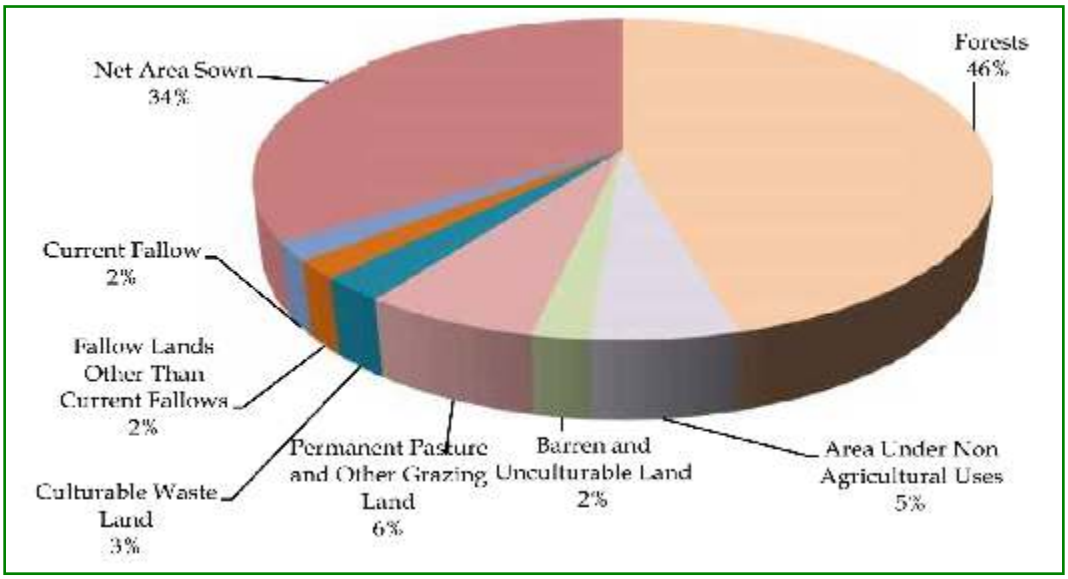

Fig 2.2: Per cent Share of different Land Use Parameters to Geographical Area (2015)

an important west-flowing River of central India, originates from Amarkantak in the central part of this physiographic unit. The highest point in the State is 1197 m MSL at Tulisi Dongri range in Dantewada district and the lowest point is 50 m MSL at Konta in Dantewada district.

The land use pattern is an important index of the human, social, cultural, and economic developments. As per the available statistics for the year 2015 (Directorate of Economics and Statistics), 6315530 ha (45.80%) of the total area (13789836 ha) in the State is covered by forests.

The forests include protected forests, reserved forests, revenue forests and others. The net sown area of Chhattisgarh is just 34% (4680740 ha). The double cropped area is only 22.37% of the net sown area 1047153 ha (Fig 2.2).

Chhattisgarh contributed only 0.82% (1277 thousand t) in total milk production (155491 thousand t) of India (Table 2.2). The per capita availability of milk is also found too less in Chhattisgarh (132 g/capita) as compared to India (329 g/capita).

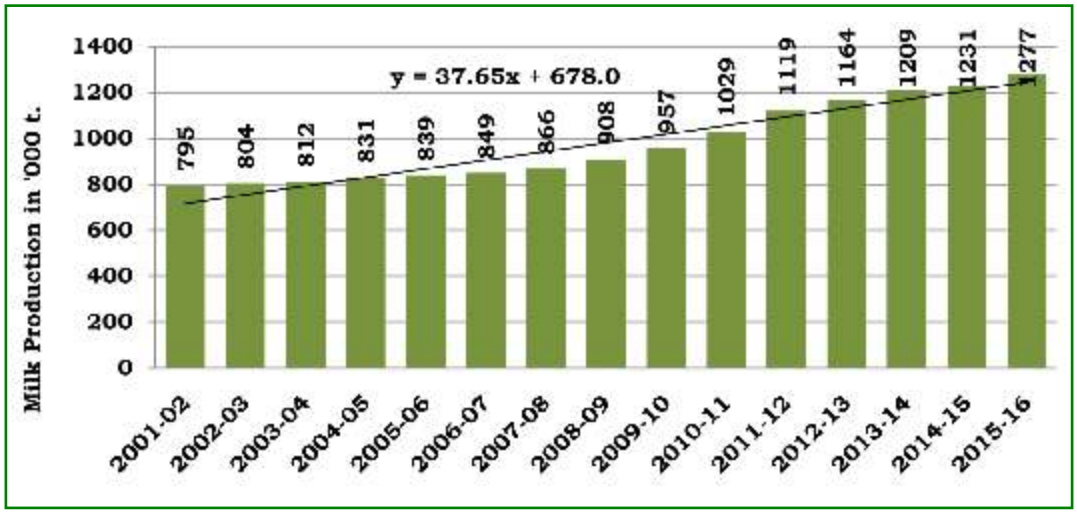

Fig: 2.3: Milk Production in Chhattisgarh (2001-15)

Table 2.2: Milk production and per capita availability of milk at State and National level

Years	Milk Production (in '000 t)		Milk Availability (in g)	
	Chhattisgarh	India	Chhattisgarh	India
2001-02	795 (0.94)	84406 (100)	104	225
2002-03	804 (0.93)	86159 (100)	106	230
2003-04	812 (0.92)	88082 (100)	107	231
2004-05	831 (0.90)	92484 (100)	109	233
2005-06	839 (0.86)	97066 (100)	110	241
2006-07	849 (0.84)	100869 (100)	112	246
2007-08	866 (0.80)	107934 (100)	114	252
2008-09	908 (0.81)	112183 (100)	119	258
2009-10	957 (0.82)	116425 (100)	126	263
2010-11	1029 (0.84)	121848 (100)	128	268
2011-12	1119 (0.87)	127904 (100)	129	290
2012-13	1164 (0.88)	132431 (100)	131	295
2013-14	1209 (0.88)	137686 (100)	130	301
2014-15	1231 (0.84)	146314 (100)	130	315
2015-16	1277 (0.82)	155491 (100)	132	329

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

However, milk production and milk availability showed increasing trend in Chhattisgarh with the magnitude of 37.66 thousand t/year and 2.3 g/capita/year as against 7.28 g/capital/year in India during the period 2001-15 (Fig.2.3 and Fig 2.4).

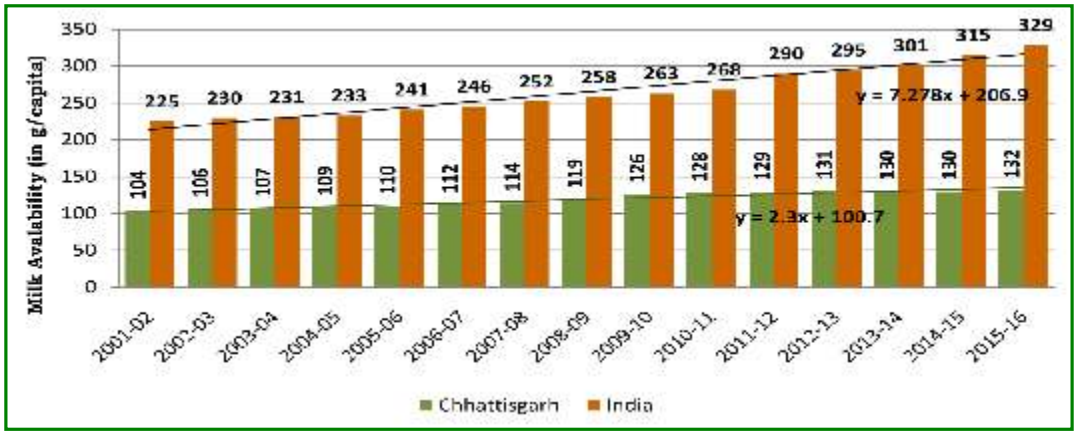

Fig.2.4: Milk Availability in India and Chhattisgarh 2001-15

2.2 Contribution of Dairy in State GDP

Agriculture and livestock sector contributed Rs. 11668 Crores in (2010-11) total Gross State Domestic Product (Rs.78902 Crores) in Chhattisgarh with 34.4 per cent contribution of livestock sector in agriculture (2010-11) which was found to be increased by 4.27 per cent in 2010-11 as compared to 2009-10. (Table 2.3)

Table 2.3: Gross State Domestic Products - Chhattisgarh at 2004-05 Price (in Crores)

S.No.	Sector	2006-07	2007-08	2008-09	2009-10	2010-11	% change over in 2009-2010	Share of sectors in total GSDP of 2010-11
1	Primary sector (Agri.,Forest, Fisheries and Mining)	18368	19801	19187	20367	23554	16	30
2	Secondary sector	20693	22376	25816	24711	25031	1	32
3	Tertiary sector	19535	21466	23978	26263	30316	15	38
4	GSDP at Current Prices	58598	63643	68982	71342	78902	11	100
5	Agriculture and livestock	8738	9743	8358	9268	11668	26	15
6	Livestock only	2370	2417	2522	3845	4009	4	5
7	% Share of livestock in Agriculture GDP	27	25	30	42	34	0	0

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

There was found to be Rs. 373.3 and 567.7 Crores of fund allocation to livestock sector in plan and non-plan schemes in Chhattisgarh. The utilization of fund has been increased to 66.9 per cent plan and 128.6 per cent non-plan in XIth plan as compared to Xth plan. (Table 2.4)

Table 2.4: Allocation and utilization of budgets in 10th plan and 11th plan period

S. No.	Particulars	X Plan (02-03 to 06-07)		XI Plan(07-08 to 11-12)		% change in Utilization
		Allocation	Utilized	Allocation	Utilized	
A	**Plan**	**232.7**	**165.6**	**373.3**	**274.5**	**66.9**
1	State	195.0	148.4	190.0	142.6	
2	Centrally Sponsored Schemes	16.3	10.1	32.4	23.4	
3	Central sector Schemes	21.4	7.1	25.1	6.0	
4	RKVY	Nil	Nil	125.9	104.5	
B	**Non Plan**	**243.6**	**233.5**	**567.7**	**533.7**	**128.6**

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

The value of out-put (milk and milk product) was increased from Rs. 2370 Crores (2006-07) to Rs. 4009 Crores (2010-11) with change of 4.2 per cent in 2010-11 over 2009-10. The percentage change of milk (6.1% per year), egg (5.7% per year) and dung (5.8% per year) in 2009-10 to 2010-11 was also increased, while meat (-3.6% per year) was found to be decreased (Table 2.5). The allocated to given to the sector among plan and non-plan schemes during XIth plan in Chhattisgarh was found to be Rs. 373.3 and 567.7 crores, respectively.

Table 2.5: Value of output of livestock sector Chhattisgarh at 2004-05 Price (in Crores)

S. No.	Livestock Produce	2006-07	2007-08	2008-09	2009-10	2010-11	% Change in over 2009-10
1	Milk	1158.0	1195.0	1254.0	2394.0	2540.0	6.1
2	Meat	336.0	335.0	360.0	704.0	679.0	-3.6
3	Egg	146.0	145.0	154.0	158.0	167.0	5.7
4	Wool/hair	2.0	2.0	2.0	3.0	3.0	0.0
5	Dung	728.0	740.0	752.0	586.0	620.0	5.8
	Total	**2370.0**	**2417.0**	**2522.0**	**3845.0**	**4009.0**	**4.2**

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

2.3 Growth and Composition of Livestock

Chhattisgarh contributed only 3.93 per cent of total livestock population of the country (382974 thousand). The state recorded maximum population of goat (52.93%) followed by cattle (5.14%), pigs (4.2%), buffaloes (1.28%), horse & ponies (0.48%), sheep(0.26%) and donkeys (0.21%) of the country. In Chhattisgarh among different livestock species, cattle contributes highest share (65.25%) in total livestock population followed by goat (21.44%), buffalo (9.24%), pigs (2.92%), sheep (1.12%) and horse & ponies (0.48%) besides marginal contribution was attributed by other livestock species such as camel, mules, donkeys and others in minority (Table 2.6).

Table 2.6 Species-wise livestock population & its share in Total livestock - (2012)

S.No.	Particular	Chhattisgarh			India	
		Livestock	% share to India	% share to Total Livestock	Livestock	% share in total Live
1	Cattle	9812.87	5.14	65.25	190,904	49.85
2	Buffalo	1390.18	1.28	9.24	108702	28.38
3	Sheep	168.22	0.26	1.12	65069	16.99
4	Goat	3224.71	52.93	21.44	6092	1.59
5	Horse & Ponies	2.97	0.48	0.02	624	0.16
6	Donkeys	0.68	0.21	0.00	318	0.08
7	Pigs	439.05	4.27	2.92	10294	2.69
8	Others	2	0.17	0.00	971	0.25
	Total	**15040.31**	**3.93**	**100.00**	**382,974**	**100.00**

Source: 19th Livestock census, Chhattisgarh. http://ahd.cg.gov.in/

Table 2.7: Year wise livestock population in Chhattisgarh (in '000)

Years	Local cow	Cross Breed Cow	Buffaloes	Goat
2001-02	1344	35	261	513
2002-03	1346	36	264	518
2003-04	1351	36	266	520
2004-05	1369	38	271	522
2005-06	1356	39	271	524
2006-07	1373	39	268	526
2007-08	1389	40	198	533
2008-09	1432	47	201	567
2009-10	1476	54	208	551
2010-11	1408	49	192	535
2011-12	1472	49	206	622
2012-13	1508	50	210	644
2013-14	1436	48	196	565
2014-15	1391	48	192	592
2015-16	1176	50	190	612

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

The population of local cow and buffaloes was found to be decreased from 1344 thousand to 1176 thousand and 261 thousand to 190 thousand respectively during the period 2001-15, although, the trend of local cow was found to positive. The population of local cow increased with the magnitude of 2.07 thousand/year in Chhattisgarh during this period.

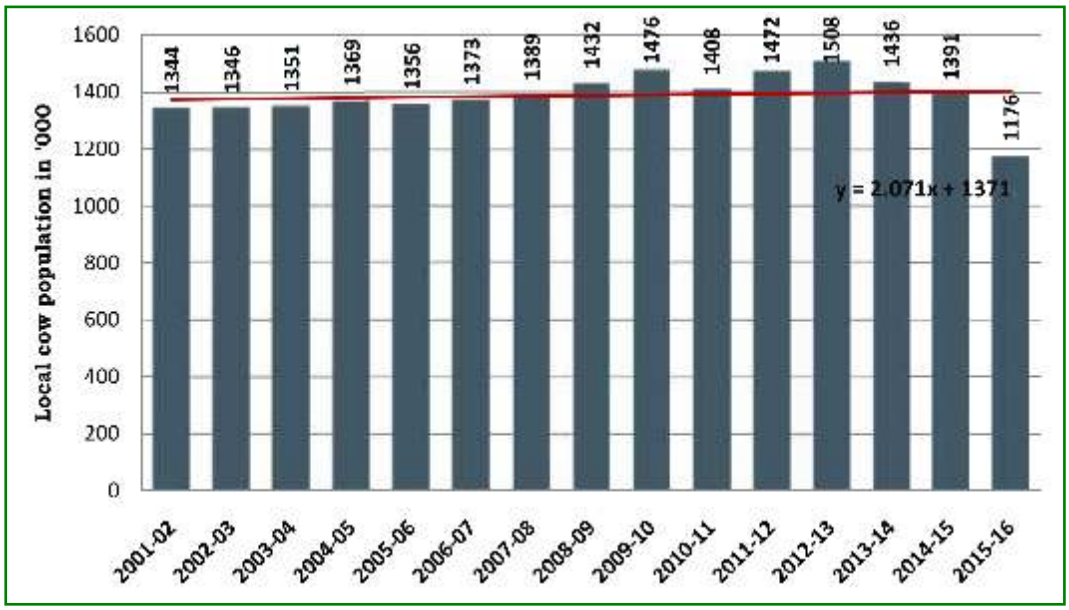

Fig.2.5: Local Cow Population in Chhattisgarh 2001-15

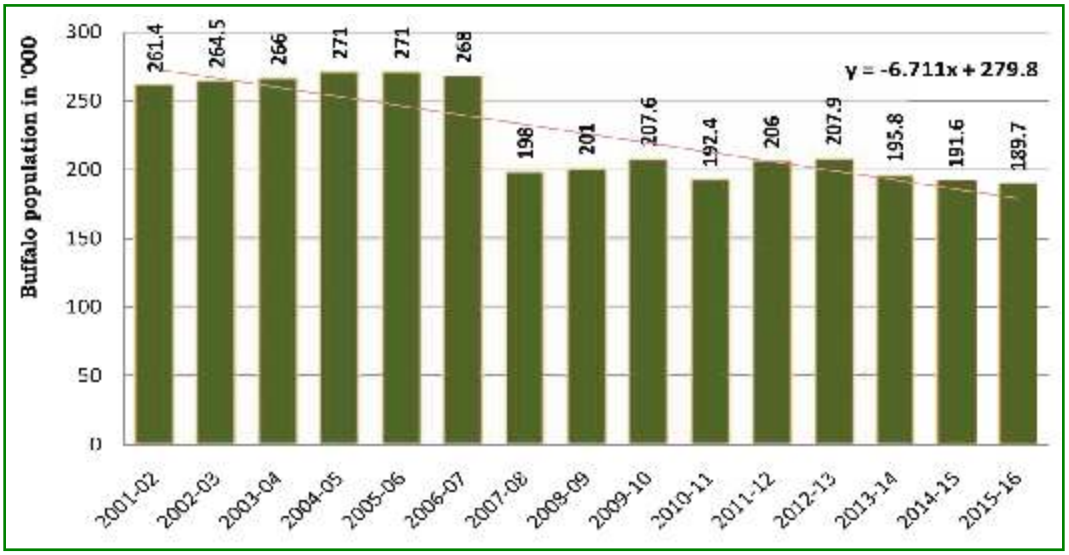

Fig.2.6: Buffaloes Population in Chhattisgarh 2001-15

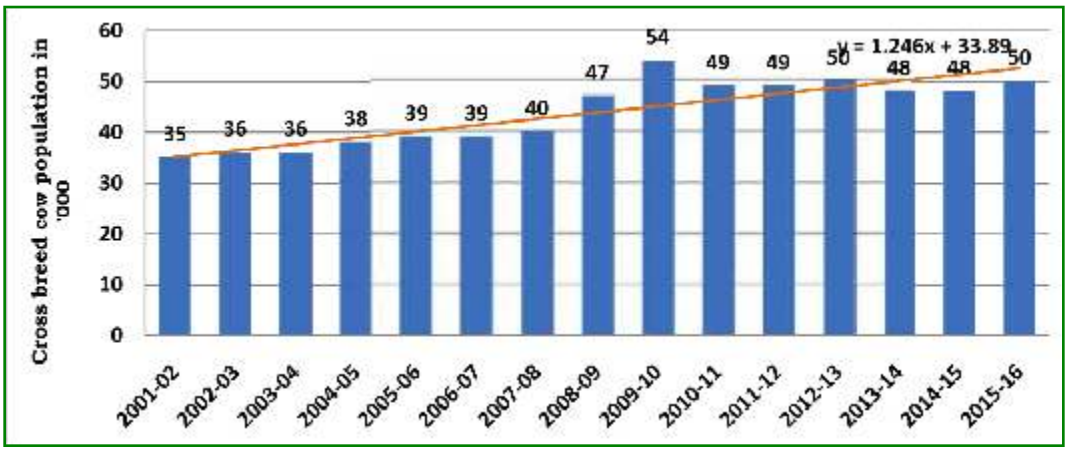

Fig.2.7: Crossbreed Cow Population in Chhattisgarh 2001-15

The population of buffalos was found to be decreased with the magnitude of -6.71 thousand/year during the period of 2001-15 in Chhattisgarh (Fig. 2.6). The population of crossbreed cow (Fig. 2.7) and goat (Fig. 2.8) was found to be increased from 35 thousand (2001-02) to 50 thousand (2015-16) and 513 thousand (2001-02) to 612 thousand (2015-16) with the magnitude of 1.25 and 7.79 thousand/year respectively.

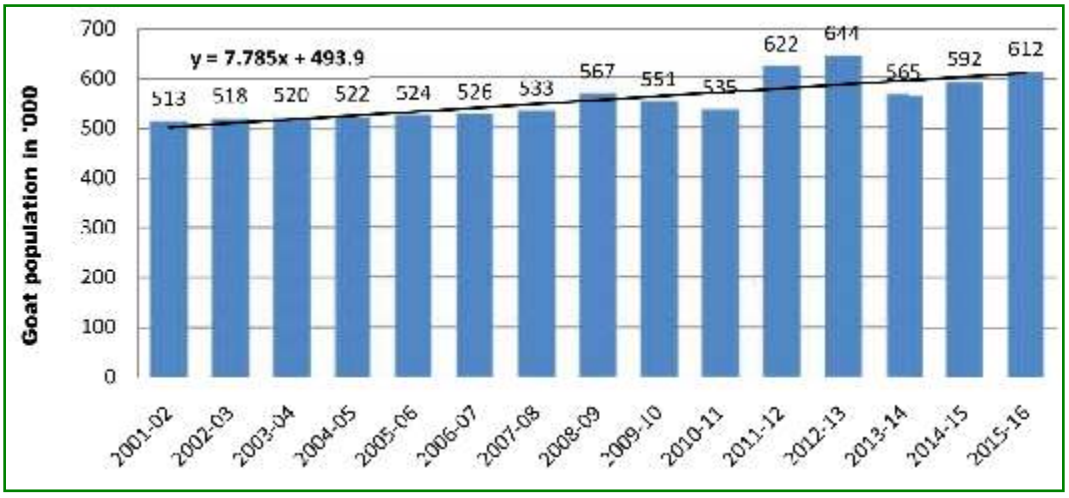

Fig.2.8: Goat Population in Chhattisgarh 2001-15

The 9 breeds of cows and 4 breeds of buffaloes were found in Chhattisgarh, out of 9 breeds of cows Gir, Sahiwal, Red-Sindhi, Jersey, Holstein, Tharparker, Ongole and Hariyana were found in all the districts of Chhattisgarh, while Kosali was found only in Raipur, Durg Bilaspur and Janjgir districts of Chhattisgarh.

Out of 4 breeds of Buffaloes Nagpuri and Mehsana were found in all the districts of Chhattisgarh, while Murrah (Raipur and Durg) Niliravi (Bilaspur, Dhamtari, Durg Janjgir-chapa, Kabirdham, Raipur, Rajnandgaon and Sarguja) in some districts of Chhattisgarh. Gir and Jersey breed of cow were found to be used for milk purpose, while Sahiwal, Tharparkar, Ongole and Kosali used for dual purpose. The holstein breed used for milk and meat purpose. Amongst the different breed of buffaloes Murrah, Niliravi and Mehsana were found to be used for dual purpose. (Table 2.8)

Table 2.8 Distribution of different breeds of cattles & buffalo in Chhattisgarh

Breeds	Breeding Tract	Utility
	(A) Cattle	
Gir	All District	Milch
Sahiwal	All District	Dual
Red Sindhi	All District	Milch
Jersey	All District	Dairy
Holstein	All District	Milk & Meat
Tharparker	All District	Dual
Ongole	All District	Dual
Kosali	Raipur, Durg, Bilaspur and Janjgir districts.	Dual
Hariana	All District	Milch
	(B) Buffalo	
Murrah	Raipur and Durg	Milch
Surti	Durg	Dual
Nagpuri	All District	
Nili ravi	Bilaspur, Dhamtari,Durg, Jangir chapa, Kabeerdham, Raipur, Rajnandganv and Surguja	Milch
Mehsana	All District	Milch

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

Chhattisgarh state had 15040.34 numbers of livestock spread over all the district (Fig.2.9). Out of which there were found 9812.91, 3224.71, 1390.18, 168.22 and 444.31 thousand were found to be cow, goat, buffalo, sheep and others animal respectively. Out of 9812.91 thousand of total cow, 9634.12 and 178.19 thousand were found to be indigenous and cross breeds cow respectively (Fig.2.11).

Fig 2.9: Intensity Livestock Population in Chhattisgarh

Out of total cross breed Cow (178.19 thousand) the maximum number were found in Raigarh (25.90%) followed by Mahasamund (9.69%), Bilaspur (8.82%), Janjgir (6.58%), Raipur (6.04%), Durg (4.86%), Kanker (3.98%), Surajpur (3.65%), Ambikapur (3.53%), Koriya (2.98%), Dhamtari (2.78%), Bastar (2.25%), Juspur (2.22%), Korba (2.12%), Baloda (2.10%), Balodabazaar (1.90%), Kondagaon (1.36%), Balrampur (1.32%), Gariyaband (0.89%), Dantewada (0.75%), Narayanpur (0.71%), Mungeli (0.69%), Bijapur (0.67%), Bemetra (0.41%), Kabirdham (0.37%) and Sukuma (0.23%) (Table 2.10).

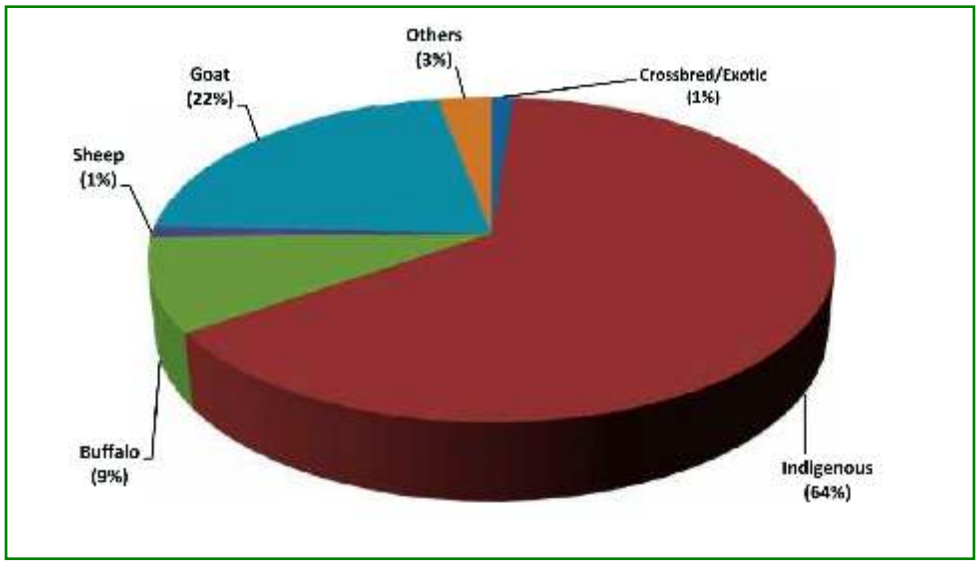

Fig 2.10: Species–Wise Livestock Population in Chhattisgarh

Out of total Indigenous breed Cow (9634.72 thousand), the maximum number were found in Rajnandgaon (7.45%) followed by Balodabazaar (5.72%), Bilaspur (5.66%), Janjgir (5.59%), Juspur (4.51%), Raigarh (4.22%), Raipur (4.04%), Kondagaon (3.97%), Balrampur (3.85%), Bemetra (3.78%), kanker (3.71%), Baloda (3.69%), Kabirdham (3.60%), Korba (3.59%), Mahasamund (3.58%), Durg 3.53%), Surajpur (3.28%), Ambikapur (3.20%), Bastar (3.18%), Koriya (3.10%), Dhamtari (2.91%), Gariyaband (2.84%), Sukuma (2.78%), Mungeli (2.62%), Bijapur(2.47%), Narayanpur (1.62%) and Dantewada (1.52%) (Table 2.10).

Out of total buffalo (1390.18 thousand), the maximum number were found in Bilaspur (7.37%) followed by Janjgir (5.72%), Ambikapur (5.03%), Surajpur (4.98%), Baloda bazaar (4.81%), Raipur (4.74%), Rajnandgaon (4.57%), Korba (4.52%), Durg (4.16%), Balrampur (4.11%), Bastar (3.97%), Dhamtari (3.92%), Koriya (3.53%), Kabirdham (3.49%), Raigarh (3.43%), Bemetra (3.32%), Gariyaband (3.21%), Kondagaon (3.14%), Baloda (3.10%), Mahasamund (3.01%), Sukuma (3.00%), Bijapur (2.89%), Mungeli (2.88%), Kanker (2.68%), Juspur (2.54%), Dantewada (0.97%) and Narayanpur (0.88%) (Table 2.10).

Out of total sheep (168.22 thousand), the maximum number were found in Gariyaband (17.3%) followed by Bastar (15.6%), Raigarh (12.7%), Mahasamund (10.3%), Janjgir (5.6%), Baloda Bazar (4.8%), Bemetra (4.5%), Jushpur (4.4%), Raipur (3.9%), Sukma (3.2%), Rajnandgaon (3.0%), Durg (2.6%), Balod (2.3%), Balrampur (2.2%), Kondagaon (1.8%), Bilaspur (1.67%), Mungeli (1.50%), Kanker (1.34%),Kabirdham (0.41%), Ambikapur (0.38%), Dantewada (0.27%), Surajpur (0.14%), Bijapur (0.09%), Dhamtari (0.08%) and Korba (0.03%) (Table 2.10).

Out of total Goat (3224.71 thousand), the maximum number were found in Juspur (10.41%) followed by Balrampur (7.17%),

Raigarh (6.48%), Ambikapur (6.41%), Surajpur (5.57%), Kanker (5.17%), Bilaspur (5.12%), Koriya (4.83%), Korba (4.37%), Mahasamund (3.83%), Sukuma (3.31%), Rajnandgaon (3.31%), Kondagaon (3.24%), Bijapur (3.18%), Baloda bazaar (2.97%), Janjgir (2.91%), Bastar (2.85%), Kabirdham (2.19%), Raipur (2.05%), Gariyaband (2.03%), Mungeli (2.02%), Bemetra (1.99%), Dantewada (1.84%), Durg (1.84%), Balod (1.67%), Dhamtari (1.61%) and Narayanpur (1.61%) (Table 2.10).

Table 2.9 District wise total livestock population of different species in Chhattisgarh (in '000)-2012

S. No.	Districts	Cow			Buffalo	Sheep	Goat	Others	Total Livestock
		Crossbred/ Exotic	Indigenous cow	Total cow					
1	Koriya	5.22	298.42	303.64	49.13	0.00	155.61	3.69	512.06
2	Balrampur	2.36	371.18	373.54	57.12	3.76	231.20	22.44	688.06
3	Surajpur	6.51	315.70	322.20	69.26	0.23	179.76	6.13	577.58
4	Ambikapur	6.29	308.16	314.46	69.91	0.64	206.83	13.73	605.57
5	Jushpur	3.95	434.85	438.80	35.33	7.40	335.54	40.33	857.41
6	Raigarh	46.15	406.37	452.52	47.69	21.32	208.95	9.49	739.96
7	Korba	3.78	346.17	349.95	62.90	0.05	140.89	3.80	557.59
8	Janjgir	11.73	538.50	550.23	79.53	9.38	93.94	4.25	737.31
9	Bilaspur	15.72	545.32	561.03	102.46	2.81	165.23	8.41	839.95
10	Mungeli	1.23	252.54	253.77	40.03	2.53	65.10	2.26	363.70
11	Kabirdham	0.66	346.52	347.18	48.47	0.69	70.70	13.72	480.75
12	Rajnandgaon	5.81	717.65	723.46	63.57	5.08	106.81	10.60	909.52
13	Bemetra	0.73	364.45	365.18	46.18	7.61	64.26	1.54	484.76
14	Durg	8.65	339.69	348.34	57.80	4.30	59.44	1.98	471.86
15	Balod	3.73	355.95	359.68	43.05	3.84	53.95	3.64	464.16
16	Baloda Bazar	3.39	550.74	554.14	66.88	8.02	95.64	4.48	729.16
17	Raipur	10.77	389.22	399.98	65.88	6.62	65.95	4.30	542.73
18	Gariyaband	1.58	273.33	274.91	44.69	29.05	65.56	5.02	419.22
19	Mahasamund	17.26	344.93	362.20	41.80	17.31	123.66	4.21	549.18
20	Dhamtari	4.95	280.18	285.13	54.56	0.13	51.88	8.64	400.34
21	Kanker	7.09	357.24	364.32	37.32	2.25	166.82	46.45	617.16
22	Kondagaon	2.42	382.39	384.81	43.62	2.99	104.62	41.76	577.80
23	Bastar	4.01	306.86	310.87	55.25	26.22	91.93	31.03	515.30
24	Narayanpur	1.27	155.98	157.25	12.29	0.00	51.79	34.74	256.07
25	Dantewada	1.34	146.36	147.70	13.50	0.45	59.39	27.06	248.10
26	Sukma	0.40	267.61	268.01	41.74	5.40	106.63	55.42	477.20
27	Bijapur	1.19	238.43	239.61	40.24	0.15	102.65	35.19	417.84
	Chhattisgarh	178.19	9634.72	9812.91	1390.18	168.22	3224.71	444.31	15040.34

Source: 19th Livestock census, Chhattisgarh. http://ahd.cg.gov.in/

Out of total others animal (444.31 thousand) the maximum number were found in Sukma (12.47%) followed by Kanker (10.45%), Kondagaon (9.40%), Jushpur (9.08%), Bijapur

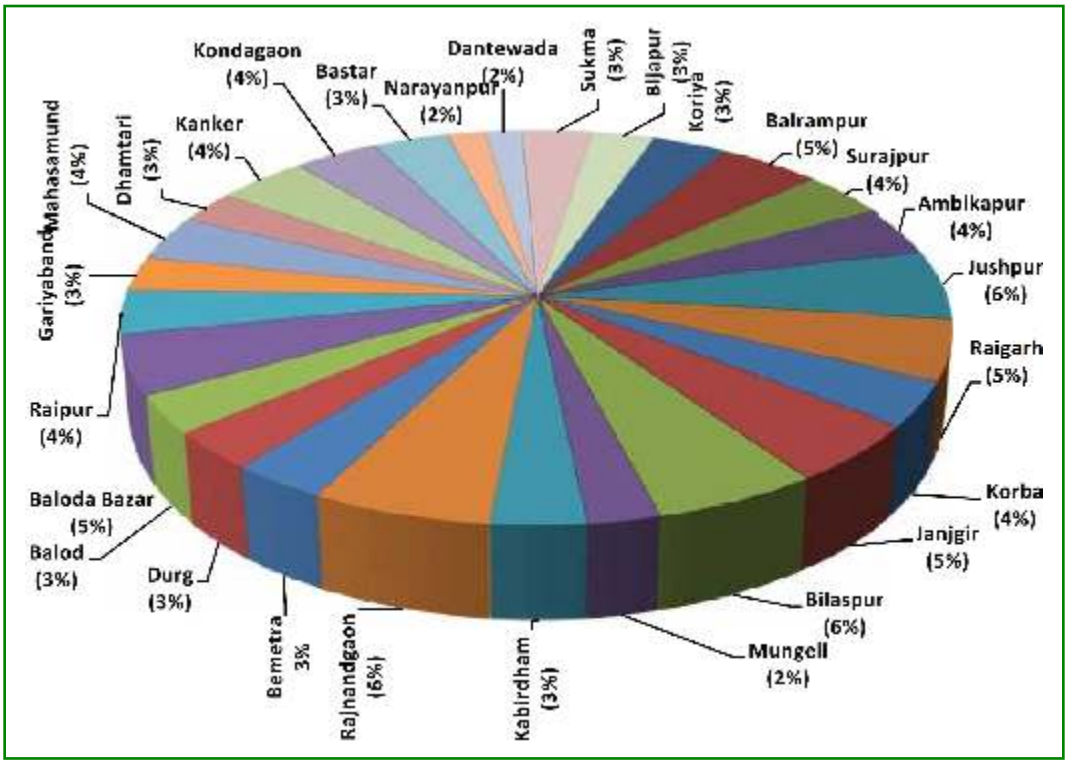

Fig.2.11: Share in Total Livestock Population in Chhattisgarh-2012 (%)

(7.92%), Narayanpur (7.82%), Bastar (6.98%), Dantewada (6.09%), Balrampur (5.05%), Ambikapur (3.09%), Kabirdham (3.09%), Rajnandgaon (2.39%), Raigarh (2.13%), Dhamtari (1.95%), Bilaspur (1.89%), Surajpur (1.38%), Gariyaband (1.13%), Baloda bazaar (1.01%), Raipur (0.97%), Janjgir (0.96%), Mahasamund (0.95%), Korba (0.86%), Koriya (0.83%), Balod (0.82%), Mungeli (0.51%), Durg (0.44%) and Bemetra (0.35%) (Table 2.10).

