AERC REPORT 169

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 Rajasthan

Hemant Sharma and S. S. Kalamkar

All India Study Coordinated by Agro-Economic Research Centre
Sardar Patel University, Vallabh Vidyanagar (Gujarat)

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

Rajasthan has the largest geographical area in India covering one-tenth of country's land area. The state is characterized by diverse terrain ranging from desert and semi-arid regions of Western Rajasthan to the greener belts east of the Aravalis and the hilly tribal tracts in the South-East. More than 60 percent of the state's area is desert with sparsely distributed population. Agriculture is dependent on rainfall and failure of monsoon causes severe drought and scarcity conditions. It is deficient in water (the state has only 1% of total surface water). Ground water at many places is unfit for human and livestock consumption.

Rajasthan is rich in agro-ecological diversity and has a wide range of unique livestock production systems that have evolved in different regions in tune with the naturally available resources and needs of the people. This diversity begins with the choice of species reared; breeds that have evolved, management and feeding practices, health care systems that are closely linked to the natural flora and fauna, and local marketing systems. Animal Husbandry in Rajasthan is a major economic activity contributing approximately 10.21 per cent to the total GDP of the state. Agriculture and dairying have always been inter-dependent in the state. The cultivator depends largely on bullock power for tillage, irrigation and carting. Milk and milk products constitute the only source of animal protein for a sizable vegetarian population. Milk is also an item of cultural importance. Milk products are an integral constituent of religious ceremonies. As per the livestock census of 2012, there were 577.32 lakh animals and over 80.24 lakh poultry population in the State. Rajasthan accounts for around 7 per cent of the country's cattle population while contributes about 11 per cent of the total milk production. Besides, State contributes about 30 per cent of the mutton and 31 per cent wool produced in the country. Rajasthan rank first in wool production while second in milk production. The state has three native cattle breeds, viz. Rathi, Tharparker and Nagori, having great deal of endurance. Rathi cattle breed is reared for dairy purposes in the northern districts of Shri Ganganagar, Bikaner and parts of Jaisalmer which are irrigated or partially irrigated arid zones with alluvial or loamy soil. The Tharparkar cattle breed is native of the Jodhpur and Jaisalmer districts in eastern region of the state which has arid climate characterized by low rainfall and desert soil.

There are plethora of state and central government schemes that provide forward and backward linkages for promotion of dairying

involving milk producers. Apart from the government programs, the state milk federations and the milk unions have evolved a variety of schemes that provide incentives to the milk producers. 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. Convergence of different programs also enhances sustainability. In view of same, the Ministry of Agriculture and Farmers Welfare, Government of India entrusted this study to our Centre. The study is based on both primary and secondary level data. The study came out with important and relevant policy implications which would help to enhance efficiency of implementation benefitting the milk producers.

I am thankful to authors and their research team for putting in a lot of efforts to complete this excellent piece of work. I also thank the Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India for the unstinted cooperation and support. I hope this report will be useful for policy makers and researchers.

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List of Abbreviations

APEDA	-	Agricultural & Processed Food Products Export Development Authority
ASMM	-	Area Specific Mineral Mixture
A.I.	-	Artificial Insemination
A.I.C.	-	Artificial Insemination Centre
Av.	-	Average
BAH& FS	=	Basic Animal Husbandry and Fishery Statistics
BDO	-	Block Development Officer
BEN	-	Beneficiary
BRGF	-	Backward Regions Grant Fund Programme
CB	-	Cross Breed
DADF	-	Department of Animal Husbandry, Dairying and Fisheries,
DCS	-	Dairy Cooperative Society
DES	-	Directorate of Economics and Statistics
DM	-	Dry Matter
DPAP	-	Drought Prone Area Programme
EIA	-	End Implementing Agency
FDG	-	Focus Group Discussion
GCA	-	Gross Cropped Area
GDP	-	Gross Domestic Product
GIA	-	Gross Irrigated Area
GNP	-	Gross National Product
GOR	-	Government of Rajasthan
GOI	-	Government of India
GRO	-	Grievance Redressal Officer
GVA	-	Gross Value of Agriculture
GVO	-	Gross Value of Output
ha	-	Hectare
HH/hh	-	Household
I.I.	-	Irrigation Intensity
IDA	-	International Development Association
INAPH	-	Information Network for Animal Productivity and Health
ISP	-	International Organization for Standardization
kg	-	kilograms

KVK	-	Krishi Vigyan Kendra
KM	-	Krishi Mahotsav
LTPD	-	Litres per day
LRP	-	Local Resource person
mha	-	Million hectares
MOA	-	Ministry of Agriculture
mt	-	Metric Tonnes
NA	-	Not Available
NBEN	-	Non-Beneficiary
NCDFI	-	National Cooperative Dairy Federation of India
NDDB	-	National Dairy Development Board
NDP	-	National Dairy Plan
Nos	-	Numbers
OF	-	Operation Flood
PCs	-	Producers Company
PDO	-	Project Development Objective
PMC	-	Project Management Cell
PMU	-	Project Management Unit
Prodvty.	-	Productivity
PSC	-	Project Steering Committee
RBP	-	Ration Balancing Programme
RCDF	-	Rajasthan Cooperative Dairy Federation
RLDB	-	Rajasthan Livestock Development Board
SC	-	Scheduled Caste
SNF	-	Solid Not Fat
ST	-	Scheduled Tribe
SWOT	-	Strength, Weakness, Opportunity and Threat
TE	-	Triennium Endings
VAP	-	Village Awareness Programme
Y	-	Yield

(A) Institution / Farms etc.

V.D	-	Veterinary Dispensaries
F.A.V.C.	-	First Aid Veterinary Centre
DISP	-	Dispensary
AVI	-	Animal Vaccine Institute
ICDP	-	Intensive Cattle Development Programme
IPDP	-	Intensive Poultry Development Project

ISDP - Intensive Sheep Development Project
ICBP - Intensive Cattle Breeding Programme
CBF - Cattle Breeding Farm
PBF - Poultry Breeding Farm
SBF - Sheep Breeding Farm
Dist. - District
L.I. Centre - Livestock Inspector Centre

(B) Words related to Budget

Sec. - Section (Section -I , Section - II)
CFT - Coming for First Time
Cont/ Conti - Continuous
Co on AH - Capital Outlay on Animal Husbandry
Co on DD - Capital Outlay on Dairy Development
C.C - Cent age Charges
S.C.A - Special Central Assistance

(C) Plan / Report / Programmer/ Scheme

SNP - Sate Normal Plan
TASP - Tribal Area Sub Plan
SCP - Special Component Plan
BADP - Border Area Development Plan
CSS - Centrally Sponsored Scheme
ADP - Annual Development Plan
OFP - Operation Flood Programme

(D)

DAH - Director of Animal Husbandry
JD - Joint Director of Animal Husbandry
DD - Deputy Director of Animal Husbandry
AD - Assistant Director of Animal Husbandry
VO - Veterinary Officer
Supdt - Superintendent
Sr - Senior
Jr - Junior
CL - Clerk
CL - Class

(E) Weight / Measurement etc.

Kg - Kilogram
M.T. - Metric Tone

Km	-	Kilometer
Hect. Or Hec.	-	Hectare
No.	-	Number
Rs.	-	Rupees

(F) Diseases / Vaccine

R.P.	-	Rinderpest
F.M.D.	-	Foot and Mouth Disease
T.B.	-	Tuberculosis
H.S.	-	Hamorrhagic Septicemia
B.Q.	-	Black Quarter
E.T.	-	Enterotoxaemia
F.D.R.D.	-	Freeze Dried Ranikhet Disease

(G) Others

A.I	-	Artificial Insemination
L.N. 2	-	Liquid Nitrogen
S.C.	-	Scheduled Caste
S.T.	-	Scheduled Tribe
SF/MF/AL	-	Small Farmer, Marginal Farmer, Agricultural Laborer
A.H.	-	Animal Husbandry
M.V.Sc.	-	Master in Veterinary Science

Executive Summary

Agriculture, with its allied sectors, is unquestionably the largest livelihood provider in India, more so in the vast rural areas. This sector plays a vital role in India's economy and forms the backbone of development, though its contribution to the overall Gross Domestic Product (GDP) of the country has fallen over the period of time which is expected in the development process of any economy. However, decrease in agriculture's contribution to GDP has not been accompanied by a matching reduction in the share of agriculture in employment. About 52 per cent of the total workforce is still employed by the farm sector which makes more than half of the Indian population dependant on agriculture for subsistence. Thus, excessive dependence on agriculture without any quality transformation will harm the growth of the nation, as rural economy persistently continues to reel under poverty. Instability of prices, natural calamities, unscrupulous role played by the middlemen has pushed the farmer to a miserable condition. Migration of the rural masses to the city is the cumulative consequence of these factors. In this situation, animal husbandry and dairy has come as a boon to the farmer. Over the period, emphasis has shifted from mere agriculture to other subsidiary occupations such as dairying and horticulture, of which dairying has brought about a sea change in the life of rural India.

Livestock rearing is one of the most important economic activities in the rural areas of the country providing supplementary income for most of the families dependent on agriculture. This is the sector where the poor contribute to growth directly instead of getting benefit from growth generated elsewhere. This sector has also the highest potential for rural self-employment generation at the lowest possible investment per unit The smallholders and landless farmers together control 75 per cent of country's livestock resources. Since the livestock wealth of India is mostly distributed among the marginal and small landholders, any growth in the sector would be beneficial to the rural poor of India.

Role of Dairy Sector in Rajasthan Economy

Animal husbandry and livestock is highly potential sector contributing a lot in state economy, especially of rural economy. The potential of crop production depends upon huge investment and weather and meteorological conditions. Comparatively Animal husbandry and livestock is more stable and requires lesser investments. In fact, livestock and poultry have proved to be life saviour in many distress conditions, especially in case of drought. The livestock population of State was 577.32 lakh in 2012. The State total milk production in was 18.5 million tonnes in 2015-16, rank second in India. Animal Husbandry in Rajasthan is a major economic activity contributing approximately 10.21 per cent to the total GDP of the state.. Rajasthan is rich in agro-ecological diversity and has a wide range of unique livestock production systems that have evolved in different regions in tune with the naturally available resources and needs of the people. This diversity begins with the choice of species reared; breeds that have evolved, management and feeding practices, health care systems that are closely linked to the natural flora and fauna, and local marketing systems., Development of livestock sector therefore is critical pathway to rural prosperity. This fact in

context to Rajasthan is well established where agricultural operations offer less promising prospects due to extreme agro-climatic conditions and uncertainty of rains.

Trend in Contribution of Dairy in State GDP

Rajasthan is the largest State having highest geographical area about 10.41 per cent of the total area of the country. It supports 5.5 per cent of human population and about 11 per cent of the country's livestock population. Animal husbandry contributes over 9 per cent to the gross domestic product. More than 80 per cent rural families keep livestock in their households. About 35 per cent of the income to small and marginal farmers comes from dairy and animal husbandry. In arid areas, the contribution is as high as 50 per cent. The sector has potential to create employment in rural areas with least investments as compared to other sectors. Milk contributes to around 28 per cent to the agricultural GDP of Rajasthan and is one of the biggest sectors for supporting livelihood in the state.

Composition of Livestock & details on Cow and Buffalo Breeds

The state of Rajasthan is rich in livestock wealth. State is blessed with the best breeds of cattle, sheep and camels of the country. The Nineteenth Livestock Census (2012) of India has placed total livestock population at 512.1 million, out of which, 57.73 million livestock (11.3 %) population was in the state of Rajasthan. There is an increase in livestock population in 2012 over 2007 (from 56.66 million to 57.73 million). In fact, the share of the Rajasthan in all Indian total stock of livestock has also considerably increased over the period of time (8. 4% in 1951 to 11.3 in 2012). The state accounts for 6.98 per cent share in cattle population, 11.94 per cent of buffalo population, 13.95 per cent sheep population and 16.03 per cent goat population of the country. The state ranks 1st in goat and camel production, ranks 2nd in buffalo population and rank 3rd in sheep population of the country. The significant share of Camels (81.37 %) and Donkeys (25.56 %) in national stock has also been recorded (2012). Main strengths of livestock sector in the State is that it produces 11 per cent milk, 35 per cent wool and 10 per cent meat of the country.

Among the species, the share of cattle population in total livestock population has declined from 42.26 per cent in 1951 to 23.08 per cent in 2012, while share of buffalo population has increased considerably (11.93% to 22.48%) during corresponding period. The rate of increase in buffaloes population (326 %) was much faster as compared to rate of increase in cows population (23.57%). In case of small ruminants, sheep and goat population has increased by 68.55 per cent and 289.56 per cent respectively n 2012 over 1951. Total livestock population in Rajasthan has increased by 126.25 per cent during last six decades period

The district-wise share in total state livestock population figures indicate that Barmer district (9.30 %) has the highest number of livestock population followed by Jodhpur (6.22%), Jaisalmer (5.53%), Nagour (5.46%),

Jaipur (4.86%), Udaipur (4.82%), Bikaner (4.80%), Bhilwara (4.24%) and Pali (3.99). These nine districts together accounted for 49.21 percent of total livestock population in the state in 2012.

Jaipur district has the highest number of in-milk crossbreds and buffaloes. Bikaner has the highest number of in-milk indigenous Cattle followed by Jodhpur and Barmer district. In milk indigenous cattle like Tharparkar cattle breed is native of the Jodhpur and Jaisalmer districts in eastern region of the Rajasthan whereas Rathi cattle breed is reared for dairy purposes in the northern districts of Shri Ganganagar, Bikaner and parts of Jaisalmer which are irrigated or partially irrigated arid zones. The highest livestock and bovine animal density was recorded in Bharatpur.

Rajasthan state has three native cattle breeds viz Rathi, Tharparker and Nagori, having great deal of endurance. Tharparkar is also known as "White Sindhi". "Cutchi" or "Thari" cattle breed reared for dual purpose of draught and milk production as it can produce milk under rigorous feeding and unfavourable environmental conditions. Nagori cattle breed has been named after the Nagaur district which is in central part of the state. The Nagori cattle are sturdy and used for ploughing, cultivation, drawing water from wells as well as transportation of field produce to markets. Earlier they were used as trotters in light iron- wheeled carts for quick transportation. There was a good demand of Nagori animals in Bihar but after implementation of Rajasthan Bovine Animal (Prohibition on Slaughter and Regulation of Temporary Migration or Export) Act, the demand has tapered off. In addition to native breeds, Gir, Malvi, Kankrej and Hariana cattle are found in large numbers in the State. In case of buffalo, there is no native breed. However, enormous numbers of Murrah, Surti buffaloes are reared in the region.

Status of Availability of Feed and Fodder

Feed and fodder availability in a drought prone area of the State is a major constraint of dairy development in Rajasthan. In Rajasthan, the livestock keepers have traditionally relied on common grazing lands "gochars", scared groves "orans" and forests. With the growth of mining industry and allocation of community wastelands for biodiesel plantation, the permanent pastures and other grazing land has reduced from 1.9 million ha in 1990-91 to 1.7 million ha in 2009-10. Often layers of white marble dust choke neighbouring grazing land. In Rajasthan, the share of area under fodder crop to state gross cropped area has increased from 15.93 per cent in 2008-09 to 20.26 per cent in 2012-13. Bikaner district has the highest area under fodder crops followed by Churu, Hanumangarh and Jaisalmer. As against the estimated animals' requirements, feed resources available in Rajasthan are lower. During the last two decade (1992 to 2011), the shortage of dry matter in the State has increased from 29.01 per cent of the requirement to 51.88 per cent during corresponding years. Six cattle feed plant, in the cooperative sector and spread across the State, produced about 1650 MTPD during 2016.

Growth in Milk Production and Productivity

Milk is a major source of nutritious food to millions of people and only acceptable sources of animal protein for large vegetarian segment of population in Rajasthan. Rajasthan ranks second among the milk producing states in India, achieving 185 lakh MT in 2015-16, which has increased from the 41.46 lakh MT in 1985-86. The numbers of initiatives were taken by the government which could help in improving the milk productivity over the period. During the year 2015-16, per capita milk availability was very high of 704 gm/day against 337 gm/day of national availability and 208 grams of milk requirement per head per day as per ICMR norms.

Out of total milk production, about 53.72 per cent of the milk production is contributed by Indigenous buffaloes followed by indigenous cattle (23.75%), crossbreed cattle (12.08%) and Goat (10.45%). However, the productivity of cross breed cows was maximum at 7.93 liters/day among all dairy animals. The indigenous cattle is also contributing significantly in milk production, especially in arid and semiarid areas of the state, though its productivity is much lower than the crossbreed cows and buffaloes (5.84 ltr/day). While the productivity of cows and buffalo in term of daily milk yield is increasing continuously. Among all cow breeds in Rajasthan, Tharparkar has the highest yield of 1800 to 2600 kilograms of milk per lactation. Despite of increase in milk yield, there is still a wide scope for improving milk yield of milch animals.

Out of total bovine milk production, 59.99 per cent accounts buffalo milk, 26.52 per cent by indigenous cows and remaining 13.49 per cent was of cross breed cows. The significant growth in population of in milk bovine animals supported by increase in milk yield of bovine animals which has increased (bovine milk production) by 41.67 per cent in 2015-16 over 2001-02. The share of cross bread cows in total milk production has increased while share of indigenous cows and buffalo has declined during last one and half decade period.

Alwar is the highest milk producing district in the state with an estimated milk production of about 1116 thousand tonnes during 2013-14, followed by Jaipur, Jodhpur and Ajmer. The top ten districts together contributes about 50 per cent of milk production of the state, those are Alwar, Jaipur, Jodhpur, Ajmer, Pali, Barmer, Sikar, Ganganagar, Nagour and Jhunjhunu. Category-wise share of milk production in Rajasthan clearly indicate that top ranked milk producer five districts in Rajasthan are dominated by the production of milk by buffalo, followed by Indigenous cow and cross bred cows goat .

Infrastructure Development

Rajasthan is the largest state in the country and large part of the state is arid or semi-arid and fall under Thar Desert. The climatic conditions are adverse with scarcity of water for irrigation and erratic rains with very low average annual rainfall. These conditions leave a little scope for crop

production and enhance the importance of animal husbandry over the crop production especially during recurrent droughts. Despite of these constraints, state ranks second in milk production in country and accounts for 11 per cent milk. This could happen because of good network of milk cooperatives and development of infrastructure at the village as well as district level. The co-operatives have developed modern systems of Marketing of dairy product, veterinary care, milk processing, training, cattle feed farm and artificial insemination and provide these services to a large number of milk producers at very low prices. The special emphasis on development of dairy infrastructure was given during the Operation Flood movement.

The marketing activities of the Federation include providing support to the Milk Unions in milk and milk products marketing, within and outside the State. RCDF is presently marketing milk & milk products under SARAS brand. Fresh milk of different compositions and long shelf life tetra pack milk is being marketed in rural and urban areas. The Federation is a major supplier of tetra pack milk (UHT) to the armed forces. Saras Milk Parlours serving a complete range of milk products are operational at 383 points and there are 18,374 booths and shop agencies in Rajasthan.

The milk collection and testing systems at village DCS have been automated with the installation of various testing equipments. At present 14,070 such equipments are working. Milk reception, weighment and testing at dairy plants and chilling centres have been modernized with the installation of 37 automated raw milk reception Dock (RMRD). Further, 1779 Bulk Milk Coolers (BMC) have been installed for quality milk collection. An ultramodern Frozen Semen Station is established at Bassi which supplies the Semen of high pedigree exotic and native breeds. For indigenous breed Germ Plasm Station, Narwa Khichiyan, Jodhpur has been established where bulls of indigenous breeds like Rathi, Tharparkar, Kankrej, Gir & Murrah are available for semen production. At present, 4696 veterinary Institution, 34 Veterinary policlinics, 775 First Grade Veterinary Hospitals, 1718 Veterinary Hospitals, 198 Veterinary Dispensaries, 2571 veterinary sub centre are working at present.

The frozen seman bank and exotic nucleus farm was established in Bassi (Jaipur) and Narwa with the objective to provide high quality genetics in the form of semen straw to cover milk shed area to uplift socioeconomic condition of dairy farmer in the milk shed area and country. Balanced cattle feed is being manufactured by five cattle feed plants (Ajmer, Bikaner, Jodhpur and Nadbai, Lambiyakalan). The milk unions make feed available to the farmers via village level dairy cooperative societies.

Status of Dairy Development Institutions in Rajasthan

India is the highest milk producing country in the world holding nearly 16 per cent of World milk production share. Most of the milk in India is produced in 14 states which contribute to 92 per cent of total milk produced in India. Amongst these, Rajasthan bags second place. Co-operative dairying on Amul pattern was introduced to the state in 1980's with initiatives of RCDF

based on primary milk producers co-operative societies. The pattern is based on three tier structure with DCSs at the village level, union at the district level, and federation at the state. Today in Rajasthan, under the AMUL Pattern system, there are 14026 village-level co-operatives with a total membership of 7.73 lakhs milk producers affiliated with 21 district-level unions. These unions federate into a state-level apex marketing organization known as the Rajasthan state dairy Federation (RCDF). These tiers are legally independent bodies, but vertically integrated so as to avail economies of scale. Currently there are 21 Milk Union, 4696 veterinary Institution, 34 Veterinary policlinic, 775 First Grade Veterinary Hospitals, 1718 Veterinary Hospitals, 198 Veterinary Dispensaries, 2571 veterinary sub centre are working in the state.

Initially animal husbandry activities were taken care by the Department of Agriculture. In the year 1958, the department was separated from the Department of Agriculture. The Animal Husbandry Department thus came in to existence in 1958, along with sheep and wool and fisheries sections. In 1984, the Fisheries Department was separated from the Department of Animal Husbandry making it an independent Department. Various livestock development programmes are aimed to increase the productivity of the animals on sound scientific methodology. With the purpose to promote breeding & development of all species and breeds of economic importance and to introduce, promote and adopt appropriate technology for improving all aspects of livestock production and their productivity, an autonomous body in the name of 'Rajasthan Livestock Development Board' (RLDB) was established by State Government in the year1998.

The RCDF is a State level apex co-operative organization owned by its member unions each of which, in turn, is owned the dairy co-operative societies in its area of operation which are themselves owned by farmer members. Veterinary services like First Aid, Veterinary Treatment and Vaccinations against infectious diseases like foot & mouth disease and Haemorrhagic septicaemia are being provided to the members by the milk unions. Milk Union provides services for animal health through first aid, Vaccination is provided at the village at the DCS. Artificial Insemination Programme has been undertaken by RCDF. Milk Unions like Ajmer, Alwar, Sriganganagar, Jaipur, Jodhpur and Pali they are providing AI facilities to the milk producers. The milk unions make feed available to the farmers via village level dairy cooperative societies. The federation have reported increasing trends of milk procurement from 1741 TKG per day in 2011-12 to 2601 kilogram per day in 2015-16. The cost of milk per kg has been also increased from Rs. 23.75 to 30.33 in respected period. The marketing activities of the Federation include providing support to the Milk Unions in milk and milk products marketing, within and outside the State. Saras Milk Parlours serving a complete range of milk products are operational at 350 points and there are 17,909 booths and shop agencies in Rajasthan.

There are 21 milk unions in Rajasthan State. The total milk procurement capacity and drying capacity are 1955 TL per day and 65 MT per day; of these Jaipur unions are highest procurement capacity 500 Lt per

day followed by Bhilwara. The federation having 22 chilling centre operating in the state with total capacity 565 and 10 chilling centre hired. Out of the 21 milk union, 7 are having training centre. CDF has adopted quality management and food safety system at member milk unions. Bhilwara and Bikaner milk union have obtained IS:22000:2005 and milk unions namely Ajmer, Alwar, Hanumangarh, Jaipur, Kota & Udaipur are ISO 9001 and IS 15000 (HACCP) certified. Rest other milk unions are also in process to obtain ISO certification.

PAAYAS Milk Producer Company limited was incorporated on 19th May 2012 under Part IX A of the Companies Act 1956. At present, the company has its operations in eight districts of Rajasthan and daily procured average 650 thousand litres of fresh raw milk from its producer-members spread over 2,400 villages of Rajasthan. The company organized 694 Milk Pooling Point taking its tally to 3,009, an increase of 30 per cent over the previous year. There remained an overwhelming response during membership drive resulting in addition of 19,031 new members. Average milk procurement grew to all time high of 570 Thousand Kilos per Day, registering a growth of 38 per cent over the previous year. A Milk Chilling Centre each at Bassi (Jaipur) and Beawar (Ajmer) was created to aid to milk procurement. The Paayas Milk Producer Company implemented different programmes like Village Based milk procurement System (VBMPS), Rational Balancing Programme (RBP), Fodder Development (FD), Pilot model for viable artificial Insemination Delivery (AI) are facilitated by National Dairy Services Supported under NDP.

Policies and Programmes/Schemes for Dairy Development

It is a well known fact that for a sustainable development in any sector, there must be a definite policy so that a systematic approach can be made in the right direction. The policy so adopted should also similitude with the policy framed for the country as a whole. Considering the above factor, the department of A.H. and Veterinary as a central as well as state has taken up various programmes for an overall development in this sector. For the proper management and care of both livestock animals and dairy produce, a number of government policies and schemes have been developed to improve the standard of control of animal diseases, scientific management and up gradation of genetic resources, increasing availability of nutritious feed and fodder, sustainable development of processing and marketing facilities and enhancement of production and profitability. Apart from the Central and State government programs, the state milk federations and the milk unions have evolved a variety of schemes that provide incentives to the milk producers.

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 (SIQ&CMP), 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.

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 meagre 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. Rajasthan has witnessed the impressive growth in milk production during the operation flood programmes (OF). On the line of suggestion made by the Working Group for 12th five year plan (GOI, 2012), all the ongoing schemes should be converged and put under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development.

Socio-Economic Profile of selected sample

Rajasthan has varying topographic features of Rajasthan justify the selection of four unions from four regions, as per sampling framework i.e. Hanumangarh (North Rajasthan), Bharatpur (East Rajasthan), Ajmer (Central Rajasthan) and Jalour (Western Rajasthan). The Sriganganagar milk cooperative union cover 628 villages and 526 primary cooperative milk societies spread over two districts (Sriganganagar and Hanumangarh). Ajmer milk cooperative union cover highest number of villages (779) and PDCS (673) in hold one district. Jalore –Sirohi milk cooperative union covers relatively less number of villages (97) and number of milk societies (268) as compared to Ajmer and Sriganganagar milk union. Bharatpur Milk cooperative union cover less no of village and PDCS in selected area. The highest average milk procurement in Ajmer (281 thousand kg / day) and Sriganganagar (156 thousand kg / day) followed by Jalore-Sirohi (55 thousand kg / day) and Bharatpur (13 thousand kg / day) milk union in the state.

All the selected villages of both PDCS and Non PDCS are well connected through pucca road. Sarmaliya and Saradhana Village of Ajmer district and Nagrana Village of Hanumangarh distinct having chilling centre/ BMC established in the village and all other village having these facility more than 10 Km away from village. Thus, at overall level, the PDCS had little bit more

exposure and received support as compared to non-PDCS, due to implementation of programme having support of local resource person.

About 80 per cent sample households belong to other backward classes. The selected household average size was 6.42 members with average age of respondents of between 40 to 44 years. Around three members from each family engaged in dairy activity. The operational land holding indicates that selected households in DCS member have more land of 5.19 hectare as compared to NDCS members (4.17 hectare). The selected households in both the group has significant land under irrigation and facility of protective irrigation to save crop in case of less rainfall during kharif or grow more crop during rabi and summer seasons. The DCS households were found more experienced than NDCS household. Bajra, maize, moong, sorghum, cotton, groundnut and guar were the dominant kharif crops, while wheat, gram, rapeseed & mustard, barley and cumin were important crops grown in Rabi season while summer bajra and lucern were grown. Besides, significant area was allotted to fodder crops as well, due to requirement of fodder for dairy animals. The cropping intensity was found slightly higher in case of NDCS households than DCS households.

Cost of Milk Production & Awareness about the Schemes

The total herd strength was found to be 783 which varied from 149 with small farmers to 390 with large farmers. The total numbers of milch animals were ascertained to be 504 out of which the maximum i.e. 376 were buffaloes, 66 were local cattle and 62 were cross breed in DCS category of milk producers. Thus, the number of buffaloes was higher in large category and it was comparatively much higher in DCS category. While in NDCS category, the total herd strength was found to be 707 which varied from 126 on small farmers to 361 on large farmers. The number of total milch animal was 488 where in 301 were buffaloes, 108 were local cattle and only 79 were cross breed. On an average investment of Rs. 120735 was made on a pucca cattle shed which varied from Rs. 67777 on a cattle shed maintained by a small cattle owner to Rs. 155833 on a large. The investment increased with an increase in the size of cattle holding and same trend were found in NDCS category. Accordingly the pucca cattle sheds were lesser in number than the Kuccha sheds in both DCS and NDCS categories.

On an average, in both DCS and NDCS group, the animal age was varied from 6 years to 7 in local cow and buffaloes, 5 year to 8 in cross breed cattle and 6 year to 7 years in buffaloes reared by milk producer. The average of all animal of category was at first calving was the highest for buffaloes followed by local cattle and lowest for cross breed cattle. In both categories, the age at first calving for the small, medium and large category HH was found to be 39-40, 36-40 and 40-44 months respectively. The average lactation order among the small, medium and large category of all breedable animals was 2 or 3 respectively in DCS and NDCS HH. The overall average length of lactation period varies from 226.60 days to 241.93 days among all the animals which was slightly high in cross breed against local cattle and buffaloes. It may be also observed average milk yield in present

and past lactation. The average peak yield of all animals during last lactation was varied from 9.21 to 9.34 liters per day per animals against 9.37 to 9.45 litres per day per animals. Among crossbreed cows it was higher yield as comparative to local cattle and buffaloes in Present lactation. Thus, in yield there was a marginal difference during last and present lactation of breedable animals. The DCS category the average yield of milk was found to be maximum in 15.60 litres per day buffalos against the minimum i.e. 6.10 litres per day per local cow in winter season. In summer season, milk yield low as compared to rainy season. In NDCS cases, the maximum milk yield observed during winter season and it was varied from 5.10 litres to 12.70 litres per day in which the maximum milk yield i.e. 12.70 litres per animals per day was estimated in case of crossbreed cows against minimum milk yield i.e. 5.10 litres per animal per day in local cows.

As dairy activities are carried out as complimentary activity to agriculture activities, the labour use pattern by the selected sample household indicate the complete dominance of family labour who were engaged in both the activities and out of total time worked in a day, about half of the time was spent on dairy and household activities while remaining time was spent on field. Though some of the household had hired casual labour (which were mainly used for agriculture activities), tendency of having permanent labour was very rare and found with few households only. The hired labour for fodder management, only medium and large cattle holders were hired who worked in grass collection and fodder management. The small milk producer too were spending higher time as compared to the medium farmers and to some extent the large milk producers. However in cross bred being high yielding strains of cattle, need more labour and constant attention as compared to local cattle.

Though no definite trend in terms of feeding per day could be ascertained, but it could be pointed out that the large milk producer were feeding their animals with slightly higher quantity of green fodder and concentrates as compared to the other farm categories. The quantity of feed (dry and green fodder) and concentrates was found higher in Case of NDCS household, While in case of supplements, except one case, DCS households have feeded more quantity than NDCS households. The main sources of water for dairy purpose farm pond, tubewell, open well and village talawadi used by DCS and NDCS.

Almost all the animals were given vaccinations (such as FMD, HS, BQ etc), which was mostly received free of cost in DCS household. In case of NDCS the vaccination percentage was lower as compared to DCS animals. Besides, some of the selected households had incurred expenditure on medicine and doctor as and when some of animals fell sick. The on an average DCS household had incurred medicine plus doctor fee cost ranging between Rs. 600-850/- per animal during the year, while corresponding figure for NDCS was at higher side which ranges between Rs. 925-1205/animal. The amount spent towards cost of medicine and doctor on animals NDCS households was relatively higher than animals under DCS. While expenditure incurred by non DCS households on medicine and doctor

was at lower range, which was very strange to note. The farmers kept close contact with the dairy co-operative society because of the variety of services it offered i.e. milk marketing, feed supply, A.I. and veterinary clinical services. Therefore the cooperative was an important source of information to farmers in all locations and wealth groups. On an average, every year total number of visit of veterinary doctor ranges between 2 to 3 only. Thus, most of the households had either depend on the alternative source of advisory and medical support for their animals.

It was observed that more than 80 percent of DCS member households were aware about the vaccination and artificial Insemination (AI) programme. More than 65 per cent DCS household were awareness about dairy development scheme while figure was about 32 per cent in case of NDCS households. The major source of information about the programme for more than 80 percent of DCS household was dairy cooperatives, followed by the media (TV/ Radio) and other sources such as farmer, dairy owner and neighbour. While about 65 per cent media was main source of information followed by farmer/ dairy owner, neighbour and dairy cooperatives for NDCS households. No NDCS household was benefitted from any dairy scheme.

Cost of Milk Production

Analysis of cost of milk production provides clues to the decision making bodies and helps the decision support system to understand whether or not farmers get remunerative prices. The feeds and fodder feeded to different species of animals as major share of cost goes towards the expenditure. The cost of production of milk and net returns realised by the sample households indicate that net returns realised by the DCS households was higher than NDCS households all groups and in all species. On an average, net return of about Rs. 22/- per animal per day was realised by the DCS households as compared to Rs. 16/- per animal per day realised by the NDCS households. The highest net return by DCS households was recorded in case of buffaloes, followed by crossbred cows and lowest was in case of local cows. However, in case of NDCS households, the highest net return per animal was recorded in cross breed cows, followed by local cows and lowest was in buffalos. Low margins for NDCS dairy producers may be due to low milk productivity from animals with low genetic potential, poor health, feeding and husbandry practises low price offered by private agent/agency. Therefore, there is a huge scope to enhance producers' income from dairy by enhancing animals productivity, improving management practise, and ensuing remunerative prices.

Low productivity of milk animals is a serious constraint to dairy development. The productivity of dairy animals could be increased by crossbreeding low-yielding nondescript cows with high-yielding selected indigenous purebreds or suitable exotic breeds in a phased manner. The cattle-breeding policy should not only focus on milk yield but should also provide for the production of good-quality bullocks to meet the draft-power requirements of agriculture. Upgrading nondescript buffalo through selective breeding with high-yielding purebreds such as Murrah, Mehsani or Nili Ravi

should be given high priority in all areas where buffalo are well-adapted to the agro-climatic conditions.

Milk Consumption & Marketable Surplus

As mentioned earlier, more than 62 per cent of the milk produced in the country is marketed by the unorganised sector (private organisations) and less than 38 per cent is marketed by the organised sector (government or cooperative societies). Even though co-operatives provide a remunerative price to the producer, the unorganized sector plays a major role in milk marketing because of three factors. The first factor is the pricing policy of the co-operatives: their purchase price is based on the fat content of the milk, whereas the private sector pays a flat rate per liter of milk. The second factor, which motivates the milk producers to sell milk to private vendors, involves the type of milk reared by the producer. Crossbred cows yield more milk with a lower fat than do buffalo. The crossbred cow population has increased over years because animals of artificial insemination and improvements in management practices. The third factor is payment policy. The private sector can pay their producers every day, whereas the co- operatives pay weekly or fortnightly. Producers sometimes have to fight with the co-operatives to get their payments. Within the organized sector, the co- operative sector is by far the largest in terms of volumes of milk handled, installed processing capacities, and marketing infrastructure. Cooperatives pay back the highest share of consumer rupee to the milk producer. Besides, input services are also provided to member milk producer.

*The data collected on production and use of milk on the earlier day of visit indicate that the small milk producers generally consume larger proportion of milk produced followed by medium milk producer and the lowest was in case of large milk producers. At overall level, the highest share of total milk produced at household level is consumed by small size households (30.53 per cent) as liquid milk and processed milk products, followed by medium size households (22.91 per cent) and large size households (14.36 per cent). The highest milk consumption as fluid was noted in Hanumangarh district and the lowest was in Dholpur district. Though in percentage terms, consumption is less in large farms but in absolute terms, the consumption is much more than the other categories. The per cent share of milk consumed at home (for direct consumption as fluid milk and milk product) was estimated to be 19.05 percent at overall level, while across breed, same was 31.19 per cent, 20.82 per cent and 14.49 percent respectively in case of small, medium and large household in NDCS household. Th*us, the highest per cent use of milk at home for *direct consumption and milk product was recorded in case of small size household followed by medium and the lowest was in case of large size holdings. Across the breed, out of total milk produced, the highest share of milk consumption at home was recorded in case of local cows, followed by cross breed cows and the lowest was in case of buffaloes.*

About 20 per cent of total milk production had consumed by the selected households of which around 5 percent was in processed form. The details of milk sold to various agencies. The liquid milk sold to cooperative society was estimated varied from 69 per cent to 86 per cent of total milk drawn from all animals by the milk producers of selected categories. The maximum share in total milk producer was sold by large category farmer and the lowest was by the small size group, as expected. Across the breed, the highest share of milk sold to total quantity drawn was recorded in case of buffalos (about 85 %), followed by 70 percent in case of cross breed cows and 69 per cent in case of local cows. Across groups, large size milk producer having buffalo milk had sold largest quantity of milk produced (around 88 per cent) to the cooperative society as compared to that of milk of local as well as crossbreed cow.

The price per litre milk realised was the highest of Rs.33 for buffalo milk and Rs. 23.9 per litre in case of cross breed and Rs. 23.5 per litre for local cattle milk, wit on an average rate of about Rs. 30 per litre. The entire milk producers received the payment on weekly basis. In case of NDCS category, the per cent share of total marketable milk estimated to be about 81 percent, which varied from 68.81 per cent to 85.51 per cent. The highest share in marketed surplus went to retail shop (54.38%) followed by middle man (29.83%) and the sweet shop (9.89%). The transport charges were high in case of milk sale to retail shop than sale to other agencies in study area.

As dairy activities are carried out mostly at household level and it has been observed that most of labour engaged in dairy activities were family labour, it is expected the dominance of female member in dairying activity as well as handling the income and expenditure of dairy. At overall level, 45-49 per cent male members had handled the income received from sale of milk in DCS and NDCS categories. However, females dominate the handling of income received by milk products. Out of the income generated from the sale of milk and milk products, the maximum share was spent on family expenditure followed by animal feed and health.

Constraints faced in Production and Marketing of Milk and Suggestions

The performance of the dairy sector in depends on many factors includes input supply (particularly feed) and service provision (veterinary service and Artificial Insemination (AI) or breed) or output services. DCS and NDCS households are fully depend on the agent or private agency to get support for emergency veterinary services. DCS households recorded the adequate supply of cattle feed while NDCS households did not have facility to get any support from the dairy cooperatives existing in their area, they are fully depend on the agent or private agency to get support for input and output service systems.

About 90 per cent of DCS milk producers reported that supply of cattle feed under input delivery systems was adequate and also got credit facility for cattle feed and fodder. Majority of milk producer (92 per cent) reported that the cost of cattle feed and mineral mixture was high. About 75 per cent

of milk producer responded that EVS (Emergency Veterinary Services) was not available from PDCS but this facility were provided by private agent (private vet. doctors) and charge of EVS was very high (average Rs. 1200/visit with medicines). About 70 per cent of milk producer responded that the vaccines availability was adequate and provided by government on the demands of PDCS in the village. More than 75 per cent household responded positively for quality and requisite quantity of vaccines. About 75 per cent milk producer told that the semen at the AI centre was adequate.

The lack of training facility was the major constraint faced by both the categories. About more than 50 per cent of milk producers under DCS as well as NDCS respondent had never faced the constraints such as irregular & inadequate supply of cattle feed, unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day. The vaccines were in plenty as reported by milk producer of DCS and more than 70 per cent never faced the problem, but 29.17 per cent NDCS respondent had faced this problem always while 26.67 per cent had faced same sometime. More than 40 per cent of milk producer of both categories sometime faced the constraints of unavailability of green/ dry fodder throughout the year and low average milk yield of milk animals.

About 73.33 per cent of milk producer of DCS reported of having always low price of milk offered by Milk union. Also 44.17 per cent in NDCS and 41.67 per cent in DCS categories had reported that high cost for crossbred cow. Besides, there was high cost of cattle feed and mineral mixture. Thus, the rearing of milch animals was more costly for NDCS as compared to DCS due to high cost of cattle feed and mineral mixture. On the other hand almost all the milk producers under DCS and NDCS categories had responded that there were always, high charges of emergency veterinary services and low provision of loan in society or govt. for purchasing of milch animals in state.

About 60 per cent responded of NDCS having less knowledge about marketing strategies was major constraint followed by low risk taking behaviour and no or less advance payment for milk by society/venders. On an average more than 75 per cent of milk producer in both categories had responded that there was always lack of technical guidance. Also 61.67 per cent in NDCS and 41.67 per cent in DCS household reported that they poor knowledge about feeding and health care. The lack of purchasing power is serious social constraint followed by milk produces in study area. Most of households reported the constraints such as lack of awareness about quality milk production, poor housing to milch animals, poor knowledge about scientific animal husbandry practices and dairy farming. Also lack of finance, necessary space, marketing facility, lack of water supply and labour, storage access to AI and disease control were faced by milk producers in the State.

The constraints (such as milk supply related, infrastructure related and marketing related) were also faced by the selected primary dairy cooperative societies and private dairy units. In case of milk supply related constraints, top three constraints faced by both the groups are high numbers of small

producers, irregular and inadequate supply of milk, unavailability of fodder throughout the years and low average milk yield of milk animals in area. Regarding infrastructure related constraints were unavailability of chilling facilities at village level for milk preservation and lack of training facilities. Few of them also faced Lack of necessary space required for dairy operation. Selected milk unions have also faced the constraints, they faced the problem of shortage of man power and technical constraint like veterinary doctor and maximum work is conducted by contract labours in selected all milk union. Besides, during lean season, this dairy faces the problems of working capital. Overall, all the dairy unions have bright future subject to no political interfere in the working of unions.

Conclusions and Recommendations

- *It was pronounced that the productivity of the buffaloes and local cows maintained by the all category of dairy farms were lower than crossbred cows across all categories of dairy farms, therefore there is a need to make efforts to increase the productivity of buffaloes and local cows by upgrading the animals and scientific dairy farming practices should be disseminate to milk producer.*

- *Feed cost represented one of the major cost components within dairy farming and was an obvious cost to be reduced. Arrangement to provide green and dry fodder in adequate quantity and at a reasonable price to the milk producers particularly during off seasons be made.*

- *The major constraint in milk marketing is the involvement of the unorganized sector. Changing the dairy-cooperative laws and regulations can reduce the unorganized sector's role in milk marketing. Strengthening the infrastructure for milk collection, transportation, processing, packaging, pricing, and marketing through dairy co-operatives can also change the minds of the milk producers.*

- *The livestock services like artificial insemination/natural service, vaccination, de-worming, etc are time-sensitive and government institutions are not able to deliver in time due to financial as well as bureaucratic constraints. Therefore, there is a need to re-orient the government policy for delivery of livestock services and involve major stakeholder.*

- *The public provisioning of veterinary inputs delivery system should be strengthened by invigorating the extension machineries, so that the needy farmers could benefit from it. There is a need to make greater efforts to educate and assist the milk producers in respect to latest breeding, feeding and animal management technique.*

- *It was observed that the awareness about the dairy schemes among selected households was very poor. Therefore, there is a need to increase use advanced technology such as mobile phones in dairying*

for effective dissemination of livestock related information in general and dairying in particular.

- *The selected households seldom aware about the livestock insurance. As insurance of livestock is the best safeguard for minimising the risk especially small holder producers, there is a need to increase the awareness and mandatory provision of the companies to undertaken livestock insurance of interested milk producers.*

- *The role of institutions in dairy farming especially district dairy cooperatives need to be strengthened and there should be less bureaucratic and political interference in managing cooperative run dairies.*

- *The co-operative structure is very weak in Bharatpur regions of the state. Therefore, there is a need to support the MPCs as well as union in this the areas for balanced development of dairy sector.*

- *The major constraints faced by the selected primary dairy cooperative societies and private dairy units were high numbers of small producers, irregular and inadequate supply of milk, unavailability of fodder throughout the years and low average milk yield of milk animals in area. Regarding infrastructure related constraints were unavailability of chilling facilities at village level for milk preservation and lack of training facilities. Few of them also faced Lack of necessary space required for dairy operation.*

- *The milk Unions are primarily engaged in manufacturing value added milk, butter, ice cream, peda, dehi, etc., in addition to milk sale. These milk produce are aimed at urban consumers whereas the attention of the dairy management should be focused to the welfare of the farmers' members. The union dairy should revised milk procurement price so as to factors like cost variation and seasonality in milk production could be taken into account.*

- *There are number of schemes that provide incentives to the milk producers, however most of the schemes were stand alone with meagre financial outlay. In fact it would be beneficial to harness the regional strengths using a regionally differentiated approach for exploiting the potential. On the line of suggestion made by the Working Group for 12th five year plan (GOI, 2012), all the ongoing schemes should be converged and put under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development.*

Chapter I

Introduction

1. 1 Background:

Agriculture, with its allied sectors, is unquestionably the largest livelihood provider in India, more so in the vast rural areas. This sector plays a vital role in India's economy and forms the backbone of development, though its contribution to the overall Gross Domestic Product (GDP) of the country has fallen over the period of time (from about 30 percent in 1990-91 to less than 17.4 percent in 2015-16) which is expected in the development process of any economy. As per the second advanced estimates by the Central Statistics Office (CSO), the share of agriculture and allied sectors (including agriculture, livestock, forestry and fishery) is expected to be 17.3 per cent of the Gross Value Added (GVA) during 2016-17 at 2011-12 prices. The decrease in agriculture's contribution to GDP has not been accompanied by a matching reduction in the share of agriculture in employment. About 52 per cent of the total workforce is still employed by the farm sector which makes more than half of the Indian population dependant on agriculture for subsistence (NSSO 66th Round). Thus, excessive dependence on agriculture without any quality transformation will harm the growth of the nation, as rural economy persistently continues to reel under poverty. Instability of prices, natural calamities, unscrupulous role played by the middlemen has pushed the farmer to a miserable condition. Migration of the rural masses to the city is the cumulative consequence of these factors. In this situation, animal husbandry and dairy has come as a boon to the farmer. Over the period, emphasis has shifted from mere agriculture to other subsidiary occupations such as dairying and horticulture, of which dairying has brought about a sea change in the life of rural India.