Chhattisgarh state had 15040.34 thousand of total livestock. Out of which, Rajnandgaon (6.05%) was to have maximum number of livestock followed by Juspur (5.70%), Bilaspur (5.58%), Raigarh (4.92%), Janjgir (4.90%), Baloda bazaar (4.85%), Balrampur (4.57%), Kanker (4.10%), Ambikapur (4.03%), Surajpur (3.84%), Kondagaon (3.84%), Korba (3.71%), Mahasamund (3.65%), Raipur (3.61%), Bastar (3.43%), Koriya (3.40%), Bemetra (3.22%), Kabirdham (3.20%), Sukuma (3.17%), Durg (3.14%), Balod (3.09%), Gariyaband (2.79%), Bijapur (2.78%), Dhamtari (2.66%), Mungeli (2.42%), Narayanpur (1.70%) and Dantewada (1.65%), (Fig.2.11).

As far as density of population of livestock per sq. km is connected, the maximum density of livestock was found in Durg (203/km) followed by Raipur (187/km), Bemetra (170/km), Jangir (165/km), Kondagaon (157/km), Balod Bazar (156/km), Bilaspur (144/km), Jashpur (133/km), Mungeli (132/km), Balod (131/km), Ambikapur (121/km), Surajpur (116/km), Balrampur (114/km), Raigarh (113/km), Rajnandgaon

Table 2.10 District wise share of animal in total livestock population in Chhattisgarh (in%)-2012

S. No	Districts	Cow			Buffalo	Sheep	Goat	Others	Total Livestock
		Crossbred/ Exotic	Indigenous cow	Total cow					
1	Koriya	2.93	3.10	3.09	3.53	0.00	4.83	0.83	3.40
2	Balrampur	1.32	3.85	3.81	4.11	2.23	7.17	5.05	4.57
3	Surajpur	3.65	3.28	3.28	4.98	0.14	5.57	1.38	3.84
4	Ambikapur	3.53	3.20	3.20	5.03	0.38	6.41	3.09	4.03
5	Jushpur	2.22	4.51	4.47	2.54	4.40	10.41	9.08	5.70
6	Raigarh	25.90	4.22	4.61	3.43	12.67	6.48	2.13	4.92
7	Korba	2.12	3.59	3.57	4.52	0.03	4.37	0.86	3.71
8	Janjgir	6.58	5.59	5.61	5.72	5.57	2.91	0.96	4.90
9	Bilaspur	8.82	5.66	5.72	7.37	1.67	5.12	1.89	5.58
10	Mungeli	0.69	2.62	2.59	2.88	1.50	2.02	0.51	2.42
11	Kabirdham	0.37	3.60	3.54	3.49	0.41	2.19	3.09	3.20
12	Rajnandgaon	3.26	7.45	7.37	4.57	3.02	3.31	2.39	6.05
13	Bemetra	0.41	3.78	3.72	3.32	4.52	1.99	0.35	3.22
14	Durg	4.86	3.53	3.55	4.16	2.56	1.84	0.44	3.14
15	Balod	2.10	3.69	3.67	3.10	2.28	1.67	0.82	3.09
16	Baloda Bazar	1.90	5.72	5.65	4.81	4.77	2.97	1.01	4.85
17	Raipur	6.04	4.04	4.08	4.74	3.93	2.05	0.97	3.61
18	Gariyaband	0.89	2.84	2.80	3.21	17.27	2.03	1.13	2.79
19	Mahasamund	9.69	3.58	3.69	3.01	10.29	3.83	0.95	3.65
20	Dhamtari	2.78	2.91	2.91	3.92	0.08	1.61	1.95	2.66
21	Kanker	3.98	3.71	3.71	2.68	1.34	5.17	10.45	4.10
22	Kondagaon	1.36	3.97	3.92	3.14	1.78	3.24	9.40	3.84
23	Bastar	2.25	3.18	3.17	3.97	15.58	2.85	6.98	3.43
24	Narayanpur	0.71	1.62	1.60	0.88	0.00	1.61	7.82	1.70
25	Dantewada	0.75	1.52	1.51	0.97	0.27	1.84	6.09	1.65
26	Sukma	0.23	2.78	2.73	3.00	3.21	3.31	12.47	3.17
27	Bijapur	0.67	2.47	2.44	2.89	0.09	3.18	7.92	2.78
	Chhattisgarh	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: 19th Livestock census, Chhattisgarh. http://ahd.cg.gov.in/

(113/km), Mahasamund (111/km), Kabirdham (108/km), Dhamtari (98/km), Kanker (96/km), Koriya (86/km), Sukma (85/km), Bastar (80/km), Korba (78/km), Dantewada (73/km), Goriyaband (72/km), Bijapur (64/km) and Narayanpur (37/km) (Table 2.11).

The maximum density of Bovine population was also found in Durg (175/km) followed by Raipur (160/km), Bemetra (144/km), Janjgir (141/km), Baloda Bazar (133/km), Kondagaon (116/km), Bilaspur (114/km), Balod (114/km), Mungeli (107/km), Rajnandgaon (98/km), Kabirdham (89/km), Dhamtari (83/km), Mahasamund (81/km), Surajpur (78/km), Ambikapur (77/km), Raigarh (77/km), Jashpur (73/km), Balrampur (72/km), Kanker (62/km), Koriya (59/km), Karba (58/km), Bastar (57/km), Goriyaband (55/km), Sukma (55/km), Dantewada (47/km), Bijapur (43/km) and Narayanpur (25/km), (Table 2.11).

Table 2.11: Density of livestock and bovine population in different districts of Chhattisgarh.

S. No	Districts	Livestock	Bovine
1	Koriya	86	59
2	Balrampur	114	72
3	Surajpur	116	78
4	Ambikapur	121	77
5	Jushpur	133	73
6	Raigarh	113	77
7	Korba	78	58
8	Janjgir	165	141
9	Bilaspur	144	114
10	Mungeli	132	107
11	Kabirdham	108	89
12	Rajnandgaon	113	98
13	Bemetra	170	144
14	Durg	203	175
15	Balod	131	114
16	Baloda Bazar	156	133
17	Raipur	187	160
18	Gariyaband	72	55
19	Mahasamund	111	81
20	Dhamtari	98	83
21	Kanker	96	62
22	Kondagaon	157	116
23	Bastar	80	57
24	Narayanpur	37	25
25	Dantewada	73	47
26	Sukma	85	55
27	Bijapur	64	43
	Chhattisgarh	**109**	**81**

Source: 19th Livestock census, Chhattisgarh. http://ahd.cg.gov.in/

2.4 Milk Production

The total milk production was found to be increased from 794.5 (2001-02) to 1277.3 thousand t (2015-16) in Chhattisgarh. The milk production of different livestock species was also found to be increased from 442.9 (2001-02) to 815.1 thousand t (2015-16), 49.5 (2001-02) to 103.4 thousand t (2015-16), 264.0 (2001-02) to 310.8 thousand t (2015-16) and 38.0 (2001-02) to 48.1 (2015-16) thousand t with the magnitude of 24.92, 4.33, 07.67 and 0.75 thousand t milk/year in local cow (Fig 2.14), Cross breed cow (Fig.2.15), buffaloes (Fig.2.16) and goat (Fig.2.17) respectively during the period 2001-02 to 2015-16 (Table 2.12).

Chhattisgarh produces 1277.753 thousand t of milk production in 2015-16, out of which the maximum milk was obtained

Table 2.12: Year-wise milk production of different species in Chhattisgarh (In'000 ton)

Years	Local cow	Cross Breed Cow	Buffaloes	Goat	Total
2001-02	442.9	49.5	264.0	38.0	794.5
2002-03	444.3	50.8	269.0	40.1	804.1
2003-04	447.8	51.3	272.0	41.1	812.3
2004-05	455.7	53.8	280.0	41.5	831.0
2005-06	457.8	54.5	285.0	42.1	839.3
2006-07	463.1	55.9	287.0	42.6	848.6
2007-08	471.1	56.4	296.0	43.0	866.5
2008-09	487.2	67.9	307.0	46.5	908.6
2009-10	514.8	77.4	318.0	45.9	956.1
2010-11	561.8	81.8	343.0	42.8	1029.3
2011-12	618.1	83.1	368.3	49.4	1118.9
2012-13	650.9	86.9	375.1	51.3	1164.3
2013-14	694.5	93.8	374.9	46.0	1209.2
2014-15	716.8	106.4	359.4	48.7	1231.3
2015-16	815.1	103.4	310.8	48.1	1277.3

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

through Cow Indian breed (39%) followed by Cow degraded native (25%), Buffalo native breed (16%), Buffalo advance breed (8%), cow cross breed (7%), Goat (4%) and cow foreign breed (1%) spread over all the district. (Fig 2.12).

Out of total milk production 1277.75 thousand t the highest milk production was found in Durg (88.16 thousand t) followed by Raipur (86.61 thousand t), Rajnandgaon (82.4 thousand t), Bilaspur (79.77 thousand t), Janjgeer (74.44 thousand t), Balodbajar (71.96 thousand t),

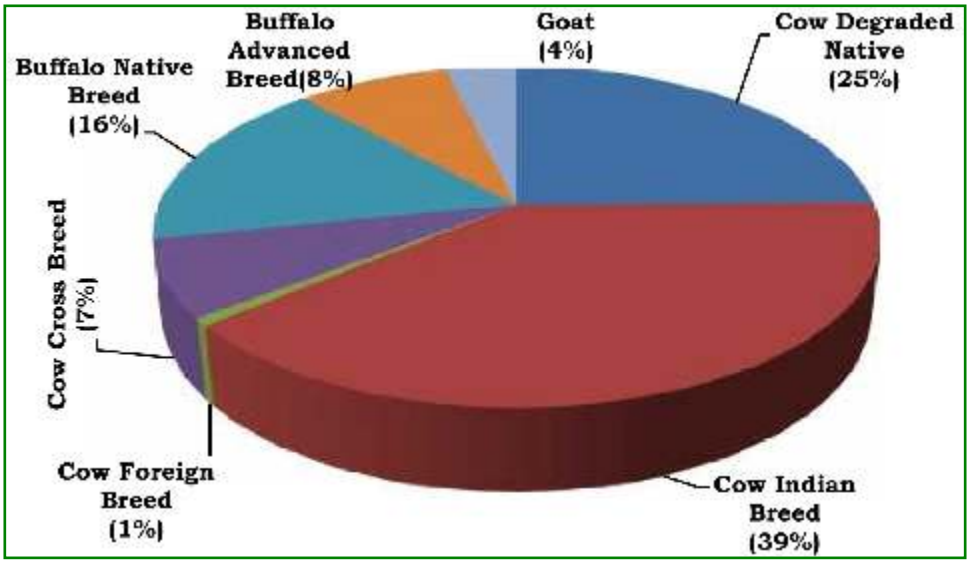

Fig 2.12 : Species- Wise Milk Production in Chhattisgarh

Table: 2.13 District and species wise milk production in Chhattisgarh 2015-16 (in '000 ton)

S. No.	Districts	Cow Degraded Native	Cow Indian Breed	Cow Foreign Breed	Cow Cross Breed	Buffalo native breed	Buffalo Advanced Breed	Goat	Total Milk Production
1	Koriya	10.30	11.04	2.10	1.95	12.32	3.41	2.54	43.65
2	Balrampur	12.21	4.14	0.26	0.94	9.31	0.68	3.44	30.97
3	Surajpur	6.82	15.04	0.30	2.42	5.76	2.94	2.74	36.03
4	Sarguja	6.72	10.35	0.00	2.87	7.39	3.82	3.09	34.23
5	Jashpur	10.41	11.90	0.18	2.28	7.61	0.94	5.54	38.85
6	Raigarh	14.43	20.52	0.00	21.12	6.42	1.48	3.50	67.47
7	Korba	18.51	1.21	0.75	1.87	10.07	4.49	2.26	39.15
8	Janjgeer	21.38	36.55	0.29	4.90	3.75	5.97	1.60	74.44
9	Bilaspur	26.16	20.75	0.89	7.81	17.80	4.27	2.10	79.77
10	Mungeli	6.23	27.01	0.00	0.55	7.45	0.81	0.89	42.94
11	Kabidham	12.38	35.31	0.00	0.09	7.32	1.92	1.14	58.15
12	Rajnandgaon	24.82	37.82	0.27	4.10	9.16	4.77	1.46	82.40
13	Bemetara	9.57	30.96	0.00	0.34	10.49	2.63	0.87	54.87
14	Durg	7.37	44.18	0.41	8.13	6.45	20.69	0.93	88.16
15	Balod	6.59	37.19	0.00	2.06	7.86	2.25	0.84	56.78
16	Balodabazar	21.32	27.62	0.22	1.78	15.41	4.23	1.38	71.96
17	Raipur	17.27	23.87	0.97	8.13	14.06	21.12	1.18	86.61
18	Goriyaband	8.88	15.82	0.00	0.72	10.10	1.44	1.03	37.99
19	Mahasamund	12.68	20.07	0.00	12.22	8.08	3.66	2.51	59.21
20	Dhamtari	2.31	35.53	0.00	2.35	3.00	10.58	0.66	54.43
21	Kanker	10.37	11.05	1.39	2.63	3.71	0.40	2.19	31.75
22	Kondagaon	11.67	0.24	0.18	0.90	3.78	0.13	1.41	18.32
23	Bastar	7.99	7.07	0.43	2.08	3.49	0.46	1.24	22.75
24	Narayanpur	5.07	4.96	0.14	0.17	1.46	0.00	0.73	12.52
25	Dantewada	3.70	2.13	0.00	0.94	1.23	0.14	0.45	8.60
26	Sukma	8.58	7.37	0.00	0.15	4.95	0.29	1.13	22.46
27	Bijapur	12.27	0.00	0.00	0.24	9.54	0.00	1.29	23.33
Total		**315.99**	**499.66**	**8.77**	**93.72**	**207.97**	**103.51**	**48.10**	**1277.75**

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

Raigarh (67.47 thousand t), Mahasamund (59.21 thousand t), Kabirdham (58.15 thousand t), Balod (56.78 thousand t), Bemetra (54.87 thousand t), Dhamtari (54.43 thousand t), Koriya (43.65 thousand t), Mungeli (42.94 thousand t), Korba (39.15 thousand t), Jashpur (38.85 thousand t), Goriyaband (37.99 thousand t), Surajpur (36.03 thousand t), Sarguja (34.23 thousand t), Kanker (31.75 thousand t), Balrampur (30.97 thousand t), Bijapur (23.33 thousand t), Bastar (22.75 thousand t), Sukma (22.46 thousand t), Kondagaon (18.32 thousand t), Narayanpur (12.52 thousand t) and Dantewada (8.60 thousand t) (Table 2.13).

Chhattisgarh produces 499.67 thousand t of milk production from Indian Breed cows, out of which the maximum milk production from these Indian Breed cows was found in Durg (44.18 thousand t) followed by Rajnandgaon (37.82 thousand t), Balod (37.19 thousand t), Janjgeer (36.55 thousand t), Dhamtari (35.53 thousand t), Kabirdham (35.31 thousand t), Bemetra (30.96 thousand t), Balodabazar (27.62 thousand t), Mungeli (27.01 thousand t), Raipur (23.87 thousand t), Bilaspur (20.75 thousand t), Raigarh (20.52 thousand t), Mahasamund (20.07 thousand t), Goriyaband (15.82 thousand t), Surajpur (15.04

thousand t), Jashpur (11.90 thousand t), Kanker (11.05 thousand t), Koriya (11.04 thousand t), Sarguja(10.35 thousand t), Sukuma (7.37 thousand t), Bastar (7.07 thousand t), Narayanpur (4.96 thousand t), Balarampur (4.14 thousand t), Dantewada (2.13 thousand t), Korba (1.21 thousand t) and Kondagaon (0.24 thousand t) (Table 2.13).

Chhattisgarh produces of milk production from Degraded Native cows 315.99 thousand t, the maximum milk production was found in Bilaspur (26.16 thousand t), followed by Rjnandgaon (24.82 thousand t), Janjgeer (21.38 thousand t), Balodbazar (21.32 thousand t), Korba (18.51 thousand t), Raipur (17.27 thousand t), Raigarh (14.43 thousand t), Mahasamund (12.68 thousand t), Kabirdham (12.38 thousand t), Bijapur (12.27 thousand t), Balrampur (12.21 thousand t), Kondagaon (11.67 thousand t), Jashpur (10.41 thousand t), Kanker (10.37 thousand t), Koriya (10.30 thousand t), Bemetra (9.57 thousand t), Goriyaband (8.88 thousand t), Sukma(8.58 thousand t), Bastar (7.99 thousand t), Durg (7.37 thousand t), Surajpur (6.82 thousand t), Sarguja (6.72 thousand t), Balod (6.59 thousand t), Mungeli (6.23 thousand t), Naranpur (5.07 thousand t), Dantewada (3.70 thousand t), and Dhamtari (2.31 thousand t) (Table 2.13).

Fig 2.13: Intensity of Milk Production in different Districts of Chhattisgarh

Chhattisgarh produces 207.97 thousand t of milk production from Buffalo Native Breed, out of which the maximum milk production was found in Bilaspur (17.80 thousand t) followed by Balodbazar (15.41 thousand t), Raipur (14.06 thousand t), Koriya (12.32 thousand t), Bemetra (10.49 thousand t), Goriyaband (10.10 thousand t), Korba (10.07 thousand t), Bijapur (9.54 thousand t), Balrampur (9.31 thousand t), Rajnandgaon (9.16 thousand t), Mahasamund (8.08 thousand t), Balod (7.86 thousand t), Jashpur (7.61 thousand t), Mungeli (7.45 thousand t), Sarguja (7.39 thousand t), Kabirdham (7.32 thousand t), Durg (6.45 thousand t), Raigarh (6.42 thousand t), Surajpur (5.76 thousand t), Sukma (4.95 thousand t), Kondagaon (3.78 thousand t), Janjgeer (3.75 thousand t), Kanker (3.71 thousand t), Bastar (3.49 thousand t), Dhamtari (3.00 thousand t), Narayanpur (1.46 thousand t), and Dantewada (1.23 thousand t) (Table 2.13).

Fig.2.14: Milk Production of Local Cow in Chhattisgarh 2001-15

Chhattisgarh produces 103.52 thousand t of milk production from Buffalo Advance Breed, out of which the maximum milk production was found in Raipur (21.12 thousand t) followed by Durg (20.69 thousand t), Dhamtari (10.58 thousand t), Janjgir (5.97 thousand t), Rajnandgaon (4.77 thousand t), Korba (4.49 thousand t), Bilaspur (4.27 thousand t), Balodbazar (4.23 thousand t), Sarguja (3.82 thousand t), Mahasmund (3.66

Fig.2.15: Milk Production of Cross Breed Cow in Chhattisgarh 2001-15

thousand t), Koriya (3.41 thousand t), Surajpur (2.94 thousand t), Bemetra (2.63 thousand t), Balod (2.25 thousand t), Kabirdham (1.92 thousand t), Raigarh (1.48 thousand t), Goriyaband (1.44 thousand t), Jaishpur (0.94 thousand t), Mungeli (0.81 thousand t), Balarampur (0.68 thousand t), Bastar (0.46 thousand t), Kanker (0.40 thousand t), Sukma (0.29 thousand t), Dantewada (0.14 thousand t), and Kondagaon (0.13 thousand t) (Table 2.13).

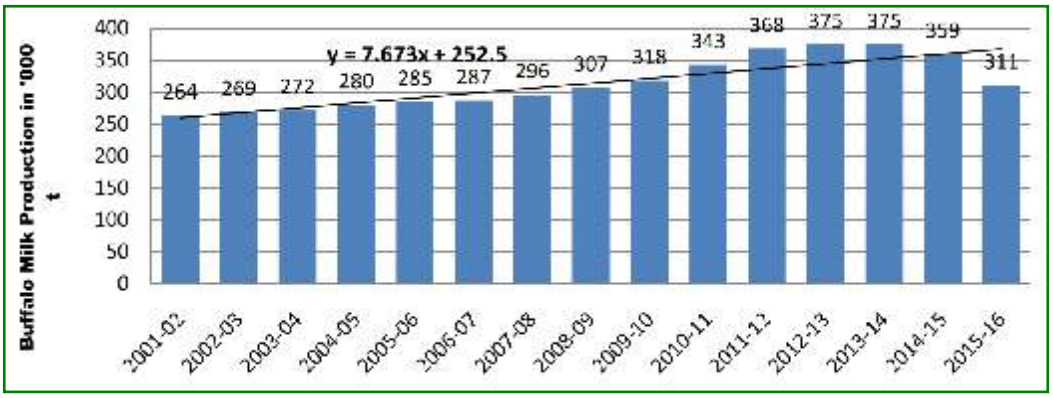

Fig.2.16: Milk Production of Buffaloes in Chhattisgarh 2001-15

Chhattisgarh produces 93.72 thousand t of milk production from Cross Breed Cow, out of which the maximum milk production was found in Raigarh (21.12 thousand t) followed by Mahasamund (12.22 thousand t), Raipur (8.13 thousand t), Durg (8.13 thousand t), Bilaspur (7.81 thousand t), Janjgeer (4.90 thousand t), Rajnandgaon (4.10 thousand t), Sarguja (2.87 thousand t), Kanker (2.63 thousand t), Surajpur (2.42 thousand t), Dhamtari (2.35 thousand t), Jashpur (2.28 thousand t), Bastar (2.08 thousand t), Balod (2.06 thousand t), Koriya (1.95 thousand t), Korba (1.87 thousand t), Balodbazar (1.78 thousand t), Balrampur (0.94 thousand t), Dantewara (0.94 thousand t), Kondagaon (0.90 thousand t), Goriyaband (0.72 thousand t), Mungeli (0.55 thousand t) , Bemetra (0.34 thousand t), Bijapur (0.24 thousand t), Narayanpur (0.17 thousand t), Sukma (0.15 thousand t) and Kabirdham (0.09 thousand t) (Table 2.13).

Fig.2.17: Milk Production of Goat in Chhattisgarh 2001-15

Chhattisgarh produces 48.11 thousand t of milk production from Goat, out of which the maximum milk production was found in Jashpur (5.54 thousand t) followed by Raigarh (3.50 thousand t), Balrampur (3.44 thousand t), Sarguja (3.09 thousand t), Surajpur (2.74 thousand t), Koriya (2.54 thousand t), Mahasamund (2.51 thousand t), Korba (2.26 thousand t), Kaker (2.19 thousand t), Bilaspur (2.10 thousand t), Janjgeer (1.60 thousand t), Rajnandgaon (1.46 thousand t), Kondagaon (1.41 thousand t), Balodabazar (1.38 thousand t), Bijapur (1.29 thousand t), Bastar (1.24 thousand t), Raipur (1.18 thousand t), Kabirdham (1.14 thousand t), Sukma (1.13 thousand t), Goriyaband (1.03 thousand t), Durg (0.93 thousand t), Mungeli (0.89 thousand t), Bemetra (0.87 thousand t), Balod (0.84 thousand t), Narayanpur (0.73 thousand t), Dhamtari (0.66 thousand t) and Dantewada (0.45 thousand t) (Table 2.13).

Chhattisgarh produces (8.78 thousand t) of milk production from Foreign breed of cow, out of which the maximum milk production was found in Koriya (2.10 thousand t) followed by kanker (1.39 thousand t), Raipur (0.97 thousand t), Bilaspur (0.89 thousand t), Korba (0.75 thousand t), Bastar (0.43 thousand t), Durg (0.41 thousand t), Surajpur (0.30 thousand t), Janjgeer (0.29 thousand t), Rajnandgaon (0.27 thousand t), Balrampur (0.26 thousand t), Balodabazar (0.22 thousand t), Kondagaon (0.18 thousand t), Jashpur (0.18 thousand t), and Narayanpur (0.14 thousand t), (Table 2.13).

2.5 Infrastructure Development

The 6546 dairy units were found in Chhattisgarh out of which 1679 (25.65%) were found in Urban and Sub Urban area and rest 4867 (74.35%) were located in rural areas.

Out of total urban dairies, highest were found in Raipur (375) followed by Durg (321), Korba (165), Rajnandgaon (150), Bastar (90), Dhamtari (84), Jashpur (74), Koriya (69), Bilaspur (67), Raigarh (58), Sarguja (46), Mahasamund (44), Janjgir (39), Baloda Bazar (24), Kondagaon (18), Dantewada (17), Bemetra (12), Balod (12), Kanker (8), Goriyaband (5) and Kabirdham (1). Out of total number of dairies in rural areas, the maximum were found in Durg (939) followed by Raipur (906), Mahasamund (569), Bemetra (460), Raigarh (415),Balod (254), Janjgir (242), Dhamtari (222), Bilaspur (162), Rajnandgaon (162), Jashpur (114), Bastar (110), Goriyaband (68), Koriya (59), Korba (49), Sarguja (38), Kondagaon (25), Mungeli (20), Kabirdham (18), Kanker (17), Balod Bazar (9), Dantewada (7) and Balrampur (2). Table (2.14)

In Chhattisgarh there were found to be established 301 Veterinary Hospitals (Bilaspur 22, Rajnandgaon 21, Raipur 19, Raigarh 16, Janjgirchapa 15, Koria 14, Kanker 14, Balodabazar 14, Durg 13, Jaspur 13, Korba 11, Ambikapur 11, Balod 11 and Balrampur 11, Mahasanmund 10, Dhamtari 9, Gariband 9, Surajpur 9, Bastar 9, Dantewada 8, Kabardha 7, Kondagaon 7, Sukuma 6, Bijapur 6, Narayanpur 5 and Mungeli 5), 01- State Level Hospital in Raipur (Table 2.15). 01- State DI laboratory (Raipur). 798-Outline Dispensary (Rajnandgaon 70, Bilaspur 51, Raigarh 48,

Table: 2.14 District-wise commercial dairy units in Chhattisgarh

S.No.	Districts	Urban	Rural	Total
1	Koriya	69 (4.11)	59 (1.21)	128 (1.96)
2	Balrampur	0 (0.00)	2 (0.04)	2 (0.03)
3	Surajpur	0 (0.00)	0 (0.00)	0 (0.00)
4	Sarguja	46 (2.74)	38 (0.78)	84 (1.28)
5	Jashpur	74 (4.41)	114 (2.34)	188 (2.87)
6	Raigarh	58 (3.45)	415 (8.53)	473 (7.23)
7	Korba	165 (9.83)	49 (1.01)	214 (3.27)
8	Janjgeer	39 (2.32)	242 (4.97)	281 (4.29)
9	Bilaspur	67 (3.99)	162 (3.33)	229 (3.50)
10	Mungeli	0 (0.00)	20 (0.41)	20 (0.31)
11	Kabidham	1 (0.06)	18 (0.37)	19 (0.29)
12	Rajnandgaon	150 (8.93)	162 (3.33)	312 (4.77)
13	Bemetara	12 (0.71)	460 (9.45)	472 (7.21)
14	Durg	321 (19.12)	939 (19.29)	1260 (19.25)
15	Balod	12 (0.71)	254 (5.22)	266 (4.06)
16	Balodabazar	24 (1.43)	9 (0.18)	33 (0.50)
17	Raipur	375 (22.33)	906 (18.62)	1281 (19.57)
18	Goriyaband	5 (0.30)	68 (1.40)	73 (1.12)
19	Mahasamund	44 (2.62)	569 (11.69)	613 (9.36)
20	Dhamtari	84 (5.00)	222 (4.56)	306 (4.67)
21	Kanker	8 (0.48)	17 (0.35)	25 (0.38)
22	Kondagaon	18 (1.07)	25 (0.51)	43 (0.66)
23	Bastar	90 (5.36)	110 (2.26)	200 (3.06)
24	Narayanpur	0 (0.00)	0 (0.00)	0 (0.00)
25	Dantewada	17 (1.01)	7 (0.14)	24 (0.37)
26	Sukma	0 (0.00)	0 (0.00)	0 (0.00)
27	Bijapur	0 (0.00)	0 (0.00)	0 (0.00)
	Total	**1679 (100)**	**4867 (100)**	**6546 (100)**

Source: Livestock Statistics-Chhattisgarh, http://ahd.cg.gov.in/

Balod 47, Kanker 43, Mahasamund 40, Janjgir 39, Balodbazar 37, Dhamtari 33, Raipur 32, Bemetra 30, Baster 29, Jaspur 29, Korba 28, Gariband 28, Surajpur 27, Durg 26, Sarguja 26, Kondagaon 26, Mugeli 26, Kabardha 23, Balrampur 22, Koria 10, Dantewada 10, Bijapur 8, Sukuma 7, Narayanpur 3), 22- AI (Artificial Insemination) Centres (Raigarh 4, Raipur 3, Bilaspur 2, Janjgir 2, Surajpur 2, Gariaband 1, Kondagaon 1, Jaspur 1, Surguja 1, Koria 1, Baster 1, Kanker 1, Dantewada 1), 249- AI Sub Centres (Raigarh-50, Raipur 35, Bilaspur 27, Janjgirchapa 22, Surajpur 19, Sarguja 13, Koria 10, Baster 10, Kanker 10, Kondagaon 10, Balarampur 7, Gariaband 7, Rajnandgaon 6, Jaspur 6, Dhamtari 5, Sukuma 5, Dantewada 5, Balodabazar 2) 10, Key village Centres (Durg 10, Rajnandgaon 10, Dhamtari 10, Korba 10, Bilaspur 10, Kanker 10, Jaspur 10, Gariband 10, Bemetra 10, Mungeli 10), 99- Key Village Units (Durg 10, Dhamtari 10, Bilaspur 10, Korba 10, Kanker 10, Jaspur 10, Gariaband 10, Bemetra

Table 2.15: Livestock infrastructure development in Chhattisgarh

S. No.	Name of Institution	Numbers
1	Veterinary Hospital	301
2	State level Hospital	01
3	State DI Laboratory	01
4	Outline Dispensary	798
5	AI Center	22
6	AI Sub Center	249
7	Key village Center	10
8	Key village Unit	99
9	RP surveillance Center	05
10	Veterinary Check Post	07
11	Mass Vaccination Unit	01
12	Mobile Unit	27
13	Ambulatory Clinics	08
14	Motor cycle unit	20
15	Government Goat Breeding Farm	03
16	Government Poultry Farm	08
17	Government Quail Farm	02
18	Duck and Turkey Farm	02
19	Cattle Breeding Farm	04
20	Pig Breeding Farm	03
21	AVFO Training Center	00
22	Poultry Development Project	00
23	Disease Investigation Lab	16
24	CSS and Frozen Semen Bull Station	05

10, Mungeli 10, Rajnandgaon 9) 05, RP Surveillance Centres (Raipur 1, Rajnandgaon 1, Raigarh 1, Surguja 1, Baster 1), 07- Veterinary Check Post (Rajnandgaon 2, Ambikapur-2, Bastar 1, Dantewada 1, Bilaspur 1), 01- Mass vaccination unit (Raipur) 27, Mobile unit (one mobile unit/district), 08- Ambulatory Clinics (Rajnandgaon 1, Bilaspur 1, Raigarh 1, Koria 1, Baster 1, Gariaband 1, Baalod 1, Surajpur 1), 20-Motor Cycle Unit (Bastar 8, Kanker 7, Dantewada 3, Naranpur 1, Bijapur 1), 16-Disease Investigation Lab. 04- Cattle Breeding Farm(Raipur 1, Durg 1, Bilaspur 2) and 05-CSS & frozen Semen Bull station (Raipur 1, Durg 1, Bilaspur 1, Ssarguja 1, Bastar 1) are present in the state.

2.6. Summary of the Chapter

The Chhattisgarh contributed only 0.82 per cent in total milk production (155491 thousand t) for India. The per capita availability of milk is also found less in Chhattisgarh (132 g/capita) as compared to India (329 g/capita). However, milk production showed increasing trend in Chhattisgarh with the magnitude of 37.657 thousand t/year during the period 2001-15.

Chhattisgarh contributed only 3.93 per cent of total livestock population of the country (382974 thousand).The state recorded maximum population of goats (52.93%) followed by cattles (5.14%), pigs (4.2%) and buffaloes (1.28%) of the country. Among different livestock species, cattle contributes highest share (65.25%) followed by goats (21.44%), buffaloes (9.24%), pigs (2.92%), and sheeps (1.12%) in total livestock population.

The population of local cows, cross bred cows and goats were found to be increased with the magnitude of 2.07, 12.46 and 7.78 thousand/ year respectively, while the population of buffaloes were found to be decreased with the magnitude of -6.71 thousand/year during the period 2001 to 2015 in Chhattisgarh. The milk production of different livestock species was found to be increased with the magnitude of 24.92, 4.33, 7.67 and 0.75 thousand t/ year in local cows, cross breed cows, Buffaloes and goats.

The 9 breeds of cow and 4 breeds of buffaloes were found in Chhattisgarh, out of 9 breeds of cows Gir, Sahiwal, Red-Sindhi, Jersey, Holstein, Tharparker, Ongole and Hariyana were found in all the districts of Chhattisgarh. Out of 4 breeds of buffaloes Nagpuri and Mehsana were found in all the districts of Chhattisgarh. Gir and Jersey breed of cows were found to be used for milk purpose, while Sahiwal, Tharparkar, Ongole and Kosali used for dual purpose, the Holstein breed used for milk and meat purposes.

Out of total cross breed cows (178.19 thousand) the maximum number were found in Raigarh (25.90%) followed by Mahasamund (9.69%), Bilaspur (8.82%), Janjgir (6.58%) and Raipur (6.04%), while out of total Indigenous breed cows (9634.72 thousand), the maximum number were found in Rajnandgaon (7.45%) followed by Balodabazaar (5.72%), Bilaspur (5.66%) and Janjgir (5.59%).

Out of total buffaloes (1390.18 thousand) the maximum number were found in

Bilaspur (7.37%) followed by Janjgir (5.72%), Ambikapur (5.03%), Surajpur (4.98%) and Baloda bazaar (4.81%).

Out of total goats (3224.71 thousand) the maximum number were found in Juspur (10.41%) followed by Balrampur (7.17%), Raigarh (6.48%), Ambikapur (6.41%), Surajpur (5.57%), Kanker (5.17%) and Bilaspur (5.12%).

Chhattisgarh state had 15040.34 numbers of livestock. Out of which, Rajnandgaon (6.05%) was to have maximum number of livestock followed by, Juspur (5.70%) and Bilaspur (5.58%). As for as density of population of livestock per sq. km is concerned, the maximum density of livestock was found in Durg (203/km) followed by Raipur (187/km), Bemetra (170/km), Jangir (165/km) and Kondagaon (157/km).

The maximum density of bovines population was also found in Durg (175/km) followed by Raipur (160/km), Bemetra (144/km) and Janjgir (141/km). Chhattisgarh produces 1277.753 thousand t of milk production in (2015-16), out of which the maximum milk was obtained through Indian breed cow (39%) followed by degraded native cow (25%), buffalo native breed (16%) and buffalo advance breed (8%).

Out of total milk production (1277.753 thousand t) the highest milk production was found in Durg (6.90%) followed by Raipur (6.78%), Rajnandgaon (6.45%), Bilaspur (6.24%), Janjgeer (5.83%), Balodbajar (5.63%), Raigarh (5.28%), Mahasamund (4.63%), Kabirdham (4.55%), Balod (4.44%), Bemetra (4.29%) and Dhamtari (4.26%).

There were 6546 dairy units were found in Chhattisgarh, out of which 25.65 per cent were found in urban and sub urban area and rest 74.35 per cent were located in rural areas. Out of total urban dairies, highest were found in Raipur (22.33%) followed by Durg (19.12%), Korba (9.83%), Rajnandgaon (8.93%), Bastar (5.36%), Dhamtari (5%), Jushpur (4.41%), Koriya (4.11%), Bilashpur (3.99%) and Raigarh (3.45%) districts of Chhattisgarh.