Importance of livestock in general and dairying in particular hardly needs emphasis in a country like India. 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 underdeveloped (Singh and Meena, 2012). This is the sector where the poor contribute to growth directly instead of getting benefit from growth generated elsewhere. The smallholders and landless farmers together control 75 per cent of country's livestock resources. This sector has also the highest potential for rural self-employment generation at the lowest possible investment per unit. Since the livestock wealth of India is mostly distributed among the marginal and small landholders, any growth in the sector would be beneficial to the rural poor of India.

Dairying is one of the important sub-sectors of agriculture, next only to field crops (Saxena, et al., 2002). The Indian dairy sector contributes a large share in the agricultural Gross Domestic Product (GDP). The livestock sector alone has contributed to 29.20 per cent of the total value of agriculture gross domestic product in 2012-13. This has increased gradually from 13.88 per cent in 1980-81. Dairy sector in India provides regular employment to 9.8 million peoples in principal status and 8.6 million people in subsidiary status, which together constituted 5 per cent of total workforce (Kadirvel, 2004). Dairying has been considered as one of the activities aimed at alleviating the poverty

and unemployment, especially in the rain-fed and drought-prone regions of the rural areas. 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. In the Indian context of poverty and malnutrition, milk has a special role to play for its many nutritional advantages as well as providing supplementary income to some 70 million farmers in over five lakh remote villages.

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. Today, country is the world's largest milk producer, accounting for more than 18.5 per cent of world's total milk production. The rate of growth in annual output of milk production in India was 6.26 per cent in 2014-15 over 2013-14 (146.3 million tonnes during 2014-15 as compared to 137.69 million tonnes during 2013-14). Whereas, the Food and Agriculture Organization (FAO) has reported 3.1 per cent increase in world milk production, i.e. from 765 million tonnes in 2013 to 789 million tonnes in 2014 (GOI, 2016, Economic Survey). India is also the world's largest consumer of dairy products, consuming almost all milk produced in the country. Dairy products are a major source of economical and nutritious food to millions of people in India and the only acceptable source of animal protein for large vegetarian segment of Indian population. Therefore, progress in dairy sector will result in a more balanced development of the rural economy.

In spite being the largest milk producer, India is a very minor player in the world market of milk and milk products (less than 1 per cent of the total export earnings). During the year 2015-16, India's

export of dairy products was 33377.16 MT to the world for the worth of Rs. 754.20 crores, having major export destinations to United Arab Emirates, Pakistan, Bangladesh, Singapore and Nepal. Indigenous milk products and desserts are becoming popular with the ethnic population spread all over the world and export demand for these products is on increase. As the World is getting integrated into one market, quality certification is becoming essential in the market. All dairy plants, including private players are going for ISO certification of the dairy plants which involves adoption of high standards of hygiene, training of staff, taking into account the environment too. Some of the challenges that Indian dairy industry is facing such as, clean milk production, preservation of raw milk, adoption of newer processing methods, mechanization of indigenous dairy based products, new product development life extension of perishable foods, storage and packaging technologies, promoting export of dairy products, energy saving, environment-friendly effluent treatment methods, reducing carbon foot print and so on. Therefore, there is a need to upgrade the quality of milk produced (mainly from the villages) and need to avoid the wastage from spoilage of the perishable dairy commodities.

A specific Indian phenomenon is the unorganized sector of milkmen, vendors who collect the milk from local producers and sell the milk in both urban and non-urban areas, which handles 65-70 per cent of the national milk production. In the organized dairy industry, the cooperative milk processors have 60 per cent market share. The cooperative dairies process 90 per cent of the collected milk as liquid milk, whereas the private dairies process and sell only 20 per cent of the milk collected as liquid milk and 80 per cent for other dairy products.

State Profile:

Rajasthan is the north-western largest state of India, with a land area of 34.3 million hectares (10.4% of India's total area). The state has

four main physiographical regions- the Western Desert, the Aravali hills (running southwest to northeast), the Eastern Plain, and the South eastern Plateau. It is divided into 33 districts, and further sub-divided into 249 blocks and 9,177 gram panchayats. The total human population of Rajasthan in 2011 was 68.62 million, of which 75.3 per cent was rural population. The population density was estimated to be 201 per sq. km. The state has experienced a decadal population growth rate of 21.44 percent (2011 over 2001), which is higher than not only national average (17.64 percent) but also among the states in the country. An estimated 24.8 percent of the population lives below poverty line (BPL), compared to 29.8 percent at national level. At current prices, Rajasthan's Gross state domestic product (GSDP) stood at US$ 102.98 billion in 2015-16, in comparison with US$ 32.22 billion in 2005-06. Between 2005-06 and 2015-16, GSDP of Rajasthan grew at a CAGR of 12.32 per cent. At current prices, net state domestic product (NSDP) stood at US$ 93.3 billion in 2015-16, in comparison with US$ 28.39 billion in 2005-06. Between 2005-06 and 2015-16, NSDP registered growth at a CAGR of 12.63 per cent. In 2015-16, Rajasthan's per capita GSDP at current prices was US$ 1,501 as compared to US$ 521 in 2005-06. Per capita GSDP is estimated to have increased at a CAGR of 11.16 % per cent between 2005-06 and 2015-16.

1.2 Role of Dairy Sector in Rajasthan Economy

Animal husbandry and livestock is highly potential sector contributing a lot in state economy, especially of rural economy. The potential of crop production depends upon huge investment and weather and meteorological conditions. Comparatively Animal husbandry and livestock is more stable and requires lesser investments. Livestock and poultry have proved to be life saviour in many distress conditions, especially in case of drought. The livestock population of State was 577.32 lakh (2012). Rajasthan is considered as

"Denmark of India". The total milk production in Rajasthan was 18.5 million tonnes in 2015-16, ranks second in India. Animal Husbandry in is a major economic activity contributing approximately 10.21 per cent to the total GDP of the state.

Rajasthan is rich in agro-ecological diversity and has a wide range of unique livestock production systems that have evolved in different regions in tune with the naturally available resources and needs of the people. This diversity begins with the choice of species reared; breeds that have evolved, management and feeding practices, health care systems that are closely linked to the natural flora and fauna, and local marketing systems. Development of livestock sector therefore is critical pathway to rural prosperity. This fact in context to Rajasthan is well established where agricultural operations offer less promising prospects due to extreme geo-climatic conditions and uncertainty of rains. As such livestock operations have expressed their superiority over crop farming in terms of growth, stability, resource conservation and uplifting the socio- Economic status of the inhabitants.

1.3 Trend in Contribution of Dairy in State GDP

Rajasthan is the largest state having about 10.41 per cent of the total geographical area of the country. It supports 5.5 per cent of human population and about 11 per cent of the country's livestock population. Agriculture and allied activities, however, remain the primary and major economic activity in the state; this sector provide livelihood to 66 per cent of the State's population. Because of the limited water resources, most of the agriculture production is rain-fed and as such, the livestock sector assumes more importance. Animal Husbandry is not only a subsidiary occupation to agriculture but it is a major economic activity, especially in the arid and semi-arid regions of the Rajasthan. Livestock sector development has a significant beneficial impact in generating employment and reducing poverty in rural areas.

Table 1.1: Value of Output: Agriculture and Livestock

Item	Value of Output: Agriculture and Livestock in Rajasthan						
	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Value of Output at Current Prices (Rs. billion)							
Agriculture & Allied*	489	521	615	677	819	897	1,187
Agriculture	265	280	338	384	444	435	636
Livestock	167	177	198	220	289	345	418
Share of Value of Output to Agriculture and Allied* (%)							
Agriculture	54	54	55	57	54	48	54
Livestock	34	34	32	32	35	38	35
Value of Output at Constant Prices (Rs. billion) (2004-05)							
Agriculture & Allied*	489	488	521	534	577	538	643
Agriculture	265	259	280	287	307	252	342
Livestock	167	173	183	186	217	225	239
Share of Value of Output to Agriculture and Allied* (%)							
Agriculture	54	53	54	54	53	47	53
Livestock	34	35	35	35	38	42	37
Value of Livestock Output at Current Prices (Rs. billion)							
Milk	114	122	138	152	211	250	308
Meat	8	10	10	12	14	16	18
Egg	1	1	1	1	1	2	2
Dung	39	39	42	46	53	63	73
Others^	5	5	7	9	10	14	17
Share of Livestock Output at Current Prices (%)							
Milk	68	69	70	69	73	72	74
Meat	5	6	5	5	5	5	4
Egg	1	1	1	0	0	1	0
Dung	23	22	21	21	18	18	17
Others^	3	3	4	4	3	4	4
Value of Livestock Output at Constant Prices (Rs. billion) (2004-05)							
Milk	114	119	128	130	159	165	177
Meat	8	9	9	9	9	10	11
Egg	1	1	1	1	1	1	1
Dung	39	39	40	41	42	43	44
Others^	5	5	5	5	6	6	6
Share of Livestock Output at Constant Prices (%)							
Milk	68	69	70	70	73	73	74
Meat	5	5	5	5	4	4	5
Egg	1	1	1	1	0	0	0
Dung	23	23	22	22	19	19	18
Others^	3	3	3	3	3	3	3

Notes: P: Provisional Estimates, Q: Quick Estimates, * Includes Livestock, Forestry & Fisheries, ^ Includes Wool and Hair, Silkworm Cocoons & Honey, Increment in Stock
Source: NDDB (2016).

Animal husbandry contributes over 9 per cent to the gross domestic product. More than 80 per cent rural families keep livestock in their households. About 35 per cent of the income to small and marginal farmers comes from dairy and animal husbandry. In arid areas the contribution is as high as 50 per cent. The sector has potential to

create employment in rural areas with least investments as compared to other sectors. Milk contributes to around 28 per cent to the agricultural GDP of Rajasthan and is one of the biggest sectors for supporting livelihood in the state. Livestock output at constant prices was reported at Rs. 239 billion in 2010-11 (at constant prices), of which milk contributes about 74 per cent or Rs. 177 billion (Table 1.1).

1.4 Composition of Livestock & details on Cow & Buffalo Breeds

The state of Rajasthan is rich in livestock wealth. State is blessed with the best breeds of cattle, sheep and camels of the country. The climatic conditions are adverse with scarcity of water for irrigation and erratic rains with very low average annual rainfall. These conditions leave a little scope for crop production and enhance the importance of animal husbandry over the crop production especially during recurrent droughts. The Nineteenth Livestock Census (2012) of India has placed total livestock population at 512.1 million, out of which, 57.73 million livestock (11.3 %) population was in the state of Rajasthan (Table 1.2). There is an increase in livestock population over 2007 to 2012 from 56.66 million to 57.73 million total number of animals of various species. In fact, the share of the Rajasthan in all Indian total stock of livestock has also considerably increased over the period of time (8. 4% in 1951 to 11.3 in 2012) (Table 1.2). The state accounts for 6.98 per cent share in cattle population, 11.94 per cent of buffalo population, 13.95 per cent sheep population and 16.03 per cent goat population of the country (Table 1.3). The state ranks 1st in goat and camel production, ranks 2nd in buffalo population and rank 3rd in sheep population of the country. The significant share of Camels (81.37 %) and Donkeys (25.56 %) in national stock has also been recorded (2012). Main strengths of livestock sector in the State is that it produces 11 per cent milk, 35 per cent wool and 10 per cent meat of the country.

Table 1.2: Growth of the Livestock in Rajasthan and India

Sr. No	Livestock Census Year	Total Livestock (000)		% Share of Rajasthan to All India	% Growth of Rajasthan State between two Census
		All India	Rajasthan		
1	1951	292784	24642	8.4	
2	1956	306615	32427	10.6	31.6
3	1961	336432	34499	10.3	6.4
4	1966	344111	37476	10.9	8.6
5	1972	353338	38678	10.9	3.2
6	1977	369525	41359	11.2	6.9
7	1983	419588	49650	11.8	20.0
8	1987	445285	40901	9.2	-17.6
9	1993	470830	48482	10.3	18.5
10	1997	485385	54655	11.3	12.7
11	2003	485002	49136	10.1	-10.1
12	2007	529698	56663	10.7	15.3
13	2012	512057	57732	11.3	1.9

Note: Figures without Dog & Rabbit.
Sources: GOI (2015, 2016) & GOR (2015).

Table 1.3: Species-wise Livestock population & its Share in total livestock

Sr. No.	Particulars	Rajasthan -2012				India 2012	
		Livestock-2012	% share in India	% share in total Livestock	Rank in All India	Livestock-2012	% share in Total Livestock
1	Cattle	13324	6.98	23.08	5	190904	37.28
2	Buffaloes	12976	11.94	22.48	2	108702	21.23
3	Sheep	9080	13.95	15.73	3	65069	12.71
4	Goats	21666	16.03	37.53	1	135173	26.4
5	Pigs	238	2.31	0.41	17	10294	2.01
6	Horses & Ponies	38	6.05	0.07	4	625	0.12
7	Mules	3	1.72	0.01	11	196	0.04
8	Donkeys	81	25.56	0.14	1	319	0.06
9	Camel	326	81.37	0.56	1	400	0.08
10	Yaks	0	0.00	0.00	-	77	0.02
11	Mithun	0	0.00	0.00	-	298	0.06
12	Total Livestock	57732	11.27	100.00	2	512057	100

Note: Figures without Dog & Rabbit
Source: GOR (2015, 2016), Department of Animal Husbandry, Rajasthan.

However, over the period, share of cattle population in total livestock population has declined from 42.26 per cent in 1951 to 23.08 per cent in 2012, while share of buffalo population has increased considerably (11.93% to 22.48%) during corresponding period. The rate of increase in buffaloes population (326%) was much faster as compared to rate of increase in cows population (23.57%). In case of small ruminants, sheep population has increased by 68.55 per cent and goat population increased by 289.56 per cent in 2012 over 1951. Total

livestock population in Rajasthan has increased by 126.25 per cent during last six decades period (Table 1.4 and Fig. 1.1).

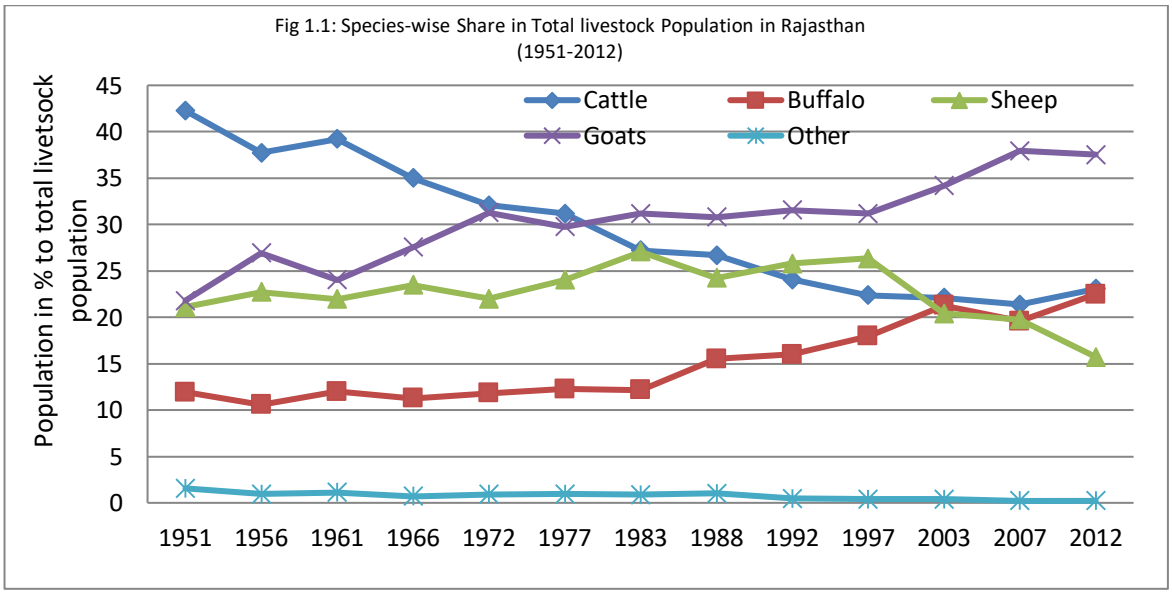
Table 1.4: Growth in Livestock Population in Rajasthan- 1951 to 2012

Sr. No.	Year	Cattle		Buffalo		Sheep		Goat		Total Livestock	
		Nos.	GR (%)	Nos.	GR (%)	Nos.	GR (%)	Nos.	GR (%)	Nos.	GR (%)
1	1951	107.82	-	30.45	-	53.87	-	55.62	-	255.16	-
2	1956	120.73	11.97	34.30	12.64	73.73	36.87	87.30	56.96	324.28	27.09
3	1961	131.36	8.80	40.19	17.17	73.60	-0.18	80.52	-7.77	335.09	3.33
4	1966	131.23	-0.10	42.23	5.08	88.06	19.65	103.23	28.20	374.76	11.84
5	1972	124.70	-4.98	45.92	8.74	85.56	-2.84	121.62	17.81	388.78	3.74
6	1977	128.96	3.42	50.72	10.45	99.38	16.15	123.07	1.19	413.59	6.38
7	1982	135.04	4.71	60.43	19.14	134.31	35.15	154.8	25.78	496.5	20.05
8	1988	109.21	-19.13	63.44	4.98	99.32	-26.05	125.78	-18.75	409.17	-17.59
9	1992	116.66	6.82	77.75	22.56	124.91	25.77	152.85	21.52	484.45	18.40
10	1997	121.41	4.07	97.70	25.66	145.85	16.76	169.71	11.03	546.55	12.82
11	2003	108.54	-10.60	104.14	6.59	100.54	-31.07	168.09	-0.95	491.36	-10.10
12	2007	121.20	11.66	110.92	6.51	111.9	11.30	215.03	27.93	566.63	15.32
13	2012	133.24	9.93	129.76	16.99	90.8	-18.86	216.66	0.76	577.32	1.89

Note: GR- Growth rate over previous year.
Source: GOR (2015), Department of Animal Husbandry, Rajasthan.

The district-wise share in total state livestock population figures indicate that (Fig. 1.2 & Table 1.5) Barmer district (9.30 %) has the highest number of livestock population followed by Jodhpur, Jaisalmer, Nagour, Jaipur, Udaipur, Bikaner, Bhilwara and Pali. These nine districts together accounted for 49.21 percent of total livestock population in the state (Fig. 1.2).

Fig 1.1: Species-wise Share in Total livestock Population in Rajasthan (1951-2012)



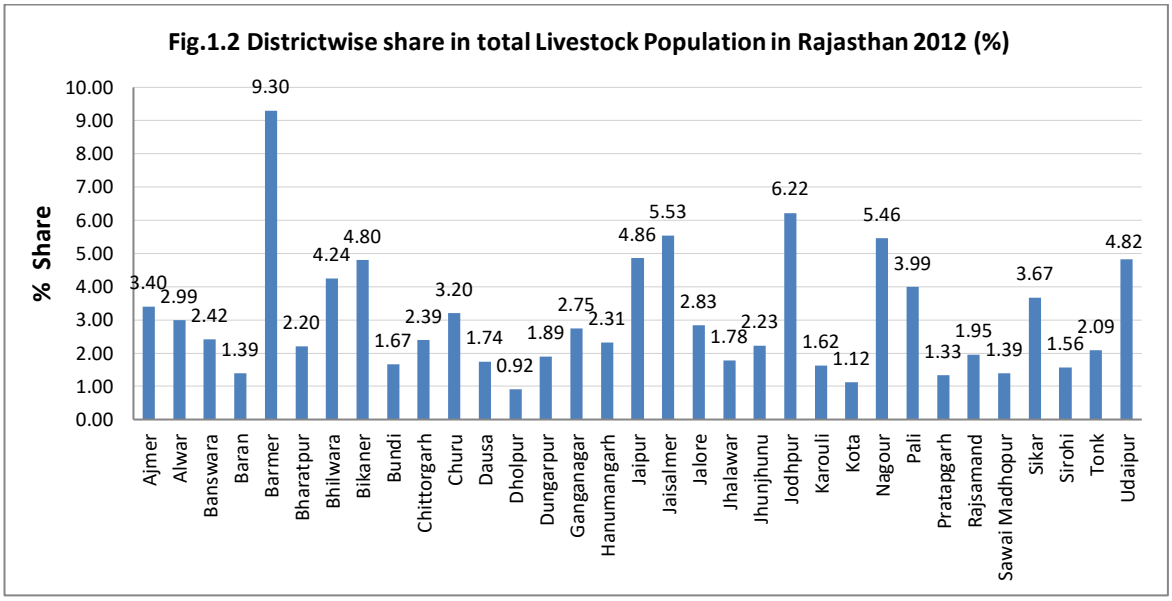


Table 1.5: District wise Percentage share of Animals in Total Livestock Population

District	District wise Percentage share of animals in Total livestock population in Rajasthan-2012											
	Cross-bred	Indige-nous	Total Cow	Buffalo	Sheep	Goat	Total Pigs	Horses & Ponies	Mules	Donkey	Camel	Pig
Ajmer	2.18	18.41	20.59	22.33	18.58	37.18	0.09	0.00	0.11	0.08	1.05	2.18
Alwar	3.22	7.30	10.53	53.97	2.65	19.32	0.05	0.03	0.07	0.30	0.77	3.22
Banswara	0.50	29.94	30.45	14.37	0.37	25.68	0.01	0.00	0.09	0.03	0.01	0.50
Baran	0.27	17.18	17.45	12.73	0.49	9.34	0.03	0.01	0.05	0.04	0.61	0.27
Barmer	0.12	39.99	40.11	10.90	71.44	147.38	0.13	0.00	0.89	2.20	0.01	0.12
Bharatpur	1.90	6.59	8.49	42.55	3.31	8.77	0.04	0.00	0.07	0.12	1.24	1.90
Bhilwara	6.20	30.32	36.53	23.01	20.63	43.08	0.11	0.01	0.06	0.24	0.74	6.20
Bikaner	2.92	43.18	46.10	9.84	33.23	48.94	0.16	0.00	0.44	2.35	0.04	2.92
Bundi	0.71	11.65	12.36	16.12	2.75	16.76	0.07	0.00	0.04	0.14	0.69	0.71
Chittorgarh	1.68	21.56	23.25	20.01	2.24	24.16	0.09	0.00	0.02	0.11	0.21	1.68
Churu	1.63	16.05	17.68	14.89	17.73	41.72	0.04	0.01	0.26	1.73	0.06	1.63
Dausa	1.73	5.30	7.02	24.85	2.84	15.59	0.04	0.00	0.02	0.12	0.55	1.73
Dholpur	0.32	2.71	3.04	18.27	0.60	4.56	0.03	0.01	0.04	0.02	0.36	0.32
Dungarpur	0.14	18.94	19.08	11.81	3.19	21.20	0.01	0.00	0.06	0.09	0.00	0.14
Ganganagar	8.79	23.59	32.38	13.79	13.91	19.56	0.05	0.01	0.23	0.63	0.09	8.79
Hanumangarh	4.98	20.56	25.54	19.81	9.63	10.84	0.06	0.02	0.17	1.59	0.07	4.98
Jaipur	17.55	14.76	32.31	54.61	11.70	42.59	0.06	0.00	0.07	0.25	1.08	17.55
Jaisalmer	0.08	22.03	22.11	0.21	60.30	77.00	0.06	0.00	0.30	2.54	0.06	0.08
Jalore	0.11	14.94	15.05	23.87	19.61	23.89	0.10	0.00	0.17	0.26	0.04	0.11
Jhalawar	0.16	19.18	19.34	15.80	0.58	15.95	0.07	0.00	0.04	0.01	0.36	0.16
Jhunjhunu	9.34	2.50	11.84	19.58	6.41	26.54	0.06	0.01	0.08	0.65	0.17	9.34
Jodhpur	2.87	40.29	43.16	15.53	37.20	85.57	0.08	0.01	0.21	0.85	0.04	2.87
Karouli	0.46	4.68	5.14	24.25	2.88	14.40	0.03	0.01	0.04	0.17	0.58	0.46
Kota	0.46	10.86	11.33	12.03	0.93	7.61	0.02	0.00	0.02	0.09	0.75	0.46
Nagour	3.69	21.83	25.52	28.32	29.76	75.56	0.11	0.00	0.09	0.54	0.38	3.69
Pali	0.46	17.63	18.09	15.86	43.28	39.05	0.06	0.00	0.11	0.42	0.27	0.46
Pratapgarh	0.80	15.99	16.79	7.66	1.12	13.22	0.01	0.00	0.02	0.01	0.12	0.80
Rajsamand	1.33	11.94	13.27	11.31	5.11	27.32	0.05	0.00	0.05	0.08	0.16	1.33
S.Madhopur	0.09	5.50	5.60	16.19	4.23	13.86	0.05	0.00	0.06	0.19	0.71	0.09
Sikar	10.23	6.62	16.84	28.19	7.44	54.61	0.04	0.00	0.06	0.36	0.21	10.23
Sirohi	0.16	9.74	9.90	9.47	10.47	15.66	0.03	0.01	0.07	0.21	0.03	0.16
Tonk	0.48	11.10	11.58	19.92	10.21	19.12	0.05	0.00	0.01	0.04	0.55	0.48
Udaipur	2.70	46.76	49.46	28.17	7.15	56.31	0.04	0.00	0.12	0.14	0.08	2.70
	3.01	20.07	23.08	22.48	15.73	37.53	0.07	0.01	0.14	0.56	0.41	3.01

Source: GOR (2015), Department of Animal Husbandry, Rajasthan.

Jaipur district has the highest number of in-milk crossbreds and buffaloes. Bikaner has the highest number of in-milk indigenous Cattle followed by Jodhpur and Barmer district. In milk indigenous cattle like Tharparkar cattle breed is native of the Jodhpur and Jaisalmer districts in eastern region of the Rajasthan whereas Rathi cattle breed is reared for dairy purposes in the northern districts of Shri Ganganagar, Bikaner and parts of Jaisalmer which are irrigated or partially irrigated arid zones. The highest livestock and bovine animal density was recorded in Bharatpur (Table 1.6).

Table 1.6: District-wise Livestock and Bovine Density (1997-2012)

Districts	Livestock (No. per sq km)				Bovine (No. per sq km)			
	1997	2003	2007	2012	1997	2003	2007	2012
Ajmer	248	190	239	232	94	69	86	100
Alwar	194	199	240	206	115	131	140	151
Banswara	259	310	309	309	178	203	204	195
Baran	117	112	124	115	85	74	83	85
Barmer	145	116	158	189	22	24	28	35
Bharatpur	182	207	183	251	127	159	119	198
Bhilwara	259	203	194	234	108	88	85	112
Bikaner	84	81	85	92	22	25	27	36
Bundi	169	155	172	167	95	88	96	97
Chittaurgarh	221	238	256	176	139	141	158	109
Churu	154	104	137	134	39	30	34	46
Dausa	233	243	283	292	143	147	160	182
Dhaulpur	149	158	174	174	110	120	123	138
Dungarpur	273	303	309	289	153	168	175	161
Ganganagar	130	120	151	144	67	61	79	83
Hanumangarh	129	120	140	138	66	67	76	92
Jaipur	208	221	255	252	108	117	131	153
Jaisalmer	64	46	74	83	8	6	9	11
Jalor	170	154	179	153	57	57	66	72
Jhalawar	149	167	182	165	106	111	117	111
Jhunjhunun	210	200	237	217	80	85	92	104
Jodhpur	172	116	146	157	38	31	40	50
Karauli	144	140	177	169	89	84	94	105
Kota	126	126	139	124	86	81	91	88
Nagaur	183	149	176	178	52	44	50	60
Pali	223	172	187	186	60	46	54	54
Pratapgarh	-	-	-	72	-	-	-	108
Rajsamand	26	233	249	242	114	97	110	104
Sawai Madhopur	16	166	196	179	93	86	82	95
Sikar	32	241	293	274	87	91	100	114
Sirohi	188	189	188	175	67	65	72	74
Tonk	175	141	169	168	81	62	77	86
Udaipur	216	253	233	237	122	134	125	130
RAJASTHAN	**159**	**144**	**166**	**169**	**64**	**62**	**68**	**77**

Source: NDDB (2016).

Rajasthan state has three native cattle breeds viz Rathi, Tharparker and Nagori, having great deal of endurance (Table 1.7). Rathi cattle breed is reared for dairy purposes in the northern districts of Shri Ganganagar, Bikaner and parts of Jaisalmer which are irrigated or partially irrigated arid zones with alluvial or loamy soil. The Tharparkar cattle breed is native of the Jodhpur and Jaisalmer districts in eastern region of the state which has arid climate characterized by low rainfall and desert soil. Tharparkar is also known as "White Sindhi", "Cutchi" or "Thari" cattle breed reared for dual purpose of draught and milk production as it can produce milk under rigorous feeding and unfavourable environmental conditions. Nagori cattle breed has been named after the Nagaur district which is in central part of the state. The Nagori cattle are sturdy and used for ploughing, cultivation, drawing water from wells as well as transportation of field produce to markets. Earlier they were used as trotters in light iron- wheeled carts for quick transportation. There was a good demand of Nagori animals in Bihar but after implementation of Rajasthan Bovine Animal (Prohibition on Slaughter and Regulation of Temporary Migration or Export) Act, the demand has tapered off. In addition to native breeds, Gir, Malvi, Kankrej and Hariana cattle are found in large numbers in the State. In case of buffalo, there is no native breed. However, enormous numbers of Murrah, Surti buffaloes are reared in the region. The performances of these breeds are presented in Table 1.8.

Table 1.7: Distribution of Rajasthan's Cattle Breeds

Breed	Breeding Tract	Utility	Distribution
Rathi	Bikaner, Ganganagar and Jaisalmer districts of Rajasthan	Milch	Mainly distributed in Bikaner, Ganganagar and Hanumangarh districts
Tharparkar	Jodhpur, Barmer, Jaisalmer districts of Rajasthan and Kutch district of Gujarat	Milk and Draught	Distributed in Jaisalmer, Jodhpur and Barmer districts
Nagori	Nagaur, Bikaner and Jodhpur districts of Rajasthan	Draught	Mainly distributed across Nagaur, Jodhpur, Bikaner districts

Source: NDDB (2016).

Table1.8: Performance of Native Cattle Breeds

Parameters	Cattle		
	Rathi	Tharparkar	Nagori
Breed Population as on 2012	1,218,294	486,339	503,193
Average Adult Body Weight *(Kg)*	Female : 295	Male : 475 Female : 295	Male : 363 Female : 318
Lactation Yield *(Kg)*	1,560 (1,062 - 2,810)	1,749 (913 - 2,147)	603 (479 - 905)
Lactation Length *(days)*	336	285	267 (237 - 300)
Calving Interval *(days)*	512 (420 - 600)	425 (403-565)	455 (420 - 540)
Age at First Calving *(days)*	1,392 (1,080 - 1,560)	1,231 (1,101 - 1,575)	1,421 (1,260 - 1,500)
Average Milk Fat *(%)*	3.7 - 4.0	4.9 (4.7 - 4.9)	5.8

Source: NDDB (2016) Animal Genetic resources of India (Agri-IS), NBAGR, ICAR and estimated Livestock Population Breed Wise, Based on Breed Survey 2013, Department of Animal Husbandry, Dairying and Fisheries, MoA&FW, Govt. of India

1.5 Status of Availability of Feed and Fodder

Feed and fodder availability in a drought prone area of the State is a major constraint of dairy development in Rajasthan. Dairying is the most reliable source of earning to farmers in Rajasthan but with disappearing grazing land, restricted forest and stall feeding, the bovine are facing a severe shortage of fodder. It is estimated that a perpetual shortage of fodder in the State is to the tune of 40 per cent. In Rajasthan, the livestock keepers have traditionally relied on common grazing lands “gochars”, scared groves “orans” and forests. With the growth of mining industry and allocation of community wastelands for biodiesel plantation, the permanent pastures and other grazing land has reduced from 1.9 million ha in 1990-91 to 1.7 million ha in 2009-10. Often layers of white marble dust choke neighbouring grazing land. Rajasthan is a leader in crops like sorghum, pearl millet (bajra), pulses, oil seeds, wheat and rice, all of which in some way or other, form parts of compound livestock feed. Rajasthan also produces non-conventional ingredients, which can be integral part of the feed raw material. Now the dairy farmers are shifting from extensive open grazing system to semi-intensive and intensive stall feeding system. Green fodder is a comparatively economical source of nutrients. However, the availability of green fodder is lower than estimated

requirement. In Rajasthan, the area under fodder crop to state gross cropped area has increased from 15.93 per cent in 2008-09 to 20.26 per cent in 2012-13 (Table 1.9 and Figure. 1.3). Bikaner District has the highest area under fodder crops followed by Churu, Hanumangarh and Jaisalmer District.

Table1.9: Area under Fodder Crops in Rajasthan

Districts	Area under Fodder Crops ('000 ha)					Gross Sown area ('000 ha)				
	2008-09	2009-10	2010-11	2011-12	2012-13	2008-09	2009-10	2010-11	2011-12	2012-13
Ajmer	17	15	13	12	27	493	436	775	640	664
Alwar	50	35	34	30	55	809	864	859	854	853
Banswara	2	2	2	2	2	316	325	332	337	340
Baran	2	3	2	2	2	550	547	574	593	629
Barmer	360	370	411	430	417	1,777	1,820	1,979	1,868	1,646
Bharatpur	30	31	27	26	35	562	603	597	591	587
Bhilwara	47	35	36	30	54	520	456	733	624	643
Bikaner	891	653	884	908	1,101	1,784	1,502	1,880	1,884	1,807
Bundi	15	15	18	13	14	413	384	444	461	464
Chiiorgarh	21	21	22	21	27	492	423	520	505	518
Churu	350	295	248	327	608	1,459	1,283	1,575	1,528	1,355
Dausa	18	14	12	11	15	351	382	392	384	378
Dholpur	3	3	3	3	4	208	229	226	230	230
Dungarpur	4	5	5	5	5	158	186	187	200	200
Ganganagar	282	187	217	216	357	1,092	947	1,073	1,107	1,187
Hanumangarh	389	215	310	314	509	1,237	1,014	1,278	1,220	1,198
Jaipur	73	70	59	53	71	963	934	1,172	1,091	1,013
Jaisalmer	374	318	426	430	500	728	626	878	848	844
Jalor	66	63	61	50	103	813	824	1,126	911	895
Jhalawar	3	4	3	3	4	549	579	570	601	614
Jhunjhunun	79	67	61	66	132	655	614	734	668	644
Jodhpur	174	148	153	158	291	1,420	1,402	1,580	1,516	1,449
Karauli	5	5	4	3	7	306	348	344	340	340
Kota	5	5	5	4	4	435	439	459	462	492
Nagaur	135	92	78	91	217	1,460	1,411	1,859	1,469	1,453
Pali	66	53	46	35	65	645	631	887	702	721
Pratapgarh	2	2	2	2	2	272	267	272	283	291
Rajsamand	12	9	10	8	12	110	99	146	139	140
S.Madhopur	7	6	5	4	8	372	425	412	398	400
Sikar	87	76	72	80	134	743	715	847	777	748
Sirohi	23	22	22	18	32	192	171	241	233	230
Tonk	16	14	13	13	19	584	575	715	691	637
Udaipur	22	22	22	21	22	303	284	336	348	342
Rajasthan	3,627	2,875	3,287	3,386	4,853	22,771	21,745	26,002	24,505	23,954

Source: NDDB (2016).

As against the estimated animals' requirements, feed resources available in Rajasthan are lower. It can been seen from the state that during the last two decade (1992 to 2011), as given in Table 1.10, shortage of dry matter in the State has increased from 29.01 per cent of the requirement to 51.88 per cent during corresponding years. Six

cattle feed plant, in the cooperative sector and spread across the State, produced about 1650 MTPD during 2016.

Fig.1.3: Districtwise Area under Fodder Crops in Rajasthan 2012-13

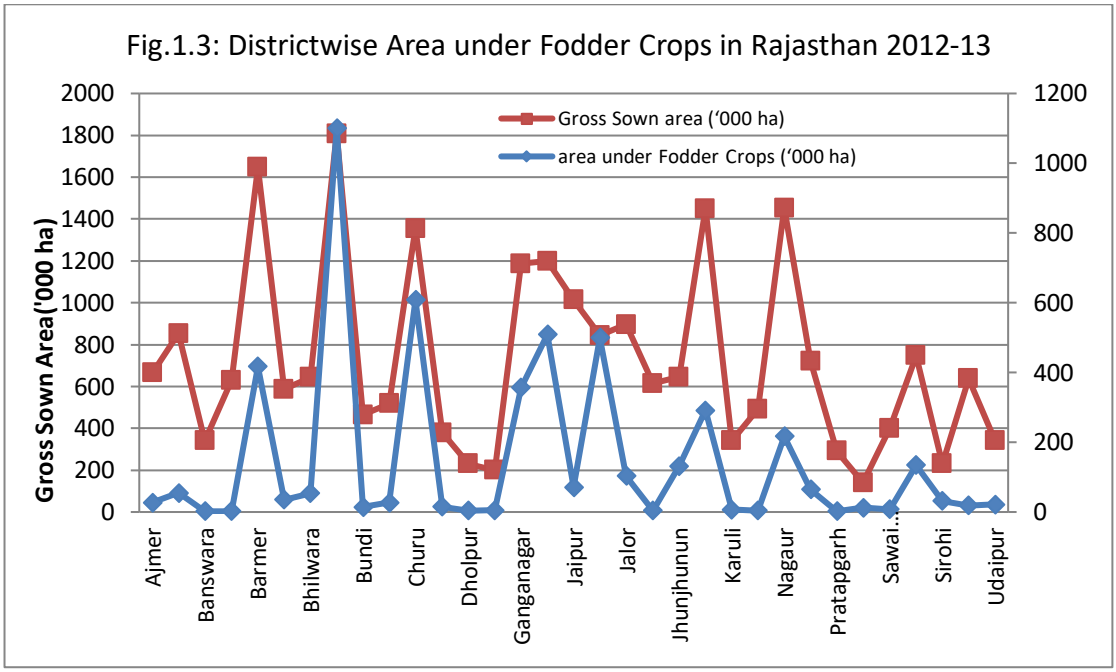


Table 1.10: Dry Matter Availability, Requirement & Surplus/Deficit in Rajasthan

Year	Dry Matter Availability, Requirement and Surplus/Deficit in Rajasthan (000 MT)		
	Availability	Requirement	Deficit/ Surplus
1992	33,571	55,046	-21,475
1997	35,848	66,634	-30,786
2003	29,523	66,153	-36,630
2007	45,655	74,298	-28,643
2008	47,310	76,464	-29,154
2009	47,052	78,929	-31,877
2010	38,218	81,703	-43,485
2011	40,809	84,808	-43,999

Source: ICAR-NIANP (2012)- Feedbase 2012, National Institute of Animal Nutrition and Physiology, Bangalore.

1.6 Growth in Milk Production and Productivity (Regional trend)

Milk is a major source of nutritious food to millions of people and only acceptable sources of animal protein for large vegetarian segment of population in Rajasthan. Modern animal breeding technologies for faster multiplications of genetically superior germplasm have contributed significantly to increase in milk production. Rajasthan ranks second among the milk producing states in India, achieving 185 lakh MT in 2015-16, which has increased from the 41.46 lakh MT during 1985-86. The numbers of initiatives were

taken by the government which could help in improving the milk productivity over the period. A trend showing the increase in milk production over the past three decades is depicted in Fig 1.4. The graph indicates that there is a consistent increase in the production of milk over the years. The milk production has increased from 7718 thousand tonnes in 2001-2002 to 18500 thousand tonnes in 2015-16 registering a growth of 139.70 per cent over base year (Table 1.11). In Rajasthan, per capita milk availability is high as compared to national availability and ICMR recommendation. During the year 2015-16, per capita milk availability was very high of 704 gm/day against 337 gm/day of national availability and 208 grams of milk requirement per head per day as per ICMR norms.

Table 1.11: Milk Production in Rajasthan: 2000-01 to 2015-16

Sr. No	Year	Milk Production in Thousand MT						Growth of Milk Production (%) over base year	Per Capita availability (gms/ day)
		In milk Cow		In Milk Buffalo	In milk Bovine	In Milk Goat	Total		
		Indi-genous	C.B.						
1	2001-02	2325	91	4488	6904	814	7718	-	376
2	2002-03	2159	121	4702	6982	866	7848	1.68	368
3	2003-04	2134	157	4899	7190	864	8054	2.62	371
4	2004-05	2148	188	5065	7401	909	8310	3.18	376
5	2005-06	2287	257	5108	7652	981	8633	3.89	387
6	2006-07	2782	606	5571	8959	1350	10309	19.41	449
7	2007-08	3161	681	6012	9854	1523	11377	10.36	486
8	2008-09	3625	703	6033	10361	1572	11933	4.89	501
9	2009-10	3927	882	6074	10883	1448	12331	3.34	509
10	2010-11	4120	913	6611	11644	1590	13234	7.32	538
11	2011-12	3822	867	7153	11842	1669	13511	2.09	539
12	2012-13	4084	913	7238	12235	1712	13947	3.23	555
13	2013-14	4173	938	7682	12793	1781	14574	4.50	572
14	2014-15	4286	1840	8985	15111	1823	16934	16.19	655
15	2015-16	4394	2235	9938	16567	1933	18500	9.24	704

Source: NDDB (2016).

Out of total milk production, about 53.72 per cent of the milk production is contributed by Indigenous Buffaloes followed by 23.75 per cent by indigenous cattle. The crossbreed cattle contribute 12.08

per cent of the total milk production in the state whereas Goat contributes 10.45 per cent to total milk production. However, the productivity of cross breed cows was maximum at 7.93 liters per day among all dairy animals. The indigenous cattle is also contributing significantly in milk production, especially in arid and semiarid areas of the state, though its productivity is much lower than the cross bred cows and buffaloes (5.84 ltr/day). While the productivity of cows and buffalo in term of daily milk yield is increasing continuously (Fig 1.5). Despite of increase in milk yield, there is still a wide scope for improving milk yield of milch animals.

Fig. 1.4 Trends in Total Milk production in Rajasthan state (1985-86 to 2015-16)

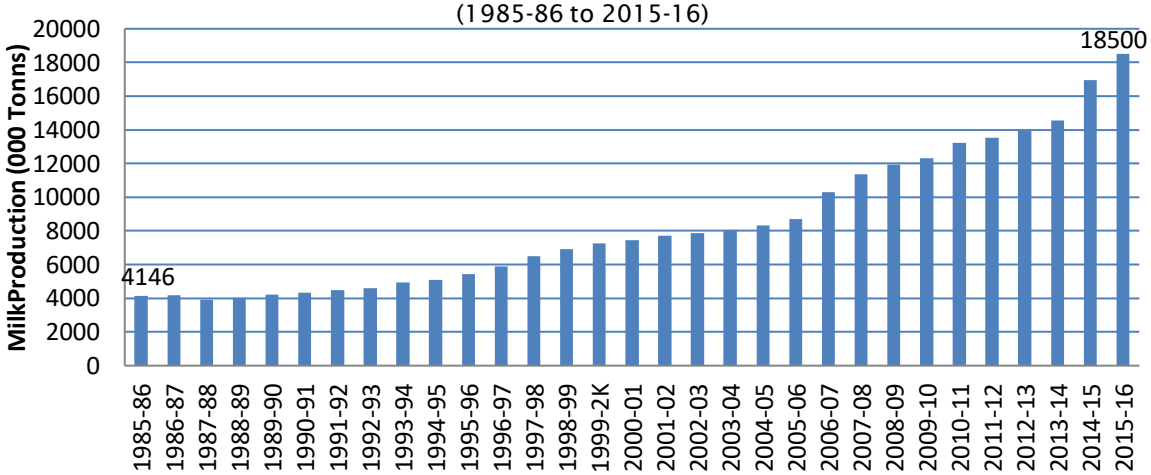
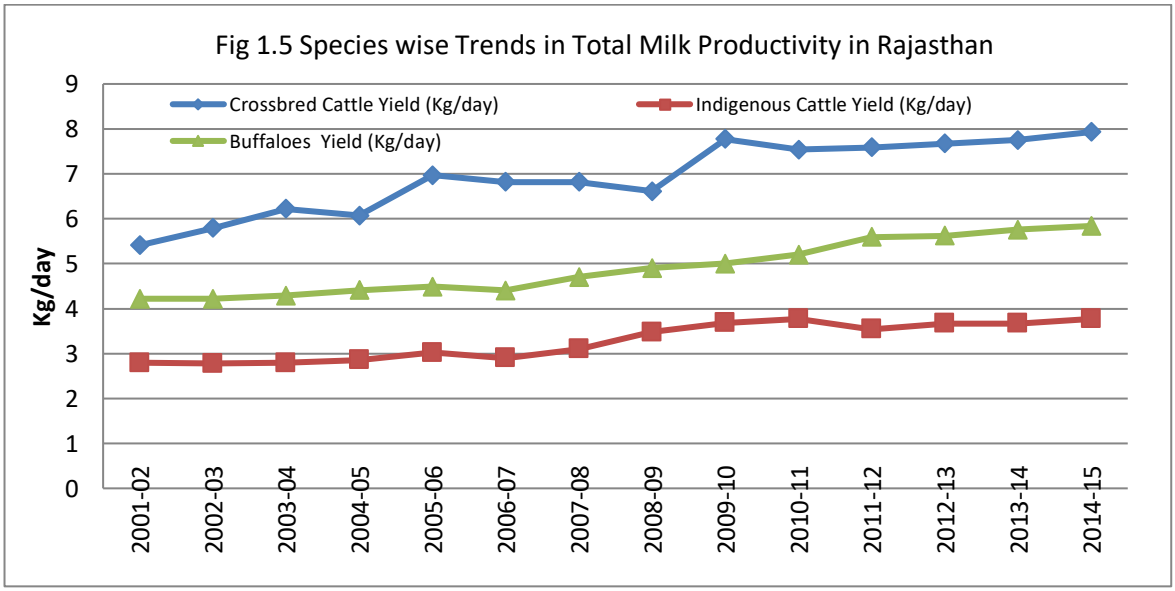


Fig 1.5 Species wise Trends in Total Milk Productivity in Rajasthan



Out of total bovine milk production, 59.99 per cent accounts buffalo milk, 26.52 per cent share accounts for indigenous cows and remaining 13.49 per cent was of cross breed cows. The significant growth in population of in milk bovine animals supported by increase in milk yield of bovine animals which has increased (bovine milk production) by 41.67 per cent in 2015-16 over 2001-02. The share of cross bread cows in total milk production has increased while share of indigenous cows and buffalo has declined during last one and half decade. The corresponding share was 65.0 per cent, 33.68 per cent and 1.32 per cent respectively in 2000-01.