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CHAPTER-III

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

Government policies that have been implemented over the period have produced positive impacts on dairy production in India. It is quite oblivious that dairying cannot be expanded easily if related government policies are not supportive of dairy farming. There are plethora of state and central government schemes that provide forward and backward linkages for promotion of dairying involving milk producers. Department of Animal Husbandry and Dairying is the parent department, mandated to implement different schemes and programs of the governments for dairy development. The resources to implement different schemes and programs are provided through state budgets and central grants. Many government welfare schemes are implemented for dairy development which is funded through budgetary provisions of multiple departments. For instance, department of Rural Development and Panchayat Raj, Agriculture and Cooperation, Scheduled Caste and Scheduled Tribe, Finance Corporation, Tribal Welfare, Women and Child Welfare beside the parent department are engaged in the promotion of various welfare schemes to promote dairying. The aforesaid departments have their own mandates and thus schemes are promoted in consonance with departments' targets and demands.

The schemes are intended to provide impetus for milk production. Convergence of different state and central governments programs in a given geography provide forward and backward linkages to any development program enhancing efficiency in implementation. In view of same, convergence of different programs also enhances sustainability. The milk producers benefit when both state and central government programs converge over a given territory so that linkages among these programs foster speedy realization of program benefits. The flip side is that if the programs are implemented in isolation, the impact is unlikely to be sustainable, with less economic benefit accrued to the producers. The convergence theory is also desirable from the standpoint of use of scare public resources.

Therefore, convergence of all state and central government schemes at the implementation level, in a given territory, would bring about improvement in milk production sector in a manner that will be sustainable, while ensuring social and economic improvements of the dairy farmers. NDDB Documented the outlining all schemes of the central government have been documented[1].

3.1 Goals of the Livestock Policy

The proposed policy envisions livestock sector growth with a human face. It has a renewed focus on improving the livelihood and self-reliance of the poor and other underprivileged sections of the rural society

[1]http://www.dairyknowledge.in/article/compendium-documents-dairy-development-andanimal- husbandry-schemes-10-sep-2014

through sustainable development of livestock. The over-arching goals of the new livestock policy therefore shall be to:

1. Enhance growth of livestock sector by improving efficiency in production, service delivery systems, marketing and processing to build up a self-sustained livestock economy that enhances income and employment opportunities, and food and nutrition security of the large masses and absorbs risks of crop failure.

2. Empower the underprivileged, especially women and resource poor rural households to participate in the livestock production process to reduce poverty and social economic inequalities.

3. Minimize negative externalities of modernization of livestock sector to ecology through appropriate technological, institutional and policy interventions. Conserve and develop the indigenous livestock and poultry bio-diversity in situ preferably with community participation.

4. Ensure that the process of modernization takes place within the confines of the cultural and religious ethos of the society

5. Promote the existing scope, potential of livestock as per the needs and requirements of the different agro-climates.

3.2 Regulatory Framework for the Dairy Processing Sector

Food processing industry is of enormous significance for India's development as it has linked economy, industry and agriculture in India, efficiently and effectively. Different laws govern the food processing sector in India. The prevailing laws and standards adopted by the Government to verify the quality of food and drugs is one of the best in the world. Multiple laws/regulations prescribe varied standards regarding food additives, contaminants, food colours, preservatives and labeling. The food laws in India are enforced by the Director General of Health Services, Ministry of Health and Family Welfare, Government of India (GOI). There are various food laws applicable to food and related products in India (Box 3.1).

Milk is an important food for households-both in rural and urban areas, even though consumption levels vary across income classes and regions. Milk and dairy foods are healthy foods and considered nutrient-rich. The dairy industry handling the marketable surplus of the milk can be broadly divided into the organized sector and the unorganized sector. The organized dairy sector refers to the dairy units registered under the Milk and Milk Products Order, 1992, rev. 2002 (MMPO). These dairies have each capacity of handling over 10,000 litres of milk per day[2]. These organized dairies are under cooperative, private or other (like government dairies) sector. As per the Annual Report 2007-08 of the Department of Animal Husbandry, Dairying and Fisheries, Government of India, there were 818 MMPO registered units with a combined processing capacity of 953 lakh litres a day as on 31 March 2007. Many of these are however not functional. These dairy plants are supplied milk by over 1 lakh collection centres.

[2] http://old.fssai.gov.in/Portals/0/Baseworkingpaper_june2009.pdf

The organized dairy sector has a good share in milk products market. But the products manufactured are mostly western-type in nature like table butter, cheese and different types of milk powders. Even though the organized sector has entered the market of indigenous milk Products like ghee, shrikhand and paneer, these markets are mostly controlled by un-organized sector. The organized sector, especially cooperative dairy sector, disposes large portion of milk as processed liquid milk and only surplus is converted into products.

Box 3.1: 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 & Marking) Act (Ministry of Rural Development).
- Essential Commodities Act, 1955(Ministry of Food & Consumer Affairs).
- Fruit Products Order (FPO), 1995.
- Meat Food Products Order, 1973 (MFPO).
- 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 Flour (Control) Order , 1967.

The unorganized dairy sector comprises numerous, small and/or seasonal milk producers/traders (popularly known as 'halwai') that are not registered under the MMPO. They handle 10,000 litres of milk per day or less. They are involved in selling raw liquid milk, boiled liquid milk as well as manufacturing and selling mainly indigenous milk products like peda, barfi, rasgulla, khoa, paneer, ghee etc., usually at the local level, but have a major share in these milk products. There are no official records on number of such unorganized dairy units. The organized dairy sector handle around 38 per cent of the marketable surplus (884 lakh kg/day) while the unorganized sector handles (1416 lakh kg/day) about 62 per cent of the marketable milk (NDDB, 2017). In the organized dairy sector, equal share of 50 per cent each is accounted by the co-operative with government dairies and private dairies. The organized dairy sector has been paying increasing attention, though not adequate, on improving quality of products. Enforcement of rules is also concentrated mostly on this sector, while the unorganized dairy sector largely remains unattended. As a result business operators in the unorganized sector pay little importance to quality, except some reputed sweet shop owners who maintain relatively good quality standards.

3.2.1 Milk and Milk Product Order 1992[3]

The Government of India had promulgated the Milk and Milk Product Order (MMPO) 1992 on 9th June 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 liters 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

Box 3.2: Silent features of MMPO-1992

- 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 1.00 lakh liters per day to 2.00 lakh litters per day.
- Altogether the Central and the State Registering Authorities have registered 818 units with combined milk processing capacity 952.93 lakh litres per day in Co-operative, Private and Government Sector as on 31.3.2007.

[3]http://dahd.nic.in/related-links/milk-and-milk-product-order-1992

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-92 from time to time in order to make it more liberal and oriented to facilitate the dairy entrepreneurs (Box 3.2). The Government of India has notified the last amendment proposals in the official Gazette on 26th March 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.

3.2.2 National Livestock Policy 2013

National Livestock Policy 2013[4] has been formulated by Central Government in order to have a policy framework for improving productivity of the livestock sector in a sustainable manner, taking into account the provisions of the National Policy of Farmers, 2007 and the recommendations of the stakeholders, including the States. The National Livestock Policy aims at increasing livestock productivity and production in a sustainable manner, while protecting the environment, preserving animal bio-diversity, ensuring bio-security & farmers' livelihood.

3.3 Operation Flood

Operation Flood was implemented in different parts of the country in three phases, Phase I (1970–1980), Phase II (1981–1985) and Phase III (1985–1996).

Table 3.1: Salient features of operation flood in India

Features	OF-I	OF-II	OF-III
Period	July 1, 1970 to March 31, 1981	October 2, 1979 to March 31, 1985	April 1, 1985 to April 30, 1996
Number of Milk sheds covered	39	136	170
Number of Anand Pattern DCSs set up ('000)	13.3	34.5	72.7
Number of Members (in million)	1.8	3.6	9.3
Average Milk Procurement (Million Kg Per Day)	2.6	5.8	10.9
Processing Capacity in Rural Dairies (Million Ltrs Per Day)	3.8	8.8	18.1
Drying Capacity (Metric Tons Per Day)	261	508	842
Liquid Milk Marketing (Million Ltrs Per Day)	2.8	5	9.9

Source: http://www.amuldairy.com/index.php/white-revolution.

The summary of operation flood achievement in the major states of India is presented in Table 3.1. The growth in production of milk in Chhattisgarh and India is presented in Table 3.2.

[4] http://dahd.nic.in/sites/default/files/NLP%202013%20Final11.pdf

Table 3.2: Growth in production of milk during operation flood programme in Chhattishgarh and India

Period/ Operation Flood (OF) Programme	Chhattisgarh	India
1970-71 to 1979-80– OF Phase I	-	3.37
1980-81 to 1984-85- OF Phase II	-	5.60
1985-86 to 1995-96- OF Phase III	-	3.78
1995-96 to 2015-16- Post OF	-	4.15
1980-81 to 1989-90	-	5.62
1990-91 to 2000-01	-	4.21
2001-02 to 2015-16	3.84	4.19

3.4 Government Policies on Quality Semen Import, Export of Meat & Milk Products

There are many success stories in genetic improvement in advanced dairy producing countries. Remarkable increase in average lactation yields has been achieved. Thus, there is a need to breed the farmer's heard with superior germplasm[5]. The import and export of the cattle/ buffalo germplasm is under the restricted list and is allowed against license(s) issued by the Directorate General of Foreign Trade, Ministry of Commerce on the recommendation of the Department of Animal Husbandry dairying & Fisheries. There is a definite demand for the germplasm of Indian breeds of cattle and buffaloes in South America, South Asia and other countries. Towards conservation of the rich diversity of indigenous breeds, it is important to broadly identify germplasm of cattle and buffalo meant for breeding purposes and for the export. As introduction of temperate dairy breeds in the country for crossbreeding indigenous non - descript cattle has been accepted for quite some time and need was felt by a number of State Governments/ Organisations to import exotic germ plasm to produce quality cross -bred animals, Central Government issued guidelines for processing such applications germplasm, in (Guidelines for export /import of bovine germplasm-Revised April2016) order to streamline procedures and ensure efficient and transparent processing.

India moves fast in exports of livestock products. The total exports recorded a whopping around 60 per cent growth during the last three financial years and buffalo meat covered 89 per cent of the total exports during 2014-15 and India stands tall as the largest exporter country[6]. India is considered as world's 5th largest meat producer with 6.3 million tonnes which account for 3% of world meat production of 220 million tonnes. The

[5]Guidelines for export /import of bovine germplasm (Revised April 2016) http://www.dahd.nic.in/sites/default/files/Guidelines%20for%20Import%20and%20Export%20of%20Bovine%20Germplasm%2C%202016.pdf
[6]http://vetconcerns.org/2015/10/16/export-of-livestock-products-india-on-a-winning-streak/

support from the Government helps boosting the meat industry. A grant of up to Rs 15 crore is still offered to set up new abattoirs or modernize existing ones. New players enter the field and India Mart, an online marketplace has seen by the 20 % increase in registration of meat exporters. Indian meat is gaining preference in global markets as it is 20% cheaper than Brazilian meat. The cost of rearing of animals in Brazil is higher as they are meant for slaughtering alone. In India, the water buffaloes are reared and used as milch animals and sent for slaughtering once they are considered unproductive. The popularity of Indian beef among Middle East and other Muslim countries is on a higher side as the importers are assured of Halal slaughter. Beef exports from India more than trebled from around 0.6 million tonnes to over 2 million tones between 2009 and 2014. The export value more than quadrupled from $ 1,163.54 in 2009-10 (April-March) to $ 4,781.18 million in 2014- 15. India's buffalo meat exports have been growing at an average of nearly 14 per cent each year since 2011. According to Department of Animal husbandry, Dairying and Fisheries, India produced 14.3 lakh tons of beef of which 11 lakh tons are from buffalo-meat and 3.3 lakh tons are from cattle.

All exported meat products must be sourced from abattoirs and meat processing plants registered with APEDA. Export shipments are subject to compulsory microbiological and other testing for the issuance of animal health certificates by the certified GOI agency. Since, most Indian states restrict or prohibit cow slaughter due to religious sensitivities, India's carabeef[7] sector mainly depends on unproductive water buffalo and water buffalo bulls from the dairy sector. In 2015, several India states, including Maharashtra and Haryana, enacted stringent cattle slaughter legislation to completely prohibit the cattle slaughter. However, industry sources indicate that these legislations have not had a major impact on the carabeef trade and supply chain. All Indian states except Kerala, West Bengal, and northeastern states prohibit the slaughter of cattle of any age, including for both female and male calves. Once a net importer, India has now turned a net exporter of dairy products. The value of dairy exports in 2013-14 is USD 546.1 million. Saudi Arabia, Bangladesh, UAE, Egypt, Nepal, Singapore and Pakistan are among the top export destinations for dairy products from India.

India's import of dairy products during 2012-13 and 2013-14 accounts for US $ 30.65 and 35 million. Milk and cream concentrates, milk powders, and cheese are major products imported among dairy products. New Zealand, France and Australia are the major suppliers of dairy products to India.

3.5 Maintenance of Progeny History of Dairy Animal

Given the fact that stress due to climate

[7] https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Livestock%20and %20Products%20Annual_New%20Delhi_India_8-31-2016.pdf

variability and availability of feed will be increasing constraints, more emphasis is required in promoting indigenous breed. Besides, as the milk productivity of local animals is low and high variability in the economic traits of cows, there is a vast scope for improvement of the milk production and consequently marketable surplus of milk for processing by systematic implementation of genetic improvement of cattle and buffaloes through progeny testing and building the capacity of different states, union territories, government institutes, dairy development agencies and public-private partnership for overall improvement of dairy animals in the country.

Genetic improvement of dairy animals depends on the type of genetic resources available in the country[8]. The type of bovine genetic resources varies in different agro-climatic regions and even within the particular region of the country. The global cattle and buffalo population indicate that there are 861 and 74 recognized cattle and buffalo breeds in the world and out of that India has 30 recognized cattle breeds and 15 breeds of Indian

Box 3.3 : Summary of Indian dairy sector policy changes: 1950s to 2002s

Pre-Operation Flood Period 1950s and 1960	> Focus on urban consumers >Promotion of govt. owned dairy plants and periurban dairying > Limited practice of crossbreeding introduced in 1960s > Failure of urban milk schemes recognized > Stagnant Production; > Decline in per capita milk availability >Missing Link between rural producer and urban consumer
Operation Flood Period 1970s and 1980s	> Launch of Operation Flood Programme in 1970 > White Revolution: Institutional innovation, linked rura l producers with urban consumers; reduced transactions costs through coops > Import substitution strategy through tariffs and Non-tariff barriers (NTBs) > Restricted competition within organiz ed sector through licensing and preference for cooperative s >Large public investment (Coops) in processing infrastructure > Significant increase in milk production and per capita availability > Industrial licensing for setting up milk processing facilities abolished
Post Macro-Reforms Period1990s	>1992 - Reintroduced of licensing through Milk and Milk Products Order (MMMPO) > Milk shed area concept introduced for procurement of raw milk > Signed the URAA in 1994 and became member of the WTO in 1995 > Non-tariff barriers (NTBs) such as quantitative restri ctions(QRs), canalization, etc. removed > Amendments in the MMPO
Post- MMPO Period 2002	> 2002 - MMPO amended > Licensing requirements abolished > No milk shed area requ irement for setting up milk but food safety and hygiene requirements

Source: Sharma and Singh, 2007.

[8]http://www.dairyfarmguide.com/types-of-genetic-resources-0126.html

buffaloes. Among fifteen breeds of buffalo, eight breeds have a sizeable breedable population and are recognized. In India most of the indigenous cattle breeds have been developed from Bos indicus origin. The cattle breeds are different morphologically with different types of horns; long drooping ears, prominent dewlaps and hump over the withers but the animals are suitable to variable climatic conditions because of different sweat glands and are more tolerant to enzootic diseases. Like cattle, the buffalo breeds are also different morphologically though the average productivity of different breeds is low. In spite of that the country possesses some best breeds of cattle and buffaloes in the world. The rural households have different types of genetic resources such as indigenous pure breed of cattle, pure breed of buffalo, non-descript cattle, graded buffaloes, different types of crossbred animals and various combinations of the above types of animal. The herd size in India is predominantly very small whether in organized or rural areas. Therefore, it is important to maintain the progeny history of all dairy animals.

Besides, recording of breeding information such as herd status, growth, reproduction, production performance of male and females, age at first service and age at first training and production of semen doses, age group wise mortality of male and female animals, bull wise semen production and utilization, test and elite daughters and males born shall be maintained in the herd. Under rural condition beside pedigree the peak yield and monthly milk yield of each dairy animal should be maintained. The NDRI has initiated the performance recording of daughters of various crossbred and Murrah test bulls in 15 villages on test day milk yield at monthly interval for evaluation of high pedigree bulls.

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

As a part of agriculture, the dairy sector in India comes under the State subject to policy concerns. The central government, however, has taken a lead in formulating policies in this sector at the national level while implementation of these policies has been largely left to the State Governments (Sharma and Singh, 2007). Despite the importance of dairying in the Indian economy, especially for livelihoods of resource poor farmers and landless labourers, government policy for the sector has suffered from the lack of a clear, strong thrust and focus.

One of the priority indicators to a sector could be judged from budget allocation under plan periods to the sector. The allocation of animal husbandry and dairying as total percentage plan outlay varied from 0.98 per cent during the Fourth Plan to about 0.18 per cent during Ninth Plan compared to the sector's contribution to the national GDP over five per cent. Although the dairy sector occupies a pivotal position and its contribution to the agricultural sector is the highest, the plan investment made so far does not appear commensurate with its contribution and future

potential for growth and development. Dairy sector policies in the country in the post independence period into four distinct phases: Pre-operation Flood (1950s & 1960s) Operation Flood to the Pre-reforms Period, (1970s & 1980s); Post-reform Period (Post 1991) and Post MMPO period 2002 (see, Box 3.3).

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 & Clean Milk Production Assistant to Cooperatives and National Project for Cattle & Buffalo Breeding. 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-I (NDP-I) in February, 2012 with a total investment of about Rs.2242 crore to be implemented from 2011-12 to 2018-19 with an aim to increase 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 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 Cooperative Federations/Unions/Milk Producers Companies. NDP-I would focus on 15 major milk producing States - Uttar Pradesh, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Bihar, West Bengal, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, Orissa and Kerala which account for over 90% of the country's milk production. Now the area of Operation of NDP-I has been extended to three more states i.e. Uttarakhand, Chhattisgarh and Jharkhand. Coverage of NDP- I will however be across the country in terms of benefits accruing from the scheme. Raipur Chhattisgarh Agriculture Department demanded Rs100 crore from the central government under the National Dairy Plan. The central government to increase the grant for general category farmers from 25 percent to 50 percent and from 33 percent to 66 percent for farmers belonging to Other Backward Classes, the Scheduled Castes and the Scheduled Tribes.

The overall performance of most of the schemes has not been to the desired levels (GOI, 2012). Problems lied with funding pattern, poor flexibility, etc. Most of the schemes were stand alone with meager financial outlay. Their implementation across all the state resulted in dilution of the focus. As states have their own specific needs and problems but are not able to

address them comprehensively due to inadequate financial resources of their own and therefore they have to essentially look forward to the Central assistance. In fact it would be beneficial to harness the regional strengths using a regionally differentiated approach for exploiting the potential.

The programmes/schemes are being implemented in Chhattisgarh are presented in Table 3.3.

Table 3.3 Policies/scheme implemented in Chhattisgarh

S. No.	Name of Scheme	Activity	Scheme/ Institutions	Central /State	Central Ministry/ State Nodal Dept.	Relative Components/ Description
			(A) Animal Production			
1	National Cattle-Buffalo Breeding Project	Animal breed improvement work is being done in the State by the Agency has Established well equipped Central Semen Station.	Scheme for Anjora Durg and A.I. training center at Mahasamund. Provide training, materials and tapering grant to private A.I. workers for expansion of self employment and A.I. facilities.	Central	Livestock Development Department Chhattisgarh.	The first step project Rs. 10.42 crores was sanctioned to the state, which was utilized completely. In the second step of the projectRs. 17.60 crores was sanctioned. Availability of frozen semen at A.I. centers for conserved breeds under frozen-semen insemination policy.
2	Private Artificial Insemination Worker Scheme	Training program based on A.I.	Extension of services of Artificial insemination in far-flung areas and Provide employment to educated unemployed youth.	State	Gram Panchayat/ Concern District Joint Director/ Deputy Director, Veterinary Services.	After 04 months of training Private Artificial Insemination Worker in rural far-flung areas based on artificial insemination work stipend of Rs 1200/- (Including tag) on production of each calf (Under National Agriculture Development Scheme)
3	Pashudhan Mitra Yojna	Serving Gosevak Private Artificial Insemination Worker	Pashudhan Mitra to earn his livelihood and to maintain interest in his work ,encouragement stipend to be given.	State	District Joint Director/ Deputy Director, Veterinary Services.	Work Based stipend 1. Helping in beneficiary based schemes case preparation–Rs 100/-per case. 2. Helping in vaccination of large animal Rs 5/-per animal, helping in small animal vaccination Rs 3/- per animal and in Poultry Rs 0.50/-per bird.
4	Distribution of Bull under 100% Subsidy	Far flung areas where facilities of artificial insemination is not available in those areas to improve breeds pedigreed or high breed bulls are distributed for natural service.	On recommendation of Gram Panchayat progressive farmer or trained person	State	Veterinary Hospital/ Concern District Joint Director/ Deputy Director Veterinary Services.	Under the scheme from Government Cattle Breeding Farm on Book Value along with transportation charges or on nivida on minimum rate (inclusive transportation) will be the scheme cost. Bulls will be insured on prevalent rates as given by insurance companies. Amount of insurance will also be included in unit cost. High breed/ pedigreed Bull on 100% subsidy , Average Rs 54000/ - annual profit can be accrued.
5	High Breed Female Calf Rearing Scheme	Financial assistance for High Breed Female calf rearing.	Assistance for Under the scheme Small/Marginal Farmer and Landless labour who owns female calf born through A.I.	State	Veterinary Hospital/ Concern District Joint Director/ Deputy Director, Veterinary Services	Animal feed to rear female calf from 04-24 months of age eligibility for general category subsidy of 75% of unit cost or maximum Rs 15000/- whichever is less for Schedule caste/ schedule tribe subsidy of 90% of unit cost or maximum Rs 18000/- whichever is less. Average Rs. 22000/-annual profit.
6	Grassroots Scheme (Gramotthan Charwaha yojana)	To provide incentive money to the herders to increase the breed improvement program through the shepherds	Scheme for A.I. and castration of unwanted bulls by Trained and named cowboy by Livestock Development Department.	State	Nearest Veterinary Institute / Development Office/District Veterinary office	Under the R.K.V.Y. Scheme, bringing a cow / buffalo to the Artificial Insemination and the castration of unwanted bulls Rs. 10/- per animal. Scheme for Trained and named cowboy by Livestock Development Department, Promoting Breed-Improvement Program in the Area.

Table 3.3 Policies/scheme implemented in Chhattisgarh

S. No.	Name of Scheme	Activity	Scheme/ Institutions	Central/State	Central Ministry/ State Nodal Dept.	Relative Components/ Description
			(B) Livestock Health			
7	Distribution of Animal Feed and Transportation Grants	Financial assistant for transportation and distribution of balanced nutritious and milk.	Balance nutritious for milch animal.	State	State Co-operative Dairy Federation Limited	Distribution of 250 grams of balanced nutritious animals at free of cost per liter milk supplied to the milk societies of the state milk producers and distribution of 2.50 Rs. per liter milk declared by the state government.
8	Green fodder production program	Free Delivery Campaign was started in the village.	Program for increase in production animal health and disease resistant capacity by animal fodder	State	State Co-operative Dairy Federation Limited	For the purpose of development of milk production, increase in productivity, animal health and disease resistant capacity, in the Government Animal Breeding Farm. By N.G.O. Preparing Co-4 Hybrid Napier Mother nursery. For the village to village of Napier Rout-Cut – Free Delivery Campaign was started in the village.
9	Advanced Calf Rearing Scheme	Balanced dietary supply for 4 to 24 months of advanced breed calf.	Scheme for General /SC/ST / marginal farmer farm laborer.	State	Nearest Veterinary Institute / Development Office/District Veterinary office.	Unit cost for General category 10500 (Subsidy 5000/- & Grant 5500/-) For SC/ST (Subsidy 7500/- & Grant 3000/-) Estimated income 22500 per milk production per 5 liters per cow after three years.
10	Field Special Mineral Mapping	Scheme for cheap cattle feed.	On the basis of SHC and support from NDDB.	State	State Co-operative Dairy Federation Limited	On the lines of Soil Health Card, for the creation of cheap cattle feed. Special mineral mapping of state sector with the support of National Dairy Development Board Anand for the creation of cheap animal food grains.
11	Animal Disease Control Project	Assistance to States for Control of Animal Diseases(ASCAD)	Prevention and vaccination for F.M.D and other important diseases.	Central	Livestock Development Department Chhattisgarh.	Animal Disease Control Project came in existence under livestock health & disease control in the year 2002-2003. Since 2015-16 the funding pattern of the program has been changed from 75:25 to Central Share 60% and State Share 40%. In this scheme per year about 894 camps are organized at district level and block level . Along with this annual work shop are also being organized.
12	National Livestock Insurance Scheme	Promoting risk management measures including livestock insurance for farmers.	Scheme start to Raipur, Durg, Mahasamund, Dhamtari and Rajnandgaon districts .	Central	Livestock Development Department Chhattisgarh.	Under this Scheme1499 animals has been insured. The purpose is to provide risk coverage to the farmers from the losses by accidental deaths of cattle and bufflaoes. Under the scheme Govt. pays 50% of the insurance premium and rest 50% is given by the beneficiary.

Table 3.3 Policies/scheme implemented in Chhattisgarh

S. No.	Name of Scheme	Activity	Scheme/ Institutions	Central /State	Central Ministry/ State Nodal Dept.	Relative Components/ Description
			(C) Dairy Development			
13	Intensive Dairy Development Scheme	Establishment of milk Co-operative societies & BMC units.	Scheme for Raipur-50, Mahasamund-65, Dhamtari-40, Rajnandgaon-35 in the Districts	Central	Directorate of Veterinary Services & Dairy Federations.	190 milk cooperative societies in 5 years and 8 Bulk Milk Cooler units of 1200 liters capacity.
14	Rashtriy krishi vikas yojana	Establishment of milk Co-operative societies in 16 districts.	Scheme for Balodabazar-04, Durg-03, Balod-15, Bemetra-03, Mahasamund-11, Dhamatri04, Bilaspur-18, Mungeli-08, Raigarh-109, Janjgeera-chapa-34, Kanker-18, Korba-02, Koriya-07, Surajpur-06, Balrampur-01, Kabeerdham-05	Central	Agriculture Department (Nodal Department) or other allied sector (Fisheries Department, Horticulture, Animal Husbandry.)	248 milk Co-operative societies with the help of RKVY. Development of Agriculture and allied sectors. 100% funded by centre. This scheme for agriculture sector and other allied sector all state covered.
15	National Programme for Dairy Development	Establishment of milk Co-operative societies & Bulk Milk Cooler **(BMC)** units.	Scheme for Janjgeera-chapa-25, Kanker-25, Bemetra-25, & Balod-25 districts.	Central	Directorate of Veterinary Services & Dairy Federations.	The proposed setting up of a total of 100 new societies and bulk milk coolers for 13 new 2000 liters capacity in which 40 societies were formed and 8 BMC were established in the scheme.
16	National Dairy Plan Phase-I	Establishment of Automatic Milk Collection Unit, Bulk Milk Cooler Centers, milk Societies for the cattle feed from the computer programmable & Provide the training for farmers.	Scheme for Internal village based milk procurement system and Internal dietary balance program in the Mahasamund, Raigarh, Balodabazar, Raipur, and Dhamtari districts.	Central	Directorate of Veterinary Services & Dairy Federations.	On the special initiative of the state government, by joining Chhattisgarh in May 2015 by the Government of India. The plan period increased for 2 Years and the following schemes were approved in October 2015. 53 Automatic Milk Collection Unit and 18 BMC Centers of 31000 liters capacity proposed. Initiation of compilation of 9 milk societies In the scheme, selection of 100 milk committees for making the cattle feed from the computer programmable to the existing feed on the milk producing farmers' house. In the workplace. On the pilot basis, with the help of Dairy Development Board (Gujarat) in 100 villages, food balancing program started, and for the training of cheap cheaper, animal food preparation of techniques using local resources.
17	National Livestock Mission	Distribution of chaff cutter on grants for beneficiaries.	Scheme Covered under all districts of state categories wise.	Central	Directorate of Veterinary Services & Dairy Federations.	1999 Power-operated chaff cutter distributed in which 1399 general and backward classes and 600 Scheduled Castes-Category beneficiaries distributed on grants.
18	Human Resource Development	Organisation of Training Programme	Training visit of the farmers.	State	State Co-operative Dairy Federation Limited	Practical training of 6786 cattle keepers for milk production techniques. 714 farmers trained by National Dairy Development Board, Anand (Gujrat)

19	Ghar Pahuch Pashu Chikitsa Seva (Gowardhan) Yojana	Expansion of animal health, reproduction and preventive vaccination and fodder development program.	Govardhan Yojana started by NGO's .	State	State Co-operative Dairy Federation Limited	3 mobile veterinary units and 30 integrated cattle development/ Artificial Insemination Centre in the Mahasamund and Raigarh district. 3 mobile veterinary units operated under Corporate Social Responsibility (CSR) Scheme in Dharmari district. 5 Integrated Live Stock Centers operated under Corporate Social Responsibility (CSR) Scheme in pakhanjoor area of Kanker district. 2 Integrated Live Stock Centers operated under Corporate Social Responsibility (CSR) Scheme in Janjgir- radapa district.
20	Measures of Transparency	Transparency of payment		State	State Co-operative Dairy Federation Limited	Direct payment to milk Societies through Corporate Banking.

Source:, www.ahd.cg.gov.in , www.rkvy.nic.in, www.cgcoopdairyfed.in

3.7 Convergence of Schemes Suggested

As suggested by Working Group for 12th five year plan (GOI, 2012), all the ongoing schemes should be classified under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development as under (Table 3.4)

3.8 NDDB-Satellite Mapping to Boost Dairy Farming

Dairy farming is the latest addition to the list of traditional businesses that are achieving higher efficiency and productivity through technology. Big cooperatives are taking the help of Indian Space Research Organisation (ISRO) to track the milk system at village level more efficiently. The National Dairy Development Board (NDDB) has taken the help of satellite imaging to track the animal population, fodder status, and land use patterns. Recently, an NDDB project won an award at the Geosmart India 2016 for developing an 'internet-based Dairy Geographical Information System' or IDGIS. IDGIS is a visualisation tool which enables identification of villages and integrates human census, livestock census, land-use and land-cover of villages in all the major milk producing states.

Table: 3.4 Convergence of schemes suggested

S.No.	Activity
	Animal Production
1	Develop inventory of feed resources available locally.
2	Establishment of elite herd of high pedigreed Male/Female calves of Gir and Kankrej breed
3	Establishment of A.I. service centres .
4	Training should be done to farmers for information about the benefits of pure breed animals.
	Livestock Health
5	Improvement in the feed-fodder for the milch animals.
6	Aid for Concentrate, Feed to Pregnant Animals
7	Establishment of Silk with Milk Scheme training centre in hilly & dry land areas.
8	Extension of animal heath services.
9	Castration of scrub bulls
10	Establishment of Dairy school for farmers and new young.
11	Establishment of Animal health centres, Animal Breeder Centres and fertility improvement projects.
12	Transportation cost of calves/bullocks
	Dairy Development
13	Establishment and increasing of communication facilities for awareness of various schemes
14	Establishment of Women Dairy Program for interial area s.
15	Establishment of Mini Dairy Schemes for the Marginal and small farmers.
16	Participate to the farmers in Dairy education.
17	Establishment of Co-operative societies.
18	Provide the financial help on less interest rate for the marginal and small farmers which live in interial areas.
19	Provide the facility for milk packing, distribution and marketing.
20	Support for cattle shed, water tank, store room and steel bucket
21	Provide the facility for cattle shed
22	Establishment of milk adulteration testing machine (MADM) for women operated DCS
	Others
23	Provide the training to the farmers for motivation Organic Farming.
24	Organize village visit time to time.
25	Increase the awareness in the farmer for Animal Insurance.
26	Animal fairs should be organized from time to time
27	Organize visit to village
28	Organisation of Training Programme

3.9 Summary of the Chapter

The chapter presented the government policies that have been implemented in India over the period. Apart from the Central and State government programs, the state milk federations have evolved a variety of schemes that provide incentives to the milk producers through milk cooperative societies. National Livestock Policy 2013 formulated by Central Government aim at increasing livestock productivity and production in a sustainable manner, while protecting the environment, preserving animal bio-diversity, ensuring bio-security and farmers' livelihood. Chhattisgarh has achieved 3.84 per cent per

year impressive growth in milk production during 2001-02 to 2015-16. It is suggested that on the line of suggestive measures made by the working group for 12th five year plan (GOI) all the ongoing schemes should be converged and put under three mega schemes a) Animal Production, b) Livestock Health and c) Dairy Development. In addition to this fodder development programme should also be included in the state livestock development programme through Department of Agriculture in priority basis to accelerate live stock development and milk production in the State.

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CHAPTER-IV

SOCIO-ECONOMIC PROFILE OF THE STUDY AREA & SAMPLE MILK PRODUCERS

This chapter deals with the profile of the Chhattisgarh State Cooperative Dairy Federation (CGCDF), selected districts, primary dairy cooperative societies and villages. The chapter also highlighted the socio-economic profile of the selected respondents related to Dairy Cooperative Society (DCS) and Non- Dairy Cooperative Society (NDCS) across different size of dairy farms.

4.1 Chhattisgarh State Cooperative Dairy Federation

Chhattisgarh State Cooperative Dairy Federation is one of the largest Cooperative Dairy Federation in Chhattisgarh, owned and managed by milk producers of Chhattisgarh State. The State Dairy Federation was formed in the year 2013 which was previously known as Raipur Dudgh Sangh. Federation has over 82000 per day milk producers in over 726 Dairy Cooperative Societies at village level. The Moto of CGCDF is to provide the quality milk and milk products, an unmatched in quality and made available to consumers at most competitive prices. There after its business was taken over by Federation to set up TWO TIER SYSTEM and soon planning for THREE TIRE SYSTEM based on "ANAND" Pattern.

Raipur Cooperative Milk Producer Union Limited was established on 25 July, 1983, which worked under Madhya Pradesh State Cooperative Dairy Federation Limited. After the formation of Chhattisgarh state, it began working separately. CGCDF was established on 15 Feb, 2013. The CGCDF is registered under the Chhattisgarh Co-operative Society Act. The CGCDF produces a wide range of products such as ghee, flavoured milk, paneer, butter, curd, lassi, shrikhand, khova, peda etc. Under the brand name of "Devbhog".

The mission of the Federation is to usher rural prosperity through dairy development. During the last four decades of Cooperative Dairy Development by CGCDF, the dairy industry in Chhattisgarh State has progressed from a situation of milk-scarcity to that of milk-surplus.

Dairy enterprise is an important allied activity in the mono cropped rain fed production system of Chhattisgarh. The state is endowed with a large and diverse livestock population.

4.1.1 Vision and Mission

- Bring growth and rejuvenation to dairy industry.
- Bring revenue to villages of the state under cooperative fold.
- Increase the dairy productivity and rural employment.
- Increase socio-economic scale in the rural part of the state.
- Bring a new revolution in dairy industry with innovation.

- ✔ Ensure the prosperity of milk producer and preserving their interest.
- ✔ Promote the milk and milk products to society.
- ✔ Bring sustainability in dairy industry.
- ✔ Create adequate marketing infrastructure for providing quality milk and milk products to urban consumers.

CGCDF is playing an important role in development of dairy industry in the state. The co-operative dairies are playing a very significant role to safeguard the interests of both the producers and the consumers by providing more procurement price to the milk producers by charging reasonable price to consumers. Co-operative dairies also offer better cattle feed to milk producers besides providing the medical services to their milch animals.