Species wise performance of growth in milk production and milk yield during the 2001-02 to 2014-15 is presented in Table 1.12. The rate of growth in milk production in the state has varied widely from different spices. Cross breed cow has recorded highest growth rate of 24.32 per cent per annum followed by goats 7.30 per cent, desi cow 6.03 per cent and buffaloes 4.88 per cent in the state. Though growth in milk production has been increased in the state but it was very less at the national level as compared to state level. During the same year, crossbreed cow also has highest annual growth milk in yield (2.88%) followed by buffaloes (2.72%), desi cow (2.69%) and goats (1.09%) per annum in the state. Nagori, Rathi, Tharparkar and Kankrej are some of the cow breeds found in Rajasthan. Among all cow breeds in Rajasthan, Tharparkar has the highest yield of 1800 to 2600 kilograms of milk per lactation.

Table 1.12: Growth in Milk production and Milk Yield (2001-02 to 2014-15)

Category	Milk production (%)		Milk yield (%)	
	Rajasthan	India	Rajasthan	India
Cross breed cow	24.32	7.58	2.88	0.74
Desi Cow	6.03	3.39	2.69	2.21
Buffaloes	4.88	3.80	2.72	1.40
Goats	7.30	3.27	1.09	0.23

Source: GOR (2015, 2016), Annual Report, Directorate of Animal Husbandry, Jaipur.

Alwar is the highest milk producing district in the state with an estimated milk production of about 1116 thousand tonnes during 2013-14 (Table1.13). Jaipur is the second largest producer of milk (7.44%) followed by Jodhpur (5.39 %) and Ajmer (4.66%). The top ten districts together contributes half of the state are Alwar, Jaipur, Jodhpur, Ajmer, Pali, Barmer, Sikar, Ganganagar, Nagour and Jhunjhunu. The top ranked milk producer five districts in Rajasthan are dominated by the production of milk by buffalo, followed by Indigenous cow and cross bred cows goat .

Table 1.13: Districtwise & categorywise Percentage share of Milk Production in Rajasthan

Name of the District	District wise & category wise %age share of Milk Production in Rajasthan (2013-14)					
	% share of Crossbred Cow	% share of Indigenous Cow	% share of Total Cattle	% share of Buffalo	Goat	% share to total Milk Production
Ajmer	0.81	5.08	5.90	8.17	2.18	4.66
Alwar	0.36	2.59	2.95	21.36	2.42	7.66
Banswara	0.12	1.97	2.09	4.22	0.79	2.03
Baran	0.05	2.21	2.25	3.16	0.48	1.68
Barmer	0.00	8.27	8.27	2.59	3.40	4.09
Bharatpur	0.43	1.37	1.80	6.09	0.41	2.37
Bhilwara	1.63	4.22	5.85	4.53	1.29	3.34
Bikaner	1.17	6.47	7.65	2.42	1.61	3.34
Bundi	0.12	3.12	3.24	5.49	0.55	2.66
Chittaurgarh	0.89	3.12	4.00	5.94	0.96	3.12
Churu	0.36	2.66	3.02	3.64	1.92	2.46
Dausa	0.43	1.08	1.51	7.69	0.98	2.92
Dhaulpur	0.02	0.84	0.86	3.36	0.29	1.29
Dungarpur	0.02	1.94	1.97	3.21	0.74	1.70
Ganganagar	3.07	5.80	8.87	3.57	0.72	3.77
Hanumangarh	1.15	3.60	4.75	4.82	0.65	2.92
Jaipur	3.45	3.81	7.26	16.90	1.80	7.44
Jaisalmer	0.02	3.50	3.52	0.05	2.56	1.75
Jalor	0.02	2.66	2.68	5.25	0.96	2.55
Jhalawar	0.02	1.99	2.01	4.65	0.84	2.15
Jhunjhunun	2.71	1.58	4.29	7.17	1.68	3.76
Jodhpur	1.20	7.33	8.53	7.50	2.78	5.39
Karauli	0.07	0.86	0.93	4.72	0.89	1.87
Kota	0.10	1.51	1.61	3.33	0.48	1.55
Nagaur	0.38	4.10	4.48	6.23	2.92	3.91
Pali	0.14	6.52	6.66	6.38	1.68	4.22
Rajsamand	0.60	1.27	1.87	3.67	0.74	1.81
Sawai Madhopur	0.05	1.37	1.41	5.61	0.65	2.20
Sikar	2.49	2.97	5.47	9.61	2.09	4.91
Sirohi	0.02	1.51	1.53	2.47	0.91	1.41
Tonk	0.12	2.04	2.16	4.22	0.89	2.09
Udaipur	0.48	2.42	2.90	5.99	1.41	2.95

Source: GOR (2016a).

At present both private and co-operative organizations are engaged in the production, procurement, processing and marketing of milk in the state. The milk producers who sell their milk through private local traders are always exploited. The private traders who have been interested in maximizing their own profits are least concerned about improving the productivity of dairy farming. The burden, therefore, lies on the cooperative sector and primary milk cooperative societies were organized to help dairy farmers in developing dairy as an industry.

1.7 Infrastructure Development

Rajasthan is the largest state in the country and large part of the state is arid or semi-arid and fall under Thar Desert. The climatic conditions are adverse with scarcity of water for irrigation and erratic rains with very low average annual rainfall. These conditions leave a little scope for crop production and enhance the importance of animal husbandry over the crop production especially during recurrent droughts. Main strength of livestock sector in the State is that it produces 11 per cent milk and ranks second in the country. This could happen because of good network of milk cooperatives and development of infrastructure at the village as well as district level. The co-operatives have developed modern systems of Marketing of dairy product, veterinary care, milk processing, training, cattle feed farm and artificial insemination and provide these services to a large number of milk producers at very low prices. the special emphasis on development was dairy infrastructure was given during the Operation Flood movement.

The marketing activities of the Federation include providing support to the Milk Unions in milk and milk products marketing, within and outside the State. RCDF is presently marketing milk & milk products under SARAS brand. Fresh milk of different compositions and

long shelf life tetra pack milk is being marketed in rural and urban areas. The Federation is a major supplier of tetra pack milk (UHT) to the armed forces. Saras Milk Parlours serving a complete range of milk products are operational at 383 points and there are 18,374 booths and shop agencies in Rajasthan.

The milk collection and testing systems at village DCS have been automated with the installation of various testing equipments (AMCS, AMCU, EMT, Auto Milk Analyser & DPMCU, FT-1/120, LACTO SCAN, MILKO SCAN MINOR). At present 14,070 such equipments are working. Milk reception, weighment and testing at dairy plants and chilling centres have been modernized with the installation of 37 Automated raw milk reception Dock (RMRD). Further, 1779 Bulk Milk Coolers (BMC) have been installed for quality milk collection.

An ultramodern Frozen Semen Station is established at Bassi which supplies the Semen of high pedigree exotic and native breeds to supply the frozen semen to the AI Centres of Milk Unions as well as to A.H. Department. At Frozen Semen Bank Bassi semen of high pedigree bulls like Surti, HF, HF crossbreed, Tharparkar, Gir, Rathi, Sahiwal & Kankrej are available. For indigenous breed Germ Plasm Station, Narwa Khichiyan, Jodhpur has been established where bulls of indigenous breeds like Rathi, Tharparkar, Kankrej, Gir & Murrah are available for semen production. The animal health care is more important for all over economic growth in Rajasthan state. There are 4696 veterinary Institution, 34 Veterinary policlinic, 775 First Grade Veterinary Hospitals, 1718 Veterinary Hospitals, 198 Veterinary Dispensaries, 2571 veterinary sub centre are working at present.

The district wise growth of veterinary institutions in Rajasthan during 2014 – 2015 is presented in Table 1.14, while District wise Number of Veterinary Institutions in Rajasthan (2014 – 2015) for animal Husbandry in Rajasthan is presented in Table 1.15 .

Table1.14: Districtwise growth of Veterinary Institutions in Rajasthan)

Districts	Number of Veterinary Institutes- Rajasthan					
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Ajmer	100	104	116	133	147	147
Alwar	175	178	186	208	237	237
Banswara	105	110	113	117	120	120
Baran	67	68	72	78	84	84
Barmer	105	110	119	138	158	158
Bharatpur	149	150	154	170	180	180
Bhilwara	176	178	183	194	205	205
Bikaner	110	114	121	134	148	148
Bundi	67	67	69	71	79	79
Chittaurgarh	115	119	123	131	138	138
Churu	88	92	97	110	125	125
Dausa	75	78	83	94	102	102
Dhaulpur	49	49	50	54	58	58
Dungarpur	136	140	142	146	151	151
Ganganagar	115	118	123	135	141	141
Hanumangarh	90	95	102	119	133	133
Jaipur	231	239	253	284	318	318
Jaisalmer	48	49	52	57	60	60
Jalor	87	90	91	95	106	106
Jhalawar	71	73	73	78	78	78
Jhunjhunun	147	154	168	198	219	219
Jodhpur	138	140	144	160	174	174
Karauli	61	62	67	73	78	78
Kota	60	61	64	70	76	76
Nagaur	161	170	196	235	277	277
Pali	120	121	126	135	143	143
Pratapgarh	64	65	66	72	75	75
Rajsamand	103	103	108	112	115	115
Sawai Madhopur	54	59	65	76	84	84
Sikar	167	173	191	219	244	244
Sirohi	75	75	77	79	82	82
Tonk	80	83	90	98	114	114
Udaipur	206	211	216	230	247	247
Rajasthan	**3,595**	**3,698**	**3,900**	**4,303**	**4,696**	**4,696**

Source: NDDB (2016).

Table 1.15: Districtwise Number of Veterinary Institutions in Rajasthan

S.No.	Districts	PC	VHF	VH	VD	SC	DMVU	Total
1	Ajmer	1	29	68	5	99	3	205
2	Alwar	1	34	79	9	189	3	315
3	Baran	1	18	30	4	86	3	142
4	Banswara	1	23	50	6	83	3	166
5	Barmer	1	28	70	5	102	3	209
6	Bharatpur	1	23	52	7	147	3	233
7	Bhilwara	1	38	68	10	135	3	255
8	Bikaner	1	26	63	9	94	3	196
9	Bundi	1	12	21	4	76	3	117
10	Chittorgarh	1	19	44	7	99	3	173
11	Churu	1	23	47	5	98	3	177
12	Dausa	1	17	42	5	77	3	145
13	Dholpur	1	12	25	5	38	3	84
14	Dungarpur	1	21	44	6	115	3	190
15	Hanumangarh	1	20	53	6	96	3	179
16	Jaipur	2	57	98	10	244	3	414
17	Jaisalmer	1	12	28	1	31	3	76
18	Jalore	1	18	38	6	79	3	145
19	Jhalawar	1	22	25	4	72	3	127
20	Jhunjhunu	1	35	102	0	128	3	269
21	Jodhpur	2	31	87	8	110	3	241
22	Karoli	1	12	31	7	55	3	109
23	Kota	1	15	29	4	63	3	115
24	Kuchaman city	0	22	58	4	105	3	192
25	Nagaur	1	15	45	7	83	3	154
26	Pali	1	26	65	5	98	3	198
27	Pratapgarh	1	12	20	4	61	3	101
28	Rajsamand	1	17	34	4	85	3	144
29	Swaimodhpur	1	15	24	6	81	3	130
30	Sikar	1	31	94	10	164	3	303
31	Sirohi	1	13	29	7	54	3	107
32	Sriganganagar	1	26	41	7	110	3	188
33	Tonk	1	18	42	5	88	3	157
34	Udaipur	1	35	71	6	202	3	318
Total		35	775	1717	198	3447	102	6274

Notes: PC- Poly Clinic, **VHF**- first Grade Veterinary Hospital, **VH**- Veterinary Hospital, **VD**- Veterinary Dispensary, **SC**- veterinary Sub Centre, **DMVU**- Mobile veterinary Unit
Source: GOR (2012)- Statistical Abstract, GoR, Jaipur

The Input facility like cattle feed and fodder farm, semen bank and nucleus farm are presented in Table. It can be seen that the frozen Seman bank and Exotic Nucleus farm was established in Bassi (Jaipur) and Narwa with the objective to provide high quality genetics in the form of semen straw to cover milk shed area to uplift socioeconomic

condition of dairy farmer in the milk shed area and country. For the development of the production potentiality of our livestock, availability of nutritious feed and fodder is essential. The cattle seed farm is located in Rajori/ Bassi (Jaipur). Balanced cattle feed is being manufactured by five cattle feed plantsviz. Ajmer, Bikaner, Jodhpur and Nadbai, Lambiyakalan. The milk unions make feed available to the farmers via village level dairy cooperative societies.

1.8 Need and scope of the Study

India is the largest milk producer of the world with an average four per cent annual growth in milk production. The demand for milk and milk products are increasing in India with socioeconomic development of the country and the demand for milk is projected as about 180 MMT by 2021-22 and milk production in the country has to grow by 5 MMT annually, twice the present growth rate of 2.5 MMT per annum. In spite of the consistent growth rate, the dairy sector in India is expected to face the shortage of milk in the near future.

India's white revolution under Anand model co-operative institutions had demonstrated the organized strength and capabilities of marginal farmers in leading the country to a situation of self sufficiency in milk production. The emerging situation of milk shortage, characterized by media as 'White Crisis' is yet another opportunity for small and marginal farmers to reorganize themselves under their own co-operative organizations to improve the dairy development activities to enhance milk production and attain economic advantages in the globalised economy. The white revolution was realized in the context of a controlled economic environment in India but the co-operative organizations have to accommodate the dynamics of globalised economy in approaching the emerging situation where they have to compete with multinational corporate to gain benefits for their member farmers.

Rajasthan has 133.24 lakh cattle and 129.76 lakh buffaloes (2012 livestock census) and has some of the nationally recognized breeds of milch and draught cattle viz. Ralhi, Tharparkar, Gir, Kankrej, Sahiwal and Nagauri. Malvi and Haryana have their home tracts in Rajasthan. This indicates that the cattle in the state are of better quality in comparison to those found in other parts of the country. However, the number of high yielding indigenous pure bred cattle is reducing and number of non-descript cattle is increasing. The productivity of non-descript cattle is very low and needs to be improved. The above observations indicate that the status of dairy development in the study area is low in comparison to its potential, despite the fact that this region has relatively superior resource endowment. The dairy cooperative structure in some of the areas has been weak in comparison to elsewhere in the country. The coverage of dairy cooperatives in terms of villages, milk producers and share of milk procurement in surplus milk is low. There are areas of concern that constraints realization of full potential of this sector. Therefore, present study was undertaken in the state of Rajasthan with following specific objectives.

1.9 Objectives of the study:

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

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

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

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

1.10 Data and Methodology:

The study is based on both secondary and primary level data.

(A) Primary Data: For the study, primary data were collected from the selected Milk producers, Primary Dairy Cooperative Societies, and Milk Unions (Table 1.15 and 1.16).

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

- Four milk unions/district milk unions/districts in each state were selected. On the basis of 100 potential districts list prepared by the NDDB, Anand- One milk union/district milk union/district each from three categories i.e. High, Moderate, Low and one from either non-categorized/from region not covered were selected.

ii) Selection of Villages:

- From each milk union/ district milk union/district, four villages were selected. Two villages having dairy cooperative and two villages without dairy cooperative.
- Wherever, cooperative union/primary dairy cooperative society is not in existence, collect data from villages not having primary dairy cooperative.
- Milk Producer Company/Private Dairy/Agent were treated as non-cooperative agency.
- Total numbers of selected villages in State were 16 villages.

iii) Selection of Milk Producers:

- From each selected village, 15 milk producers were selected randomly.
- Total sample size of milk producers in State would be 240.
- The milk producers were categorized as follows as per holding of number of bovine population (cattle and buffalos)- random selection from total milk producers list (without village census)
  - Small Milk Producers (1-2 Milch animal),
  - Medium Milk Producers (3-5 Milch animal) and
  - Large Milk Producers (above 5 Milch animal)
- Data on parameters related cost of milk production were collected from 03 milk producers from each village (one each from three categories)

Table 1.16 Sampling Framework

DU/D	District Unions/District DU1/D1				DU2/D2				DU3/D3				DU4/D4			
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
Total sample	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	60				60				60				60			

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

Table 1.17: Total numbers of selected DCS and NDCS Milk Producers in the Rajasthan state

Districts/ Milk Unions	DCS				NDCS			
	Small	Medium	Large	Total	Small	Medium	Large	Total
Hanumangarh	10	10	10	30	10	10	10	30
Ajmer	10	10	10	30	10	10	10	30
Bharatpur	10	10	10	30	10	10	10	30
Jalour	10	10	10	30	10	10	10	30
Rajasthan	40	40	40	120	40	40	40	120

Notes: Milk Unions-04; PDCS- 08 (or whatever available); Private dairy/vender/agent -08, Villages: 16; Milk Producers- 240;

Data collection from Milk Union and PDCS: Officials of every District Milk Union and Primary Dairy Cooperative Society were interviewed and data collected.

(B) Secondary data: 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 as well as from the government publications such as *Livestock Census (Department of Animal Husbandry), Statistical Abstract of the State, Economic Surveys* and related web sites. Besides tabular analysis, annual compound growth rates were calculated to indicate an increase or decrease in livestock populations and other related parameters during inter census periods/years.

Nature of Data collected:

Information was collected from the DCS and NDCS households on structured interview schedules as mentioned above. The major aspects on which data were collected were as follows: Number of milch animal quantity of different types of feed and fodder fed to animals, milk yield, milk fat, household and village characteristics, prices of feed inputs and milk output. General information on animal health, milk consumption, employment opportunities, awareness on different dairy development, capacity of households to scaled up dairy activities, coverage and quality of services delivery, their timeliness, mode of implementation, etc. In addition to the information collected from the farm households, the interaction and interviews with the various functionaries such as Milk Union, secretary of PDCS and other stakeholders in the boundary has been carried out to examine these aspects.

1.11 Limitations of the Study

The study is based on both primary and secondary level of data and hence the accuracy of results depends on the accuracy with which the data were generated. The secondary data on few aspects were not provided by the Union, thus could not estimate the impact accurately. Some PDCS, NPDCS and agents were not cooperative, thus did not show much interest in providing data and support. These posed the major constraints to assess the evaluation of dairy development.

1.12 Organization of Report

The present study report is divided into eight chapters including this introductory chapter. The introductory chapter presents the introductory notes with overview of dairy development in the state of Rajasthan. It is also present the data and methodology used for selection of districts/blocks/sample households, sample size, analytical and conceptual framework and concepts used in the study. Chapter two presents the review of Milk cooperatives in Rajasthan state as well as in selected districts. Chapter III covers government programmes & policies for development of dairy/ animal husbandry sector in Rajasthan. 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 presents the summary of findings of the study and some policy implications.

The next chapter presents the review of milk Cooperative structure under study.

Chapter II

Status of Dairy Development Institutions in Rajasthan

2.1 Introduction

India is the highest milk producing country in the world holding nearly 16 per cent of World milk production share. Most of the milk in India is produced in 14 states which contribute to 92 per cent of total milk produced in India. Amongst these, Rajasthan bags second place. Nearly 30 crore kg of milk is produced in rural India daily. Out of this 48 per cent is kept by the milk producer for home consumption and rest is marketable surplus out of which only 30 per cent goes to organised milk sector. There are three main players in organized Milk sector viz. Cooperative Milk Unions, Private Companies and Producer Companies.

Co-operative dairying on Amul pattern was introduced to the state in 1980's with initiatives of RCDF based on Primary Milk Producers Co-operative Societies. The pattern is based on three tier structure with DCSs at the village level, union at the district level, and federation at the state (Chart 2.1). Today in Rajasthan, under the AMUL Pattern system, there are 14026 village-level co-operatives with a total membership of 7.73 lakhs milk producers affiliated with 21 district-level unions. These unions federate into a state-level apex marketing organization known as the Rajasthan State Dairy Federation (RCDF). These tiers are legally independent bodies, but vertically integrated so as to avail economies of scale. Currently there are 21 Milk Union, 4696 veterinary Institution, 34 Veterinary policlinic, 775 First Grade Veterinary Hospitals, 1718 Veterinary Hospitals, 198 Veterinary Dispensaries, 2571 veterinary sub centre are working in the state.

2.2 About Dairy Development Institutions

2.2.1 Department of Animal Husbandry:-

When the Rajasthan State came in existence in March 1949, there was no department as such in the state to deal with the animal husbandry sector. Initially animal husbandry activities were taken care by the Department of Agriculture. In the year 1958, the department was separated from the Department of Agriculture. The Animal Husbandry Department thus came in to existence in 1958, along with sheep and wool and fisheries sections. In 1984, the Fisheries Department was separated from the Department of Animal Husbandry making it an independent Department. Various livestock development programmes are aimed to increase the productivity of the animals on sound scientific methodology. The main activities and programmes of the department include (i) breed improvement programme using superior germplasm; (b) Veterinary health care & Disease Control Programme, and (c) Extension Activities.

2.2.2 Rajasthan Livestock Development Board (RLDB)

With the purpose to promote breeding & development of all species and breeds of economic importance and to introduce, promote and adopt appropriate technology for improving all aspects of livestock production and their productivity, an autonomous body in the name of 'Rajasthan Livestock Development Board' (RLDB) was established by State Government in 1998. The project envisages 100 per cent grant-in-aid to implementing agencies to achieve the following objectives:

- To arrange, delivery of a vastly improved artificial insemination service at the farmer's doorstep
- To progressively bring 80 percent breedable females among cattle and buffalo under organized breeding through Artificial insemination or Natural service by high quality bulls within a period of ten years.

- To undertake breed improvement programmes for indigenous cattle and buffalo breeds so as to improve their genetic qualities as well as their availability.
- To provide quality breeding inputs in the breeding tracts of important indigenous breeds so as to prevent the breeds from deterioration and extinction.
- To bring all breeding agencies under single umbrella To increase coverage of breedable population under organized breeding programme through A.I./ NS
- Conservation and development of indigenous breeds. Cattle : Tharparkar, Rathi Buffalo : Surti, Murrah
- Training to A.I. workers for quality A.I. services and professionals for production of semen straws.

2.2.3 Rajasthan Cooperative Dairy Federation

Dairy development was initiated by the state government in the early seventies under the auspices of Rajasthan State Dairy Development Corporation (RSDDC) registered in 1975. Two years later RCDF assumed responsibility for many of the functions of RSDDC. It became the nodal agency for implementation of operation flood in the state. Rajasthan Cooperative Dairy Federation (RCDF) set up in 1977 as the implementing agency for dairy development programmes in Rajasthan is registered as a society under the Rajasthan cooperative societies act 1965. The main objectives of RCDF are as follows:

- To carry out activities for promoting production, procurement, processing and marketing of milk and milk products for the economic development of animal husbandry/ farming community.
- Development & expansion of such other allied activities as may be conducive for the promotion of the dairy industry, improvement protection of milch animals and economic betterment of those engaged in milk production.

- Organize and provide technical inputs.
- Erection of Dairy, chilling plant, cattle feed plants for unions.
- Study of problems of mutual interest of Federation & milk unions.
- Impart training and orientation to dairy co-operative members.
- Advise, assist and guide milk unions
- Undertake audit and accounts supervision
- Encourage fodder production etc.

The Federation is a State level apex co-operative organization owned by its member unions each of which, in turn, is owned the dairy co-operative societies in its area of operation which are themselves owned by farmer members. The Federation has a board of directors which has overall responsibility for the planning policies, financial resource mobilization and management, member and public relations as well as liaison with agencies of the state and central government, financing institutions etc. The Federation has a chief executive designated as Managing Director.

2.2.3.1 Three tier Structure

The dairy co-operative movement operates on three tier system wherein farmer members own dairy co-operative societies (DCS) which own district milk producer's union. The unions collectively own the RCDF. It is a vertically integrated structure that establishes a direct linkage between those who produce milk and those who consume it.

A. **Federation** - Provides service & support to unions. Marketing within & outside state, Liaison with government and NGO agencies, mobilization of resources & coordinating & planning programmes / projects.
B. **Union** - Develops village milk cooperative network, procures milk from DCS, processes & markets. Sale of cattle feed and related inputs, promotion of cross breeding through AI and NS,

promotion of fodder development and general support & supervision to DCS.

C. **DCS** - Provides input services (AH, AI) to its members and procurement of milk.

Figure 2.1: Flow Chart of Federation, Union and DCS

Source: GOR (2015b), RCDF, Jaipur.

2.2.3.2 Input Services

In addition to provision of regular and remunerative market for milk to the farmers the dairy cooperative development programme also provides input and services for promoting animal health and production enhancement of milch animals.

Animal Health Programme (AH)

Veterinary services like First Aid, Veterinary Treatment and Vaccinations against infectious diseases like foot & mouth disease and *Haemorrhagic septicaemia* are being provided to the members by the milk unions. Regular scheduled services are provided by mobile units and veterinary camps are organized in coordination with AH Department in which free medicines like deworming & mineral mixture

etc. are provided to the animal breeders. These services are helpful for enhancing productivity & quality of the milk. Milk Union provides services for animal health through first aid, Vaccination is provided at the village at the DCS.

Table 2.1: Progress of Animal Husbandry programs in Rajasthan

Particulars	2011-12	2012-13	2013-14	2014-15	2015-16
Ah Programme (No.)					
First Aid Cases	6,47,233	5,06,089	3,96,104	377,418	317,803
Case Treated At Camps	94,354	40,209	184,188	38,583	71,336
Cases By Regular Mobile	0	0	0	0	0
Cases By Emergency Mob	40,762	31,315	13,687	5,867	8,009
Vaccinations	7,23,929	6,95,901	7,68,439	344,834	344,230

Source: http://sarasmilkfed.rajasthan.gov.in/tech.aspx

Breed Improvement

Artificial Insemination Programme has been undertaken by RCDF. Milk Unions like Ajmer, Alwar, Sriganganagar, Jaipur, Jodhpur and Pali they are providing AI facilities to the milk producers. An ultramodern Frozen Semen Station is established at Bassi which supplies the Semen of high pedigree exotic and native breeds to supply the frozen semen to the AI Centres of Milk Unions as well as to A.H. Department. At Frozen Semen Bank Bassi, semen of high pedigree bulls like Surti, Jersey, Jersey crossbreed, HF, HF crossbreed, Tharparkar, Gir, Rathi, Sahiwal & Kankrej are available. For indigenous breed, germ plasm station at Narwa Khichiyan, Jodhpur has been established where bulls of indigenous breeds like Rathi, Tharparkar, Kankrej, Gir & Murrah are available for semen production. After CMU grading indigenous pedigree bulls semen will be supplied to the AI centres of milk unions as well as to AH Department.

Where artificial insemination activities are not much feasible, bulls of improved breeds like Rathi, Gir, Kankrej, graded murrah etc. are provided for natural services to the animals of milk producers on demand at subsidized rates and according to breeding policy of the state.

Cattle Feed

Balanced cattle feed is being manufactured by five cattle feed plants viz. Ajmer, Bikaner, Jodhpur and Nadbai, Lambiyakalan The milk unions make feed available to the farmers via village level dairy cooperative societies. The available range of Cattle Feed are balanced cattle feed, high energy feed & Bypass Protein Cattle feed supplements like Urea molasses bricks (UMB) and Mineral mixture.

Table 2.2: Functional Cattle Feed Plants with their Production Capacity/ day MT

Plant	Ajmer	Nadbai	Bikaner	Jodhpur	Lambiyakalan
Production Capacity	300	300	300	300	150

Source: http://sarasmilkfed.rajasthan.gov.in/tech.aspx

Fodder Development:

Under the recent major input programme, fodder development activities have been taken up by RCDF through which the major fodder crops and their seed is grown on Rojhri, Bassi and Pal Farms and seed is supplied to the dairy farmers on no profit-no loss basis. The major fodder crops are Lucerne, Oats, Bajra, Berseem, Sorghum Sudan Grass etc. The federation also procures quality seeds from other agencies & provides them to the farmers.

2.2.3.3 Physical Dairy Activity Progress of Dairy Federation

Rajasthan Cooperative Dairy Federation Ltd., Jaipur an organization with a combined turnover of around 2500 crores, engaged in Marketing of “Saras” range of long life milk products Ghee, SMP, Cheese, Rasgulla, Flavoured Milk, Ice Cream, Butter, UHT Milk and Fresh milk products Chhach, Lassi, Shrikhand, Dahi. The physical activity progress during period from 2011-12 to 2015-16 are given in Table 2.3. The federation have reported increasing trends of milk procurement from 1741 TKG per day in 2011-12 to 2601 kilogram per day in 2015-16. The cost of milk per kg has been also increased from

Rs. 23.75per k to Rs. 30.33per k in respected period. The composition of milk has stagnated especially its fat (5.6) and SNF (8.5) percentage. Under DCS, number of AI and natural service performance decreased over the period due to more area covered by private Vetenary assistance.

Table 2.3: Physical Activity progress

Particulars	Units	2011-12	2012-13	2013-14	2014-15	2015-16
Procurement & Input						
Milk Procurement	TKGPD	1,741	1,931	2,245	2,545	2,601
Milk Payment	LAC Rs.`	151,322	1,64,990	2,47,012	295,717	288,690
Cost / Kg Milk	Rs.`	23.75	23.4	30.14	31.83	30.33
Reg. DCS	NOS.	12,563	12,699	12,875	13,492	13,878
Avg. Pourer DCS	NOS.	8,441	8,246	8,087	8,339	8,445
Reg. Membership	NOS.	6,82,916	7,00,610	7,03,031	731,473	761,953
Avg. Pourer Membership	NOS.	3,41,434	3,47,701	3,28,689	337,169	349,881
Dcs Under Ai	NOS.	2,561	1,398	1,371	1,557	1,573
Ai Performed	NOS.	4,65,112	3,97,740	3,01,028	321,449	309,396
Cattle Feed Distrib.	MT	1,97,209	1,90,542	1,97,267	248,604	245,554
Transport Cost	PAISA/KG	82	87	96	94	90
Dcs Under Ns	NOS.	1,813	1,778	1,772	1,800	1,822
Bulls For Ns	NOS.	1,470	1,394	1,406	1,351	1,339
Ns Performed	NOS.	1,72,867	1,79,997	1,84,214	171,243	174,680
Fodder Distribution	Qtl.	6,362	4,968	5,042	5,337	3,497

Source: http://sarasmilkfed.rajasthan.gov.in/achievements.aspx.

2.2.3.4 Marketing

The marketing activities of the Federation include providing support to the Milk Unions in milk and milk products marketing, within and outside the State. RCDF is presently marketing milk & milk products under Saras brand: Fresh milk of different compositions and long shelf life tetra pak milk is being marketed in rural and urban areas. The Federation is a major supplier of tetra pak milk (UHT) to the armed forces. RCDF is also marketing various fresh milk products in Saras brand, which are, Chhach, Lassi, Shrikhand, Flavoured Milk, Paneer and Dahi. Long life products such as Cow ghee, Ghee, Table Butter, Skim Milk Powder and Tetra Pak Milk are also being marketed. Saras Milk Parlours are operational at 350 points and there are 17909 booths and shop agencies in Rajasthan.

Table 2.4 Progress of Production and Sales of Milk and Milk Products

Particulars	Units	2011-12	2012-13	2013-14	2014-15	2015-16
Production & Sales						
Plant Receipts	TKGPD	2,022	2,198	2,456	2,732	2,829
Capacity Utilization	%	130	133	133	143	145
I) Production						
Ghee	MT	15,350	14,914	19,033	23,967	20,804
SMP		9,025	10,594	9,181	17,566	16,624
WMP		113	4	291	306	243
Table Butter		176	136	161	221	148
Tetrapack	000 LPD	26	26	26	34	33
Ii) Sales						
Local Milk Marketing	TLPD	1,544	1,603	1,760	1,856	1,882
Supplies To Nmg	TKGPD	6	102	78	34	211
Ghee	MT	12,953	15,499	20,273	18,548	23,186
WMP		0				
Table Butter		135	118	128	175	111
C. Cattle Feed Plants	MT					
Production		2,41,913	2,22,728	2,33,828	294,120	298,458
Capacity Utilization		134%	124%	130%	88%	74%
Sales		2,41,821	2,22,465	2,33,742	294,150	298,544

Source: http://sarasmilkfed.rajasthan.gov.in/achievements.aspx

2.2.3.5 Milk Procurement and Distribution

The RCDF was established with the objective of providing the milk producers of Rajasthan with their own marketing and distribution network in order to give them access to the most important link in the system: the customer. The farmers had realized that marketing was the key to the success of the AMUL Pattern and to their success when they had control over the marketing system. The SARAS brand is among the most popular brands in the State. There are 21 milk unions in Rajasthan State. The total milk procurement capacity and drying capacity are 1955 TL per day and 65 MT per day; of these Jaipur unions are highest procurement capacity 500 Lt per day followed by Bhilwara (Table 2.6). The federation having 22 chilling centre operating in the state with total capacity 565 and 10 chilling centre hired. Out of the 21 milk union, 7 are having training centre.

Table 2.5: No. of Milk Union, PDCS and members in Rajasthan (2015-16)

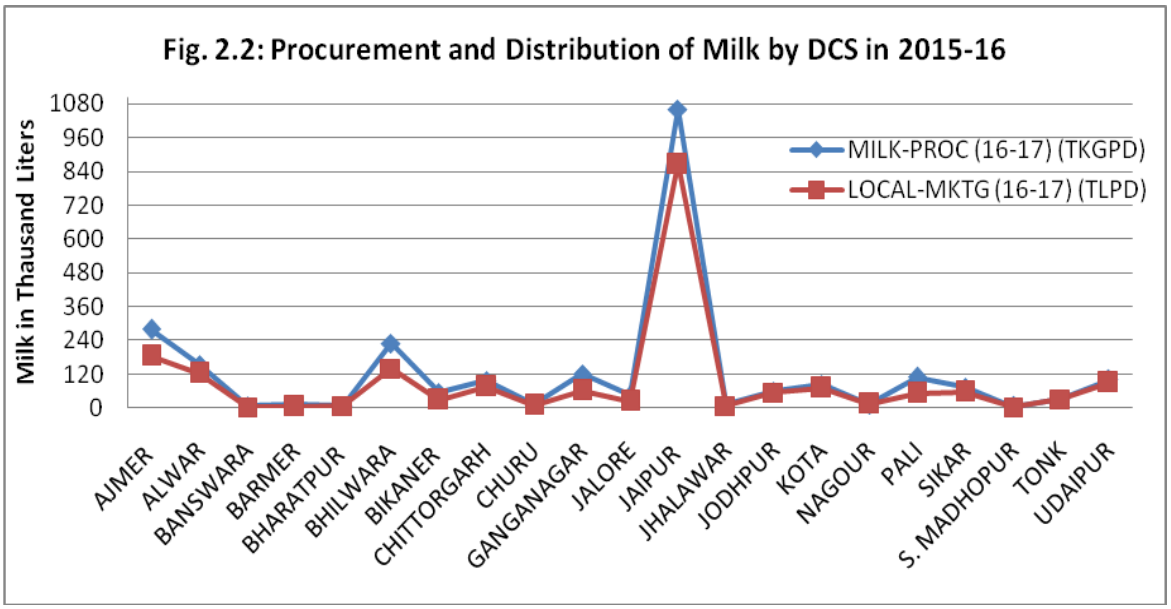
Milk Union	Registered DCS*(Nos)	PDCS(CC) *(Nos)	MEMBERSHIP *(Nos)	MILK-PROC (15-16) (TKGPD)	LOCAL-MKTG (15-16) (TLPD)
Ajmer	722	149	48238	267	180
Alwar	1104	513	93855	143	133
Banswara	246	26	9562	8	4
Barmer	221	26	12472	12	5
Bharatpur	299	71	8010	9	9
Bhilwara	1052	67	64271	226	131
Bikaner	851	374	39400	80	28
Chittorgarh	933	51	44397	101	72
Churu	293	215	13997	16	10
Ganganagar	1068	487	44902	127	66
Jalore	545	84	14272	53	23
Jaipur	2208	669	153598	1026	857
Jhalawar	268	56	6930	18	6
Jodhpur	646	70	35518	63	55
Kota	733	116	28183	92	66
Nagour	347	123	14006	17	13
Pali	551	61	34118	129	48
Sikar	556	152	32604	84	60
S. Madhopur	270	14	9658	1	1
Tonk	402	39	23697	28	30
Udaipur	711	47	41778	101	83
Total	14026	3410	773466	2601	1882

Source: http://sarasmilkfed.rajasthan.gov.in/infra.aspx.

Table 2.6: Milk Processing, Training & Cattle Feed Production Facilities in Milk Union

S. No.	Union	Districts Covered	Milk (Tlpd)	Drying (Mtpd)	Chilling Centres		Hired Chilling Centres		Training Centre (Nos.)	Cattle Feed Plants (Mtpd)
					Capacity (TKGPD)	No.	Capacity (TKGPD)	No.		
1	Ajmer	Ajmer	150	10	-	-	-	-	-	300
2	Alwar	Alwar	150	15	-	-	-	-	-	-
3	Banswara	Banswara Dungarpur	30	-	20	1	-	-	-	-
4	Barmer	Barmer	20	-	20	1	-	-	-	-
5	Bharatpur	Bharatpur Dholpur	50	-	20	1			-	300
6	Bhilwara	Bhilwara	200	-	-	-	-	-	1	150
7	Bikaner	Bikaner	150	5	175	4	15	1	1	300
8	Chittorgarh	Chittorgarh Pratapgarh	60	-	-	-	-	-	-	-
9	Churu	Churu	30	-	20	1	-	-	-	-
10	Ganganagar	Ganganagar Hanumangarh	100	10	80	3	60	3	1	-
11	Jalore	Jalore Sirohi	100	10	20	1	15	1	-	-
12	Jaipur	Jaipur Dausa	500	15	80	2	220	3	1	-
13	Jhalawar	Jhalawar Baran	20	-	20	1	-	-	-	-
14	Jodhpur	Jodhpur Jaisalmer	125	-	25	2	25	1	1	300
15	Kota	Kota Bundi	50	-	-	-	-	-	1	-
16	Nagour	Nagour	-	-	15	1	-	-	-	-
17	Pali	Pali	60	-	20	1	-	-	-	-
18	Sikar	Sikar Jhunjhunu	60	-	10	1	15	1	-	-
19	S.Madhopur	S.Madhopur Karauli	20	-	20	1	-	-	-	-
20	Tonk	Tonk	20	-	-	-	-	-	-	-
21	Udaipur	Udaipur Rajsamand	60	-	20	1	-	-	1	-
	Total		1955	65	565	22	350	10	7	1350

Source: http://sarasmilkfed.rajasthan.gov.in/infra.aspx



2.2.3.6 Training & Extension

Seven milk unions viz Ajmer, Bhilwara, Bikaner, Jaipur, Jodhpur, Kota and Udaipur are operating centres where training is provided for several area related to DCS operations viz DCS secretary, Management Committee member, AI workers, milk tester, first aid worker, chairman orientation, dairy animal management and various refresher courses etc. To enhance active participation of the producer members in the DCS, to create awareness about improved animal husbandry practices viz feeding, crossbreeding, animal management and stimulate fodder production, extension activities are carried out at DCS and at milk unions. Under farmer's induction & orientation programme, visits to the dairy plants are arranged to demonstrate the process & disposal of the milk collected from the producers. Producers also taken to visit the model Indian dairy cooperative-Anand Milk Cooperative Union (AMUL) in Gujarat and they in turn educate other milch animal owners in their area about the practices and benefits of cooperatives. Audio-visual aids, field demonstrations, extension camps are used to explain feeding, breeding, fodder development and clean milk production practices.

2.2.3.7 Quality Assurance Programme at RCDF

RCDF's main role being marketing and support in infrastructural development with superior quality of products is main concern for establishing brand image of Saras milk & milk products in the market. The improvement in quality is a continuous process and start from milk producer to consumer and to build quality each and every personnel right from MD to attainder need to contribute. RCDF has designed strategies on six important areas namely, (a) Raw Milk Quality Control; (b) Plant and Process Improvement; (c) Adoption of Quality Management and Food Safety System; (d) Packaging material quality control; (e) Finished product quality control; (f) Customer feedback.

- Quality norms are prescribed centrally and implemented through affiliated milk unions. There is strict quality control is over incoming milk through regular testing for detection of adulterants in order to ensure that milk received in the dairy is completely free from adulteration
- All the milk unions have own independent quality control labs and required quality testing facilities to ascertain quality of incoming raw milk from Dairy Cooperative Societies and testing at all stages of processing
- Initial quality of raw milk plays vital role in manufacturing high quality milk products. To maintain quality standards in raw milk, steps have been taken to achieve minimum 1 hour MBRT and total bacterial count below 10 lacs/ ml.
- The milk & milk products manufactured at Dairy Plants are in accordance to the provisions of FSSA 2006 and rules made their under and also certified / graded by BIS/ AGMARK.
- To strengthen internal quality control system, samples of milk and milk products, packaging material and cattle feed are also tested at Central Quality Control Lab of RCDF. During 2015-16,

total 4882 samples of milk & milk products, packaging material and cattle feed were analyzed at CQCL.

- RCDF has adopted quality management and food safety system at member milk unions. Bhilwara and Bikaner milk union have obtained the IS: 22000:2005 and milk unions namely Ajmer, Alwar, Hanumangarh, Jaipur, Kota and Udaipur are ISO 9001 and IS 15000 (HACCP) certified. Rest other milk unions are also in process to obtain ISO certification.
- Vigilance committees have been formed at RCDF and its affiliated milk union's level to strengthen the monitoring system.

2.3 PAAYAS Milk Producer Company Limited

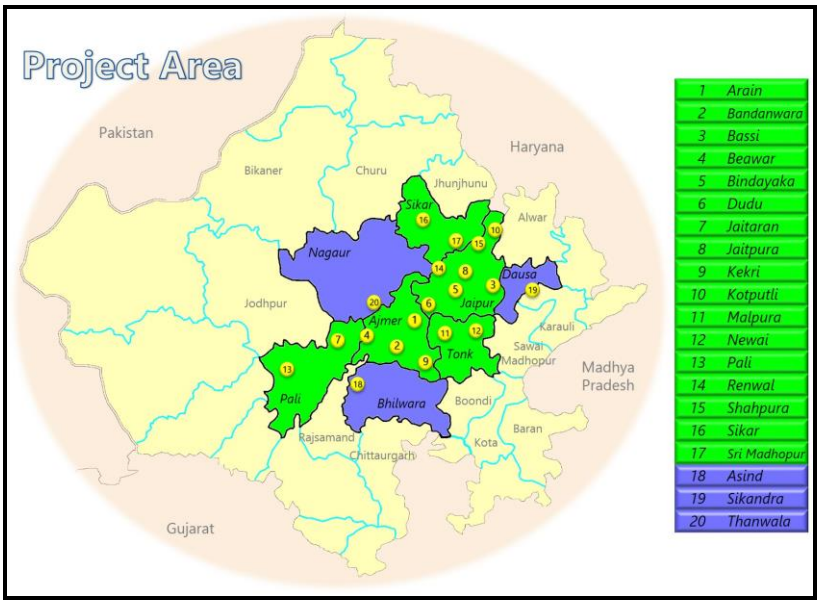
PAAYAS Milk Producer Company limited was incorporated on 19th May 2012 under Part IX A of the Companies Act 1956. The company has received overwhelming response from the milk producers who have applied for the membership of the company and resulting that the Company has successfully allotted membership to 1.12 lakh milk producers (March,2017) of Rajasthan within three years from its incorporation. At present, the company has its operations in eight districts of Rajasthan and daily procured average 650 thousand litres of fresh raw milk from its producer-members spread over 2,400 villages of Rajasthan (Table 2.7 and Map 2.1).

Table 2.7: Paayas MPCs at a glance as of March, 2017

Particulars	**PAYAS**
Total No. of MPPs	3444
No of Members	1,12,460
Women Members	45,210
women membership as % of Total members	40%
Small holders$ as % of total members	38%
Paid up Share Capital (Rs in crores)	30.7
Average Milk Procurement ('000 Kg Per Day)	650
Turnover 2016-17 (Rs in crores)	1006

Source: PAYAS (2016), Annual Report 2015-16, PAAYAS Milk Producers Company, Jaipur.