4.1.2 Goal

- ✔ Development & expansion of allied activities as may be conducive for the promotion of the dairy industry, improvement in protection of animals and socio-economic betterment of those engaged in milk production.
- ✔ Organize and provide technical inputs.
- ✔ Erection of Dairy, chilling plant, cattle feed plants for milk cooperative societies.
- ✔ Study of problems of mutual interest of the Federation and milk co-operative societies.
- ✔ Impart training and orientation to dairy co-operative members.
- ✔ Advice, assist and guide milk unions.
- ✔ Undertake audit and accounts supervision.
- ✔ Encourage fodder production.
- ✔ To channelize marketable surplus milk from the rural areas to urban deficit areas and maximize the returns to producer and provide quality milk and milk products to the consumers.
- ✔ To carryout activities for promoting Production, Procurement, Processing and Marketing of milk and milk products for economic development of the farming community and
- ✔ To provide stable and reliable market and secure price to the dairy farmers for their produce.

The achievements of Chhattisgarh State Cooperative Milk Federation Limited in 2015-16 over the year 2003-04 is presented in Table 4.1. It is observed from the data that there was found impressive increase in number of milk cooperative societies average milk collection (litre Per day), milk marketing (litre Per day Sale of milk products (Rs. Lac), payment of milk products (Rs. Lac), milk collection per member/per day (litre) and milk price given to milk products (per litre) in the year 2015-16 over the year 2003-04.

Table 4.1: Achievements of Chhattisgarh State Cooperative Milk Federation Limited

No.	Statement	2003-04	2015-16 (% increase year 2003-04)
1	Milk Cooperative Committee	188	724 (385.11)
2	Average milk collection (litre Per day)	16710.00	(461.82)
3	Milk Marketing (litre Per day)	28810.0	(204.13)
4	Sale of milk products (Rs. Lac)	138.20	(1172.94)
5	Payment of milk products (Rs. Lac)	518.25	(1558.13)
6	Increase in the milk collection per member / per day (litre)	2.88	(171.52)
7	Milk price given to milk products (per litre)	8.73	(329.32)
8	Cold chain expansion (Program taken in regular review by the Prime Minister's Office(P.M.O.)		
	8.1 Dairying plant (Processing capacity litre)	75000	141000 (188.00)
	8.2 Milk Chilling Centre (Processing capacity litre)	16500	47000 (293.75)
	8.3 Bulk milk cooler unit (capacity litre)	4000	31000 (787.50)

Source: Chhattisgarh State Cooperative Milk Federation Limited

The infrastructural development viz. number & capacity of processing plants, chilling centres (Table 4.2), Bulk milk cooler units (Table 4.3) also found to be increased in 2015-16 over the year 2003-04.

Table 4.2: Infrastructure Chhattisgarh State Cooperative Milk Federation Limited

No.	Place (Milk Plant)	Processing Capacity (liter)	
		Un till 2011	2015-16
1	Main milk plant Urla	65,000	1,00,000
2	Bilaspur	10,000	20,000
3	Jagadalpur		5,000
4	Raigarh		8,000
5	Baikunthpur		2,000
6	Ambikapur		2,000
7	Jashpur		2,000
8	Kbirdham		2,000
	Total (liter)	**75,000**	**1,41,000**
	Chilling Center		
1	Basna	7,000	15,000
2	Dhamtari	7,500	12,000
3	Pankhanjoor	2,000	7,500
4	Sarangarh		9,500
5	Bhatagaon		3,000
	Total (liter)	**16,500**	**47,000**

Source: Chhattisgarh State Cooperative Milk Federation Limited

Table 4.3: Bulk milk coolar unit

No	District	Bulk Milk Coolar Unit	
		Un till 2011	In Present
1	Raipur	Kosrangi	Tamasivni
2	Mahasamund	Kohakundi	Tappasevaiya, Godavhal, Chhilpavan, Nartora, Kasahibahra
3	Balodabazar	Simga	Amera, Rohansi
4	Baloda	Dallirajhara	Chikhalaksa
5	Gariyaband	Ravan	Majarkatta, Shyamnagar, Barula, Chura, Mainpur
6	Rajnandgaon	Sahdevnagar	Pipariya (Khairagarh)
7	Raigarh		Lendhra, Barpali, Govarsingha
8	Jashpur		Lailunga (Gala)
9	Sarguja		Mainpat
	Total (liter)	**4,000**	**31,500**

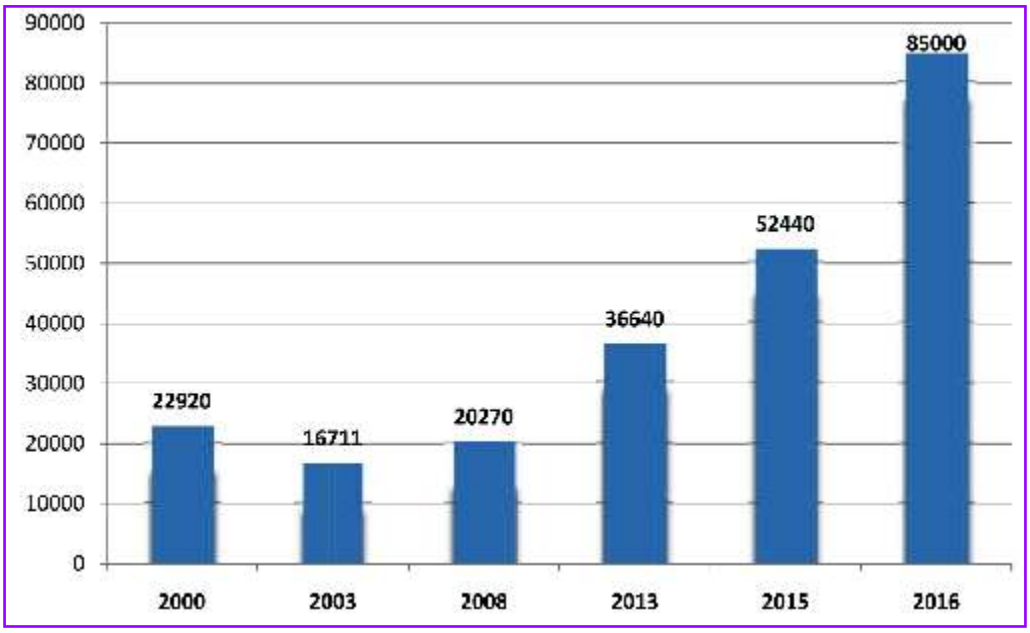

Fig. 4.1: Average Milk Collection per Day (kg.)

4.1.3 Organization structure

In Chhattisgarh, the structure of dairy sector is quite different and it is only two tier system. At present, there is no any dairy union. Milk is produced at village levels by individual farmers and sold to dairy cooperative society. The milk collected at various village dairy societies and then transported to the processing plant of federation. At federation, the collected milk is processed and other value added milk products are prepared, packed and marketed. These milk and milk products are marketed through wholesalers and retailers who have their own margins. Chhattisgarh State Cooperative Dairy Federation Limited (CGCDF) is managed by National Dairy Development Board.

4.1.4 Pattern of Pricing and Marketing

The basis for price fixation is the FAT and SNF (Solid but Not Fat) contents of the milk. Milk with lowest FAT/SNF contents gets low price whereas milk with highest FAT/SNF contents gets higher price. A minimum percentage of 8.52 per cent SNF is fixed by the dairy organization.

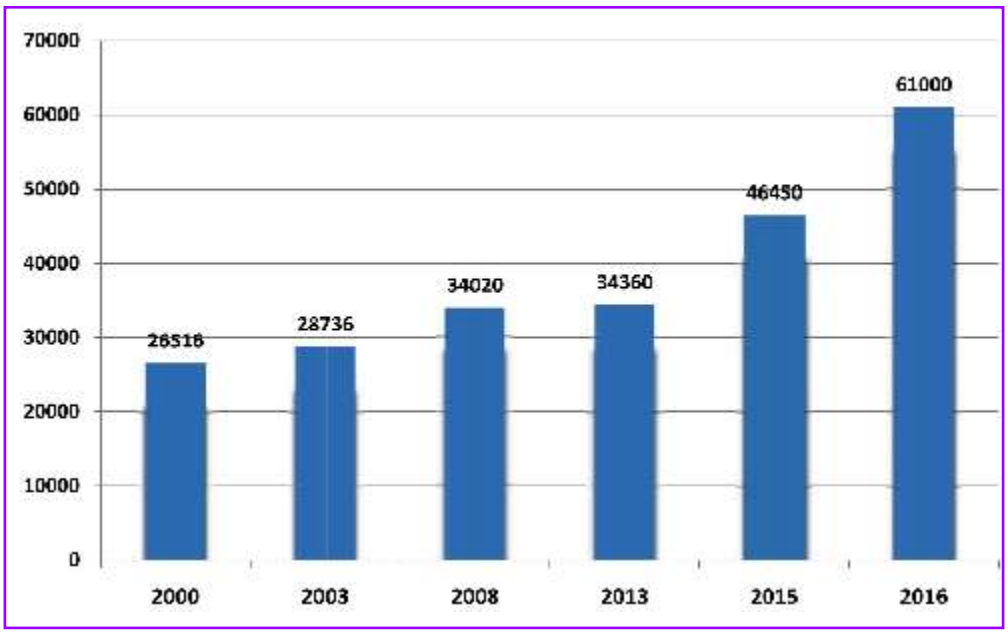

Fig. 4.2: Milk Marketing per Day (liter)

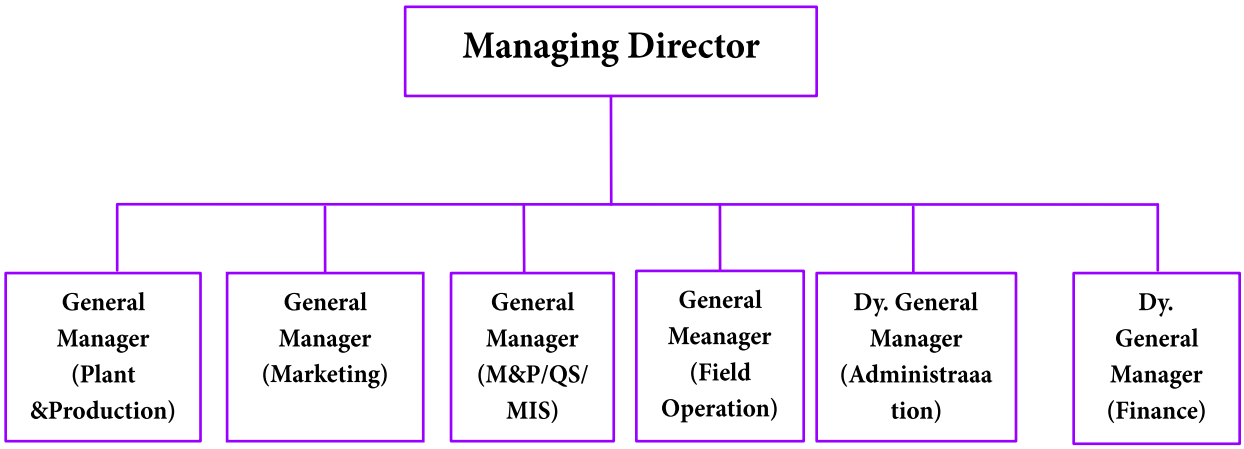

Fig. 4.3: Organization Structure of Devbhog Cooperative Dairy

4.1.5 Weakness in the Present Milk Cooperative Structure

Shortage of Funds – Chhattisgarh Mark fed is working with inadequate working capital, a huge amount of Income used for payment of interest. Societies are not in a position to provide trade credit to buyers because of shortage of funds so the societies are not efficient and viable.

Lack of Transport Facilities – A bulk of stock blocked in open storage centre due to lack of transport facilities.

Untrained Personnel – Most of the staff of the marketing societies is untrained, unqualified, incompetent and inefficient. They lack requisite business experience and training.

Lack of Coordination and Supervision – No encouragement given by Apex Society like NAFED to primary cooperative marketing societies. No incentives to marketing societies.

Poor Management – The management of the marketing societies in most cases does not come up to the standard necessary for conduct of such varied functions as are assigned to them under bylaws.

4.2 Selected Districts

The background information of selected districts viz. Raipur, Bilaspur, Durg and Rajnandgaon are presented in these subheads.

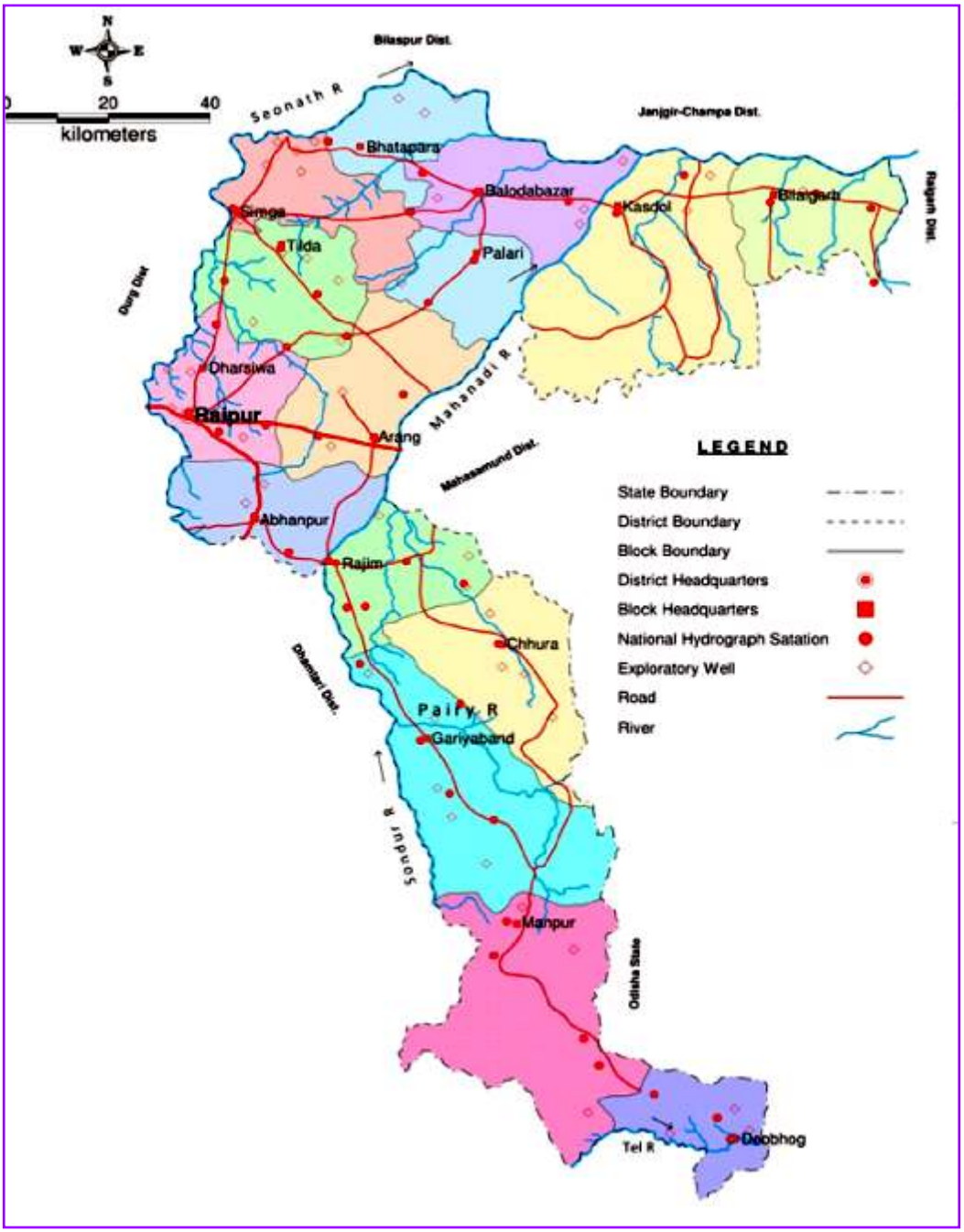

Fig. 4.4 : Map of Raipur District

4.2.1 Raipur

Raipur district is situated in the fertile plains of Chhattisgarh Region. This district is situated between 22°33' N to 21°14'N latitude and 82° 6' to 81°38'E longitude. The District is surrounded by District Bilaspur in North, District Bastar and part of Orissa state in South, District Raigarh and part of Orissa state in East and district Durg in West. (Fig. 4.4) The district occupies the south eastern part of the upper Mahanadi valley and the bordering hills in the south and the east. Thus, the district is divided into two major physical divisions, Viz., the Chattisgarh plain and the Hilly Areas.

Mahanadi is the principal river of this district. Its tributaries being Sendur, Pairy, Sondur, Joan, Kharun and Shivnath. The fertility of lands of Raipur district can be attributed to the presence of these rivers. Mahanadi originating in the hills of Sihava flows in the direction of East into the Bay of Bengal. Mahanadi crosses the district diagonally from its south western corner to Northern boundaries. The area to the west of the river comprising the North Eastern part of Dhamtari (now separated from the Raipur District), the whole of Raipur, Rajim Tehsil and the western part of Baloda Bazar Tehsil is a part of the open Chhattisgarh plain, gently sloping, thickly populated and closely cultivated and almost devoid of forests. The plain also extends in a belt of about 13 to 15 kilometers east of Mahanadi, except between Sirpur and Kasdol where the hills are much closed. The Southern part of Mahanadi plain is about 305 metres above the Mean Sea Level, whereas the northern part is about 244 metres above the Mean Sea Level.

The district is divided into 15 tehsils, 15 Community Development blocks and 2134 revenue villages for the convenience of administration,. In the district there are 8 urban centres. The Raipur town is covered by Municipal Corporation. As per 2011 provisional census figure, the population of the district is 4062160.The decadal growth of population is 34.64%. The high decadal growth in population is attributed to the growth in population in urban areas which includes the capital city of Raipur as well.

Raipur is endowed with high rainfall. Areas of chronic shortfall are few and localized. The district receives its rainfall mainly from the south-west monsoon which usually sets in the third/fourth week of June and spread over a period from late June to early October with heaviest shower in winds. In summers, the temperature can also go up to 50 °C. The city receives about 1,300 millimetres (51") of rain, mostly in the monsoon season from late June to early October. Winters last from November to January and are mild, although lows can fall to 5 °C (41 °F). An around 406368 hectare (30.22%) of the total area is covered by forest. Solid wood used for furniture's and buildings, fire wood, tendu leaves, lac, adhesive, commercial and industrial bamboo, harra, sal seed, mahua flower etc. are the main forest produce of the district. The land is very fertile and is mostly used for the agriculture purposes with surface irrigation facilities.

The net area sown is around 40% of the total geographical area. Paddy is the main crop (290469 ha) followed by wheat (6947 ha) and then by pulses (3470 ha). The net sown area in the district is 537876 hectares. The net irrigated area is 300813 ha & gross irrigated area is 311961 ha. The contribution of ground water for irrigation comes to nearly 15.22% of the net irrigated area and 18.32% of the gross irrigated area in the district.

4.2.2 Bilaspur

Bilaspur district is famous for its unique characteristics like rice quality, Kosa industry and its cultural background. Bilaspur district has a major contribution in the naming "Dhan ka Katora" for the entire Chhattisgarh region. Bilaspur district is situated between 21°47' and 23°8' North latitudes and 81°14' and 83°15' East longitudes. The district is bounded by Korea on the North, Anuppur and Dindori districts of Madhya Pradesh on the west, Kawardha on the southwest and Durg and Raipur on the South and Korba and Janjgir-Champa on the East. Bilaspur District falls under the "Plains of Chhattisgarh". The climate of Bilaspur district is sub-tropical, semi-arid, continental and mansoon type. The climate is ideal for industrial development. (Fig. 4.5)

Bilaspur district is divided into 7 blocks, 858 gram panchayats, and 10 panchayat samitis for administrative purpose. The population of the district is 19,93,042. In which 15,94,434 is rural population and 3,98,608 is urban population. Bilaspur is the zone headquarters of South East Central Railway. It is an important Railway Station on the Mumbai - Howrah route, connected to all major towns of India. Bilaspur falls within the temperate zone of Indian sub continent.

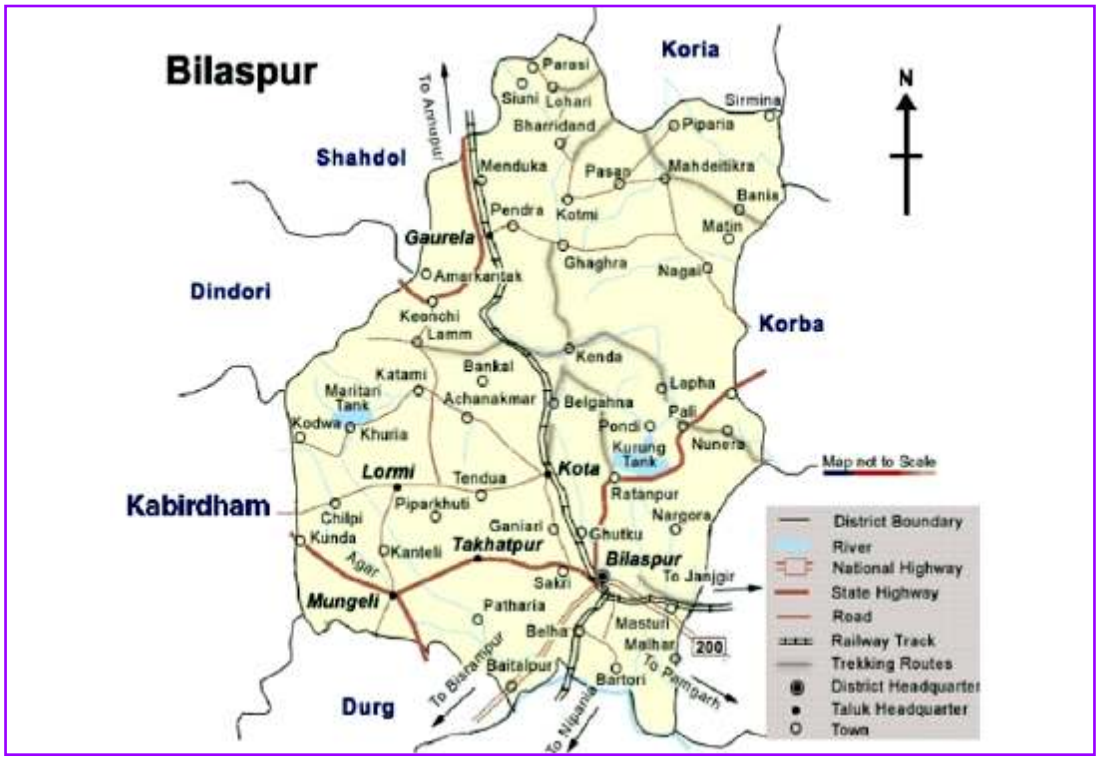

Fig. 4.5 : Map of Bilaspur District

Forest area of the district is 273920 hactares and forest products are also used for commercial purpose. The average rain fall is 1085.50 mm. and the maximum temperature goes up to 45.40°C. The winter Commences from December and last till the end of February. The summer continues till the second week of June. Monsoon commences from middle of June and remains till the end of September. Excessive heat during summer necessitates general public sleeping in open. The maximum temperature in May 46°C and mean minimum temperature is 90°C to 70°C in December. May is the hottest month & December is the coldest. The relative humidity is higher during the South West monsoon season, being generally over 75%. After Monsoon Season, humidity decreases and during the winter season, air is fairly dry. Rainfall observations indicate that annual rainfall in the area is around 1400 mm. Rains are predominant during July -August. South-West is the predominant wind direction during the period from May to September. Wind is generally calm and the city has around 90 calm days. The layer of soil is moderate and the underground water is sufficient. The means of irrigation available in the district are Wells, Ponds, Debris, Tube-Wells, Rivers, Nalas, and Canals etc. Paddy, Red Gram, Green Gram, Groundnut and Sesamum are the main crops in Kharif while Wheat, Maize, Gram, Lentils, Blackgram etc. are grown in Rabi season.

4.2.3 Durg

Durg is one of the densely populated district of Chhattisgarh. It is situated on the Howrah-Mumbai main line of South-Eastern Railway. National Highway No.6 also passes through the district. Durg district lies between 20°02' and 22°23' North latitude, and 80°46' and

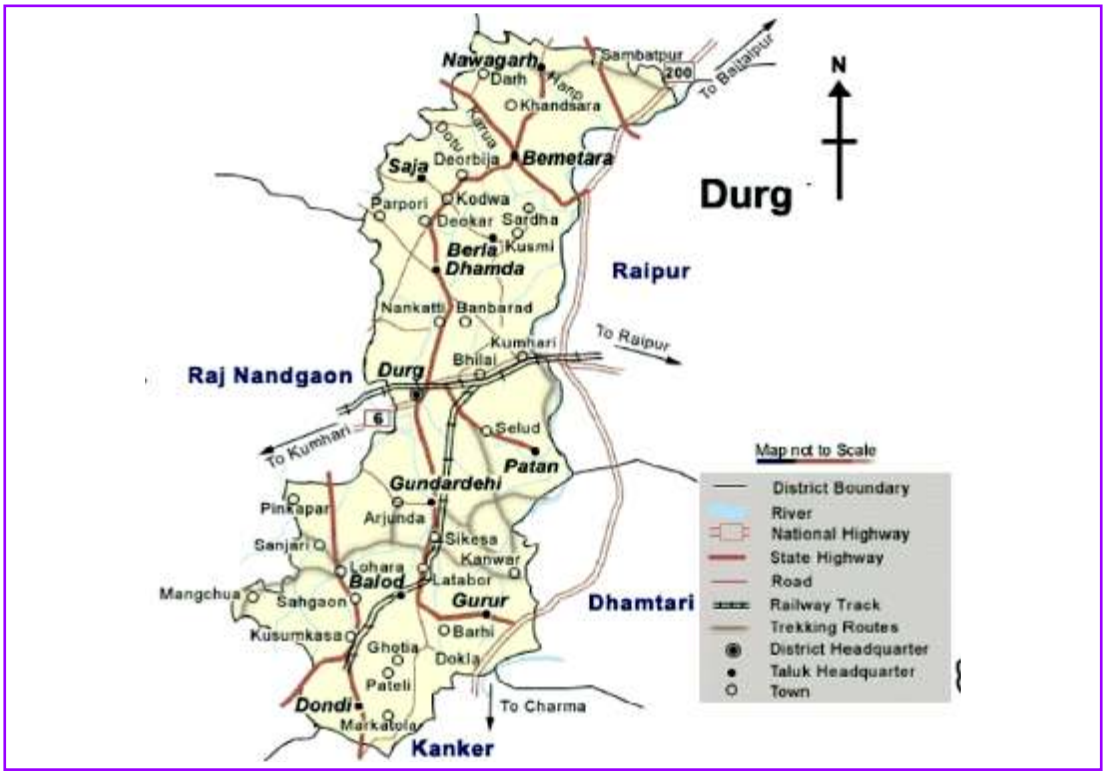

Fig. 4.6 : Map of Durg District

81°58' East longitude. Durg district is situated in the Southern part of the rich Chhattisgarh plain. It lies at 317 meters above mean sea level. Sheonath is the main river of district Durg. The district is bounded by Rajnandgaon district in the west and Raipur district in the East. (Fig. 4.6) Durg district is situated in the southern part of the rich Chhattisgarh plain.

As per Census 2011, the population of the district is 17,21,726. In which 6,17,184 is rural population and 11,04,542 is urban population. The district is divided into 12 tehsils,12 panchayat samitis and 994 gram panchayats. Durg, generally has a dry subtropical weather which is moderate, but on a warmer side in the summer season. In summer the temperature goes to a maximum of 43°-45° degree Celsius in May/June. The onset of monsoon is usually from 2nd week of June and the season extends up to September, with monsoon peaking during July and August. The annual temperature varies from 42.2°C during summer to 11°C during winter. The relative humidity varies from 86 percent during rainy season to 36 percent during winter. Maximum, average and minimum rain fall in district Durg are 1477.2, 1071.16 and 781.5 mm respectively per annum.

Area of District Durg is 231999 hacters in which 76378 hacters is the forest area of the district and People use forest products for commercial purposes. Rice is the main crop in Kharif and covers 4.15 Lakh ha of the total cultivated area, Soybean is also emerged as a major cash crop during last five years with more than 30,000 ha area. Arhar, and Urad constitute 10,000 and 5000 ha area respectively. Gram is the major crop of Rabi season and constitutes

Fig. 4.7 : Map of Rajnandgaon District

around 30 percent (1.0 lakh ha) area. Wheat, lentil, mustard and pea are the other major rabi crops of the district. The cropping intensity of the district is 145 percent which is 20 percent higher than the state average. The major horticultural crops are Banana and Papaya.

4.2.4 Rajnandgaon

The Rajnandgaon district is also situated at Mumbai-Hawarah National highway No.06. Rajnandgaon District formed on 26 January 1973 by separation from Durg District. Rajnandgaon is situated at a distance of 70 km away from the Raipur. Rajnandgaon is situated in south-eastern part of the Chhattisgarh state and lies at 19°57' N to 21°42' N latitude and from 80°23' to 81°31' E longitude with an altitude of 330.71 meter above the mean sea level. Kabirdham surrounds the Rajandgaon District

Table 4.4 Profile of selected Dairy Cooperative Society (DCS) & Non-Dairy Cooperative Society (NDCS)

Districts	Raipur		Bilaspur		Rajnandgaon		Durg	
	Selected DCS							
Name of Village	Bendri	Pond	khairi	Lakhram	Mudpar	Chhuikhadan	Ashoga	Armari Khurd
Total No. of HHs in Village	541	659	284	631	212	1571	653	273
Total No. of Dairy Farmers hh	66	87	43	62	28	162	79	36
Total milk collection (liters)	51816	66645	50270	134434	34219	121824	80580	41076
Av. Fat (%)	4.5	4.5	4.3	4.4	4.6	4.5	4.4	4.5
Total No. of milk producers	52	69	36	47	26	141	67	33
Milk sent to Milk Union (liters)	51515	64378	494088	128533	34010	117534	79827	40454
Milk sold @ dairy-Quantity (lit)	301.3	2267.5	862	5901.1	209.6	4289.5	752.9	621.8
Milk sold @ dairy-Rate/lit (Rs.)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
	Selected DCS							
Name of Village	Tarla	Mujgahan	Akhantari	Lakhasar	Dhamansarra	Aamgaon	Batrel	Teligunda
Total No. of HHs in Village	455	423	489	885	315	139	572	450
Total No. of Dairy Farmers hh (approx.)	41	37	45	64	32	22	53	42
Total milk collection (liters)	53862	46852	58238	142356	49365	30482	12685	60342
Av. Fat (%)	5.1	4.8	5.7	6.1	4.9	5.3	4.7	5.1
Total No. of milk producers	39	37	42	60	32	22	50	40
Milk sent to Milk Union (liters)	0	0	0	0	0	0	0	0
Milk sold @ dairy-Quantity (lit)	53862	46852	58238	142356	49365	30482	12685	60342
Milk sold @ dairy-Rate/lit (Rs.)	31.5	30	32	34	30	31.5	30	32

in north, Kanker in south, Durg in east and Balaghat district of M.P. in west.

The most of the north western and southern hilly track of the district measuring 3,892 Sq.km is occupied by protected and reserved forests. Nearly 73% of area falls under Mahanadi river basin, 21% under Godavari basin and 6% area in the northern part of the district falls under Narmada basin. (Fig. 4.7)

The Rajnandgaon District is administratively divided in three sub-division along with 9 block in which 696-gram panchayat and 1680 villages. Total geographical area and population of this district is 802.252 (000 ha) and 12,83,224 respectively and its categories under General 8,14,112, Schedule caste 1,27,424, Schedule tribe 3,41,688. The sex ratio in Rajnandgaon is 1000:1023 and total farm families are 222568. 70832 ha area comes under irrigation out of 356323 ha total geographical area. Total forest cover in Rajnandgaon district is 97884 hectares. Out of which 943.17 hectares are reserve forest, 1709.15 hectares are conserved forest and 270.69 hectares are non-categorised forest.

Tropical climate condition is found in district along with maximum temperature. 42-45°C in summer and minimum 10-12°C in winter season with annual rainfall 1274 m.m. Soil type in this district 70% soil is dorsa and Kanhar type and in total agriculture land 66% covered by low land and 34% under upland and cropping intensity of the District is 137% at present. As per operational land holding of the farmers 75% of the farmers comes under marginal and small categories.

Agriculture plays an important role in the district economy and more than 2.00 lakh farmer families engaged in agriculture and allied activities. Out of total geographical area of 8.02 lakh hectare, net sown area accupies 3.84 lakh, which is nearly 48% of the total geographical area. The total irrigated area is 19.7% to the net area sown. Canal is a major source of irrigation. Rice is the main kharif crop with 90% of the total Kharif area. Soybean, Maize, Arhar is other important crops in kharif whereas Gram, Wheat, Sunflower are important in Rabi season.On the other hand under horticultural crops Banana, Mango, Lime, Guava, Papaya, Custard-Apple in fruits and Tomato, Brinjal, Chill, Bitterguard, Okra are important vegetable crops which sown by the farmers. In a view of animal production Cow, Buffalo, Goat, Sheep and Piggery Categories of cattle in Rajnandgaon but remarkable poultry production is also exist in this district.

4.3 Selected Primary Dairy Cooperative Societies

The profile selected Dairy Cooperative Societies i.e Bendri & Pond (Raipur), Khairi & Lakhram (Bilaspur), Mudpar & Chhuikhadan (Rajnandgaon) and Ashoga & Armari Khurd (Durg) under DCS and Tarla & Mujgahan (Raipur), Akhantari & Lakhasar (Bilaspur), Dhamansarra & Aamgaon (Rajnandgaon) and

Batrel & Teligunda (Durg) under NDCS are presented in Table 4.4.

4.4 Villages Selected under DCS and NDCS

The basic information regarding selected villages i.e. Bendri & Pond (Raipur), Khairi & Lakhram (Bilaspur), Mudpar & Chhuikhadan (Rajnandgaon) and Ashoga & Armari Khurd (Durg) under DCS and Tarla & Mujgahan (Raipur), Akhantari & Lakhasar (Bilaspur), Dhamansarra & Aamgaon (Rajnandgaon) and Batrel & Teligunda (Durg) under NDCS are presented in table 4.5

4.5 Milk Producers

The profile of the selected milk producers includes socio- economic

Table 4.5: Basic details of selected villages under Dairy Cooperative Society (DCS) & Non-Dairy Cooperative Society (NDCS)

Districts	Raipur		Bilaspur		Rajnandgaon		Durg	
DCS								
Name of Village	**Bendri**	**Pond**	**khairi**	**Lakhasar**	**Mudpar**	**Chhuikhadan**	**Ashoga**	**Armari Khurd**
Area of village (in hectares)	657	996	611	1475	309	498	751	502
No. of households	541	659	284	631	212	1571	653	273
Population (No.)	2600	3313	1531	3132	1131	7093	3102	1421
SC population	122	155	71	147	53	333	145	66
ST population	174	221	102	209	75	475	207	95
Drinking water facilities	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Approach paved roads	Yes	Yes	No	No	No	Yes	Yes	No
Approach mud roads	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distance (kms)-nearest town	10	12	16	17	22	8	12	17
Electricity for domestic use (hr.)	24	24	24	24	24	24	24	24
Electricity of agricultural use(hr.)	24	24	24	24	24	24	24	24
NDCS								
Name of Village	**Tarra**	**Mujgahan**	**Akhantari**	**Lakhram**	**Dhamansarra**	**Aamgaon**	**Batrel**	**Teligunda**
Area of village (in hectares)	480	324	605	733	639	315	731	905
No. of households	455	423	489	885	315	139	572	450
Population (No.)	2262	2141	2302	4266	1689	648	2785	2176
SC population	106	101	108	201	79	30	131	102
ST population	152	143	154	286	113	43	187	146
Drinking water facilities	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes
Approach paved roads	No	No	Yes	Yes	Yes	Yes	No	Yes
Approach mud roads	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distance (kms)-nearest town	28	12	11	11	9	3	18	5
Electricity for domestic use (hr.)	24	24	24	24	24	24	24	24
Electricity of agricultural use(hr.)	24	24	24	24	24	24	24	24

characteristics, family profile and cropping pattern of the selected DCS and NDCS respondents across different size of farmers is presented in this subhead.

4.5.1 Socio – Economic Profile of Selected Respondents

The socio- economic profile of selected DCS & NDCS respondents across different size of milk producers includes gender of decision maker, their religion, social group, principal occupation, size of operational holding, experience in dairy, income group and types of house structures and presented in table 4.6.

It is observed from the data that the gender of decision maker of maximum respondents under DCS have found to be male

Table 4.6: Socio-economic characteristics of selected households

S. No.	Particulars	DCS				NDCS			
		Small	Medium	Large	Overall	Small	Medium	Large	Overall
1	**Gender of Decision Maker (%)**								
	Male	92.5	97.5	100	96.67	90	97.5	95	94.17
	Female	7.5	2.5	0	3.33	10	2.5	5	5.83
2	**Religion (% to total)**								
	Hindu	100	100	100	100	100	100	100	100
	Muslim	0	0	0	0	0	0	0	0
	Christian	0	0	0	0	0	0	0	0
	Sikh	0	0	0	0	0	0	0	0
3	**Social Group (% to total)**								
	ST	10	17.5	0	9.17	0	5	0	1.67
	SC	0	2.5	5	2.5	0	5	0	1.67
	OBC	90	77.5	95	87.5	97.5	90	92.31	93.27
	General	0	2.5	0	0.83	2.5	0	7.69	3.4
4	**Occupation (%)**								
	Agriculture	90	85	95	90	15	7.5	33.33	18.61
	Dairying	7.5	7.5	0	5	67.5	77.5	46.15	63.72
	Services	0	0	2.5	0.83	5	12.5	15.38	10.96
	Labour	2.5	7.5	2.5	4.17	12.5	2.5	5.13	6.71
5	**Average Operational land holding (area in ha)**								
	Irrigated	0.81	1.42	2.95	1.73	1.35	0.77	1.5	1.2
	Un irrigated	1.12	1.26	1.34	1.24	0.64	0.41	1.33	0.79
	Total	1.93	2.68	4.28	2.97	1.99	1.18	2.82	2
6	**Average Experience in Dairy**								
	Years	3.15	3.48	3.68	3.43	38.65	25.2	32.55	32.13
7	**Income Group (%)**								
	BPL	42.5	47.5	37.5	42.5	80.77	82.61	70.83	78.07
	APL	57.5	52.5	62.5	57.5	19.23	17.39	29.16	21.93
8	**House Structure (%)**								
	Pucca	22.5	32.5	30	28.33	10	12.5	12.5	11.67
	Semi-Pucca	20	25	35	26.67	55	65	40	53.33
	Kuccha	57.5	42.5	35	45	35	22.5	45	34.17

(96.67%) as compared to female (3.33%). All of them were belonged to *Hindu* (100%) community and the majority of them related to OBC (87.50%) social group. Their primary source of income was found to be agriculture (90.00%) followed by dairying (5.00%), agriculture labour (4.12%) and services (0.83%). Their average size of holding was found to be 2.97 ha, in which 1.73 ha (58.25 %) was found under irrigation. They have an experience of raring cattle up to 27 years. The majority of them belongs to Above Poverty Line (57.50 %) income group. The majority of them have kaccha (45.00%) followed by pucca (28.33%) and semi-pucca (26.67%) house structure. The similar results have also been also observed across respondents related to different size of dairy farms.

As far as the socio-economic profile of NDCS respondents is concerned the similar finding has been observed. However, their experience in dairy (32 years) was found to more as compared to DCS respondents (27 years) and the majority of them reported that their primary source of income from dairy (63.72%) followed by agriculture (18.61%) service (10.96%) and labour (6.71%).

4.5.2 Family Profile

The family profile of selected DCS and NDCS respondents were also observed across size of dairy farms. The family profile include average size of family (number of male, female and children), gender of the respondents, average age of the respondents, level of education and average number of family member works in dairy and presented in table 4.7.

Table 4.7: Family profile of selected households

S No	Particulars	DCS				NDCS			
		Small	Medium	Large	Overall	Small	Medium	Large	Overall
1	**Average Household Size (Nos.)**								
	Male	3.15	3.48	3.68	3.43	3.90	2.98	3.13	3.33
	Female	2.63	2.35	2.80	2.59	2.80	2.08	2.80	2.56
	Children(Below 15 Year)	1.30	1.23	1.28	1.27	1.28	1.38	1.08	1.24
	Total/Average	7.08	7.06	7.76	7.29	7.98	6.44	7.01	7.13
2	**Gender of Respondent/HH (%)**								
	Male	92.5	97.5	100.0	96.7	97.5	97.5	100.0	98.3
	Female	7.5	2.5	0.0	3.3	2.5	2.5	0	1.7
3	**Average Age of respondent/HH (years)**								
	Male	47.28	51.49	51.95	50.24	56.72	41.90	49.45	49.36
	Female	55.00	47.00	45.00	49.00	27.00	59.00	0.00	28.67
4	Av. Age of family (years)	20.79	18.30	23.73	20.94	24.71	19.30	17.20	20.40
5	Av. Education of respondent/HH (years)	5.30	5.14	7.12	5.85	5.86	4.39	5.36	5.20
6	Av. No. of Fami ly members works in dairy	3.03	2.90	3.28	3.07	2.88	2.75	3.20	2.94

It is observed from the data that the majority of respondents related to DCS (96.7%) or NDCS (98.3%) have male gender and they have of approximately of 50 years. Their average size of family was found to be of 7 members constituted of 3 male, 3 female and 1 child. The average age of the family was found to be observed of approximately 20 years. The average education of the respondent was between 5 (NDCS) to 6 years (DCS) of schooling. Out of total members 7, in which 3 were found to be works at their dairy farm as family labour.

4.5.3 Cropping Pattern

The cropping pattern of selected DCS and NDCS respondents across various size of dairy farm is presented in Table 4.8.

It is observed from the data that kharif was found to be major crop season in the area under study, in which an average respondent whether related to DCS (61.30%) and NDCS (51.29%) of devoted their maximum Gross Cropped Area. At overall average level in kharif paddy (95.66%) followed by soybean (3.77%) were found to be major crops, while paddy (43.14%) followed by wheat (27.80%). Gram (27.80%) was found to be major Rabi crops in DCS HHs farms. Thus paddy was found to be grown in both the season in the study area. The similar finding was observed in case of NDCS respondents farms. However, cropping intensity of an average respondent related to NDCS (181%) farm was more as compared to DCS (156%) farm, while respondents related to DCS (4.76 ha) have found to be more Gross

Table 4.8: Cropping pattern of sample household 2015-16 (Area in ha)

Season	Crops	DCS				NDCS			
		Small	Medium	Large	Overall	Small	Medium	Large	Overall
Kharif	Paddy	1.92 (99.48)	2.55 (97.33)	3.91 (92.87)	2.79 (95.66)	1.71 (90.00)	0.89 (83.96)	2.04 (77.86)	1.55 (83.15)
	Soybean	0 (0.00)	0.03 (1.15)	0.3 (7.13)	0.11 (3.77)	0.06 (3.16)	0.12 (11.32)	0.4 (15.27)	0.19 (10.39)
	Other	0.01 (0.52)	0.04 (1.53)	0 (0.00)	0.02 (0.57)	0.13 (6.84)	0.05 (4.72)	0.18 (6.87)	0.12 (6.45)
	Total	1.93 /69.68/	2.62 /66.84/	4.21 /55.39/	2.92 /61.30/	1.90 /53.07/	1.06 /50.48/	2.62 /50.38/	1.86 /51.29/
Rabi	Wheat	0.05 (5.95)	0.19 (14.62)	1.3 (38.24)	0.51 (27.80)	0.2 (11.90)	0.28 (26.92)	0.63 (24.42)	0.37 (20.94)
	Gram	0.15 (17.86)	0.24 (18.46)	1.15 (33.82)	0.51 (27.80)	0.37 (22.02)	0.36 (34.62)	1.17 (45.35)	0.63 (35.85)
	Paddy	0.64 (76.19)	0.87 (66.92)	0.88 (25.88)	0.80 (43.14)	1.06 (63.10)	0.36 (34.62)	0.7 (27.13)	0.71 (40.00)
	Other	0 (0.00)	0 (0.00)	0.08 (2.35)	0.03 (1.44)	0.05 (2.98)	0.05 (4.81)	0.08 (3.10)	0.06 (3.40)
	Total	0.84 /30.32/	1.3 /33.16/	3.4 /44.74/	1.85 /38.77/	1.68 /46.93/	1.04 /49.52/	2.58 /49.62/	1.77 /48.71/
Gross Cropped Area		2.77	3.92	7.6	4.76	3.58	2.1	5.2	3.63
Cropping Intensity (%)		143	146	177	156	180	179	184	181

Figure in brackets show percentage to total area, while figure in slash show percentage to gross cropped area

Cropped Area as compared to respondents related to NDCS (3.63 ha). Thus, respondents related to NDCS used their net area sown more intensity as compared to respondents related to DCS.

4.6 Summary of the chapter

The chapter presented profile of the Chhattisgarh along with detail information regarding Chhattisgarh State Cooperative Dairy Federation, The background information of selected districts viz. Raipur, Bilaspur, Durg and Rajnandgaon, and profile selected Dairy Cooperative Societies and villages i.e Bendri & Pond (Raipur), Khairi & Lakhram (Bilaspur), Mudpar & Chhuikhadan (Rajnandgaon) and Ashoga & Armari Khurd (Durg) under DCS and Tarla & Mujgahan (Raipur), Akhantari & Lakhasar (Bilaspur), Dhamansarra & Aamgaon (Rajnandgaon) and Batrel & Teligunda (Durg) under NDCS.

The profiles of the selected respondents under DCS and NDCS across different size of dairy farms are presented in this chapter. It is observed from the results the Chhattisgarh State Cooperative Dairy Federation still have 2 tire structures with weak infrastructural facilities. The respondents were clarified under DCS and NDCS.

The gender of decision maker of maximum respondents under DCS was found to be male (96.67%). All of them belonged to Hindu (100%) community under OBC (87.50%) social group. Their primary source of income was agriculture (90.00%) followed by dairying (5.00%). Their average size of holding was found to be 2.97 ha out of which 58.25 % was under irrigation. They have 27 year experience of rearing cattle. The majority of them belong to Above Poverty Line (57.50 %) income group and have kaccha (45.00%) house structure. As for as socio-economic profile of NDCS respondents is concerned, the similar findings were observed, however their experience in dairy (32 years) was found to more as compared to DCS respondents (27 years) and their primary source of income was dairy (63.72%) followed by agriculture (18.61%).

The majority of respondents related to DCS (96.7%) or NDCS (98.3%) have male gender with approximately 50 years of age. The average age of the family of about 20 years.. Their average size of family was found to be of 7 members. The average education of the respondent was between 5 (NDCS) to 6 years (DCS) of schooling. Out of total members 7, 3 were found to work their dairy farms as family labour.

Kharif was found to be major crop season in the area under study, in which an average respondent whether related to DCS (61.30%) and NDCS (51.29%) devoted their

maximum Gross Cropped Area. In kharif paddy (95.66%) and soybean (3.77%) were found to be major crops, while paddy (43.14%), wheat (27.80%) and Gram (27.80%) were found to be major Rabi crops in DCS respondents farms. The similar finding was observed in case of NDCS respondents farms. However, cropping intensity of an average respondent related to NDCS (181%) farm was more as compared to DCS (156%) farm, while respondents related to DCS (4.76 ha) found to have more Gross Cropped Area as compared to respondents related to NDCS (3.63 ha). The no/negligible area under fodder cultivation confirmed that the cropping pattern of dairy owners was not found to be matched with their farming system.

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COST OF MILK PRODUCTION & AWARENESS ABOUT THE SCHEMES

This chapter deals with the details about number & type of cattle shed & its present value, details about animal breeds, breedable animals & season-wise milk yield, availability of water, feed & fodder, labour use pattern, veterinary & breeding expenditure incurred & awareness of various livestock development schemes related to Dairy Co-Operative Society (DCS) & Non-Dairy Co-Operative Society (NDCS) across various size of dairy farms.

5.1 Herd Strength

The details of herd strength & types, numbers of cattle sheds & present value of cattle shed across different size of dairy farms for respondents related to DCS & NDCS are identified for the area under study.

5.1.1 Dairy Co-Operative Society

The details of herd strength & types, numbers of cattle sheds & present value of cattle shed across different size of dairy farms for respondents related to DCS is presented in Table 5.1.

Table 5.1: Details on herd strength & cattle shed under Dairy Co-operative Society

Sr. No.	Particulars	Milch Animal				Total Animal			
		Small	Medium	Large	Average	Small	Medium	Large	Average
	n	40	40	40	120	40	40	40	120
1	Local Cattle	1.18 (55.4)	2.73 (71.8)	4.33 (65.8)	2.74 (65.7)	2.13 (100)	3.8 (100)	6.58 (100)	4.17 (100)
2	Cross Bread	0.13 (72.2)	0.08 (80)	0.28 (48.3)	0.16 (57.1)	0.18 (100)	0.1 (100)	0.58 (100)	0.28 (100)
3	Buffalo	0.15 (42.9)	0.58 (62.4)	1.55 (54.4)	0.76 (55.1)	0.35 (100)	0.93 (100)	2.85 (100)	1.38 (100)
4	Other	0.00 (0.0)	0.00 (0.0)	0.00 (0.0)	0.00 (0.0)	0.48 (100)	0.55 (100)	1.13 (100)	0.72 (100)
	Total	**1.45 (46.3)**	**3.38 (62.8)**	**6.15 (55.3)**	**3.66 (56)**	**3.13 (100)**	**5.38 (100)**	**11.13 (100)**	**6.54 (100)**
	No. of Cattle Shed (%)					**Present Average value in Rs./shed**			
1	Pucca	15.0	32.5	50.0	32.5	30000	32125	45250	35792
2	Semi-Pucca	30.0	37.5	32.5	33.3	18550	22125	18875	19850
3	Kuccha	55.0	30.0	17.5	34.2	15325	10275	9500	11700
	Total	**100.0**	**100.0**	**100.0**	**100.0**				

(n=No. of respondents)

It is observed from the data that each house hold (HH) was found to have an average 6.54 number of animals at overall level, out of which the population of local cows (4.17) was found more as compared to buffaloes (1.38), cross breed cows (0.28) & other (0.72) animals. Out of total animals 65.7, 57.1, 55.1 & 56.0 per cent of local cows, cross breed cows, buffaloes & goats were found to be milch animals, respectively.

At over all level an average small, medium & large size dairy farms have 3.13, 5.38, 11.13 number of animals at their farm, out of which 46.3, 62.8 & 55.3 per cent were found to be milch cattle, respectively in the area under study.

As regards to different type was more as compared to number of cattle sheds are concerned, the proportion of kuccha (34.20%), semipucca (33.30 %) & pucca (32.5 %) type of cattle shed among different respondents related to DCS, However as the size of dairy farm increases the pucca type of cattle shed increases from 15 per-cent (Small) to 50 per-cent (Large), while kuccha type of cattle shed found to be decreased from 55.9 (Small) to 17.5 per-cent (Large).

On an average the present value of pucca, semi pucca & kuccha type of cattle shed was found to be Rs.35792, Rs.19850 & Rs. 11700 per cattle shed at over all level in the area under study and as the size of dairy farm increases the value of pucca cattle shed increases from Rs.30, 000 (Small) to Rs. 45250 (Large) & value of kuccha cattle shed decreases from Rs. 15325 (Small) Rs. 9500 (Large) per cattle shed.

5.1.2 Non-Dairy Co-Operative Society

The details of herd strength & types, number of cattle sheds & present value of cattle shed across different size of dairy farms for respondents related to NDCS is presented in Table 5.2.

Table 5.2: Details on herd strength & cattle shed under NDCS

Sr. No.	Particulars	Milch Animal				Total Animal			
		Small	Medium	Large	Average	Small	Medium	Large	Average
	n	40	40	40	120	40	40	40	120
1	Local Cow	0.28 (14.7)	0.93 (51.7)	3.4 (40.8)	1.53 (38.2)	1.9 (100)	1.8 (100)	8.33 (100)	4.01 (100)
2	Cross Bread	0.18 (41.9)	0.53 (54.1)	0.65 (50.8)	0.45 (50.6)	0.43 (100)	0.98 (100)	1.28 (100)	0.89 (100)
3	Buffalo	1.05 (39.2)	2.15 (59.2)	2.7 (57.1)	1.97 (53.5)	2.68 (100)	3.63 (100)	4.73 (100)	3.68 (100)
4	Other	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.83 (100)	1.95 (100)	0.95 (100)	1.24 (100)
	Total	1.5 (25.7)	3.6 (43.11)	6.75 (44.17)	3.95 (40..22)	5.83 (100)	8.35 (100)	15.28 (100)	9.82 (100)
	No. of Cattle Shed (%)					Present Average value in Rs./shed			
1	Pucca	30.0	32.5	52.5	38.3	41750	54250	58750	51583
2	Semi-Pucca	17.5	40.0	25.0	27.5	29500	31750	23250	28167
3	Kuccha	52.5	27.5	22.5	34.2	23125	12300	12750	16058
	Total	100.0	100.0	100.0	100.0				

It is observed from the data that each HH was found to have on an average 9.82 number of animals at over all level, out of which the population of local cows (4.01) was found more as compared to buffaloes (3.68), cross breed cows (0.89) & other (1.24) animals. Out of total animals 38.2, 50.6, & 53.5 per-cents of local cows, cross breed cows, & buffaloes were found to be milch animals, respectively.

At overall level an average small, medium & large size dairy farm have 5.83, 8.35, 15.28 number of animals at their farms, out of which milch cattle were found to be 25.72, 43.11 & 44.17 per-cent respectively in the area under study.

As regards to different types & numbers of cattle sheds are concerned, the proportion of pucca (38.3%) was found more as compared to kuccha (34.20%) and semipucca (27.50 %) house in the dairy farms related to NDCS HHs. However as the size of herd increases the pucca type of cattle shed increases from 30 per-cent (Small) to 52.5 per-cent (Large), while kucch type of cattle shed found to be decreased from 52.5 per-cent (Small) to 22.5 per-cent (Large).

On an average the present value of pucca, semi pucca & kuccha type of cattle shed was found to be Rs.51583, Rs.28167 & Rs. 16058 per cattle shed at overall level in the area under study & as the size of dairy farm increases the value of pucca cattle shed increases from Rs.41750 (Small) to Rs. 58750 (Large) & value of kuccha cattle shed decreases from Rs. 23125 (Small) ton Rs.12750 (Large) per cattle shed.

5.2 Breeds of Livestock

The majority of respondents whether related to DCS or NDCS have deshi, Sahiwal, Gir, Tharparker, Hariyana, Redsindhi & Kosali breed of local/ indigenous cows. Some of them were found to rear Jersey, Holstein & Ongole Crossbreed Cows. In buffaloes Murrah, Surti,

Table 5.3: Details of animals breeds DCS & NDCS

S. No.	Particulars	Name of breeds
1	Local/ Indigenous Cow	Deshi, Kosali Sahiwal, Gir, Tharparker, Hariyana, Redsindhi
2	Crossbred Cow	Jersey Holstein, Ongole,
3	Buffalo	Murrah, Surti, Nagpuri, Niliravi , Mehsana & Deshi

5.3. Features of Breedable Animals

The features of breedable animals viz. age, age at first calving, lactation order, length of lactation period, peak yield at last lactation, peak yield at previous lactation, animals covered under insurance etc. have been identified for local cow, cross breed & buffalo for DCS & NDCS respondents in the area under study.

5.3.1 Dairy Co-Operative Society

The features of breedable animals' viz. age, age at first calving, lactation order, length of lactation period, peak yield at last lactation, peak yield at previous lactation, animals covered under insurance etc. have been identified for local cow, cross breed & buffalo for DCS are presented in Table 5.4

5.3.1.1 Local Cow

At over all level, an average age of the local cow was found to be 6.6 years. With age at first calving of 36.1 months. The 3rd lactation of an average local cow was observed during the survey. The period of lactation was found to be varied between 185.6 (Small) to 192.9 (Large) days. Peak yield of last & previous lactation was found to be only 1.2 (Small) & 1.4 (Large) liter/day & 1.6 (Small) to 1.8 (Large) liter/day (previous lactation) respectively. None of the local cow was found to be covered under insurance in the area under study.

Table 5.4: Details of breedable animals on survey date (DCS)

Particulars	Local Cow				Crossbred Cow				Buffalo			
	Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
Age (yrs)	6.5	6.9	6.4	6.6	7.8	5.7	6.8	6.8	7.0	6.8	6.7	6.8
Age at first calving (month)	36.3	35.5	36.4	36.1	35.7	38.2	40.0	37.9	45.6	49.0	46.5	47.0
Lactation order@	2.8	3.2	2.7	2.9	4.5	2.7	3.6	3.6	2.5	4.8	2.3	3.2
Length of Lactation on Period (Days)	185.6	188.9	192.9	189.1	211.7	240.0	224.1	225.3	281.6	260.9	245.2	262.5
Peak yield Last Lact.(l)	1.2	1.3	1.4	1.3	2.0	2.7	4.3	3.0	2.1	2.5	2.8	2.5
Peak yield Pre. Lact.(l)	1.6	1.7	1.8	1.7	3.0	3.7	4.9	3.8	3.4	3.1	3.2	3.3
Covered Under Insurance (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N

N = No

5.3.1.2 Cross Breed Cow

At over all level an average age of the cross breed cow was found to be 6.8 years. With age at first calving was 37.9 months. The 3rd lactation of an average cross breed cow was observed during the survey. The period of lactation was found to be varied between 211.7 (Small) to 224.1 (Large) days. Peak yield of last & previous lactation was found to be only 4.3 & 4.9 liter/day respectively & it was found to be varied from 2.0 to 4.3 liter/day (last lactation) & 3.0 to 4.9 liter/day (previous lactation)

Table 5.5: Details of breedable animals on survey date NDCS

Particulars	Local Cow				Crossbred Cow				Buffalo			
	Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
Age (yrs)	5.5	6.8	6.7	6.3	5.9	5.6	6.3	5.9	6.8	6.9	7.2	7.0
Age at first calving (month)	31.2	35.7	36.9	34.6	40.6	35.8	41.0	39.1	47.3	48.8	48.8	48.3
Lactation order@	3.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Length of Lactation on Period (Days)	153.3	158.1	181.4	164.3	236.4	231.4	231.2	233.0	273.1	267.1	265.6	268.6
Peak yield Last Lact.(l)	1.4	1.3	1.5	1.4	3.2	4.1	3.9	3.7	3.4	3.2	3.0	3.2
Peak yield Pre. Lact.(l)	1.9	1.7	1.8	1.8	4.8	5.0	4.9	4.9	4.6	4.4	4.2	4.4
Covered Under Insurance (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N

N = No

respectively. None of the cross breed cow was found to be covered under insurance in the area under study.

5.3.1.3 Buffalo

At over all level an average age of the buffalo was found to be 6.8 years. With age at first calving was 47.0 months. At the time of survey an average buffalo was found to be in 3rd lactation. The period of lactation was found to be varied between 281.6 (Small) to 245.2 (Large) days. Peak yield of last & previous lactation was found to be only 2.5 & 3.3 liter/day respectively & it was found to be varied from 2.1 to 2.8 liter/day (last lactation) & 3.4 to 3.2 liter/day (previous lactation) respectively. None of the buffalo was found to be covered under insurance in the area under study.

5.3.2 Non-Dairy Co-Operative Society

The features of breedable animals' viz. age, age at first calving, lactation order, length of lactation period, peak yield at last lactation, peak yield at previous lactation, animals covered under insurance etc. have been identified for local cow, cross breed & buffalo for NDCS are presented in Table 5.5.

5.3.2.1 Local Cow

At over all level an average age of the local cow was found to be 6.3 years. With age at first calving was 34.6 months. The 4th lactation of an average local cow was observed during the survey. The period of lactation was found to be varied between 153.3 (Small) to 181.4 (Large) days. Peak yield of last & previous lactation was found to be only 1.4 and 1.8 liter/day respectively & it was found to be varied from 1.3 to 1.5 liter/day (last lactation) & 1.7 to 1.9 liter/day (previous lactation) across various sizes of dairy farms respectively. None of the local cow was found to be covered under insurance in the area under study.

5.3.2.2 Cross Breed Cow

At over all level an average age of the cross breed cow was found to be 5.9 years. With age at first calving was 39.1 months. The 4th lactation of the cross breed cow was observed during the survey. The period of lactation was found to be varied between 236.4 (Small) to 231.2 (Large) days. Peak yield of last & previous lactation was found to be only 3.9 & 4.9 liter/day respectively & it was found to be varied from 3.2(Small) to 3.9(Large) liter/day (last lactation) & 4.8 (Small) to 4.9 (Medium) liter/day (previous lactation) respectively. None of the cross breed cow was found to be covered under insurance in the area under study.

5.3.2.3 Buffalo

At over all level an average age of the buffalo was found to be 7.0 years. With age at first calving was 48.3 months. The 3rd lactation of the buffaloes was observed during the survey. The period of lactation was found to be varied between 273.1 (Small) to 265.6 (Large) days. Peak yield of last & previous lactation was found to be only 3.02 & 4.2 liter/day respectively & it was found to be varied from 3.4 to 3.0 liter/day (last lactation) & 4.6 to 4.2 liter/day (previous lactation) respectively. None of the buffalo was found to be covered under insurance in the area under study.

Table 5.6: Availability of water for dairy DCS (% to total)

Sr. No.	Particulars	Rainy				Winter				Summer			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
A	Source of Water Available for Dairy Purpose												
1	Open Well	25	22.5	32.5	26.67	25	22.5	32.5	26.67	10	10	12.5	10.83
2	Tube well	57.5	62.5	55	58.33	57.5	62.5	55	58.33	2.5	5	12.5	6.67
3	Canal	0	0	0	0	0	0	0	0	0	0	0	0
4	Village Talawadi	17.5	15	12.5	15	17.5	15	12.5	15	87.5	85	75	82.5
5	Av. Distance (Meters)	241.5	189	178.8	203.1	241.5	189	178.8	203.1	633.5	527.5	418.3	526.4
B	Supply of Water is Adequate												
1	Yes	80	82.5	82.5	81.67	87.5	80	72.5	80	60	67.5	67.5	65
2	No	20	17.5	17.5	18.33	12.5	20	27.5	20	40	32.5	32.5	35
C	Water Quality (Village Talawadi/Tanker)												
1	Normal	72.5	80	82.5	78.33	75	77.5	82.5	78.33	62.5	60	35	52.5
2	Poor	15	10	12.5	12.5	15	20	17.5	17.5	22.5	30	45	32.5
3	Very Poor	12.5	10	5	9.17	5	2.5	0	2.5	15	10	20	15
D	Alternative Source of Water Supply in Shortage												
1	Open Well	0	0	0	0	0	0	0	0	0	0	0	0
2	TubeWell	45	27.5	30	34.17	52.5	27.5	30	36.67	40	50	40	43.33
3	Canal	0	0	0	0	0	0	0	0	0	0	0	0
4	Village Talawadi	55	72.5	70	65.83	47.5	72.5	70	63.33	60	50	60	56.67
6	Av. Distance (Meters)	525.3	461.5	368.1	451.6	490	461.5	368.1	439.9	575	519	454.1	516

5.4 Availability of water

The responses of respondents on supply of water, its availability & alternative source of water supply in shortage during rainy, winter & summer seasons across size of dairy farms for DCS & NDCS respondents are identified for the area under study.

5.4.1 Dairy Co-Operative Society

The responses of respondents on supply of water, its availability & alternative source of water supply in shortage during rainy, winter & summer seasons across size of dairy farms for DCS is presented in Table 5.6

5.4.1.1 Rainy Season

The major source of water availability for dairy purposes as reported by maximum number of respondents was found to be tube well (58.33%) followed by open well (26.67%) & village talawadi (15%) in rainy season. An average HH used to cover 203.08 m distance to carry water to their dairy farm. The majority of HHs reported that the supply of water during rainy season was adequate (81.67%) & its quality was normal (78.33%). The alternative source of water supply in rainy season as reported by majority of HHs was village talawadi (65.83%) followed by tube well (34.17 %).

5.4.1.2 Winter Season

The major source of water availability for dairy purposes as reported by maximum number of respondents was found to be tube well (58.33 %) followed by open well (26.67 %) & village talawadi (15.00%) in winter season. An average HH used to cover 203.08 m distance to carry to their dairy farm. The majority of HHs reported that the supply of water during winter season was adequate (80.00%) & its quality was normal (78.33%). The alternative source of water supply in winter season as reported by majority of HHs was village talawadi (63.33%) followed by tube well (36.67%).

5.4.1.3 Summer Season

The major source of water availability for dairy purposes as reported by maximum number of respondents was found to be village talawadi (82.50%) followed by open well (10.83 %) & tube well (6.67 %) in summer season. An average HH used to cover 526.42 m distance to carry water from source of water to their dairy farm. The majority of HHs reported that the supply of water during summer season was adequate (65.00%) & its quality was normal (52.50%). The alternative source of water supply in summer season as reported by majority of HHs was village talawadi (56.67%) followed by tube well (43.33%).

5.4.2 Non-Dairy Co-Operative Society

The responses of respondents on supply of water, its availability & alternative source of water supply in shortage during rainy, winter & summer seasons across size of during farms for NDCS is presented in Table 5.7

5.4.2.1 Rainy Season

The major source of water availability for dairy purpose as reported by maximum number of respondents was found to be tube well (42.50%) followed by village talawadi (25.00%), open well (14.17%), cannel (14.14%), & farm pond (4.17%) in rainy season. An

Table 5.7: Availability of water for dairy NDCS (% to total)

Sr. No.	Particulars	Rainy				Winter				Summer			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
A	**Source of Water Available for Dairy Purpose**												
1	Open Well	12.50	15.00	15.00	14.17	12.50	15.00	20.00	15.83	20.00	20.00	27.50	22.50
2	Tube well	42.50	45.00	40.00	42.50	42.50	45.00	42.50	43.33	55.00	62.50	52.50	56.67
3	Cannel	20.00	7.50	15.00	14.17	20.00	10.00	17.50	15.83	15.00	2.50	7.50	8.33
4	Village Talawadi	25.00	30.00	20.00	25.00	25.00	30.00	20.00	25.00	10.00	15.00	12.50	12.50
5	Farm Pond	0.00	2.50	10.00	4.17	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
6	Distance (M)	194.78	191.50	208.68	198.32	194.78	192.75	183.43	190.32	147.58	112.70	129.43	129.90
B	**Supply of Water is adequate**												
1	Yes	97.50	97.50	95.00	96.67	87.50	85.00	90.00	87.50	72.50	77.50	70.00	73.33
2	No	2.50	2.50	5.00	3.33	12.50	15.00	10.00	12.50	27.50	22.50	30.00	26.67
C	**Water Quality (V illage talawadi/Tanker)**												
1	Normal	57.50	72.50	60.00	63.33	60.00	65.00	60.00	61.67	60.00	62.50	52.50	58.33
2	Poor	35.00	20.00	20.00	25.00	32.50	22.50	30.00	28.33	32.50	22.50	27.50	27.50
3	Very Poor	7.50	7.50	20.00	11.67	7.50	12.50	10.00	10.00	7.50	15.00	20.00	14.17
D	**Alternative source of Water supply in shortage**												
1	Open Well	22.50	25.00	2.50	16.67	17.50	15.00	5.00	12.50	22.50	15.00	10.00	15.83
2	Tube well	62.50	37.50	50.00	50.00	77.50	75.00	85.00	79.17	77.50	82.50	90.00	83.33
3	Cannel	0.00	2.50	10.00	4.17	0.00	2.50	0.00	0.83	0.00	2.50	0.00	0.83
4	Village Talawadi	15.00	35.00	37.50	29.17	5.00	7.50	10.00	7.50	0.00	0.00	0.00	0.00
5	Distance (M)	113.03	204.73	198.95	172.23	84.03	93.25	83.80	87.03	66.78	54.70	34.55	52.01

average household used to cover 198.32 m distance to carry water to their dairy farm. The majority of HHs reported that the supply of water during rainy season was adequate (96.67%) & its quality was normal (63.33%). The alternative source of water supply in rainy season as reported by majority of HHs was tube well (50.00%) followed by village talawadi (29.17%), open well (16.67%) & canal (4.17).

5.4.2.2 Winter Season

The major source of water availability for dairy purpose in winter season as reported by maximum number of respondents was found to be tube well (43.33%) followed by village talawadi (25.00%), open well (15.83%), & cannel (15.83%) An average HH used to cover 190.32 m distance to carry water to their dairy farm. The majority of HHs reported that the supply water during winter season was adequate (87.50%) & its quality was normal (61.67%). The alternative source of water supply in winter season as reported by majority of HHs was tube well (79.17%) followed by open well (12.50%) village talawadi (7.50%), & canal (0.83%).

5.4.2.3 Summer Season

The major source of water availability for dairy purpose in winter season as reported by maximum number of respondents was found to be tube well (56.67%) followed by open well (22.50%), village talawadi (12.50%) & cannel (8.33%). An average HH used to cover 129.90 m distance to carry water to their dairy farm. The majority of HHs reported that the supply of water during summer season was adequate (73.33%) & its quality was normal (58.33%). The alternative source of water supply in summer season as reported by majority of HHs was tube well (83.33%), followed by open well (15.83%) & canal (0.83%).

5.5 Feed & Fodder

The details about type & quality of feed & fodder supply viz. dry fodder, concentrates

Table 5.8: Details of feed & fodder (At the time of survey) (Kg/Ani./day)

S. No.	Particulars	Local Cow				Crossbred Cow				Buffalo			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
	DCS												
1	Dry Fodder	4.4	5.2	4.3	4.6	5.7	4.2	5.4	5.1	8.4	6.8	8.3	7.8
2	Green Fodder	16.5	15	15.8	15.7	0	17.5	15.7	11.1	10.3	12.6	12.2	11.7
3	Concentrates	1	1	0.9	1	1.5	1.4	1.7	1.5	1.9	2.1	1.9	2
4	Supplements	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.6	0.6	0.6
5	Out feeding Grazing No of Hours/day	8	8	8	8	7.3	8	8	7.8	8	8	8	8
	NDCS												
1	Dry Fodder	5.3	6.6	5.9	5.9	9.9	7.8	9.1	8.9	13.8	14.2	11.7	13.2
2	Green Fodder	15.1	15.9	17.4	16.1	18.6	19.3	18.2	18.7	20.5	22	26.3	22.9
3	Concentrates	0.8	0.6	1.2	0.9	1.3	1.8	1.7	1.6	1.9	2.5	2.4	2.3
4	Supplements	0.7	0.5	0.6	0.6	0.8	0.6	0.9	0.8	1.6	0.9	1.5	1.3
5	Out feeding Grazing No of Hours/day	8	8	8	8	8	8	8	8	8	8	8	8

supplements & out feed grazing for local cow, cross breed cow & buffalo across various sizes of farms have been analyzed for the respondents related to DCS & NDCS in the area under study.

5.5.1 Dairy Co-Operative Society

The details about type & quality of feed & fodder supply viz. dry fodder, concentrate supplements & out feed grazing for local cow, cross breed cow & buffalo across various size of farms have been analyzed for the respondents related to DCS in the area under study are presented in Table 5.8. it is

5.5.1.1 Local Cow

At overall level an average respondent related to DCS reported to fed 15.7 kg/animal/day of green fodder to his local cow. He also fed 4.6 & 1.0 kg/animal/day dry fodder & concentrates, respectively to his local cow. An average local cow was also fed 8.0kg/day grass from out feeding grazing.

5.5.1.2 Cross Breed Cow

At overall level an average respondent related to DCS reported to fed 11.1 kg/animal/day of green fodder to his cross breed cow. He also fed 5.1 & 1.5 kg/animal/day dry fodder & concentrates, respectively to his cross breed cow. An average cross breed cow was also fed 7.8kg/day grass from out feeding grazing.

5.5.1.3 Buffalo

At overall level an average respondent related to DCS reported to fed 11.7 kg/animal/day of green fodder to his buffalo cow. He also fed 7.8 & 2.0 kg/animal/day of dry fodder & concentrates, respectively to his buffalo. An average buffalo was also fed 8.0kg/day grass from out feeding grazing.

5.5.2 Non-Dairy Co-Operative Society

The detail about type & quality of feed & fodder supply viz. dry fodder, concentrate supplements & out feed grazing for local cow, cross breed cow & buffalo across various size of farms has been analyzed for the respondents related to NDCS in the area under study are also presented in Table 5.8.