Map 2.1: Covering Area of Paayas Milk Producers Company

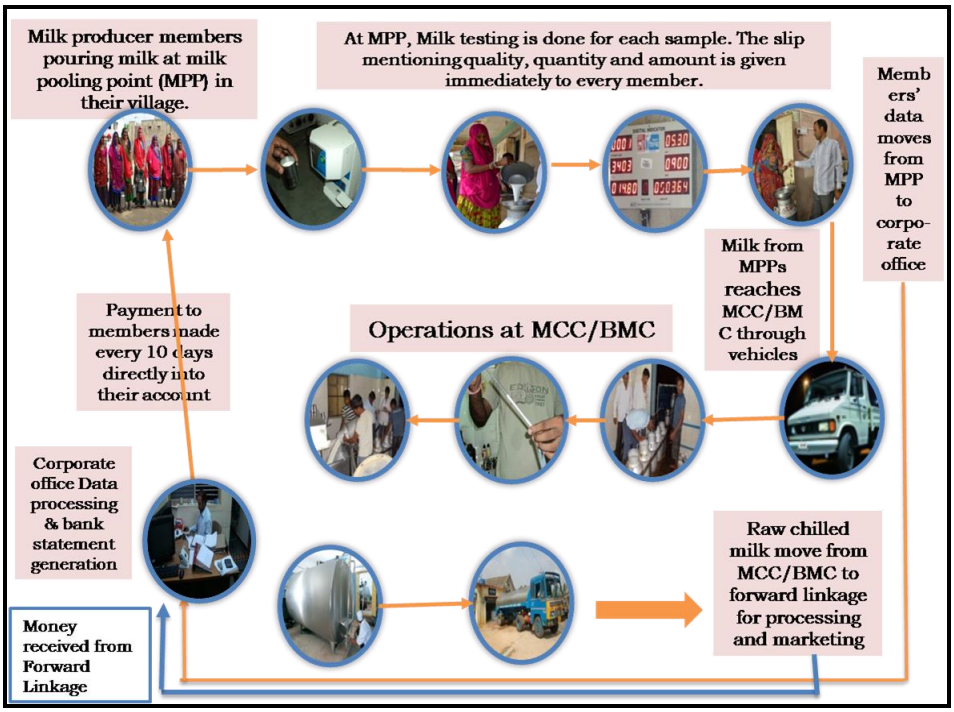


Source: PAYAS (2016), Paayas Milk Producer Company, Annual Report 2016

2.3.1 Dairy Value Chain

Each milk pooling point and chilling centre is equipped with electronic weighing and testing system thereby ensuring fairness and transparency at all the levels. The Flow Chart and Member Payment in the Milk Producer Company are presented in figure 2.3. The detail of milk transactions carried out including value of milk are provided to members in every shift in form of an auto milk receipt. Similarly, information pertaining to members is placed on milk pooling point notice board every month. The company stepped-up creation of milk market at farmers' doorstep in fresh geographies to enable new members realise benefits of fair and transparent milk procurement system. Two new milk chilling centres were added taking the tally to twenty. Besides, promising outcomes were also achieved in domains such as quality assurance and members' payment through their respective bank account despite thin banking density in Rural Rajasthan. The operations are SOP driven with periodic audits in place.

Fig. 2.3 Flow Chart and Member Payment in the Milk Producer Company



2.3.2 Milk Procurement

The company organized 694 milk pooling point taking its tally to 3009. There remained an overwhelming response during membership drive resulting in addition of 19031 new members. Average milk procurement grew to all time high of 570 thousand kilos/day. A Milk Chilling Centre each at Bassi (Jaipur) and Beawar (Ajmer) was created to aid to milk procurement. The ratio of milk procurement between April to September and October to March remained 1:1.7 which is noteworthy under North India conditions. The Paayas Milk Producer Company implemented different programmes like Village Based milk procurement System (VBMPS), Rational Balancing Programme (RBP), Fodder Development (FD), Pilot model for viable AI are facilitated by National Dairy Services Supported under NDP.

2.4 Chapter Summary

The co-operative dairy structure is very sound in the state except Bharatpur region. The milk cooperative sector in Rajasthan has grown

impressively and today includes 14620 milk cooperative societies attached to 21 district level milk unions (2015-16). Rajasthan dairy cooperative Federation is the apex marketing agency of the dairy network in the state of Rajasthan and it is manages the physical delivery and distribution of milk and dairy products from all the Milk Unions to the end users. Currently there are facilitated 4696 veterinary Institution, 34 Veterinary policlinic, 775 First Grade Veterinary Hospitals, 1718 Veterinary Hospitals, 198 Veterinary Dispensaries, 2571 veterinary sub centre working in the state. RCDF, being the apex marketing federation of the unions as part of the cooperative structure, has strong control over its procurement cost, and the flexibility to adjust procurement cost at the year-end based on the marketing surplus earned for the year. High remunerative milk procurement price to farmers has helped farmer's interest in milk production occupation. Better returns from dairying have obviously motivated farmers to enhancement their investments in increasing milk production. Federation's initiative in promoting the concept of commercial, scientific, cooperative dairy farming is also helping to attract next generation of dairy farmers to remain in the business. Despite of significant growth in the various parametres of dairy cooperative sector in Rajasthan, there are few weaknesses in the present milk cooperative structure. Besides cooperative network, PAAYAS milk Producer Company limited was incorporated on 19th May 2012 under Part IX A of the Companies Act 1956. Presently, the company has its operations in eight districts of Rajasthan and daily procured average 650 thousand litres of fresh raw milk from its producer-members spread over 2400 villages of Rajasthan. Milk procurement by co-operative movement is the basic theme and success of growth of dairy sector in Rajasthan.

The next chapter presents the policies and programmes/schemes for dairy development in Rajasthan.

Chapter III

Policies and Programmes/Schemes for Dairy Development & Convergence of Schemes

3.1 Introduction:

It is a well known fact that for a sustainable development in any sector, there must be a definite policy so that a systematic approach can be made in the right direction. The policy so adopted should also similitude with the policy framed for the country as a whole. Considering the above factor, the department of AH and Veterinary as a central as well as state has taken up various programmes for an overall development in this sector. For the proper management and care of both livestock animals and dairy produce, a number of government policies and schemes have been developed to improve the standard of control of animal diseases, scientific management and up-gradation of genetic resources, increasing availability of nutritious feed and fodder, sustainable development of processing and marketing facilities and enhancement of production and profitability. Some of these schemes and programmes issues have been listed below

3.2 Development of Dairying during Plan Periods

During the First Five Year Plan, there were hardly any schemes for development of livestock in the state. A paltry sum of Rs. 28.30 lakhs was provided for animal husbandry and dairying during first plan period which was increased to Rs. 162 lakhs during second plan. A veterinary college was established in 1954 at Bikaner. Second five year plan concentrated on live stock development, creation of veterinary facilities, Rinderpest control, and research and education. Attempts were made to organize Jaipur milk supply scheme during second five year plan period (Planning Department, 1961). Further, survey of milk pockets was undertaken in Jaipur, Alwar, Ajmer, and Jodhpur districts.

In tune with the all India breeding policy, efforts were made to evolve development of dual purpose breeds which would provide both good bullocks and higher milk yields. An expert committee was appointed to review the operations of key village schemes during Third Five Year Plan. Further, a cooperative rural creamery was started along with two more milk supply schemes (Jodhpur, and Udaipur). During the later years of the Fourth Plan an ambitious programme of dairy development was launched in the State. The idea was to mop up surplus liquid milk from the rural areas through organization of producers cooperatives and their federation into union at the district level. Work on construction of feeder balancing dairies and a liquid plants with chilling centres was initiated under various programmes (IDC, NCDC, DPAP, and state plans). Towards the end of fourth plan, dairy development received some serious consideration and a number of projects were formulated in the special schemes organization of the department of agriculture. Towards the end of the fourth five year plan, it was decided that animal husbandry projects should be formulated for identified blocks within a region and a project should provide all the requisite technical inputs for enhancing the production of milk, etc. Further, in the management of such programmes greater participation of farmers was envisaged through organization of farmer's cooperative societies. An outlay of Rs. 24.11 crores was made available during Fifth Five Year Plan (Planning Department, 1978). The major objectives of the sector during this plan were (a) to promote adoption of improved methods of animal husbandry, better feeding and breeding, proper management and animal health cover, and disease control for improvement in the productivity of live-stock, (b) to augment production of livestock products such as milk, eggs, poultry, wool, fish, and mutton, and (c) to organize marketing of produce through functional cooperatives. State government switched over to crossbreeding, especially, in eastern and at southern districts of the state.

With the assistance received under 'Operation Flood' project, feeder balancing dairy plants having an installed capacity of one lakh litres/day each was set up at both Bikaner and Jodhpur. Six chilling centres were set up in milk sheds of these plants at Leonkaransar (Bikaner), Sardarshaher (Churu). Meerta (Nagaur), Pokaran (Jaisalmer), Balotra (Barmen), and Pali under the Drought Prone Areas Program. In the eastern districts (Alwar. Bharatpur, Jaipur, Ajmer, and Sawai Madhopur), a world bank-assisted dairy development project was implemented.

The IDA programme was extended to 15 districts during Fifth Plan. Government received Rs. 41 crores from IDA to implement dairy development project in the state. The project was implemented in Alwar, Bhilwara, Jaipur, Ajmer, Sawai Madhopur, and Tonk. Under this scheme, as many as 1460 primary dairy cooperative societies (DCSs) were organized with a membership of 75000. These DCSs were federated into seven milk producers' cooperative unions and 2 feeder balancing dairies. New dairy plants at Hanumangarh, Sikar, Udaipur, and Kota were also proposed during Fifth Five Year Plan Period.

With the sanctioning of the IDA project, Rajasthan State Dairy Development Corporation was set up. Subsequently, all the dairy development programmes were organized on AMUL pattern. For proper coordination of various dairy development programmes, Government decided to merge the above two organizations and set up the Rajasthan Co-operative Dairy Federation Limited.

3.3 Impact of Operation Flood and Reasons for failure, if any

Rajasthan had second rank in milk production at time of starting of operation flood. The salient features of the operation flood programme in India are presented in the Table 3.1. Milk production in state takes place in millions of rural households scattered across the length and breadth of the state as well as country. The performance of

the state dairy sector over the last five decades has been extremely impressive. The milk production in the state has more than trebled to 2.5 million tonnes during 1971-72 with second highest milk producer after Uttar Pradesh (4.3 million tonnes) and its increased about 628.35 per cent in 2015-16.

Table 3.1: Salient Features of Operation Flood in India

Key Parameters	Operation Flood Phases		
	Phase I	Phase II	Phase III
Date of Start	1-Jul-70	2-Oct-79	April , 1985
Date of ending	31-Mar-81	31-Mar-86	31-Mar-96
No. of milksheds	39	136	170
No. of DCSs set up	13300	34500	72500
No. of members(lakh)	17.5	36.3	92.63
Average milk procurement (MKGPD)	2.56	5.78	10.99
Liquid milk marketing (LLPD)	27.9	50.1	100.2
Processing Capacity			
Rural Dairies(LLPD)	35.9	87.8	180.9
Metro Dairies(LLPD)	29	35	38.8
Milk drying capacity (MTPD)	261	507.5	842
Technical Inputs			
No. of AI Centres	4900	7500	16800
No. of AI done/year	882000	1330000	3940000
Cattle feed capacity (000MTPD)	1.7	3.3	4.9
States Covered	Bihar, Gujarat, Haryana, Karnataka, M.P., Maharashtra, Rajasthan, U.P., West Bengal	Bihar, Gujarat, Haryana, Karnataka, M.P., Maharashtra, Rajasthan, U.P., West Bengal, A.P., Assam, Goa, H.P., J & K., Kerala, Orissa, Sikkim, Tamil Nadu, Tripura, Andaman & Nicobar and Pondicherry	Bihar, Gujarat, Haryana, Karnataka, M.P., Maharashtra, Rajasthan, U.P., West Bengal, A.P., Assam, Goa, H.P., J & K., Kerala, Orissa, Sikkim, Tamil Nadu, Tripura, Andaman & Nicobar and Pondicherry, Nagaland

Source: http://shodhganga.inflibnet.ac.in/bitstream/10603/23545/9/09_chapter_03.pdf

Table 3.2: Milk Production in Rajasthan and India during Operational Flood (1971-72 to 2015-16)

Year	Rajasthan (Million tonnes)	India (Million tonnes)
1971-72	2.54	22.5
1981-82	3.3	34.3
1991-92	4.5	55.6
2001-02	7.5	84.4
2011-12	13.5	127.9
2012-13	13.9	132.4
2013-14	14.5	137.7
2014-15	16.9	146.3
2015-16	18.5	155.5

Sources: GOI (2016) & GOR (2016)

3.4 Policies and Schemes for Dairy Development

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. We can divide dairy sector policies in the country in the post independence period into three distinct phases; (a) Pre-operation Flood (1950s & 1960s); (b) Operation Flood to the Pre-reforms Period, (1970s & 1980s)'and (c) Post-reform Period (Post 1991)

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 (SIQ&CMP), 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.

Box 3.1: Summary of Indian dairy sector policy changes: 1950s to 2000s	
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
Operation Flood Period 1970s and 1980s	> Missing Link between rural producer and urban consumer > Launch of Operation Flood Programme in 1970 > White Revolution: Institutional innovation, linked rural producers with urban consumers; reduced transactions costs through coops > Import substitution strategy through tariffs and Non-tariff barriers (NTBs) > Restricted competition within organised sector through licensing and preference for cooperatives > Large public investment (Coops) in processing infrastructure > Significant increase in milk production and per capita availability
Post Macro-Reforms Period1990s	> Industrial licensing for setting up milk processing facilities abolished > 1992 - Reintroduced of licensing through Milk and Milk Products Order (MMMPO) > Milkshed 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 restrictions (QRs), canali2ation, etc. removed > Amendments in the MMPO
Post- MMPO Period2002 -	> 2002 - MMPO amended >. > Licensing requirements abolished > No milkshed area requirement for setting up milk but food safety and hygiene requirements

Source: Sharma and Singh, 2007.

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 meagre 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 Rajasthan are presented in Table 3.3.

Table 3.3: Policies/Schemes implemented in Rajasthan

Sr. No.	Name of the Scheme	Aim and objectives of Scheme	Funding pattern	Target/ Beneficiaries	Component funded under scheme	Implementing Agency
A	**Animal Production**					
1	National Programme For Bovine Breeding	Infrastructure Development for dairy development	Funding pattern - 50-100% grant-in-aid (100% grant-in-aid for all breeding related activities).	➢ To create and strengthen infrastructure for production of quality milk including cold chain infrastructure linking the farmer to the consumer. ➢ To create and strengthen infrastructure for procurement, processing and marketing of milk ➢ To create training infrastructure for training of dairy farmers. ➢ To strengthen dairy cooperative societies/ producers companies at village level. ➢ To increase milk production by providing technical input services like cattle-feed and mineral mixture etc.	National Programme for Bovine Breeding	Rajasthan Livestock Development Board
B	**Animal Health**					
1	Livestock Health & Disease Control (LH & DC)	To prevent economic loss due to FMD and to develop herd immunity	Central 60:40	Provided on cost of vaccine, maintenance of cold chain and other logistic support to undertake vaccination. State provides other infrastructure and manpower to undertake vaccination in a systematic manner	Foot and Mouth Disease Control Programme (FMD-CP)	Department of Animal Husbandry

2	Livestock Health & Disease Control (LH & DC)	The ultimate objective of eradication of this disease	Central 60.40	· Under this scheme funds are provided for procurement of vaccine, mass vaccination against PPR, strengthening of ELISA labs, Information, Education & Communication (IEC), purchase of animal identification health cards, equipments & consumables etc. · Research institutions will also be assisted for undertaking surveillance and monitoring under PPR-CP.	Peste-des-petits Ruminants Control Programme (PPR-CP)	Department of Animal Husbandry
3	Livestock Health & Disease Control (LH & DC)	strengthening of existing State Disease Diagnostic laboratories	Central 60:40 and 100 % assistance is provided for conducting training and seminar/ workshops.	Assistance is provided to State for the control of economically important and zoonotic diseases of livestock, strengthening of existing State Veterinary Biological Production Units, and strengthening of existing State Disease Diagnostic laboratories, holding workshops/seminars and in- service training to Veterinarians and Para-veterinarian.	Assistance to State for Control of Animal Diseases	Department of Animal Husbandry
4	Livestock Health & Disease Control (LH & DC)	Strengthening of Veterinary Hospitals and Dispensaries	Central 60:40	Funds are provided to States/ UTs for establishment of new hospitals and dispensaries and up- gradation of existing ones, for improving efficiency as per approved norms.	Establishment and Strengthening of Existing Veterinary Hospitals and Dispensaries (ESVHD)	Department of Animal Husbandry
5	Livestock Health & Disease Control (LH & DC)	vaccination of brucellosis	Central 60:40	vaccination of all female calves between 6-8 months in the areas where incidence of the disease is high	National Control Programme for Brucellosis	Department of Animal Husbandry
6	Livestock Health & Disease Control (LH & DC)	To record and monitor livestock disease situation in the country	Central 100%	Monitor livestock disease situation in the country with a view to initiate preventive and curative action in a timely and speedy manner.	National Animal Disease Reporting System (NADRS)	National Informatics Centre
7	Livestock Health & Disease Control (LH & DC)	for imparting training on latest technical knowledge by way of Continuing Veterinary Education	50:50	50% Central Assistance is provided to the States for improvement in the efficiency of Veterinary professionals.	Professional Efficiency Development	State Veterinary councils
8	RKVY	Assistance by free veterinary medicine and reduced cost on veterinary service	50:50	Veterinary medicine distribution	Livestock Free Health Yojana	Department of animal husbandry, GoR

9	RKVY	Assistance by veterinary facility through camp in those area where Veterinary facility is not available	50:50	Vaccination, Information dissemination regarding animal health, Fodder Production management, AI and nutritious feed	District Livestock Health Moving Unit	Department of animal husbandry, GoR
10	RKVY	Infertility prevention camp	50:50	5 day Infertility prevention camp and selection of animal on the basis district animal Population	Combat Infertility in Cattle (Livestock Free Health Yojana)	Department of animal husbandry, GoR
11	RKVY	Vaccine carrier	50:50	electrify veterinary institute and district hospital and vaccine carrier	Cold Chain Scheme	Department of animal husbandry, GoR
12	RKVY	Breed Improvement and AI	50:50	Breed improvement	Integrated Live stock Centre Scheme	Department of animal husbandry, GoR
C	**Dairy Development**					
1	Fodder Development Schemes	Production & Distribution of Quality Seed	Central 100 %	Public / Private entrepreneurship including Cooperatives and Self Help Groups (SHGs).	Establishment of Fodder Block Making Units.	GoI
2		Assistance by Fodder seed	Central 60:40	Farmers will be benefitted. The State Govts may involve SIAs/Dairy Cooperatives/ NGOs for implementation of the project. At the rate of Rs.5, 000 per quintal, total 37,000 quintals of fodder seed will be procured by the State Govt and seeds will be distributed among farmers.	Fodder Seed Procurement & Distribution	RCDF Under National Livestock Mission
3			Central 60:40	Farmers and Members of Milk Cooperatives/ ATMA/ KVKs	Distribution of Hand Driven Chaff Cutter	RCDF Under National Livestock Mission
4	Dev Narayan Yojana	The scheme for dairy development sanctioned from department of Social Justice & Empowerment	State 100	➢ Organization and revival of 650 Women DCS - organization/revival of 50 WDCS in each tehsil ➢ Establishment of 650 Electronic Milko Tester - establishment of EMT at each organized/revived DCS ➢ Aluminium Milk cans for 650 WDCS – Four aluminium milk can set to each DCS for milk collection ➢ Milk transport subsidy for milk collection of 65000 kgs per day – subsidy of Rs. 1/- per kg. on transportation of milk Distribution of 130 up-graded Bulls – distribution of bulls for natural service in - Alwar 40,		RCDF

				Bharatpur 20, Jhalawar 30, Sawaimadhopur 20 and Karouli 20 under the scheme		
1	Aam Aadmi Bima Yojana(Saras Surksha Kavach Yojana)	Insurance will provide for Registered member of DCS	12.5 % premium for member of DCS and 20% premium for Women's, SC, ST	➢ Insurance profit on death: Rs.30000/_ ➢ Accidental Death-Rs.75000/_ ➢ Accidental Full handicap – Rs. 75000/_ ➢ Accidental partially handicap-Rs.37500/_ ➢ Additional Education benefit – 100 Rs./month Scholarship for two child (9 to 12 standard) or Maximum 4 year	Saras Surksha Kavach Yojana	RCDF
2	Durghtna Bima Yojana (Accidental Insurance Scheme)(Saras Surksha Kavach Yojana)	Insurance will provide for Registered member of DCS	Premium will pay 20 % for member of DCS and 12.5% for Women's, SC, ST by Federation and 12.5 % by Milk Union, 30 % DCS and 45 % by member of DCS	➢ Insurance profit on death: Rs.100000/_ ➢ Accidental of Death or Fully handicap of Life Partner(Wife /Husband) Insurance benefit - Rs.50000/_ ➢ Rs. 30000 Compensation amount for loss through natural calamities in Pakka House ➢ Rs. 30000 Compensation amount for stolen of Household goods in Pakka House ➢ Rs. 10000 compensation amount for During the move the home or bank bucks from DCS	Saras Surksha Kavach Yojana	RCDF
3	Saras Samuhik Aarogay Bima Yojana (Saras Group health Insurance Scheme)	Insurance will provide for Registered family of DCS member	20 % Premium will pay By RCDF, 20 % Milk Union , 30 % by Capable DCS and remaining by member of DCS		Saras Surksha Kavach Yojana	RCDF
4	Integrated Sample Survey Scheme for Estimation of Major Livestock Products	To estimate The Cost and production of milk, egg, wool and meat, as per unit basis	Central (50:50)	This is a scheme to estimate the production of major livestock products of the country and study animal husbandry practices and related information.	Integrated Sample Survey Scheme for Estimation of Major Livestock Products	Department of animal husbandry, GoR
5	Live stock Census	To collect detailed information on livestock population	Central 100	To formulate, implement, monitor and evaluate any programme/scheme of the Government or private organizations meant for bringing further improvement in Livestock Sector the basic data of population of different species of livestock are required		Department of animal husbandry, GoR

Sources: GOR, Department of Animal Husbandry and Dairying & RLDB, Jaipur.

The government of Rajasthan has started Devnarayan Yojana for economic development of *Gurjar* backward class as the *Gurjar* Community is associated with Animal Husbandry activities and RCDF

also started different insurance schemes like Milk Producer Accidental Insurance, Milk Producer Life Insurance, Milk Producer Medical Insurance. Rajasthan Cooperative Federation Limited is providing facility of accident insurance to dairy producer cooperative society's members on premium amount of Rs. 36 per member per year through United Insurance Company Limited (20% of the insurance premium amount of registered general members will be carried by the federation; for Women/SC/ST members, this amount is 12.5%).