5.5.2.1 Local Cow

At overall level an average respondent related to NDCS reported to fed 16.1 kg/animal/day of green fodder to his local cow. He also fed 5.9 & 0.9 kg/animal/day dry fodder & concentrates, respectively to his local cow. An average local cow was also fed 8.0kg/day grass from out feeding grazing.

5.5.2.2 Cross Breed Cow

At overall level an average respondent related to NDCS reported to fed 18.7 kg/animal/day of green fodder to his cross breed cow. He also fed 8.9 & 1.6 kg/animal/day dry fodder & concentrates, respectively to his cross breed cow. An average cross breed cow was also fed 8.0kg/day grass from out feeding grazing.

5.5.2.3 Buffalo

At overall level an average respondent related to NDCS reported to fed 22.9 kg/animal/day of green fodder to his buffalo. He also fed 13.2 & 2.3 kg/animal/day dry fodder & concentrates, respectively to his buffalo. An

average buffalo was also fed 8.0kg/day grass from out feeding grazing.

Thus, it is clear from the above results that an average respondents whether related to DCS or NDCS fed more feed and fodder per animal per day to buffalos as compared to cross bread cow and local cow.

5.6 Labour Use Pattern

Family as well as hired rural men & women involved in dairy activities viz. fodder management, shed management, milking, animal health labour & prevailing rate of male & female labours were also identified for DCS & NDCS respondents across different size of dairy farms in the area under study.

5.6.1 Dairy Co-Operative Society

Family as well as hired rural men & women involved in dairy activities viz. fodder management, shed management, milking, animal health labour & prevailing rate of male & female labours were also identified for DCS respondents across different size of dairy farms in the area under study and presented in table 5.9.

5.6.1.1 Family Labour

At overall level, an average respondent found to spend 3.7 & 2.9 male & female family labour per days respectively in different dairy activities. Amongst different dairy activities, they were found to spent maximum male days in milking (1.4 days) followed by fodder management (1.3days) & shed management (1.0 days), while female family labour were found to spent maximum number of labour days in shed management (1.3 days) fodder management (0.9 day), & milking (0.7 days) activities. At overall level an average dairy owner found to spent only 107.9 & 87.5 minutes/ person/day of male & female, respectively in various dairy activities. Amongst various dairy activities, a male person was found to spent more minutes in shed management (41.1 minutes) followed by milking (39.5 minutes) & fodder management (27.3 minutes), while an average female person spent more time in fodder management (33.6 minutes) followed by shed management (29.5 minutes) & milking (24.4 minutes).

5.6.1.2 Hired Labour

At overall level an average respondent found to use 2.4 & 2.3 male & female hired labour days, respectively in different dairy activities. Amongst different dairy activities they were found to spent maximum male days in fodder management (1 day) followed by shed management (0.7 days) & milking (0.7 days), while female hired labour found to spent maximum number of labour days in shed management (1.2 days) & fodder management (1.1 day) activities. At overall level, an average dairy owner found to spend 122.9 & 85.9 minutes/person/day of male & female respectively in various dairy activities. Amongst various dairy activities a male person used to spent more minutes in shed management (48.7 minutes) followed by milking (37.5 minutes) & fodder management (36.7 minutes), while an average female person spent more time in shed management (43.0 minutes) fodder management & (42.9 minutes).

Table 5.9: Labour use pattern DCS HH

S. No.	Particulars	Involvement of Rural Men & Women in Dairy activities -DCS															
		No. of Workers / Day								Total Minutes Worked / Person / Day							
		Male				Female				Male				Female			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
A		**Family Labour**															
1	Fodder Management	1.4	1.1	1.3	1.3	0.8	1.0	0.9	0.9	14.3	31.4	36.3	27.3	20.4	33.8	46.6	33.6
2	Shed Management	1.0	0.9	1.0	1.0	1.2	1.5	1.1	1.3	23.6	43.8	56.0	41.1	22.4	33.0	33.2	29.5
3	Milking	1.1	1.3	1.8	1.4	0.8	1.0	0.3	0.7	25.2	30.4	63.0	39.5	6.3	30.8	36.1	24.4
4	Animal Health	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Labour Rate *	**200**				**150**											
B		**Hired Labour**															
1	Fodder Management	0.8	1.1	1.2	1.0	0.9	1.1	1.1	1.1	22.4	40.3	47.5	36.7	30.3	41.5	56.8	42.9
2	Shed Management	0.3	0.8	1.1	0.7	1.3	1.0	1.3	1.2	36.3	47.4	62.3	48.7	33.6	44.6	50.9	43.0
3	Milking	0.0	1.0	1.2	0.7	0.0	0.0	0.0	0.0	0.0	45.5	67.0	37.5	0.0	0.0	0.0	0.0
4	Animal Health	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Labour Rate *	**250**				**180**											

* (Rs./Day) Male/Female

5.6.2 Non-Dairy Co-Operative Society

Family as well as hired rural men & women involved in dairy activities viz. fodder management, shed management, milking, animal health labour & prevailing rate of male & female labours were also identified for NDCS respondents across different size of dairy farms in the area under study and presented in table 5.10.

5.6.2.1 Family Labour

At overall level, an average respondent found to 3.3 & 2.7 male & female family labour as days respectively in different dairy activities. Amongst different dairy activities, they were found to spent maximum male days in milking (1.2 days) followed by fodder management (1.1 days) & shed management (1.2 days), while female family labour were found to spent maximum number of labour days in fodder management (1 day), shed management (1 day) & milking (0.7 days) activities. At overall level an average dairy owner found to spend only 106.1 & 87.3 minutes/ person/day of male & female, respectively in various dairy activities. Amongst various dairy activities, a male person was found to spent more minutes in milking (40.3 minutes) followed by shed management (40.2 minutes) & fodder management (25.6 minutes), while an average female person spent more time in fodder management (32.4 minutes) followed by shed management (28.8 minutes) & milking (26.1 minutes).

5.6.2.2 Hired Labour

At overall level an average respondent found to use 4.4 & 3.9 male & female hired labour days, respectively in different dairy activities. Amongst different dairy activities they were found to spent maximum male days in milking (2 days) followed by fodder management (1.2 days) & shed management (1.2 days), while female hired labour found to spent maximum number of labour days in shed management (1.6 day) fodder management (1.2 day), & milking (1.1 days) activities. At overall level, an average dairy owner found to spend only 123.4 & 72.3 minutes/ person/day of male & female respectively in various dairy activities. Amongst various dairy activities a male person used to spent more minutes in milking (47.3 minutes) followed by shed management (43.7 minutes) & fodder management (32.4 minutes), while an average female person spent more time in fodder management (37.2 minutes) followed by shed management (31.6 minutes) & milking (3.5 minutes).

Hence, it is observed from the above results that on an average a dairy owner respondent earn approximately 3 days (male) and 3 days (female) per day employment irrespective to DCS/NDCS or small/medium and large size group. The main activities of employment were found to be fodder management followed by shed management milking. None of the respondents was found to spend their time on animal health.

5.7 Expenses on veterinary & breeding activities

The details of veterinary & breeding expenditure incurred in the last year in local cow, cross breed cow & buffalo across different size of dairy farms for DCS & NDCS respondents were also analyzed in the area under study.

Table 5.10: Labour use pattern -NDCS HH

S. No.	Particulars	Involvement of Rural Men & Women in Dairy activities -NDCS															
		No. of Workers / Day								Total Minutes Worked / Person / Day							
		Male				Female				Male				Female			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
A	**Family Labour**																
1	Fodder Management	0.5	1.1	1.6	1.1	1.0	1.0	1.0	1.0	12.3	29.6	35.0	25.6	21.1	30.0	46.1	32.4
2	Shed Management	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	22.0	42.6	56.1	40.2	22.6	32.9	31.0	28.8
3	Milking	1.0	1.0	1.6	1.2	0.0	1.0	1.0	0.7	22.9	25.9	62.0	40.3	0.0	37.5	40.8	26.1
4	Animal Health	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Labour Rate* (Rs)	**260**				**180**											
B	**Hired Labour**																
1	Fodder Management	1.2	1.5	1.0	1.2	1.0	1.4	1.3	1.2	20.1	36.9	40.2	32.4	18.3	45.0	48.2	37.2
2	Shed Management	1.1	1.2	1.4	1.2	1.8	1.2	1.7	1.6	28.5	47.2	55.5	43.7	21.9	33.3	39.7	31.6
3	Milking	1.7	2.0	2.4	2.0	1.0	1.3	1.0	1.1	32.2	44.0	65.8	47.3	0.0	10.6	0.0	3.5
4	Animal Health	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Labour Rate* (Rs)	**300**				**210**											

* (Rs./Day) Male/Female

5.7.1 Dairy Co-Operative Society

The details of veterinary & breeding expenditure incurred in the last year in local cow, cross breed cow & buffalo across different size of dairy farms for DCS respondents was analyzed & presented in Table (5.11).

It is observed from the data that an average DCS farmer reported that he did not spend for vaccination as these facilities were make available by the Dairy Cooperative Society to the dairy owner at free of cost. Although he used medicine of only Rs. 1.6 (Small) to Rs. 2.1 (Large) Rs.1.7 (Small) to Rs 2.3 (Large) & Rs. 0.80 (Small) to Rs. 0.83 (Large) per year for treatment of local cow, cross breed cow & buffalo respectively.

Table 5.11: Details of veterinary & breeding expenditure during last one year DCS households (kg/Animal/day)

S. No.	Particulars	Local Cow				Crossbreed Cow				Buffalo			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
A	Vaccination												
	HS	-	-	-	-	-	-	-	-	-	-	-	-
	BQ	-	-	-	-	-	-	-	-	-	-	-	-
	FMD	-	-	-	-	-	-	-	-	-	-	-	-
B	Medicines + Doctor(Rs.)	1.6	1.8	2.1	1.8	1.7	1.9	2.3	2.0	0.8	0.81	0.83	0.8
C	Av. No. of Visit By Vet./Year	-	-	-	-	-	-	-	-	-	-	-	-
D	Service												
	Artificial Insemination	-	-	-	-	-	-	-	-	-	-	-	-
	Natural service	1.6	1.6	1.4	1.5	0.0	0.0	0.0	0.0	1.2	1.3	1.2	1.2
	Amount	299	293	315	302	0	0	0	0	300	300	300	300
E	No. of AI Per conception	-	-	-	-	-	-	-	-	-	-	-	-
F	Per visit rate paid to vet. Doctor (Rs/visit)	156	144	132	144	200	167	175	181	100	126	118	115

The majority of dairy owners were found to use natural services instead of artificial insemination. An average sample respondent for serviced his local cow & buffalo 2 and 1 times respectively in a year & spend Rs. 302(local cow) & Rs. 300 (buffalo) per year as service charge. On an average he used to pay also paid only Rs.156 (Small) to Rs. 132 (Large), Rs. 200 (Small) to Rs. 175 (Large) & Rs. 100 (Small) to Rs.118 (Large) per year for visit of doctor for treatment of their local cows, cross breed cows & buffaloes respectively.

5.7.2 Non-Dairy Co-Operative Society

The details of veterinary & breeding expenditure incurred in the last year in local cow, cross breed cow & buffalo across different size of dairy farms for NDCS respondents was analyzed and presented in Table (5.12).

Table 5.12: Details of veterinary & breeding expenditure during last one year NDCS households (kg/Animal/day)

S. No.	Particulars	Local Cow				Crossbreed Cow				Buffalo			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
A	Vaccination												
	HS	-	-	-	-	-	-	-	-	-	-	-	-
	BQ	-	-	-	-	-	-	-	-	-	-	-	-
	FMD	-	-	-	-	-	-	-	-	-	-	-	-
B	Medicines + Doctor(Rs.)	180	208	230	206	250	230	275	252	140	108	170	139
C	Av. No. of Visit By Vet./Year	-	-	-	-	-	-	-	-	-	-	-	-
D	Service												
	Artificial Insemination	0	1	1	1	-	-	-	-	1	1	1	1
	Natural service	1.5	2	2.3	2	-	-	-	-	1	1	1	1
	Amount	360	310	350	340	-	-	-	-	240	200	260	250
E	No. of AI Per conception	1	2	3	2	-	-	-	-	1	1	1	1
F	Per visit rate paid to vet. Doctor (Rs/visit)	250	200	250	233	180	160	200	180	200	200	250	217

It is observed from the data that an average NDCS farmer reported that he did not spend for vaccination as these facilities are made available by the State Government in veterinary hospitals at free of cost. Although he used medicine of only Rs. 180 (Small) to Rs. 230 (Large) Rs. 250 (Small) to Rs. 275 (Large) & Rs. 140 (Small) to Rs. 170 (Large) per year for treatment of local cow, cross breed cow & buffalo, respectively. The majority of dairy owner were found to prefer natural services instead of artificial insemination. On an average sample respondent for serviced his local cow & buffalo 2.0 & 1.0 times respectively in a year & spend Rs. 340 (local cow) & Rs. 250 (buffalo) per year as service charge.

On an average he be also paid Rs. 250 (Small) to Rs. 250 (Large), Rs. 180 (Small) to Rs. 200 (Large) & Rs. 200 (Small) to Rs. 250 (Large) per year for visit of doctor for treatment of their local cows, cross breed cows & buffaloes respectively.

Thus it is from the above results that more than 60 per cent respondents were awared from different vaccination, artificial insemination and dairy development programmes of the State Govt. Cent per cent DCS respondents reported that main sources of information was dairy cooperative societies, while majority of NDCS respondents reported their main sources of information was nighbour (38.3%) followed by media (30.0%).

5.8 Season-wise milk yield

Season-wise milk yield of local cow, cross breed cow & buffaloes per day in case of selected HHs was also observed both for DCS & NDCS respondents & presented in Table 5.13

Table 5.13: Season-wise milk yield (Per day) of Selected HH

Season	Local Cow				Crossbred Cow				Buffalo			
	Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
	DCS											
Rainy	2.81	2.92	2.98	2.90	4.63	4.80	5.50	4.98	4.63	4.41	4.09	4.37
Winter	2.32	2.30	2.30	2.30	3.25	3.17	4.13	3.51	2.38	2.44	2.57	2.46
Summer	1.12	1.09	1.02	1.08	1.75	0.67	1.38	1.26	0.63	0.67	1.36	0.88
	NDCS											
Rainy	1.50	1.20	1.36	1.35	4.00	4.56	4.06	4.21	3.66	4.07	5.01	4.25
Winter	1.00	0.91	1.00	0.97	4.00	3.38	3.11	3.50	2.94	2.96	3.74	3.21
Summer	0.94	0.48	0.62	0.68	2.21	2.61	2.11	2.31	2.28	1.96	2.78	2.34

It is observed from the data that the milk obtained through local cows, cross breed cows & buffaloes were found to be more in rainy season as compared to winter & summer season amongst both the respondents whether related to DCS & NDCS across different size of dairy farms. Amongst different species of cattle cross breed cows gave more milk in all seasons as compared to buffaloes & local cow in dairy farms of DCS respondents, while buffaloes gave more milk in all the season as compared to cross breed & local cow in NDCS respondents dairy farms. However, cross breed cow (3.50 l/day) gave more milk as compared to buffaloes (3.21 l/day) in winter season in case of dairy farm related to NDCS respondents.

5.9 Awareness about various schemes

The awareness about various schemes/ programmes amongst different sample respondents related to DCS & NDCS & their sources of information have also been recorded during the course of investigation across different size of dairy farms in the area under study.

5.9.1 Dairy Co-Operative Society

The awareness about various schemes/ programmes amongst different sample respondent related to DCS & their sources of information have been recorded during the course of investigation across different size of dairy farm & presented in Table 5.14

It is observed from the data that out of total respondents 78.3, 82.5 & 94.2 per-cent were found to be aware about different vaccinations, artificial insemination & dairy development schemes/ programmes of State Government. Cent per-cent of them were reported Dairy Cooperative Society their main source of information. The 48.3 per-cent HHs related to DCS reported that they were got benefited from Dairy Development Schemes. They were found to visit 2 times in a year to concern office of the Dairy & invested approximately Rs.204/year for their visit. Cent per-cent dairy owners also reported that quality of material, which they got in Dairy Development Programmes of good quality &

they were satisfied with the benefit that they availed from milk cooperative societies.

5.9.2 Non-Dairy Co-Operative Society

The awareness about various schemes/ programmes amongst different sample respondents related to NDCS & their sources of information have also been recorded during the course of investigation across different size of dairy farms & presented in Table 5.14

Table 5.14: Awareness about various schemes

S. No.	Particulars		DCS				NDCS			
			Small	Medium	Large	Average	Small	Medium	Large	Average
1.	Awareness about different Vaccinations schemes /programmes(%)	Yes	77.5	82.5	75.0	78.3	55.0	52.5	77.5	61.7
		No	22.5	17.5	25.0	21.7	45.0	47.5	22.5	38.3
2.	Awareness about Artificial Insemination (AI) programmes (%)	Yes	70.0	85.0	92.5	82.5	70.0	80.0	72.5	74.2
		No	30.0	15.0	7.5	17.5	30.0	20.0	27.5	25.8
3.	Awareness about any dairy development scheme /programmes(%)	Yes	95.0	90.0	97.5	94.2	10.0	47.5	42.5	33.3
		No	5.0	10.0	2.5	5.8	90.0	52.5	57.5	66.7
4.	Sources of information about these scheme (%)									
a)	Govt. Animal Husbandry Department		0.0	0.0	0.0	0.0	15.0	25.0	22.5	20.8
b)	Dairy Cooperative/Milk Union		100.0	100.0	100.0	100.0	5.0	10.0	17.5	10.8
c)	Media (Press/TV)		0.0	0.0	0.0	0.0	30.0	27.5	32.5	30.0
d)	Fellow farmer/dairy owner/neighbour		0.0	0.0	0.0	0.0	50.0	37.5	27.5	38.3
5.	Have you benefited with any dairy development scheme/ programmes(%)	Yes	52.5	47.5	45.0	48.3	0	0	0	0
		No	47.5	52.5	55.0	51.7	100	100	100	100
a)	If benefited, please provide following									
i)	Av. No. of visits to concern office		2.10	1.83	2.20	2.04	-	-	-	-
ii)	Wage days lost, if any (Rs.)		194	187	230	204	-	-	-	-
iii)	Total Expenditure to avail scheme (doc/travel/etc)		-	-	-	-	-	-	-	-
iv)	Bribe paid to any one		-	-	-	-	-	-	-	-
v)	Quality of material received	Good	100	100	100	100	-	-	-	-
		Bad	0	0	0	0	-	-	-	-
v)	Satisfied with benefit received (%)	Yes	100	100	100	100	-	-	-	-
		No	0	0	0	0	-	-	-	-

It is observed from the data that out of total respondents 61.7, 74.2 & 33.3 per-cent were found to aware about different vaccination, artificial insemination & Dairy Development Schemes/ programmes of State Government, The majority of them reported that their source of information was follow farmers/dairy owners/neighbor (38.3 %) followed by media (30.0%), Government Animal Hospitals (20.8%) and Dairy Co-Operative Societies (10.8%). None of the respondents related to NDCS reported that they were benefited from Dairy Development Scheme. They were not found to be visited office of dairy.

5.10 Cost of Production of Milk Production

The cost of production of milk and return received by the respondents related to DCS and NDCS have been analyzed across different size of dairy farms.

5.10.1 Dairy Cooperative Society

The cost of production of milk and return received from rearing of local cow, cross bred cow and buffalo by the respondents related to DCS have been analyzed across different size of dairy farms and presented in table 5.15.

It is observed from the data that amongst different types of species the total cost of milk at over all level was found to be more in case of buffalo (Rs. 21.3/day) as compared to Cross bred cow (Rs.18.8/day) and local cow (Rs. 13.10/day),while the cost of production per liter of milk was found to more in local cow (Rs.9.60/l) as compared to buffalo (Rs. 8.50/l) and cross bred cow (Rs. 7.2/l) in the dairy farms related to DCS. Amongst different types of species an average respondent related to DCS found to obtained more net profit per day from selling of the milk of buffalo (Rs. 40.2/day) as compared to cross bred cow (Rs. 40.0/day) and local cow (Rs. 16.9/day). However, he found to received more benefit from the investment of Re.1.00 from cross breed cow milk (Rs. 3.10) as compared to buffalo milk (Rs.2.90) and local cow milk (Rs. 2.30). Hence, rearing of cross breed cows was found to be more economical as compared to buffalo and local cow in the area under study. The similar results were found across various sizes of dairy farms with minor variations.

5.10.2 Non Dairy Cooperative Society

The cost of production of milk and return received from rearing of local cow, cross bred cow and buffalo by the respondents related to NDCS have been analyzed across different size of dairy farms and presented in table 5.16.

It is observed from the data that amongst different types of species the total cost of milk at over all level was found to be more in case of buffalo (Rs. 25.0/day) as compared to cross bred cow (Rs.24.2/day) and local cow (Rs. 14.7/day), while the cost of production per liter of milk was found to more in cross bred cow (Rs.21.7/l) as compared to buffalo (Rs. 21.5/l) and local cow (Rs. 12.4/l) in the dairy farms related to NDCS. Amongst different types of species an average respondents related to NDCS found to obtained more net profit per day from selling of the milk of buffalo (Rs. 73.5/day) as compared to cross bred cow (Rs.

Table 5.15: Cost of milk production and net returns at different size of dairy farms related to- DCS households (Rs./Animal/Day)

S. No.	Particulars		Local Cow				Cross Cow				Buffalo			
			Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
1	Dry Fodder		2.5	2.1	2.3	2.3	3.3	3.8	3.8	3.6	3.1	3.3	4.2	3.5
2	Green Fodder		1.3	1.8	1.7	1.6	2.6	2.9	3.3	2.9	4.2	4.1	3.6	4.0
3	Concentrates		1.4	1.8	1.5	1.6	2.0	2.7	3.0	2.6	2.3	2.2	2.5	2.3
4	Supplements		1.0	0.8	0.5	0.8	1.5	1.8	2.2	1.3	1.2	1.8	2.1	1.7
5	Total Feed &Fodder		6.2	6.5	6.0	6.2	9.4	11.2	12.3	10.4	10.8	11.4	12.4	11.5
6	Labour (Rs./day)	Male	3.5	3.8	4.2	3.8	2.7	2.4	3.1	2.7	3.9	4.4	4.5	4.3
		Female	2.3	2.5	2.2	2.3	1.6	1.2	2.8	1.9	2.6	2.8	3.2	2.9
		Total Labour	5.8	6.3	6.4	6.2	4.3	3.6	5.9	4.6	6.5	7.2	7.7	7.1
7	Veterinary cost		0.3	0.2	0.6	0.4	2.3	3.0	3.5	2.9	1.8	2.0	2.8	2.2
8	Transportation Cost		0.2	0.4	0.4	0.3	0.2	0.3	0.4	0.3	0.5	0.6	0.3	0.5
9	Total Cost		12.5 (10.5)	13.4 (10.4)	13.4 (9.6)	13.1 (10.2)	16.2 (8.6)	18.1 (7.4)	22.1 (5.9)	18.8 (7.3)	19.6 (9.2)	21.2 (8.8)	23.2 (8.5)	21.3 (8.8)
10	Milk Production (L/Animal)		1.2	1.3	1.4	1.3	1.9	2.5	3.9	2.8	2.2	2.5	2.8	2.5
11	Returns from Milk Production (Rs./day)		27 (22.5)	29.3 (22.5)	31.5 (22.5)	29.3 (22.5)	39.9 (21.0)	52.1 (20.8)	80.9 (20.8)	58.4 (20.9)	57.2 (26.0)	66.1 (26.5)	76.2 (27.2)	60.7 (24.3)
12	Income from Dung (Rs./day)		0.5	0.8	0.9	0.7	0.3	0.2	0.7	0.4	0.7	0.8	1.1	0.9
13	Gross Income (Rs./day)		27.5 (22.9)	30.1 (23.1)	32.4 (23.1)	30 (23.1)	40.2 (21.2)	52.3 (20.9)	81.6 (20.9)	58.8 (21)	57.9 (26.3)	66.9 (26.8)	77.3 (27.6)	61.5 (24.6)
14	Cost of Production (Rs./l)		10.1	9.8	9.0	9.6	8.4	7.3	5.7	7.2	8.9	8.5	8.1	8.5
15	Net Return/Profit		15 (12.5)	16.7 (12.7)	19.1 (13.5)	16.9 (12.9)	24.0 (12.5)	34.2 (13.5)	59.5 (15)	40 (13.7)	38.3 (17.1)	45.7 (17.9)	54.1 (19.1)	40.2 (15.8)
16	Benefit Cost Ratio		2.2	2.2	2.4	2.3	2.5	2.9	3.7	3.1	3	3.2	3.3	2.9

Figure in parenthesis shows Rs. /l.

Table 5.16: Cost of milk production and net returns at different size of dairy farms related to-NDCS households

S. No.	Particulars	Local Cow				Cross Cow				Buffalo			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
1	Dry Fodder	2.7	2.9	2.7	2.8	3.8	4.2	4.4	4.1	4.1	3.8	4.1	4.0
2	Green Fodder	1.5	1.3	1.8	1.5	3.1	3.3	3.5	3.3	3.8	4.0	3.5	3.8
3	Concentrates	1.3	1.4	1.7	1.5	2.5	3.4	3.5	3.1	2.2	3.1	2.3	2.5
4	Supplements	0.7	0.5	1.5	0.9	2.0	2.1	2.5	1.3	2.2	2.3	1.5	2.0
5	Total Feed &Fodder	6.2	6.1	7.7	6.7	11.4	13	13.9	11.9	12.3	13.2	11.4	12.3
6	Labour (Rs./day) Male	3.7	3.5	3.0	3.4	3.3	4.5	4.2	4.0	4.1	4.7	4.9	4.6
	Female	2.6	2.2	2.5	2.4	2.8	3.7	3.0	3.2	3.3	3.6	3.8	3.6
	Total Labour	6.3	5.7	5.5	5.8	6.1	8.2	7.2	7.2	7.4	8.3	8.7	8.1
7	Veterinary cost	1.2	1.1	1.3	1.2	1.8	2.5	2.6	2.3	2.0	1.8	2.7	2.2
8	Transportation Cost	1.2	1.1	0.8	1.0	1.7	1.8	2.4	2.0	2.2	2.3	2.6	2.4
9	Total Cost	14.9 (11.5)	14.0 (11.7)	15.3 (11.8)	14.7 (11.3)	21.0 (6.6)	25.5 (6.5)	26.1 (6.7)	24.2 (6.5)	23.9 (8.2)	25.6 (8)	25.4 (7.9)	25.0 (8.1)
10	Milk Production (L/Animal)	1.3	1.2	1.3	1.3	3.2	3.9	3.9	3.7	2.9	3.2	3.2	3.1
11	Returns from Milk Production (Rs./day)	29.8 (22.9)	28.3 (23.6)	31.1 (23.9)	30.5 (23.5)	79.1 (24.7)	99.5 (25.5)	100.5 (25.8)	93.7 (25.3)	86.3 (29.8)	98.2 (30.7)	100.9 (31.5)	95.0 (30.7)
12	Income from Dung (Rs./day)	1.4	2.2	3.5	2.4	1.6	2.5	3.3	2.5	3.1	3.5	3.8	3.5
13	Gross Income (Rs./day)	31.2 (24)	30.5 (25.4)	34.6 (26.6)	32.9 (25.3)	80.7 (25.2)	102 (26.1)	103.8 (26.6)	96.2 (26)	89.4 (30.8)	101.7 (31.8)	104.7 (32.7)	98.5 (31.8)
14	Cost of Production (Rs./l)	13.5	11.8	11.8	12.4	19.4	23	22.8	21.7	20.8	22.1	21.6	21.5
15	Net Return/Profit	16.3 (12.6)	16.5 (13.8)	19.3 (14.8)	18.2 (14)	59.7 (18.6)	76.5 (19.6)	77.7 (19.9)	72.0 (19.5)	65.5 (22.6)	76.1 (23.8)	79.3 (24.8)	73.5 (23.7)

Figure in parenthesis shows Rs./l.

72.2/day) and local cow (Rs. 18.2/day). He also found to receive more benefit from the investment of Re.1.00 from cross breed cow milk (Rs. 4.00) as compared to buffalo milk (Rs.3.0) and local cow milk (Rs. 2.20). Hence, rearing of cross breed cows was found to be more economical as compared to buffalo and local cow also in farms of NDCS respondents in the area under study. The similar results were found across various sizes of dairy farms with minor variations.

It is concluded from the above results that raring of cross bread cows was found more economical as compared to buffalos and local cows across different size of farms, whether related to DCS and NDCS respondents.

5.11 Summary of the Chapter

The chapter deals with the herd strength, breed-able animals, labour use information, expenses on feed & fodder, vety. and breeding. The chapter also highlighted the awareness of various dairy development schemes and across different types of milk producers and cost of milk in various dairy farms related to DCS and NDCS. The following findings are emerged from the analysis of data.

The herd strength and types, no. of cattle sheds and present value of cattle shed a crossed different size of dairy farms related to DCS & NDCS indicates that at over all level the population of local cows (4.17 & 4.01) was found to be more as compare to buffaloes (1.38 & 3.68), cross breed cows (0.28 & 0.89) and others (0.72 &1.24) with 65.7 & 38.2, 57.1 & 50.6, 55.1 & 53.5, and 56.0 & 0 percent milch animals, respectively.

At over all level on average small, medium and large size dairy farms have 3.13 & 5.13, 5.38 & 8.38, 11.3 & 15.28 animals at their farms out of which milch cattle were found to be 46.3 & 25.72, 62.8 & 43.11 and 55.3 & 44.17 percent in case of DCS & NDCS respondents, respectively.

The majority of respondents whether related to DCS or NDCS have deshi, Sahiwal, Gir, Tharparker, Hariyana, Redsindhi & Kosali breed of local/ indigenous cows. Some of them were found to rear Jersey, Holstein & Ongole Crossbreed Cows. In buffaloes Murrah, Surti, Nagpuri, Niliravi, Mehsana & Deshi breed were found to be common breed in the study area.

The feature of breedable animals viz. age at 1st calving, lactation order, length of lactation period, peak yield at last and previous lactation among different species such as local cow, cross breed and buffalo on an average at overall were found to be 6.6, 6.8, and 6.8 years with 36.1,37.9 and 47 months at Ist calving and IIIrd lactation order with length of lactation period of 189.1, 224.1 and 262.5 days including peak yield at last (1.3,3.0 and 2.5) and previous (1.7,3.8 and 3.3) lactation in case of DCS, respectively. While in NDCS it was found to be average at overall were found to be 6.3, 5.9, and 7.0 years with 34.1,39.1 and 48.3 months at Ist calving and IVth lactation order except buffalo with length of lactation period of 164.3, 233.0 and 268.6 days including peak yield at last (1.4,3.7 and 3.2) and previous (1.8,4.9 and 4.4).

Major sources of water availability during rainy and winter season in case of DCS was found to be tube well (58.33%), followed by open well (26.67%) and village talawadi (15%). An average HHs used to cover 203.08 m distance to carry water, while in summer season the major source of water availability for dairy purpose was found to be village talawadi (8.20%) followed by open well (10.83%) and tube well (6.67%) and the distance cover carry water was found to be 526.42 m. The alternative source of water supply in across all the season was found to be village talawadi followed by tube well.

In case of NDCS the major sources of water availability for dairy purpose was found to be tube well (43.33%) followed by village talawadi (25.00%), open well (16%) and canal (16%) during rainy and winter season with an average distance of about 200 meters to carry water. During summer season the major source of water availability was found to be tube well (56.67%) followed by open well (22.5%), village talawadi (12.50%) and canal (8.33%) with an average distance of 130 meter to carry water. The alternative source of water supply during rainy season was found to be tube well (50%) followed by village talawadi (29.17%) open well (16.67%) and canal (4.17%), during the winter season tube well (79.17 %) followed by Open well (12.50%) village talawadi (7.50%) and canal (0.83 %) while in summer season it was tube well (83.33 %) followed by open well (15.83%) & canal (0.83%).

The majority of HHs reported that the supply of water during all the season was found to be adequate and of normal quality. An average respondent reported to fed 15.7, 11.1 and 11.7 kg./animal/day of green fodder, 4.6, 5.1, and 7.2 kg/ animal/day dry fodder & 1.0, 1.5 and 2.1 kg/animal/day concentrates to the local cow, cross breed cow and buffalo, respectively in case of DCS. While in NDCS an average respondent reported to fed 16.1, 5.9 & 0.9; 18.7, 8.9 & 1.6; 22.9, 13.2 & 2.3 kg/animal/day green fodder, dry fodder and concentrates to local cow, cross breed cow and buffalo, respectively. An average bovine was fed 8 kg/day grasses grazing in both the case of DCS & NDCS.

An average a dairy owner respondents earn approximately 3 days (male) and 3 days (female) per day employment irrespective to DCS/NDCS or small/medium and large size group. The main activities of employment were found to be fodder management followed by shed management milk by. None of the respondents was found to spend their time on animal health.

An average DCS farmers reported that they did not expend for vaccination as these facilities made available by Dairy Co-Operative Societies at free of cost, the same with the case of NDCS where it is made available by the State Government & Veterinary Hospitals. The medicine only Rs.1.8, Rs. 2.0 & Rs. 0.8 in case of DCS and Rs. 206, Rs. 252 & Rs. 139 in case of NDCS were used in local cow, cross breed cow & buffaloes, respectively.

The majority of dairy owners were found to use natural services instead of artificial insemination. On an average a HH serviced his

local cow & buffalo 2.0 & 1.0 times respectively in a year & spend Rs. 340 (local cow) & Rs. 250 (buffalo) per year as service charge. On an average he found to be spend Rs. 115-233/ year for visit of doctor for treatment of their local cow, cross breed and buffaloes, respectively. The milk obtained through local cows, cross breed cows & buffaloes were found to be more in rainy season as compared to winter & summer season amongst both the respondents whether related to DCS & NDCS across different size of dairy farms.

Amongst different species of cattle cross breed cows gave more milk in all seasons as compared to buffaloes & local cow in dairy farms of DCS respondents, while buffaloes gave more milk in all the season as compared to cross breed & local cow in NDCS respondents dairy farms. However cross breed cow (3.50 l/day) gave more milk as compared to buffaloes (3.21 l/day) in winter season in case of dairy farm related to NDCS respondents.

Out of total respondents more than 60 per cent were awared from different vaccination, artificial insemination and dairy development programmes of the State Govt. Cent per cent DCS respondents reported that main sources of information was dairy cooperative societies, while majority of NDCS respondents reported their main sources of information was neighbour (38.3%) followed by media (30.0%).

Raring of cross bread cows was found more economical as compared to buffalos and local cows across different size of farms, whether related to DCS and NDCS respondents.

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CHAPTER-VI

PRODUCTION & MARKETING OF MILK

This chapter deals with production and use of milk marketing & income received from dairying and by products across different size of dairy farms in the area under study.

6.1 Production and Use of Milk

Total milk production of local cow, cross breed cow and buffalo & its uses across different size of dairy farms related to DCS and NDCS have been analyzed and presented is Table 6.1.

6.1.1 Local Cow

It is observed from the data that on an average at overall level total milk production of local cows was found to be more in farms of DCS respondents (145.10l/day) as compared to NDCS respondents (78.6l/day). They were also found to use less milk of local cows at home (12.7%) as compared to NDCS (25.5%), while sold out more milk in market (87.3%) as compared to NDCS (74.5%). However, the processing in local cow milk was found more in respondents related to NDCS (65.2%) as compared to DCS (39.1%). The similar findings have been observed in different size of dairy farms with minor variations.

6.1.2 Cross Breed Cow

On an average at overall level total cross breed cow milk production of sample respondents with respect to NDCS (69.2l/day) was found more as compared to DCS (22.1l/day), as HHs related to DCS(7.5%) were found to used less milk of cross breed cow at home as compared to NDCS(11.0%) and sold out more milk(92.5%) as compared to NDCS(89.0%). They used to process more milk (60%) as compared to NDCS (54.80%). The similar findings have been observed in different size of dairy farms with minor variations.

6.1.3 Buffalo

In case of buffalo on average total milk production of respondents related to NDCS (249.0l/day) was found to be more as compared to DCS (80.6l/day) respondents at overall level. The respondents related to DCS (21.8%) were found to consume more buffalo milk as compared to NDCS (8.1%) and marketed less milk (78.2%) as compared to NDCS (91.9%).

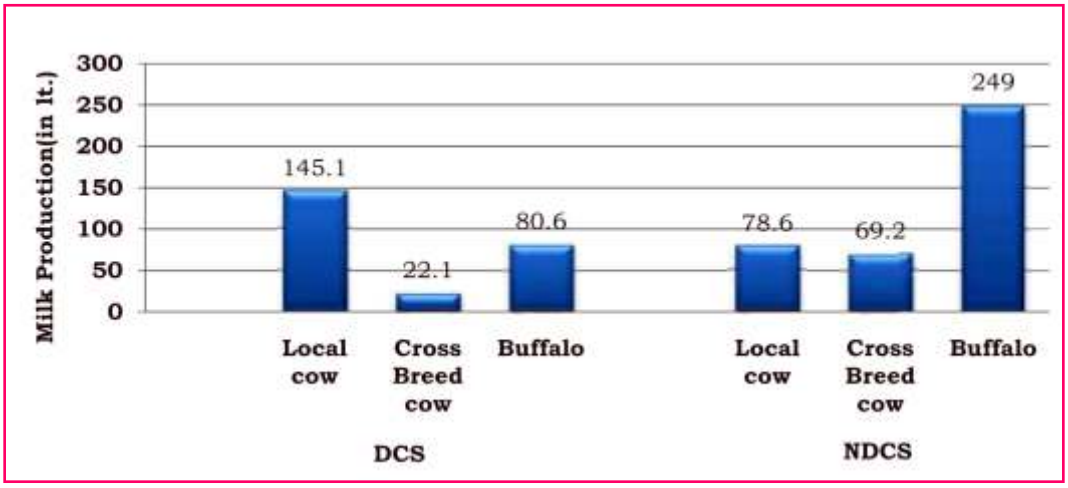

Fig.6.1: Total milk production of various species of cattle (lt.)

Table 6.1: Production and use of milk (l/Day)

S. No.	Particulars	Local Cow				Crossbred Cow				Buffalo			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
	DCS												
1	Milk Drawn/Animal (l)	1.2	1.3	1.4	1.3	1.9	2.5	3.9	2.8	2.2	2.5	2.8	2.5
2	Total Milk Production (l)	57	143	235.5	145.1	9.5	9.8	47	22.1	13	58.2	170.5	80.6
A	Use of Milk at Home (l)	8.9 (15.6)	20 .0 (14.0)	26.4 (11.2)	18.4 (12.7)	4 .0 (42.1)	1 (10.2)	0 (0.0)	1.7 (7.5)	4.5 (34.6)	11.2 (19.2)	37 (21.7)	17.6 (21.8)
I	For Direct Consumption (%)	7.19 /80.9/	12.8 /64.0/	13.7 /51.9/	11.23 /60.9/	1.5 /37.5/	0.5 /50.0/	0 /0.0/	0.67 /40.0/	0.5 /11.1/	3.7 /33.0/	9.9 /26.8/	4.7 /26.8/
Ii	For Processing (%)	1.7 /19.1/	7.2 /36.0/	12.7 /48.1/	7.2 /39.1/	2.5 /62.5/	0.5 /50.0/	0 /0.0/	1 /60.0/	4 /88.9/	7.5 /67.0/	27.1 /73.2/	12.87 /73.2/
B	Raw/Liquid Milk Sold (l)	48.1 (84.4)	123 (86)	209.1 (88.8)	126.7 (87.3)	5.5 (57.9)	8.8 (89.8)	47 (100)	20.4 (92.5)	8.5 (65.4)	47 (80.8)	133.5 (78.3)	63 (78.2)
	NDCS												
1	Milk Drawn/Animal (l)	1.3	1.2	1.3	1.3	3.2	3.9	3.9	3.7	2.9	3.2	3.2	3.1
2	Total Milk Production (l)	14.1	43	178.9	78.6	22.5	82.5	102.5	69.2	123	274	350.1	249
A	Use of Milk at Home (l)	4.3 (30.4)	12.1 (28.1)	46.3 (25.9)	20.1 (25.5)	3 (13.3)	9.5 (11.5)	10.3 (10.0)	7.6 (11.0)	6 (4.9)	28.3 (10.3)	26 (7.4)	20.1 (8.1)
I	For Direct Consumption (%)	1.75 /41.2/	3.1 /25.6/	17 /36.7/	6.98 /34.8/	2 /66.7/	3.5 /36.8/	4.8 /46.6/	3.43 /45.2/	1.5 /25/	10.3 /36.4/	8.5 /32.7/	6.77 /33.7/
Ii	For Processing (%)	2.5 /58.8/	9 /74.4/	29.3 /63.3/	13.1 /65.2/	1 /33.3/	6 /63.2/	5.5 /53.4/	4.17 /54.8/	4.5 /75/	18 /63.6/	17.5 /67.3/	13.33 /66.3/
B	Raw/Liquid Milk Sold (l)	9.8 (69.6)	30.9 (71.9)	132.6 (74.1)	58.5 (74.5)	19.5 (86.7)	73 (88.5)	92.2 (90.0)	61.6 (89.0)	117 (95.1)	245.7 (89.7)	324.1 (92.6)	228.9 (91.9)

Figure in brackets show percentage to total milk production, while figure in slashes show percentage to total consumption at home

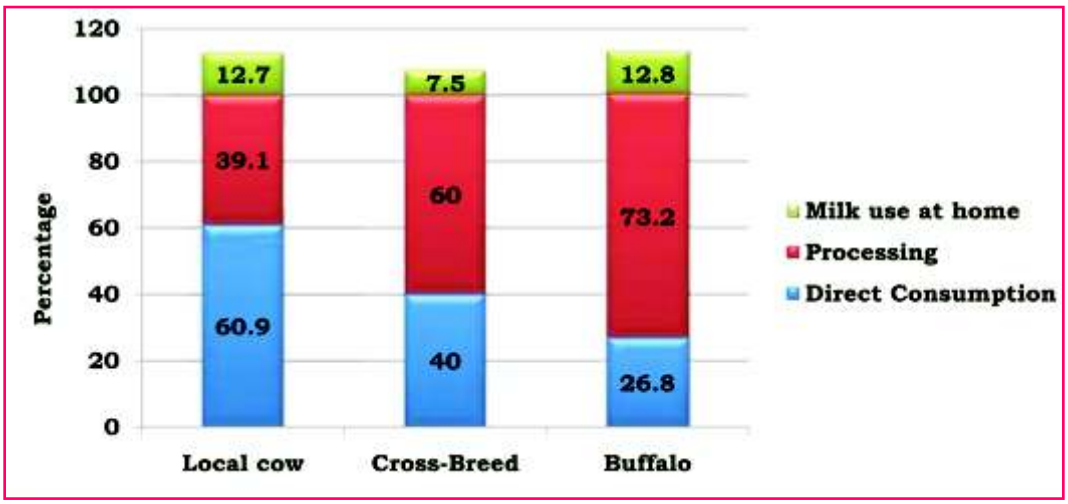

Fig.6.2: Share of the Consumption, Processing and Use of milk at home by DCS Respondent

They were also found to process more milk (73.2%) to total milk production as compared to NDCS (66.3%). As the size of herd increases the total milk production, home consumption, processing and marketing of milk tends to increases across all the species of cattle viz. local cow, cross breed cow and buffalo.

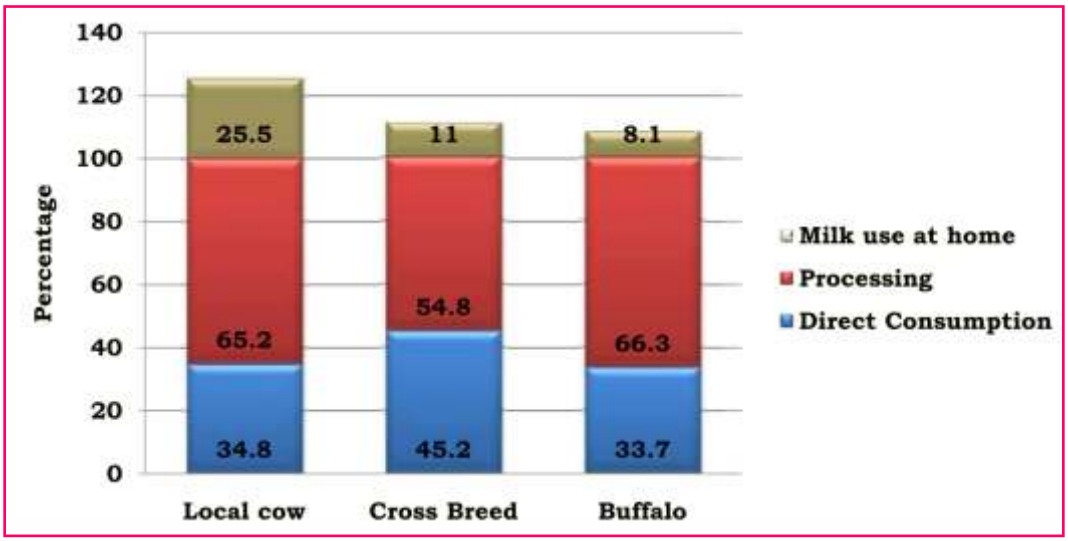

Fig.6.3: Share of the Consumption, Processing and Use of milk at home by NDCS Respondent

On an average at overall level the total milk production of buffalo (249.0l/day) was found to be more as compared to cross breed cow (69.2l/day) and local cow (78.6l/day) in case of NDCS. While in case of DCS total milk production of local cows(145.1l/day) was found to be more as compared to cross breed (22.1l/day) and buffaloes (80.6l/day) in the area under study.

6.2 Marketing of Milk

The marketing of milk has been analyzed for local cow, cross breed cow and buffalo across different size of dairies both for DCS and NDCS respondents.

6.2.1 Local Cow

All the respondents related to DCS were found to sell milk to cooperative societies through milk collection centres, while the majority of NDCS respondents used to sell it to vender / middlemen(32.60%), direct to consumer (23.17%), retail shop(22.77%) and sweet shop /creameries(21.10%). The respondents related to NDCS (Rs.23.49/l) received more price of milk as compared to DCS respondents (Rs.22.50/l). The respondents related to NDCS covered more distance (16.68km) as compared to DCS (0.20km) accordingly the cost of transportation was also found more in marketing of milk through NDCS (Rs.6.60) as compared to DCS (Rs.0.69). The remarkable difference across different size of dairy farms was not found as for as above findings are concerned for both DCS and NDCS respondents.

6.2.2 Cross Breed Cow

All the respondents related to DCS were found to sell cross breed cow milk to cooperative societies through milk collection centres, while the majority of NDCS respondents used to sell milk to vender/ middleman (28.41%), direct to consumer (13.46%), retail shop (33.47%) and sweet shop /creameries (24.67%). The respondents related to NDCS (Rs. 25.33/l) received more price of milk as compared to DCS respondents (Rs. 20.86/l). The respondents related to NDCS (17.72km) covered more distance as compared to DCS (0.18 km) respondents, accordingly the cost of transportation was also found more in marketing of milk through NDCS (Rs.10.23) as compared to DCS (Rs.0.51). The remarkable difference in these findings was not found across different size of dairy farms whether respondents related to DCS or NDCS.

6.2.3 Buffaloes

All the respondents related to DCS were found to sell milk to cooperative societies through milk collection centres, while the majority of NDCS respondents used to sell milk to vender / middleman (42.58%), direct to consumer (12.72%), retail shop (31.15%) and sweet shop/creameries (13.56%). The respondents related to NDCS (Rs.30.60/l) received more price of milk as compared to DCS respondents (Rs. 24.26/l). The respondents related to NDCS (18.12km) used to cover more distance as compared to DCS (0.20km) accordingly the cost of transportation was also found more in marketing of milk through NDCS (Rs.11.29) as compared to DCS (Rs.0.69). The remarkable difference in these finding were not found across different size of dairy farms whether respondents related to DCS or NDCS.

Table 6.2: Marketing of Milk (Rs./l)

Sr. No.	Particulars	Local Cow				Crossbred Cow				Buffalo			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
						DCS							
1	Agencies – Cooperative %	100	100	100	100	100	100	100	100	100	100	100	100
2	Price (Rs./l)	22.5	22.5	22.5	22.5	21	20.83	20.75	20.86	26	26.45	27.23	24.26
3	Payment (%/Daily	-	-	-	-	-	-	-	-	-	-	-	-
	Weekly	100	100	100	100	100	100	100	100	100	100	100	100
	Monthly	-	-	-	-	-	-	-	-	-	-	-	-
	Half Monthly	-	-	-	-	-	-	-	-	-	-	-	-
4	Distance (Km)	0.13	0.25	0.22	0.2	0.12	0.23	0.18	0.18	0.13	0.22	0.24	0.2
5	Transport Cost (Rs./l)	0.6	0.75	0.72	0.69	0.56	0.77	0.2	0.51	0.6	0.72	0.74	0.69
						NDCS							
1	Agencies % Consumer	55.56	8.7	5.26	23.17	28.57	6.25	5.56	13.46	35.29	2.86	0	12.72
	Vendor/Middlemen	22.22	60.87	15.79	32.96	42.86	31.25	11.11	28.41	55.88	57.14	14.71	42.58
	SweetShop/Creameries	22.22	17.39	23.68	21.1	14.29	37.5	22.22	24.67	2.94	17.14	20.59	13.56
	Retail shop	0	13.04	55.26	22.77	14.29	25	61.11	33.47	5.88	22.86	64.71	31.15
2	Price (Rs./l)	22.94	23.61	23.92	23.49	24.71	25.5	25.78	25.33	29.76	30.69	31.53	30.66
3	Payment (%) Daily	44.44	21.74	15.79	27.32	14.29	6.25	16.67	12.4	32.35	14.29	8.82	18.49
	Weekly	11.11	8.7	13.16	10.99	14.29	0	22.22	12.17	14.71	17.14	20.59	17.48
	Monthly	44.44	69.57	71.05	61.69	71.43	93.75	61.11	75.43	52.94	68.57	70.59	64.03
4	Distance (Km)	15	17.13	17.9	16.68	17.5	16.8	18.87	17.72	16.67	19	18.69	18.12
5	Transport Cost (Rs.)	0	9.29	10.5	6.6	9	9.3	12.4	10.23	8.67	13.79	11.41	11.29

Table 6.3: Income received from Milk and it's by Products (%)

Sr. No.	Particulars	Income receive				Income spent							
						Family Exp				Animal Feed & Health			
		Small	Medium	Large	Average	Small	Medium	Large	Average	Small	Medium	Large	Average
DCS													
A. Income from dairy (sale of milk)													
1	Male	97.5	90	87.5	91.67	45.13	54.13	64.13	54.46	34.38	35.88	45.88	38.71
2	Female	2.5	10	12.5	8.33								
B. Income from sale of products													
1	Male	50	75	63	62.65	66.3	68.13	73.00	69.15	27.00	31.88	33.70	30.85
2	Female	50	25	37	37.35								
C. Income sale of dung /FYM													
1	Male	62.5	60	88.24	70.25	68.13	84	86.53	79.55	16.00	16.47	31.88	21.45
2	Female	37.5	40	11.76	29.75								
NDCS													
A. Income from dairy (sale of milk)													
1	Male	85	75	77.5	79.17	32	34.13	48.78	38.30	51.23	65.88	68.00	61.7
2	Female	15	25	22.5	20.83								
B. Income from sale of products													
1	Male	72.7	72	50	64.91	62.58	72.09	75.6	70.09	24.40	27.91	37.42	29.91
2	Female	27.3	28	50	35.09								
C. Income sale of dung /FYM													
1	Male	84.62	91.67	93.55	89.94	67.08	69.19	72.5	69.59	27.50	30.81	32.92	30.41
2	Female	15.38	8.33	6.45	10.06								

It can be concluded from the above findings that respondents used to receive more price for buffalo milk (Rs.24.26/l) as compared to local cow (Rs.22.5/l) and cross breed cow (Rs.20.86/l) milk in DCS while in NDCS price of Buffalo milk (Rs.30.66/l) was found to be more as compared to local cow (Rs. 23.49/l) and Cross breed (Rs.25.33/l) milk. The respondents related to NDCS used to cover more distance as compared to DCS accordingly their cost of transportation was also found to be more.

6.3 Incomes received from Dairying

The details of income received from milk, milk products & by products (dung), and expanses on family members and animal feed and health of respondents related to DCS and NDCS have been analyzed across different sizes of dairy and presented in Table 6.3. It is observed from the data that at overall level majority of male (above 80%) received income from sale of milk followed by female (below 20%) in the family of sample HHs, whether they were related to DCS or NDCS (Table 6.3)

As regards to family expenses and expenses incurred in animal feed and health showed that as the size of dairies increases the income spent on family expenses and animal feed and health were also found to be increased.

6.4 Summary of the Chapter

This chapter highlighted the production and marketing of milk of different spices viz. Local cow, buffalo, and cross breed cow across the various size of dairy farms related to DCS and NDCS. The study revealed that out of total milk production the maximum milk was obtained from local cow (145.1 l) as compared to buffalo (80.6 l) and cross breed cow (22.1 l) in the dairy farms of the respondents related to DCS, while in NDCS dairy farms the quantum of buffalo milk (249.0 l) was found to be more as compared to local cow (78.6 l) and cross breed (69.2 l) milk. The size of dairy farms positively related to total milk production from all the spices of cattle as well as marketable surplus of milk.

The respondents used to more price for receive buffalo milk (Rs.24.26/l) as compared to local cow (Rs.22.5/l) and cross breed cow (Rs.20.86/l) milk in DCS while in NDCS price of Buffalo milk (Rs.30.66/l) was found to be more as compared to local cow (Rs. 23.49/l) and Cross breed (Rs.25.33/l) milk. The respondents related to NDCS covered more distance as compared to DCS respondents accordingly their cost of transportation was also found to be more as compared to DCS respondents.

At overall level, majority of male (above 80%) received income from sale of milk followed by female (below 20%) in the family of sample HHs, whether they were related to DCS or NDCS. As regards to family expenses and expenses incurred in animal feed and health showed that as the size of dairies increases the income spent on family expenses and animal feed and health were about found to be increased in the area under study.

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CHAPTER-VII

CONSTRAINTS FACED IN PRODUCTION & MARKETING OF MILK

This chapter deals with service delivery system and various constraints faced by the farmers, primary dairy cooperative society and milk union in production and marketing of milk in the area under study. The suggestions given by producers for efficient production and marketing of milk are also a part of this chapter.

7.1 Service Delivery System

Performance of input and output delivery system has been judged based on the information collected from the respondents related to DCS & NDCS in the area under study. Supply of cattle feed and mineral mixture, availability of cattle and fodder on credit, emergency veterinary service (EVS), availability & delivery of vaccine and semen and provision of loan from the societies for purchase of cattle in input delivery system (IDS) while price of milk, payment of milk, incentives or bonus for supplying of milk, acceptability of cross-bred cow milk in family and advance payment for milk by the society/ vendors were assessed for output delivery system (ODS).

DCS & private dealers were found to be main service provider for cattle feed, mineral mixtures etc to the respondents of DCS and NDCS. (Table7.1 & 7.2). The majority of respondents related to DCS (56%) & NDCS (78%) reported that the supply of cattle feed was found to be adequate in the area, however the cost of cattle feed and mineral mixture was found to be high (97%). All the respondents across both the groups informed that cattle feed and fodder seed was available neither from DCS nor from private dealers on time. The EVS was not found to be adequate as 91 (DCS) and 89 (NDCS) per cent respondents reported that it is poor and not available to them on time. The cost incurred in visit of doctor {Rs. 150 (DCS) -209 (NDCS) per visit} was found to be high under EVS but comparatively low under DCS as reported by more than 65 per cent respondents.

All the respondents appreciated the delivery and application of quality and quantity of vaccine and semen along with its timely availability. The majority of DCS (76%) and NDCS (67%) respondents reported that the provision of loan in the society for purchasing cattle is inadequate. Most of the HHs mentioned that the charges for insurance (Rs./animal) is very high as reported by 68 and 57 per cent of respondents DCS and NDCS, respectively. The similar findings have been observed across different size of farms with minor variations.

As far as output delivery system is concerned, the milk was found to be delivered through agent/milk parlour and milk vendor in case of DCS and NDCS respectively. The majority of respondents related to DCS (98%) reported that the price received by them is low while NDCS (89%) respondents felt that it is adequate and majority of them were found to receive the payment of milk within 15 days. The majority of respondents reported that incentives/bonus for supplying milk in cooperative societies was adequate (59%), while

Table 7.1: Service Delivery Constraints as reported by DCS respondents (%)

S.No.	Particulars	Size of dairy farms			
		Small	Medium	Large	All
A	INPUT DELIVERY				
1	**Supply of Cattle Feed**				
	Adequate	37.5	55	75	55.8
	Inadequate	62.5	45	25	44.2
	Not Available	0	0	0	0.0
2	**Cattle feed and fodder seed on Credit**				
	Available	0	0	0	0.0
	Not Available	100	100	100	100.0
3	**Cost of cattle feed and mineral mixture**				
	High	92.5	100	100	97.5
	ok	7.5	0	0	2.5
	Not Available	0	0	0	0.0
4	**Emergency Veterinary Services (EVS)**				
	Adequate	12.5	7.5	7.5	9.2
	Not Available	87.5	92.5	92.5	90.8
5	**Charges for EVS**				
	High	67.5	60.0	72.5	66.7
	Medium	7.5	35.0	20.0	20.8
	Low	25	5.0	7.5	12.5
6	**Vaccines**				
	Adequate	100	100	100	100.0
	Inadequate	0	0	0	0.0
	Not Available	0	0	0	0.0
7	**Delivery and applications of quality and requisite quantity of vaccines**				
	Yes	100	100	100	100.0
	No	0	0	0	0.0
8	**Semen at the AI centre**				
	Adequate	100	100	100	100.0
	Inadequate	0	0	0	0.0
	Not Available	0	0	0	0.0
9	**Provision of loan in society or govt. for Purchasing cattle**				
	Adequate	15.0	5.0	20.0	13.3
	Inadequate	77.5	82.5	70.0	76.7
	Not Available	7.5	12.5	10.0	10.0
10	**Charges for insurance (Rs. /animal)**				
	Very High	70.0	65.0	67.5	67.5
	Medium	15.0	12.5	10.0	12.5
	Low	15.0	22.5	22.5	20.0
11	**Technical Guidance**				
	Yes	100	100	100	100.0
	No	0	0	0	0.0
B	OUTPUT DELIVERY				
1	**Milk Price**				
	Adequate	0	0	5	1.7
	Low	100	100	95	98.3
2	**Payment of Milk**				
	Immediate	10.0	5.0	0.0	5.0
	Within 2 days	25.0	30.0	25.0	26.7
	Within 15 days	65.0	65.0	75.0	68.3
3	**incentives or bonus for supplying milk**				
	Adequate	27.5	67.5	82.5	59.2
	Low	72.5	32.5	17.5	40.8
4	**Acceptability cross-bred cow milk in family**				
	Poor	47.5	32.5	22.5	34.2
	Acceptable	2.5	15.0	10.0	9.2
	Not acceptable	50.0	52.5	67.5	56.7
5	**Advance payment for milk by society/vendors**				
	Available	0.0	0.0	0.0	0.0
	Not available	100	100	100	100

Table 7.2: Service Delivery Constraints as reported by NDCS respondents (%)

S. No	Particulars	Size of dairy farms			
		Small	Medium	Large	All
A	INPUT DELIVERY				
1	**Supply of Cattle Feed**				
	Adequate	77.5	72.5	85.0	78.3
	Inadequate	22.5	27.5	15.0	21.7
	Not Available	0.0	0.0	0.0	0.0
2	**Cattle feed and fodder seed on Credit**				
	Available	0.0	0.0	0.0	0.0
	Not Available	100	100	100	100.0
3	**Cost of cattle feed and mineral mixture**				
	High	90	100	100	96.7
	ok	10	0.0	0.0	3.3
	Not Available	0.0	0.0	0.0	0.0
4	**Emergency Veterinary Services (EVS)**				
	Adequate	7.5	17.5	7.5	10.8
	Not Available	92.5	82.5	92.5	89.2
5	**Charges for EVS**				
	High	82.5	85.0	47.5	71.7
	Medium	15	7.5	45	22.5
	Low	2.5	7.5	7.5	5.8
6	**Vaccines**				
	Adequate	100	100	100	100.0
	Inadequate	0.0	0.0	0.0	0.0
	Not Available	0.0	0.0	0.0	0.0
7	**Delivery and applications of quality and requisite quantity of vaccines**				
	Yes	100	100	100	100.0
	No	0.0	0.0	0.0	0.0
8	**Semen at the AI centre**				
	Adequate	100	100	100	100.0
	Inadequate	0.0	0.0	0.0	0.0
	Not Available	0.0	0.0	0.0	0.0
9	**Provision of loan in society or govt. for Purchasing cattle**				
	Adequate	12.5	10.3	15	12.6
	Inadequate	70.0	79.5	52.5	67.3
	Not Available	17.5	10.3	32.5	20.1
10	**Charges for insurance (Rs. /animal)**				
	Very High	47.5	65.0	57.5	56.7
	Medium	20.0	10.0	7.5	12.5
	Low	32.5	25.0	35.0	30.8
11	**Technical Guidance**				
	Yes	12.5	35.0	30.0	25.8
	No	87.5	65.0	70.0	74.2
B	OUTPUT DELIVERY (%)				
12	**Milk Price**				
	Adequate	87.5	82.5	97.5	89.2
	Low	12.5	17.5	2.5	10.8
13	**Payment of Milk**				
	Immediate	12.5	10.0	10.0	10.8
	Within 2 days	25.0	37.5	7.5	23.3
	Within 15 days	62.5	52.5	82.5	65.8
14	**incentives or bonus for supplying milk**				
	Adequate	20.0	7.5	27.5	18.3
	Low	80.0	92.5	72.5	81.7
15	**Acceptability cross-bred cow milk in family**				
	Poor	32.5	32.5	30.0	31.7
	Acceptable	27.5	20.0	7.5	18.3
	Not acceptable	40.0	47.5	62.5	50.0
16	**Advance payment for milk by society/vendors**				
	Available	0.0	0.0	0.0	0.0
	Not available	100	100	100	100

no such provision exists in case of NDCS. The system for advance payment of milk was not found in the area under study. The similar results have also been observed across different size of dairy farms with minor variations.

7.2 Constraints in Production of Milk

The constraints faced by producers and primary milk cooperative societies/ private dairy units in production, procurement and marketing of milk were identified in the study area.

Table 7.3: Infrastructural Constraints as reported by DCS respondents (%)

S. No	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	**Lack of improved equipments**				
	Never	72.5	65.0	25.0	54.2
	Sometime	5.0	22.5	10.0	12.5
	Always	22.5	12.5	65.0	33.3
2	**Irregular & inadequate supply of cattle feed**				
	Never	27.5	25.0	12.5	21.7
	Sometime	40.0	47.5	60.0	49.2
	Always	32.5	27.5	27.5	29.2
3	**Unavailability of emergency veterinary services**				
	Never	5.0	10.0	12.5	9.2
	Sometime	65.0	70.0	65.0	66.7
	Always	30.0	20.0	22.5	24.2
4	**Infrequent visit of veterinary staff**				
	Never	20.0	15.0	7.5	14.2
	Sometime	27.5	22.5	15.0	21.7
	Always	52.5	62.5	77.5	64.2
5	**Unavailability of vaccines**				
	Never	32.5	17.5	20.0	23.3
	Sometime	42.5	62.5	65.0	56.7
	Always	25.0	20.0	15.0	20.0
6	**Occasional Availability of semen at the AI centre**				
	Never	10.0	40.0	22.5	24.2
	Sometime	35.0	27.5	20.0	27.5
	Always	55.0	32.5	57.5	48.3
7	**Lack of training facilities**				
	Never	5.0	2.5	5.0	4.2
	Sometime	37.5	25.0	25.0	29.2
	Always	57.5	72.5	70.0	66.7
8	**Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day**				
	Never	82.5	75.0	77.5	78.3
	Sometime	2.5	17.5	22.5	14.2
	Always	15.0	7.5	0.0	7.5
9	**Unavailability of green/dry fodder throughout the year**				
	Never	15.0	5.0	10.0	10.0
	Sometime	10.0	12.5	15.0	12.5
	Always	75.0	82.5	75.0	77.5
10	**Unavailability of cattle feed and fodder seed on credit**				
	Never	10.0	7.5	10.0	9.2
	Sometime	15.0	7.5	20.0	14.2
	Always	75.0	85.0	70.0	76.7
11	**Low average milk yield of the milk animals**				
	Never	12.8	12.5	10.0	11.8
	Sometime	25.6	15.0	17.5	19.4
	Always	61.5	72.5	72.5	68.8

7.2.1 Constraints faced by Producers

The various constraints which were found to be faced by producers in production and marketing of milk are classified in infrastructural, economic, marketing, technical, socio-psychological and other constraints.

7.2.1.1. Infrastructural Constraints

The infrastructural constraints which were found to be faced by the producer respondents related to DCS and NDCS are presented in table 7.3 and 7.4.

It is observed from the data that most important infrastructural constraints which

Table 7.4: Infrastructural Constraints as reported by NDCS respondents (%)

S. No	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	**Lack of improved equipments**				
	Never	52.5	62.5	45.0	53.3
	Sometime	17.5	12.5	7.5	12.5
	Always	30.0	25.0	47.5	34.2
2	**Irregular & inadequate supply of cattle feed**				
	Never	42.5	50.0	52.5	48.3
	Sometime	32.5	27.5	25.0	28.3
	Always	25.0	22.5	22.5	23.3
3	**Unavailability of emergency veterinary services**				
	Never	20.0	27.5	17.5	21.7
	Sometime	70.0	55.0	75.0	66.7
	Always	10.0	17.5	7.5	11.7
4	**Infrequent visit of veterinary staff**				
	Never	20.0	17.5	5.0	14.2
	Sometime	27.5	12.5	27.5	22.5
	Always	52.5	70.0	67.5	63.3
5	**Unavailability of vaccines**				
	Never	57.5	55.0	87.5	66.7
	Sometime	35.0	30.0	5.0	23.3
	Always	7.5	15.0	7.5	10.0
6	**Occasional Availability of semen at the AI centre**				
	Never	25.0	27.5	25.0	25.8
	Sometime	27.5	27.5	27.5	27.5
	Always	47.5	45.0	47.5	46.7
7	**Lack of training facilities**				
	Never	0.0	0.0	0.0	0.0
	Sometime	17.5	10.0	5.0	10.8
	Always	82.5	90.0	95.0	89.2
8	**Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day**				
	Never	70.0	77.5	87.5	78.3
	Sometime	20.0	10.0	5.0	11.7
	Always	10.0	12.5	7.5	10.0
9	**Unavailability of green/dry fodder throughout the year**				
	Never	12.5	5.0	7.5	8.3
	Sometime	20.0	5.0	10.0	11.7
	Always	67.5	90.0	82.5	80.0
10	**Unavailability of cattle feed and fodder seed on credit**				
	Never	17.5	7.5	10.0	11.7
	Sometime	10.0	10.0	10.0	10.0
	Always	72.5	82.5	80.0	78.3
11	**Low average milk yield of the milk animals**				
	Never	10.0	15.0	22.5	15.8
	Sometime	20.0	15.0	17.5	17.5
	Always	70.0	70.0	60.0	66.7

producer respondents faced always are low average milk yield of the milk animals, unavailability of cattle feed and fodder seed on credit, unavailability of green/dry fodder throughout the year, lack of training facilities and infrequent visit of veterinary staff as reported by more than 60 per cent respondents across DCS and NDCS. The similar findings have been observed across different size of dairy farms with minor variations.

The important constraints which producer respondents faced sometimes are irregular & inadequate supply of cattle feed and unavailability of emergency veterinary services reported by maximum percentage of producer respondents related to DCS, while the important constraints related to NDCS as reported by maximum number of producer is unavailability of emergency veterinary services (66%). The other infrastructural constraints viz. lack of improved equipments and unsuitability of the

Table 7.5: Economic Constraints as reported by DCS respondents (%)

S. No.	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	**High cost of fodder seed**				
	Never	10.0	10.0	5.0	8.3
	Sometime	30.0	2.5	10.0	14.2
	Always	60.0	87.5	85.0	77.5
2	**Delay in payment of milk**				
	Never	90.0	95.0	82.5	89.2
	Sometime	10.0	5.0	17.5	10.8
	Always	0.0	0.0	0.0	0.0
3	**Low price of milk offered**				
	Never	12.5	7.5	10.0	10.0
	Sometime	5.0	12.5	15.0	10.8
	Always	82.5	80.0	75.0	79.2
4	**High cost of cross bred cow**				
	Never	15.0	10.0	17.5	14.2
	Sometime	17.5	15.0	5.0	12.5
	Always	67.5	75.0	77.5	73.3
5	**High cost of veterinary medicines**				
	Never	15.0	12.5	7.5	11.7
	Sometime	27.5	27.5	17.5	24.2
	Always	57.5	60.0	75.0	64.2
6	**High cost of cattle feed and mineral mixture**				
	Never	25.0	10.0	7.5	14.2
	Sometime	22.5	40.0	7.5	23.3
	Always	52.5	50.0	85.0	62.5
7	**Low provision of loan in society or govt. for purchasing cattle**				
	Never	15.0	7.5	25.0	15.8
	Sometime	27.5	32.5	12.5	24.2
	Always	57.5	60.0	62.5	60.0
8	**Low incentives or bonus for supplying milk**				
	Never	0.0	0.0	0.0	0.0
	Sometime	47.5	37.5	15.0	33.3
	Always	52.5	62.5	85.0	66.7
9	**High charges of emergency veterinary services**				
	Never	0.0	0.0	0.0	0.0
	Sometime	12.5	2.5	12.5	9.2
	Always	87.5	97.5	87.5	90.8
10	**High charges for insurance**				
	Never	0.0	0.0	0.0	0.0
	Sometime	7.5	7.5	10.0	8.3
	Always	92.5	92.5	90.0	91.7

time of delivery of milk during winters due to bitter cold in early hours of the day are found to be of least important as reported by maximum percentage of respondents related to DCS and NDCS.

7.2.1.2. Economic Constraints

The economic constraints which were found to be faced by the producer respondents related to DCS and NDCS are presented in table 7.5 & 7.6.

It is observed from the data that high cost of fodder seed, low price of milk offered, high cost of veterinary medicines, cross bred cow, cattle feed and mineral mixture, low provision of loan in society or govt. for purchasing cattle, low incentives or bonus for supplying milk and high charges of emergency veterinary services & insurance are found to be most important constraints and occurred as

Table 7.6: Economic Constraints as reported by NDCS respondents (%)

S. No.	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	**High cost of fodder seed**				
	Never	12.5	2.5	10.0	8.3
	Sometime	22.5	15.0	2.5	13.3
	Always	65.0	82.5	87.5	78.3
2	**Delay in payment of milk**				
	Never	90.0	92.5	95.0	92.5
	Sometime	10.0	7.5	5.0	7.5
	Always	0.0	0.0	0.0	0.0
3	**Low price of milk offered**				
	Never	52.5	60.0	47.5	53.3
	Sometime	35.0	17.5	20.0	24.2
	Always	12.5	22.5	32.5	22.5
4	**High cost of cross bred cow**				
	Never	2.5	7.5	17.5	9.2
	Sometime	15.0	22.5	30.0	22.5
	Always	82.5	70.0	52.5	68.3
5	**High cost of veterinary medicines**				
	Never	5.0	10.0	22.5	12.5
	Sometime	7.5	25.0	45.0	25.8
	Always	87.5	65.0	32.5	61.7
6	**High cost of cattle feed and mineral mixture**				
	Never	15.0	12.5	5.0	10.8
	Sometime	32.5	32.5	15.0	26.7
	Always	52.5	55.0	80.0	62.5
7	**Low provision of loan in society or govt. for purchasing cattle**				
	Never	17.5	20.0	10.0	15.8
	Sometime	42.5	35.0	30.0	35.8
	Always	40.0	45.0	60.0	48.3
8	**Low incentives or bonus for supplying milk**				
	Never	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0
9	**High charges of emergency veterinary services**				
	Never	0.0	0.0	0.0	0.0
	Sometime	40.0	55.0	45.0	46.7
	Always	60.0	45.0	55.0	53.3
10	**High charges for insurance**				
	Never	15.0	15.0	0.0	10.0
	Sometime	27.5	17.5	25.0	23.3
	Always	57.5	67.5	75.0	66.7

reported by the majority of sample producers related to DCS and NDCS except low price of milk as reported by 53 per cent of NDCS respondent. Delay in payment was not found to be a severe economic constraint as majority of producer respondents never felt this in the area under study.

7.2.1.3. Marketing Constraints

The marketing constraints which were found to be faced by the producer respondents related to DCS and NDCS are presented in table 7.7 & 7.8.

It is observed from the data that inability to market for value added products, no or less advance payment for milk by society/vendors, low risk taking behaviour and less knowledge about marketing strategies were found to be most important constraints as reported by about more than 70 per cent of producers respondents related to DCS, while constraints like irregular sell of milk and lack of time for marketing were found to be of least important as majority of producer respondents never felt these constraints in the area under study.

In case of NDCS, more change of the 65 per cent respondents reported that they never felt no or less advance payment for milk by society/vender's, unavailability to market for value added products, low risk taking, lack of time for marketing, irregular sell of milk . They were of the entrepreneur that they have less knowledge about marketing strategies.

Table 7.7: Marketing Constraints as reported by DCS respondents (%)

S. No.	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	**Irregular sell of milk**				
	Never	85.0	82.5	90.0	85.8
	Sometime	5.0	15.0	10.0	10.0
	Always	10.0	2.5	0.0	4.2
2	**Lack of time for marketing**				
	Never	70.0	65.0	65.0	66.7
	Sometime	22.5	17.5	30.0	23.3
	Always	7.5	17.5	5.0	10.0
3	**Less knowledge about marketing strategies**				
	Never	7.5	12.5	10.0	10.0
	Sometime	17.5	7.5	12.5	12.5
	Always	75.0	80.0	77.5	77.5
4	**Low risk taking behaviour**				
	Never	15.0	5.0	10.0	10.0
	Sometime	30.0	17.5	15.0	20.8
	Always	55.0	77.5	75.0	69.2
5	**No or less advance payment for milk by society/venders**				
	Never	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0
6	**Inability to market for value added products**				
	Never	0.0	0.0	0.0	0.0
	Sometime	0.0	0.0	0.0	0.0
	Always	100.0	100.0	100.0	100.0

Table 7.8: Marketing Constraints as reported by NDCS respondents (%)

S. No.	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	**Irregular sell of milk**				
	Never	87.5	87.5	92.5	89.2
	Sometime	7.5	12.5	7.5	9.2
	Always	5.0	0.0	0.0	1.7
2	**Lack of time for marketing**				
	Never	62.5	70.0	65.0	65.8
	Sometime	22.5	25.0	25.0	24.2
	Always	15.0	5.0	10.0	10.0
3	**Less knowledge about marketing strategies**				
	Never	40.0	17.5	45.0	34.2
	Sometime	20.0	22.5	25.0	22.5
	Always	40.0	60.0	30.0	43.3
4	**Low risk taking behaviour**				
	Never	42.5	55.0	37.5	45.0
	Sometime	32.5	35.0	40.0	35.8
	Always	25.0	10.0	22.5	19.2
5	**No or less advance payment for milk by society/venders**				
	Never	100.0	100.0	100.0	100.0
	Sometime	0.0	0.0	0.0	0.0
	Always	0.0	0.0	0.0	0.0
6	**Inability to market for value added products**				
	Never	100.0	100.0	100.0	100.0
	Sometime	0.0	0.0	0.0	0.0
	Always	0.0	0.0	0.0	0.0

7.2.1.4. Technical Constraints

The technical constraints which were found to be faced by the producer respondents related to DCS and NDCS are presented in table 7.9 & 7.10. It is observed from the data that lack of knowledge about cheap & scientific housing

Table 7.9: Technical Constraints as reported by DCS respondents (%)

S. No.	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	**Lack of technical guidance**				
	Never	7.5	17.5	5.0	10.0
	Sometime	17.5	7.5	15.0	13.3
	Always	75.0	75.0	80.0	76.7
2	**Unavailability of high genetic merit bull**				
	Never	25.0	32.5	12.5	23.3
	Sometime	50.0	50.0	67.5	55.8
	Always	25.0	17.5	20.0	20.8
3	**Poor conception rate through artificial insemination**				
	Never	17.5	15.0	25.0	19.2
	Sometime	37.5	35.0	32.5	35.0
	Always	45.0	50.0	42.5	45.8
4	**Poor knowledge about Feeding and health care**				
	Never	15.0	22.5	17.5	18.3
	Sometime	45.0	40.0	52.5	45.8
	Always	40.0	37.5	30.0	35.8
5	**Lack of knowledge about cheap & scientific housing of animal**				
	Never	12.5	7.5	2.5	7.5
	Sometime	17.5	15.0	40.0	24.2
	Always	70.0	77.5	57.5	68.3

Table 7.10: Technical Constraints as reported by NDCS respondents (%)

S. No.	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	**Lack of technical guidance**				
	Never	77.5	72.5	77.5	75.8
	Sometime	15.0	15.0	5.0	11.7
	Always	7.5	12.5	17.5	12.5
2	**Unavailability of high genetic merit bull**				
	Never	65.0	42.5	52.5	53.3
	Sometime	20.0	52.5	32.5	35.0
	Always	15.0	5.0	15.0	11.7
3	**Poor conception rate through artificial insemination**				
	Never	27.5	62.5	52.5	47.5
	Sometime	40.0	32.5	27.5	33.3
	Always	32.5	5.0	20.0	19.2
4	**Poor knowledge about Feeding and health care**				
	Never	62.5	85.0	87.5	78.3
	Sometime	37.5	15.0	12.5	21.7
	Always	0.0	0.0	0.0	0.0
5	**Lack of knowledge about cheap & scientific housing of animal**				
	Never	50.0	42.5	62.5	51.7
	Sometime	20.0	40.0	27.5	29.2
	Always	30.0	17.5	10.0	19.2

of animal, poor conception rate through artificial insemination and lack of technical guidance about the animal husbandry and dairy management were found to be most important constraints as reported by majority of producer respondents related to DCS.

while respondents related to NDCS reported that they had no specific constraints felt always however, 33 and 34 percent of them reported that unavailability of high genetic merit bull and poor conception rate through AI were important technical constraints faced by them sometimes in the area under study.

7.2.1.5 Socio-Psychological Constraints

The socio-psychological constraints which were found to be faced by the producer respondents related to DCS and NDCS are presented in table 7.11.

It is observed from the data that majority of respondents related to DCS reported that the most important constraints that they felt always in production and marketing of milk were their lower socio-economic conditions (79%), lack of cooperation and coordination among members (78%), poor purchasing power (77%), lack of time due to busy in domestic/ agricultural work (67%) and milk of cross-bred cow has poor acceptability in family members (57%). The respondents related to NDCS not reported any most important socio-psychological constraints except milk of cross-bred cow has poor acceptability in family members (58%). It is also clear from the data that the majority of respondents related to DCS reported that they are never meant for influential people, while majority respondents of related to NDCS felt that they are always meant for influential people in the area under study.

Table 7.11: Socio-Psychological Constraints as reported by DCS respondents (%)

S.No	Particulars	Size of dairy farms			
		Small	Medium	Large	All
	DCS				
1	**Lower socio- economic conditions**				
	Never	15.0	10.0	2.5	9.2
	Sometime	17.5	7.5	10.0	11.7
	Always	67.5	82.5	87.5	79.2
2	**Lack of purchasing power**				
	Never	0.0	0.0	0.0	0.0
	Sometime	17.5	22.5	30.0	23.3
	Always	82.5	77.5	70.0	76.7
3	**Lack of time due to busy in domestic/ agricultural work**				
	Never	20.0	17.5	20.0	19.2
	Sometime	17.5	17.5	7.5	14.2
	Always	62.5	65.0	72.5	66.7
4	**Lack of cooperation and coordination among members**				
	Never	12.5	10.0	5.0	9.2
	Sometime	17.5	20.0	2.5	13.3
	Always	70.0	70.0	92.5	77.5
5	**Milk producers are meant for influential people**				
	Never	52.5	65.0	52.5	56.7
	Sometime	35.0	27.5	35.0	32.5
	Always	12.5	7.5	12.5	10.8
6	**Milk of cross-bred cow has poor acceptability (family members)**				
	Never	12.5	10.0	5.0	9.2
	Sometime	20.0	45.0	37.5	34.2
	Always	67.5	45.0	57.5	56.7
	NDCS				
1	**Lower socio-economic conditions**				
	Never	60.0	47.5	62.5	56.7
	Sometime	32.5	35.0	35.0	34.2
	Always	7.5	17.5	2.5	9.2
2	**Lack of purchasing power**				
	Never	65.0	77.5	90.0	77.5
	Sometime	35.0	22.5	10.0	22.5
	Always	0.0	0.0	0.0	0.0
3	**Lack of time due to busy in domestic/ agricultural work**				
	Never	72.5	75.0	57.5	68.3
	Sometime	12.5	20.0	40.0	24.2
	Always	15.0	5.0	2.5	7.5
4	**Lack of cooperation and coordination among members**				
	Never	100.0	100.0	100.0	100.0
	Sometime	0.0	0.0	0.0	0.0
	Always	0.0	0.0	0.0	0.0
5	**Milk producers are meant for influential people**				
	Never	35.0	12.5	22.5	23.3
	Sometime	15.0	22.5	2.5	13.3
	Always	50.0	65.0	75.0	63.3
6	**Milk of cross bred cow has poor acceptability (family members)**				
	Never	25.0	5.0	0.0	10.0
	Sometime	35.0	25.0	37.5	32.5
	Always	40.0	70.0	62.5	57.5

7.2.1.6 Other Constraints

The other constraints which were found to be faced by the producer respondents related to DCS & NDCS are presented in table 7.12 & 7.13.

Table 7.12: Other Constraints as reported by DCS respondents (%)

S. No	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	Unavailability of chilling facilities at village level for milk preservation	100	100	100	100
2	Diversion of feed and fodder ingredients for industrial use	10.0	12.5	5.0	9.2
3	Majority of grazing lands are either degraded or encroached	47.5	22.5	12.5	27.5
4	Poor access to organized markets deprive farmers in getting pr oper milk price	95.0	90.0	82.5	89.2
5	Irregular quality electricity supply	0.0	0.0	0.0	0.0
6	Poor irrigation facility to grow fodder crops	72.5	80.0	75.0	75.8
7	Non availability of improved fodder seed	92.5	90.0	85.0	89.2
8	Poor livestock extension ser vices	35.0	22.5	45.0	34.2
9	Poor knowledge about scientific animal husbandry practices and dairy farming	80.0	72.5	82.5	78.3
10	Poor knowledge of mastitis (mastitis in dairy animal) in dairy animals	2.5	17.5	7.5	9.2
11	Lack of awareness about quality m ilk production	25.0	52.5	52.5	43.3
12	Poor housing to milch animals	100	90.0	77.5	89.2
13	Unavailability of medicine and equipment required for quality milk production	82.5	95.0	50.0	75.8
14	Lack of milk testing and animal screening facilities	80.0	77.5	77.5	78.3
15	Lack of veterinary services in village for quality milk production	72.5	70.0	52.5	65.0
16	Lack of nutrition's feed for quality milk production	77.5	67.5	47.5	64.2
17	Lack of ecto parasites control programmes	97.5	92.5	77.5	89.2
18	Lack of finance to invest in dairy business for quality milk production/ Inadequate finance	20.0	27.5	55.0	34.2
19	Lack of necessary space required for tying the milking animals	37.5	20.0	12.5	23.3
20	Lack of marketing facility for dairy business	22.5	10.0	7.5	13.3
21	Uneconomical capital investment on quality milk production	87.5	87.5	92.5	89.2
22	Lack of water supply	52.5	42.5	12.5	35.8
23	Inadequate labour supply	5.0	7.5	27.5	13.3
24	Ecological factors- High heat/temperature, High cold, etc	87.5	87.5	92.5	89.2
25	Competition from established and large units	70.0	82.5	85.0	79.2
26	Difficulty to store milk in summer	27.5	12.5	0.0	13.3
27	low acceptability of AI in buffalo	85.0	77.5	95.0	85.8
28	Disease outbreak: mortality and morbidity	42.5	40.0	22.5	35.0
29	Politics in Cooperative is not good	87.5	95.0	85.0	89.2

It is observed from the data that the more than 65 per cent respondents related to DCS reported unavailability of chilling facilities at village level for milk preservation (100%), low acceptability of AI in buffalo (100%), poor housing to milch animals (89 %),poor access to organized markets deprive farmers in getting proper milk price (89%), non availability of improved fodder seed (89%), lack of eco parasites control programmes (89%), uneconomical capital investment on quality milk production (89%), ecological factors- high

heat/ temperature, high cold etc (89%), competition from established and large units (89%), politics in cooperative (89%) poor irrigation facility to grow fodder crops (76%), poor knowledge about scientific animal husbandry practices and dairy farming (78%), unavailability of medicine and equipment required for quality milk production (76%), lack of milk testing and animal screening facilities (78%), lack of veterinary services in village for quality milk production (65%) and lack of nutrition's feed for quality milk production (64%).

These constraints were also reported by the respondents related to NDCS with minor variation in percentage; although they also reported inadequate labour supply (56%) and poor live stock extension services (56%) as other constraints faced by them in production, processing and marketing of milk in the study area.

Table 7.13: Other Constraints as reported by NDCS respondents (%)

S. No.	Particulars	Size of dairy farms			
		Small	Medium	Large	All
1	Unavailability of chilling facilities at village level fo r milk preservation	100	100	100	100
2	Diversion of feed and fodder ingredients for industrial use	7.5	5.0	10.0	7.5
3	Majority of grazing lands are either degraded or encroached	37.5	32.5	62.5	44.2
4	Poor access to organized markets deprive farmers in ge tting proper milk price	47.5	22.5	65.0	45.0
5	Irregular quality electricity supply	0.0	0.0	0.0	0.0
6	Poor irrigation facility to grow fodder crops	35.0	45.0	25.0	35.0
7	Non availability of improved fodder seed	32.5	22.5	55.0	36.7
8	Poor livestock extension services	67.5	45.0	57.5	56.7
9	Poor knowledge about scientific animal husbandry practices and dairy farming	52.5	47.5	27.5	42.5
10	Poor knowledge of mastitis (mastitis in dairy animal) in dairy animals	7.5	10.0	5.0	7.5
11	Lack of awareness about quality milk production	7.5	10.0	10.0	9.2
12	Poor housing to milch animals	57.5	5.0	7.5	23.3
13	Unavailability of medicine and equipment required for quality milk production	60.0	32.5	10.0	34.2
14	Lack of milk testing and animal screening facilities	25.0	32.5	12.5	23.3
15	Lack of veterinary services in village for quality milk production	65.0	62.5	72.5	66.7
16	Lack of nutrition's feed for quality milk production	20.0	7.5	12.5	13.3
17	Lack of ecto parasites control programmes	42.5	37.5	22.5	34.2
18	Lack of finance to invest in dairy business for quality milk production/ Inadequate finance	22.5	35.0	57.5	38.3
19	Lack of necessary space required for tying the milking animals	20.0	45.0	37.5	34.2
20	Lack of marketing facility for dairy business	0.0	10.0	17.5	9.2
21	Uneconomical capital investment on quality milk production	17.5	22.5	12.5	17.5
22	Lack of water supply	12.5	7.5	2.5	7.5
23	Inadequate labour supply	37.5	60.0	70.0	55.8
24	Ecological factors- High heat/temperature, High cold, etc	75.0	85.0	77.5	79.2
25	Competition from established and large units	35.0	65.0	72.5	57.5
26	Difficulty to store milk in summer	77.5	72.5	52.5	67.5
27	low acceptability of AI in buffalo	82.5	80.0	67.5	76.7
28	Disease outbreak: mortality and morbidity	42.5	50.0	42.5	45.0
29	Politics in Cooperative is not good	0.0	0.0	0.0	0.0

7.2.2 Constraints faced by Milk Cooperative Societies and Private Dairy Units

The Constraints faced by Milk Cooperative Societies and Private Dairy Units in supply of milk, infrastructure and marketing of milk were also assess for the study area.

7.2.2.1 Constraints in Milk Supply

The constraints related to milk supply faced by the milk cooperative societies and private dairy units have been recorded and presented in table 7.14. It is observed from the data that large numbers of small producers,

Table 7.14: Milk Supply related Constraints faced by the DCS & NDCS

S.No.	Constraints	Milk Supply related Constraints faced by (% to total responses)							
		DCS (% to total responses)				NDCS (% to total responses)			
		Raipur	Bilaspur	Durg	Ranandgaon	Raipur	Bilaspur	Durg	Ranandgaon
1	**High number of small producers**								
	Never	10	7.5	10	9.2	12.8	12.5	10	11.8
	Sometime	15	7.5	20	14.2	25.6	15	17.5	19.4
	Always	75	85	70	76.7	61.5	72.5	72.5	68.8
2	**No or less provision for advance payment for milk by society or vendors**								
	Never	27.5	25	12.5	21.7	20	15	7.5	14.2
	Sometime	40	47.5	60	49.2	27.5	22.5	15	21.7
	Always	32.5	27.5	27.5	29.2	52.5	62.5	77.5	64.2
3	**Unable to provide cattle feed and fodder seed on credit to members**								
	Never	5	10	12.5	9.2	15	7.5	0	7.5
	Sometime	65	70	65	66.7	2.5	17.5	22.5	14.2
	Always	30	20	22.5	24.2	82.5	75	77.5	78.3
4	**Poor Quality milk**								
	Never	12.8	12.5	10	11.8	10	7.5	10	9.2
	Sometime	25.6	15	17.5	19.4	15	7.5	20	14.2
	Always	61.5	72.5	72.5	68.8	75	85	70	76.7
5	**Irregular & inadequate supply of milk**								
	Never	0	0	0	0	12.5	5	7.5	8.3
	Sometime	17.5	10	5	10.8	20	5	10	11.7
	Always	82.5	90	95	89.2	67.5	90	82.5	80
6	**Late delivery**								
	Never	25	27.5	25	25.8	42.5	50	52.5	48.3
	Sometime	27.5	27.5	27.5	27.5	32.5	27.5	25	28.3
	Always	47.5	45	47.5	46.7	25	22.5	22.5	23.3
7	**Unavailability of emergency veterinary services**								
	Never	20	17.5	5	14.2	57.5	55	87.5	66.7
	Sometime	27.5	12.5	27.5	22.5	35	30	5	23.3
	Always	52.5	70	67.5	63.3	7.5	15	7.5	10
8	**Infrequent visit of veterinary staff**								
	Never	15	7.5	25	15.8	77.5	72.5	77.5	75.8
	Sometime	27.5	32.5	12.5	24.2	15.0	15.0	5.0	11.7
	Always	57.5	60	62.5	60	7.5	12.5	17.5	12.5
9	**Unavailability of vaccines**								
	Never	60	87.5	85	77.5	90	95	82.5	89.2
	Sometime	30	2.5	10	14.2	10	5	17.5	10.8
	Always	10	10	5	8.3	0	0	0	0

S.No.	Constraints	Milk Supply related Constraints faced by (% to total responses)							
		DCS (% to total responses)				NDCS (% to total responses)			
		Raipur	Bilaspur	Durg	Ranandgaon	Raipur	Bilaspur	Durg	Ranandgaon
10	**Occasional availability of semen at the AI centre**								
	Never	47.5	45	47.5	46.7	67.5	90	82.5	80
	Sometime	27.5	27.5	27.5	27.5	20	5	10	11.7
	Always	25	27.5	25	25.8	12.5	5	7.5	8.3
11	**Unsuitability of the time of delivery of milch during winters due to bitter cold in early hours of the day**								
	Never	15	10	17.5	14.2	25	10	7.5	14.2
	Sometime	17.5	15	5	12.5	22.5	40	7.5	23.3
	Always	67.5	75	77.5	73.3	52.5	50	85	62.5
12	**Unavailability of green/ dry fodder throughout the year**								
	Never	0	0	0	0	52.5	60	47.5	53.3
	Sometime	47.5	37.5	15	33.3	35	17.5	20	24.2
	Always	52.5	62.5	85	66.7	12.5	22.5	32.5	22.5
13	**Low average milk yield of the milk animals in area**								
	Never	15	12.5	5	10.8	17.5	20	10	15.8
	Sometime	32.5	32.5	15	26.7	42.5	35	30	35.8
	Always	52.5	55	80	62.5	40	45	60	48.3
14	**Lack of cooperation and coordination among members**								
	Never	7.5	12.5	10	10	0	0	0	0
	Sometime	17.5	7.5	12.5	12.5	0	0	0	0
	Always	75	80	77.5	77.5	0	0	0	0

no/less provision for advance payment for milk by the societies/ vendors, unavailability of cattle feed and fodder seed on credit, unavailability of emergency veterinary services, infrequent visit of veterinary staff, unsuitability of time of delivery of milk during winter due to bitter cold in early hours of the day, unavailability of green/dry fodder throughout the year, occasional availability of semen at AI centres and low average yield of milch animals were found to major constraints always faced by the majority of milk cooperative societies /private dairy units in the area under study.

The constraints which were found to be faced sometimes by the milk cooperative societies /private dairy units and reported by the majority of respondents are poor quality of milk, late delivery of milk and irregular & inadequate supply of milk.

The constraints which were found be never faced by the milk cooperative societies /private dairy units and reported by the majority of respondents is unavailability of vaccine for treatment of diseases.

7.2.2.2 Constraints in Infrastructure facilities

The constraints which were found to be faced by the milk cooperative societies /private dairy units in infrastructural facilities presented in table 7.15.

It is observed from the data that unavailability of chilling facilities, lack of improved equipments, and training facilities were found to be major infrastructural constraints always faced by majority of respondents in the study area.

The infrastructural constraints which were found be never faced by the milk cooperative societies /private dairy units and reported by the majority of respondents is lack of necessary space required for dairy operation, hence there is sufficient space available for development of dairy farms in the area under study.

Table 7.15: Infrastructure related Constraints faced by the DCS & NDCS

S.No.	Constraints	Infrastructure related Constraints faced by (% to total responses)							
		DCS (% to total responses)				NDCS (% to total responses)			
		Raipur	Bilaspur	Durg	Ranandgaon	Raipur	Bilaspur	Durg	Ranandgaon
1	**Unavailability of chilling facilities at village level for milk preservation.**								
	Never	0	0	0	0	5	2.5	5	4.2
	Sometime	17.5	10	5	10.8	37.5	25	25	29.2
	Always	82.5	90	95	89.2	57.5	72.5	70	66.7
2	**Lack of improved equipment**								
	Never	5	10	12.5	9.2	32.5	17.5	20	23.3
	Sometime	30	20	22.5	24.2	25	20	15	20
	Always	65	70	65	66.7	42.5	62.5	65	56.7
3	**Lack of necessary space required for dairy operation**								
	Never	90	90	95	89	75	85	70	76.7
	Sometime	10	10	5	11	15	7.5	20	14.2
	Always	0	0	0	0	10	7.5	10	9.2
4	**Lack of training facilities**								
	Never	5	2.5	5	4.2	0	0	0	0
	Sometime	37.5	25	25	29.2	16	10	5	12
	Always	57.5	72.5	70	66.7	84	90	95	88

7.2.2.3 Constraints in Marketing of Milk

The constraints which were found to be faced by the milk cooperative societies /private dairy units in marketing of milk presented in table 7.16.

It is observed from the data that inability to market for value added products, competition from private dairy farms and unstable price of milk are major constraints in marketing of milk which were found to be always face by majority of milk cooperative societies, while private dairy units were never faced these constraints in the study area.

7.3 Summary of the Chapter

In this chapter performance of input as well as output delivery system of the study area has been assessed and find out various constraints which were faced the milk producers and milk cooperative societies in production, procurement and marketing of milk and milk products across respondents related to DCS and NDCS. It is observed from the results that DCS & private dealers were found to be main service provider for cattle feed, mineral mixtures etc to the respondents. The majority of respondents reported that the supply of cattle feed was found to be adequate in the area, however the cost of cattle feed and mineral mixture was found to be high. All the respondents informed that cattle feed and fodder seed of desired varieties was available on time. The Emergency Veterinary Services (EVS) was not found to be adequate it is poor and not available to them on time. The cost incurred in visit of doctor {Rs. 150 (DCS) - 209 (NDCS) per visit} was found to be high under EVS but comparatively low under DCS. However, all the respondents appreciated the delivery and application of quality and quantity of vaccine and semen along with its timely availability. The majority of respondents reported that the provision of loan in the society for purchasing cattle is inadequate. The most of the households mentioned that the charges for insurance (Rs./animal) is very high.

Table 7.16: Market related Constraints faced by the DCS & NDCS

No.	Constraints	Market related Constraints faced by (% to total responses)							
		DCS (% to total responses)				NDCS (% to total responses)			
		Raipur	Bilaspur	Durg	Ranandgaon	Raipur	Bilaspur	Durg	Ranandgaon
1	**Inability to market for value-added products**								
	Never	0	0	0	0	52.5	62.5	85	66.7
	Sometime	10	10	5	11	47.5	37.5	15	33.3
	Always	90	90	95	89	0	0	0	0
2	**Competition from private dairy**								
	Never	25	27.5	25	25.8	0	0	0	0
	Sometime	27.5	27.5	27.5	27.5	0	0	0	0
	Always	47.5	45	47.5	46.7	0	0	0	0
3	**Poor Road infrastructure**								
	Never	0	0	0	0	57.5	72.5	70	66.7
	Sometime	25	20	22.5	22.5	42.5	27.5	30	33.4
	Always	75	80	77.5	77.5	0	0	0	0
4	**Unstable prices of milk**								
	Never	5	10	12.5	9.2	75	85	70	76.7
	Sometime	65	70	65	66.7	15	7.5	20	14.2
	Always	30	20	22.5	24.2	10	7.5	10	9.2
5	**Completion from imported dairy product**								
	Never	100	100	100	100	52.5	62.5	77.5	64.2
	Sometime	0	0	0	0	27.5	22.5	15	21.7
	Always	0	0	0	0	20	15	7.5	14.2

As far as output delivery system is concerned, the milk was found to be delivered through agent/milk parlour and milk vendor in case of DCS and NDCS. The majority of respondents related to DCS (98%) reported that the price received by them is low while NDCS (89%) respondents felt that it is adequate. The majority of them were found to receive the payment of milk within 15 days, adequate incentives/ bonus for supplying milk in cooperative societies (59%). The system for advance payment of milk was not prevailed in the area under study.

The various constraints which are faced by the milk producers have been classified into infrastructural, economic, marketing, technical, socio-psychological and other constraints.

The study revealed that the most important infrastructural constraints which producer respondents faced always are low average milk yield of the milk animals, unavailability of cattle feed and fodder seed on credit, unavailability of green/dry fodder throughout the year, lack of training facilities and infrequent visit of veterinary staff.

The high cost of fodder seed, low price of milk offered, high cost of veterinary medicines, cross bred cow, cattle feed and mineral mixture, low provision of loan in society or govt. for purchasing cattle, low incentives or bonus for supplying milk and high charges of emergency veterinary services & insurance are found to be most important economic constraints and occurred always as reported by the majority of sample producers related to DCS and NDCS.

The inability to market for value added products, no or less advance payment for milk by society/vendors, low risk taking behaviour and less knowledge about marketing strategies were found to be most important marketing constraints reported by the producers respondents related to DCS & NDCS.

Lack of knowledge about cheap & scientific housing of animal, poor conception rate through artificial insemination and lack of technical guidance about the animal husbandry and dairy management were found to be most important infrastructural constraints as reported by majority of producer respondents related to DCS, while respondents related to NDCS reported that they had no specific constraints that they felt always however, 33 and 34 percent of them reported that unavailability of high genetic merit bull and poor conception rate through AI were important technical constraints faced by them sometimes in the area under study.

The most important socio-psychological constraints that milk producers related to DCS felt always in production and marketing of milk were their lower socio- economic conditions, lack of cooperation and coordination among members, poor purchasing power, lack of time due to busy in domestic/agricultural work and milk of cross-bred cow has poor acceptability in family member, while the respondents related to NDCS the majority of them not reported any most important socio-psychological constraints except milk of cross-bred cow has poor acceptability in family members. It is also clear from the data that the majority of respondents related to DCS reported that they never meant for influential people, while majority of respondents related to NDCS felt that they are always meant for influential people in the area under study.

The unavailability of medicine and equipment required for quality milk unavailability of chilling facilities at village level for milk preservation (100%), low acceptability of AI in buffalo (100%), poor housing to milch animals (89%),poor access to organized markets deprive farmers in getting proper milk price (89%), non availability of improved fodder seed (89%), poor access to organized markets deprive farmers in getting proper milk price (89%), lack of ecto parasites control programmes (89%), uneconomical capital investment on quality milk production (89%), ecological factors- high heat/ temperature, high cold etc (89%), competition from established and large units (89%), politics in Cooperative (89%)poor irrigation facility to grow fodder crops (76%), poor knowledge about scientific animal husbandry practices and dairy farming (78%), unavailability of medicine and equipment required for quality milk production (76%) and lack of milk testing and animal screening facilities (78%) were found to be other constraints faced by them in production, processing and marketing of milk in the study area.

The constraints faced by Milk Cooperative Societies and Private Dairy Units in supply of milk, infrastructure and marketing of milk were also assessed for the study area. A large numbers of small producers, no/less provision for advance payment for milk by the societies/vendors, unavailability of cattle feed and fodder seed on credit, unavailability of emergency veterinary services, infrequent visit of veterinary staff, unsuitability of time of delivery of milk during winter due to bitter cold in early hours of the day, unavailability of green/dry fodder throughout the year, occasional availability of semen at AI centres and low average yield of milch animals were found to be major constraints always faced by the majority of milk cooperative societies/private dairy units in the area under study.

The unavailability of chilling facilities in the village, lack of improved equipments, and training facilities were found to be major infrastructural constraints always faced by majority of respondents in the study area.

An inability to market for value added products, competition from private dairy farms and unstable price of milk are major constraints in marketing of milk were found to be always faced by majority of milk cooperative societies, while private dairy units were never faced these constraints in the study area.

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CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with the conclusions and recommendations made from the data analysis and discussion presented in the previous chapters. The following conclusions and recommendations are made from the study.

1. Chhattisgarh State occupied pivotal position in terms of goat population contributing more than 50 per cent population of the country and found still unorganized in the State. Hence, efforts are required to be made to organize this as an industry through cooperative or producers companies as goat milk has tremendous advantageous and better than the cow milk. (Box 8.1)

2. The convergence of all the state and central government schemes under the umbrella of Chhattisgarh Cooperative Dairy Federation Limited. This will not only bring the improvement in milk production in a sustainable manner but also ensure social and economic improvement of the milk producers with equity. As suggested by the working group for 12th five year plan, all the ongoing scheme should be classified under the mega scheme a) Animal Production, b) Live stock Health and c) Dairy Development. Apart from this it is also suggested that Fodder Development should also be included as a separate sub head for the development of dairy sector in real sense.

3. Cropping pattern of the milk producers was not found to be tuned with fodder production. None of the selected respondent cultivates fodder in a scientific manner as they have lack of knowledge about the package and practices of fodder cultivation in the area under study. Hence, efforts should be made to popularize the recent fodder technology to ultimate milk producer because without fodder development a dairy industry will not get its proper shape in the State.

4. At village level, infrastructure of dairy cooperative was not found up to the mark. Therefore, there is an urgent need to support all the cooperative societies running in the village level for balance development of dairy sector.

5. Several constraints which were found to prevail in infrastructure, economic, marketing, technology, socio-psychological, quality services etc. in the study area. Hence, utmost efforts are required to be made to remove these constraints not only for the development of dairy sector in the State but also to ensure and enhance the income of the milk producers and to stabilize it at higher level.

6. It was also observed that awareness about the dairy and other development programmes including live stock insurance etc. among HHs was very poor. Therefore, there is a need to increase publicity of these schemes on mobiles etc. in local language for effective dissemination of livestock related information in general and dairying in particulars.

7. There is a need of more modern semen stations across all the districts of the State operated by both private and Government agencies. Dairy cooperatives and private players must be allowed to start their own centre to supply quality semen. Milk producers must be trained about the profile of available semen to make them more educated about the artificial insemination.

Box. 8.1: The Benefits of Goat's Milk

Goat's milk supports good health in many ways. It is also void of the negative characteristics of cow's milk..

1. **Reaction to Inflammation :** Some research suggests that one of the main benefits of goat's milk is that it doesn't cause inflammation. That's a big reason why it is easier for people with bowel inflammation to drink goat's milk, instead of cow's milk.
2. **Environmentally Friendly :** Goats require less space and eat less food than cows. Six goats can exist on the same acreage required for two cows.
3. **Supports Metabolism :** Studies performed by the USDA and Prairie View A&M University link goat's milk to an increased ability to metabolize iron and copper, especially among individuals with digestion and absorption limitations. Besides drinking goat's milk, you can also take digestive enzyme supplements to support digestion.
4. **Bio-Availability :** A main benefit of goat's milk is how closely it resembles human breast milk. Because it has a chemical composition that is much closer to human milk than cow's milk, it is easier to digest and assimilate in the human body.
5. **"Smaller" Fat :** "Smaller" fat? Does that mean it has less fat? Not necessarily, it means that the sizes of the fat molecules in goat's milk are much smaller than those found in cow's milk. This makes goat's milk easier to digest.
6. **High in Fatty Acids :** While cow's milk is about seventeen percent fatty acids, goat's milk averages thirty-five percent fatty acids, making it more nutritionally wholesome. In fact, up to 50% of people who experience lactose intolerance to cow's milk find that they can easily digest goat's milk, especially if it is raw.
7. **Rich in Calcium :** Many people worry that they need to drink cow's milk to meet their calcium requirements and support bone health. Goat's milk is high in calcium, the amino acid tryptophan, and is a more healthy option than cow's milk.
8. **Anti-Mucosal :** Cow's milk is linked to allergies and excess mucous, goat's milk is not. Cow's milk is high in fat, which may increase mucous build-up. Moreover, the fat globules in goat's milk are one-ninth the size of those in cow's milk; it's another possible reason why it does not produce irritation in the gut.
9. **Ultra-Nourishing :** In Naturopathic medicine, goats are referred to as bioorganic sodium animals. They are associated with vigor, flexibility, and vitality. Cows are calcium animals known for stability and heaviness. Bioorganic sodium is an important element for supporting joint health. Traditionally, goat's milk has been used to nourish and rejuvenate an overtaxed nervous system. Goat's milk is also extremely nutrient dense. It has almost 35% of your daily calcium requirements in one cup. One cup of goat's milk provides 20.0% of the daily requirement of riboflavin and it's a good source of phosphorous, vitamin B-12, protein, and potassium. In fact, Gandhi himself rejuvenated his own health after fasting by drinking raw goat's milk.
10. **Less Toxic Than Cow's Milk :** Whereas most cow's milk contains bovine growth hormones and bovine somatotropin, a hormone that artificially increases milk production, goats are rarely given these substances. Because of its use on the fringes of big agriculture, goat's milk is more nutritious and less toxic.
11. **May Boost Immune System :** Goat's milk contains selenium, an essential trace mineral that supports the immune system.

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Appendix-I

Coordinator's Comments on the Draft Report and Action Taken	
1.	Title of 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 Chhattisgarh.
2.	Date of Receipt of the Draft report : August 30, 2017
3.	Date of Dispatch of the Comments : September 27, 2017
4.	Comments on the Objectives of the Study : Objectives of the study have been satisfied.
5.	Comments on the Methodology : Sampling and methodology suggested has been adopted.
6.	Comments on Analysis, Organization, Presentation etc. : Detailed analysis is undertaken. Minor editing is required. For example, page 30, add thousand after 15040.34; on page 32, add column 'total' in table 2.12 & shift same below text in section 2.4 ; on page 68, Fig 4.1 - 'collection' instead of 'compilation'.
Action : It has been done as suggested	
7.	References : Major references are covered
Action : It has been done as suggested	
8.	General Remarks : The study is a comprehensive study on dairy sector in Chhattisgarh and appropriate policy measures have been suggested.
Action : It has been done as suggested	
9.	Overall view on Acceptability of Report : The report is acceptable and with minor editing, if necessary, it may be treated as final.

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