To strengthen dairy farming in India, the NABARD subsidy for dairy farming was launched. The objectives of the scheme include:

- To promote setting up of modern dairy farms for production of clean milk
- To encourage heifer calf rearing thereby conserve good breeding stock
- To bring structural changes in the unorganized sector so that initial processing of milk can be taken up at the village level itself.
- To bring about up gradation of quality and traditional technology to handle milk on a commercial scale
- To generate self employment and provide infrastructure mainly for unorganized sector.

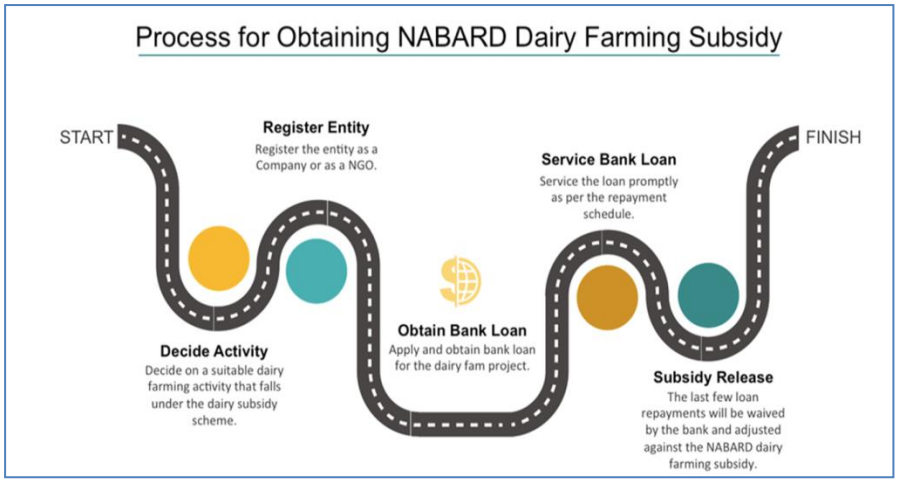
The types of persons and association of persons are eligible for receiving the NABARD Dairy Farming Subsidy are Farmers, Individual Entrepreneurs , NGOs, Companies, Groups of Unorganized and organized sector etc. and Groups of organized sector include Self Help Groups, Dairy Cooperative Societies, Milk Unions, Milk Federations, etc. However, an individual will be eligible to avail the dairy subsidy for all the components under the scheme but only once for each component. The following is the assistance provided under the NABARD subsidy for Dairy Farming scheme are given in Table 3.4 & process for obtaining loan is presented in Fig. 3.1.

Table 3.4: NABARD Subsidy for Dairy Farming Scheme

Sl. No.	Particulars	Expenditure under the Scheme (in Lakh)	Subsidy
1	Small Dairy (10 Animal) (Hybrid Cow/ Milch local breed i.e Sahiwal, Red Sindhi, Gir, Rathi, etc/ Buffalo 1. Margin Money 10 per cent 2. Repayment period 6-7 year Grace period 3 years	6 (min 2 Max 10 Animals)	General 25 % SC/ST 33.33%
2	Calves Farming (Hybrid/ Milch Local cattle and Buffalo) (max 20 Calves) Margin Money 10 per cent 2. Repayment period 6-7 year	5.30 (Min 5 calve and Max 20 Calves)	General 25 % SC/ST 33.33%
3	Vermi-compost Margin Money 10 per cent 2. Repayment period 6-7 year Grace period 3- 6 Month	0.22	General 25 % SC/ST 33.33%
4	Milking Machine (Capacity 2000 litre) Margin Money 10 per cent 2. Repayment period 6-7 year Grace period 3- 6 Month	20.00	General 25 % SC/ST 33.33%
5	Transportation and Cold Storage Facilities for Dairy Product Margin Money 10 per cent 2. Repayment period 6-7 year Grace period 3- 6 Month	26.50	General 25 % SC/ST 33.33%
6	Cold Storage Facilities for Milk and Milk Product Margin Money 10 per cent 2. Repayment period 6-7 year Grace period 3- 6 Month	35.00	General 25 % SC/ST 33.33%
7	Private Animal Health Clinic 1. Private mobile Animal Health Clinic 2. Private Stationary Animal Health Centre 3.Margin Money 10 per cent 2. Repayment period 6-7 year Grace period 3- 6 Month	2.60 2.00	General 25 % SC/ST 33.33%
8	Dairy Marketing Outlet Margin Money 10 per cent 2. Repayment period 6-7 year Grace period 3- 6 Month	1.00	General 25 % SC/ST 33.33%
9	instrument for Local Milk product	13.20	General 25 % SC/ST 33.33%

Source: GOR- Department of Animal Husbandry, Jaipur.

Figure: 3.1 Process for obtaining NABARD Dairy Farming Subsidy



Gaushala Development Programme

Under the Rajasthan Goshala Act 1960 till now 1163 Goshalas has been registered. These Goshalas have been established by the public trusts for maintaining old, infirm, unproductive cows and its progeny. Goshalas may be used for preservation & conservation of indigenous breeds. The central government as well as state government is also assisting these Goshalas for cattle development.

State Level Cattle Fairs

The heritage of Rajasthan and its cultural diversities is well projected in the various state level fairs conducted by the state Animal Husbandry department. These fairs are conducted with an aim to draw their attention to the scientific and technical developments in the Animal Husbandry sector and to motivate them for developing and rearing elite animals. These fairs are an appropriate source for sale and purchase of livestock adding to the income of livestock owners/breeders. There are 10 such fairs in the state (Table3.5).

Table 3.5: List of State Level Cattle Fair

S. No	Name of the Cattle Fair	District	Month of Conduction	As Per Hindi Tithi
1	Shri Ram Dev Pashu Mela	Nagore	January - February	Magha Shukla 1 to Magha Shukla 15
2	Shri Mahashivratri Pashu Mela	Karauli	February	Magha Shukla 15 to Phalgun Krishna 7
3	Shri Malli Nath Pashu Mela, Tilwada	Barmer	March - April	Chaitra Krishan 11 to Chaitra Shukla 11
4	Shri Baldev Pashu Mela, Merta City	Nagore	March - April	Chaitra Shukla 1 to Chaitra Shukla 15
5	Shri Gomti Sagar Pashu Mela, Jhalrapattan	Jhalawar	May	Baisakh Shukla 13 to Jyaistha Krishna 5
6	Shri Veer Tejaji Pashu Mela, Parbatsar	Kuchaman City	August	Savan Shukla 15 to Bhadra krishna 15
7	Shri Gogamedi Pashu Mela	Hanumangarh	August - September	Savan Shukla 15 to Bhadon Shukla 15
8	Shri Jaswant Pradarshni & Pashu Mela	Bharatpur	September - October	Ashwin Shukla 5 to Ashwin Shukla 14.
9	Shri Kartik Pashu Mela, Pushkar	Ajmer	November	Kartik Shukla 8 to Mangsir Krishna 2
10	Shri Chandrabhaga Pashu Mela, Jhalarapatan	Jhalawar	November - December	Kartik Shukla 11 to Mangsir Krishna 5

Source: GOR- Department of Animal Husbandry, Jaipur.

3.5 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.

Table 3.6: Convergence of Schemes suggested

No	ACTIVITY	ACTIVITY
A	**Animal Production**	Artificial Insemination services
		National Programme for Bovine Breeding
		Integrated Live stock Centre Scheme
B	**Livestock Health**	Foot and Mouth Disease Control Programme (FMD-CP)
		Peste-des-petits Ruminants Control Programme (PPR-CP)
		Assistance to State for Control of Animal Diseases
		Establishment and Strengthening of Existing Veterinary Hospitals and Dispensaries (ESVHD)
		National Control Programme for Brucellosis
		National Animal Disease Reporting System (NADRS)
		Livestock Free Health Yojana
		District Livestock Health Moving Unit
		Combat Infertility in Cattle (Livestock Free Health Yojana)
C	**Dairy Development**	Establishment of Fodder Block Making Units.
		Fodder Seed Procurement & Distribution
		Cold Chain Scheme
		Distribution of Hand Driven Chaff Cutter
		Fodder Development
		Gaushala development Programme
D	**Others**	Animal Insurance
		Accidental Insurance Scheme
		Organization of Training Programme

3.6 Chapter Summary

The chapter presented the government policies that have been implemented in India over the period and various schemes in operation in the study area. Apart from the Central and State government programs, the state milk federations and the milk unions have evolved a variety of schemes that provide incentives to the milk producers. 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. Rajasthan has witnessed the impressive growth in milk production during the operation flood programmes (OF). On the line of suggestion made by the Working Group for 12th five year plan (GOI, 2012), all the ongoing schemes should be converged and put under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development.

Chapter IV

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

4.1 About Selected District/District Milk Union

Out of 21 milk union, 4 milk unions/districts were selected for the study, viz. Hanumangarh (*Sri Ganganagar Zila Dugdh Utpadak Sahakari Sangh Ltd.*), Dholpur (*Bharatpur Zila Dugdh Utpadak Sahakari Sangh Ltd.*), Ajmer (*Ajmer Zila Dugdh Utpadak Sahakari Sangh Ltd*) and Jalore (*Jalore-Sirohi Zila Dugdh Utpadak Sahakari Sangh Ltd*) (see, Map 4.1). The livestock information of selected district is presented in Table 4.1. All selected district covered about 10 per cent of total livestock of the state in which highest 12 per cent share of buffaloes followed by cattle (10 %).

Table 4.1: Basic Livestock Information of Selected Districts (2012)

Species	Livestock Information of Selected District (19th livestock census)				
	Rajasthan	**Hanumangarh**	**Dholpur**	**Jalore**	**Ajmer**
Cattle	13324462	502071 (3.77)	59686 (0.45)	295839 (2.22)	404726 (3.04)
Buffaloes	12976095	389303 (3.00)	359012 (2.77)	469162 (3.62)	438804 (3.38)
Sheep	9079702	189210 (2.08)	11807 (0.13)	385416 (4.24)	365108 (4.02)
Goat	21665939	212993 (0.98)	89652 (0.41)	469640 (2.17)	730758 (3.37)
Other	686006	37688 (5.49)	9044 (1.32)	11118 (1.62)	26053 (3.80)
Total	**57732204**	**1331265 (2.31)**	**529201 (0.92)**	**1631175 (2.83)**	**1965449 (3.40)**

Note: Figures in parenthesis are percentage to state total.
Source: GOR (2015d).

The basic information of selected milk union is presented in Table 4.2. Sriganganagar milk cooperative union cover 628 villages and 526 primary cooperative milk societies spread over two districts (Sriganganagar and Hanumangarh). Ajmer milk cooperative union cover highest number of villages (779) and PDCS (673) in hold one

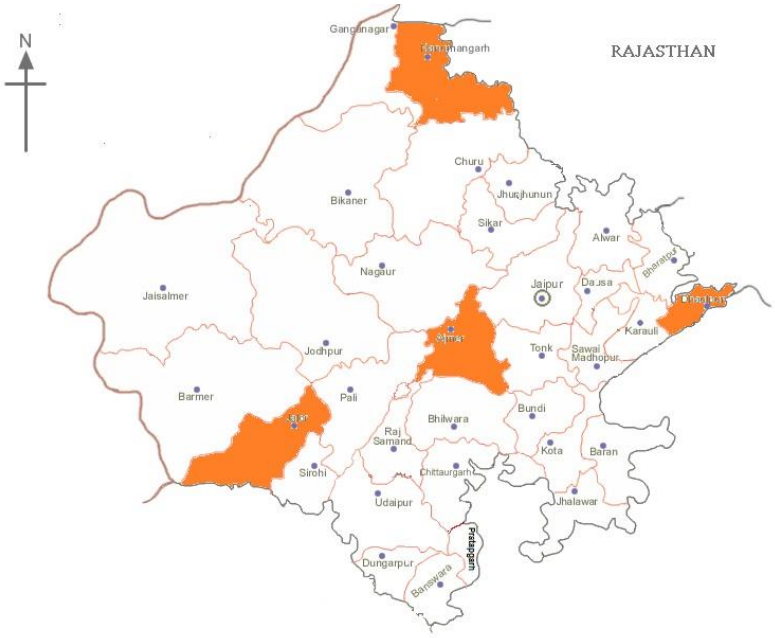
district. Jalore –Sirohi milk cooperative union covers relatively less number of villages (97) and number of milk societies (268) as compared to Ajmer and Sriganganagar milk union. Bharatpur Milk cooperative union cover less no of village and PDCS in selected area. The highest average milk procurement in Ajmer (281 thousand kg / day) and Sriganganagar (156 thousand kg / day) followed by Jalore-Sirohi (55 thousand kg / day) and Bharatpur (13 thousand kg / day) milk union in the state. The highest DCS member and pourer members were registered in Ajmer and Sriganganagar milk Union. The dominance on sale of mineral mixture, cattle feed and bypass fat was found in Ajmer and Sriganganagar.

Table 4.2: Basic Information of selected milk Union in Rajasthan

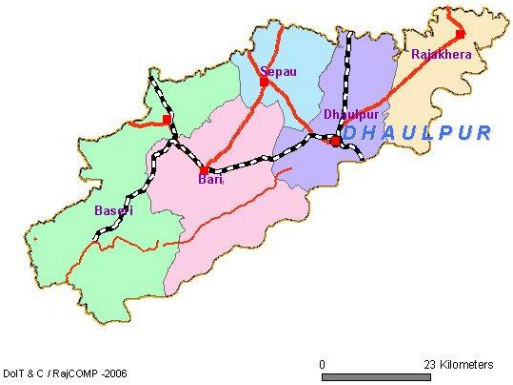
1	**Milk Union (Name)**	**Sriganga-nagar**	**Jalore-Sirohi**	**Ajmer**	**Bharatpur**
2	Districts Covered (No.)	2	2	1	2
3	Villages Covered (No.)	628	97	779	
4	PDCS (No.) covered	526	268	673	288
5	Districts Covered:	Sriganganagar-Hanumangarh	Jalore-Sirohi	Ajmer	Bharatpur-Dholpur
6	Avg. Milk Procurement (TKGPD)	156	55	281	13
7	DCS Members (Avg. No./PDCS)	42211	13740	47235	7834
8	Pourer Members (Avg. No./PDCS)	19787	8514	21618	3927
9	Avg. Milk Fat (%)	5.20	6.18	6.46	5.8
10	Daily Milk yield (TKGPD)	121	44	280	7
11	Avg. Mineral mixture sale (kg.)	1749.17	18	0.00	-
12	Avg.Cattle feed sale (kg.)	906666.67	276900	2317.31	-
13	Bypass Fat Sale (kg.)	96295.83		72.25	-
14	Avg. De-wormer (doses)-Adult & Calves/heifer			440	-
17	Avg. Veterinary Visits	110			-

Source: Data provided by respective milk union.

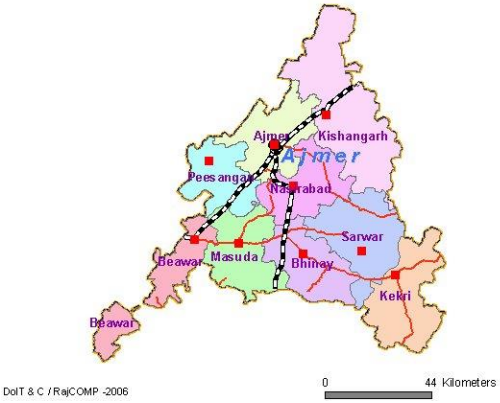
Map 4.1: Selected District Map of Rajasthan



Hanumangarh



Dholpur



Ajmer

Jalore

Source: google maps.

4.1.1 Hanumangarh:

Hanumangarh district is situated at 29˚ 5' to 30˚ 6' North and 74˚ 3' to 75º 3' east, shares its boundaries with Haryana state in the east, Sriganganagar district in the west, Punjab state in the North and Churu district in the South. The geographical area of the district is 9656.09 sq. km. The climate of the district is semi-dry, extremely hot during the summer and extremely cold during winter. The maximum average temperature remains 18˚ to 48˚ and minimum average is 2˚ to 28˚ celcius. The average rainfall during the year is 225 to 300 mm. Agriculture is the main pillar of economy in Hanumangarh. The district primarily comprises of agriculture based industries and activities. This may be attributed to the fertile land of district. Crops like pearl millet, wheat, cotton and rice are grown over here. The district also contributes high in animal husbandry with a large cattle population.

Sriganganagar Milk Union was established in March, 1981 with average milk procurement of 300 liters per day. Sriganganagar Milk Union was registered under Rajasthan co-operative act 1965 with the motto to pay remunerative price to its milk producers around the year at their door step along with technical input services such as animal health care, supply of balance cattle feed, supplements and breed improvement programmes through artificial insemination and natural services and to provide quality products to consumer at competitive price. It has an own dairy plant handling capacity 1.0 lakh ltrs per day with the facilities to pack milk, ghee etc. Its main products are Ghee, Liquid Milk, Paneer, Chhach, Lassi and Dahi. Milk Union is having three own Milk Chilling Plant at Nohar, Suratgarh and Padampur and three out-sourced Chilling Plants at Gharsana, Bhadra and Pallu. Sriganganagar Milk Union is an ISO 9001:2008 & IS 15000 (HACCP) certified organisation. This Milk Union is affiliated to Rajasthan Co-operative Dairy Federation Ltd., Jaipur. The details about milk procurement of Gangmul are presented in Figures 4.1 to 4.4.

Fig. 4.1: Sriganganagar Milk Union-Milk Procurement (2011-12 to 2014-15)

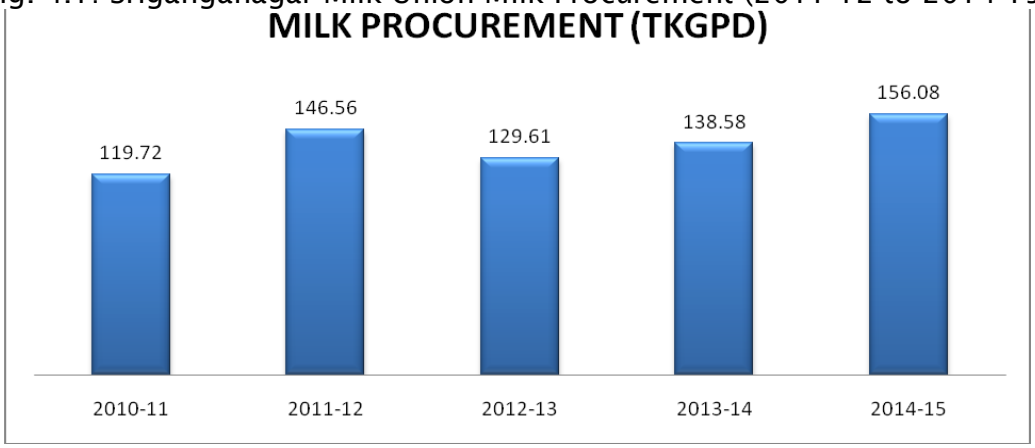


Fig. 4.2: Sriganganagar Milk Union-Ghee Production (2011-12 to 2014-15)

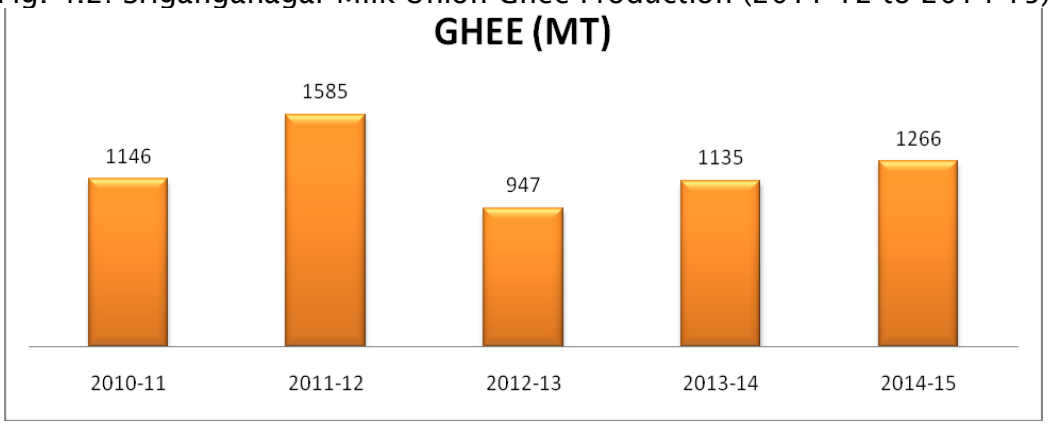


Fig. 4.3: Sriganganagar Milk Union-SMP (MT) (2011-12 to 2014-15)

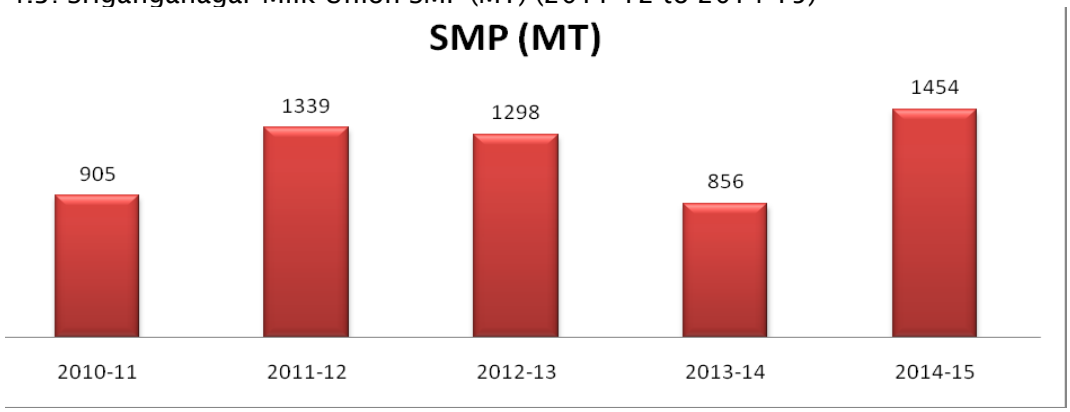


Fig. 4.4: Sriganganagar Milk Union-Local Milk Marketing (2011-12 to 2014-15)

Source: GOR (2015C).

4.1.2 Ajmer

Ajmer district of Rajasthan is located in western India. The city of Ajmer is the district headquarters. Ajmer District has an area of 8,481 km². The district is situated in the center of Rajasthan, and is bounded by Nagaur District to the north, Jaipur and Tonk districts to the east, Bhilwara District to the south, and Pali District to the west. According to the 2011 Census, district has a population of 2,581,933 with population density of 305 inhabitants per sq kms.

Ajmer Milk Union is a co-operative organization registered in 1972 under Rajasthan Cooperative Societies act 1965. It is an affiliated milk union of Rajasthan Co-operative Dairy Federation Jaipur. Its area of operation is Ajmer district. Its motto is to procure milk through village level Dairy Cooperative Societies at a remunerative price at their door step round the year along with technical input services and to make available safe and good quality milk and milk products to consumers at competitive prices. Ajmer Milk Union has got a modern and technologically updated plant which can handle up to 2 lakh liters of milk per day, having 10 MT capacity powder plant. Milk Union also takes care for all round development of its producers, which includes socio economic development. Most of milk producers are small, marginal or landless. The details about milk procurement by Ajmer Milk Union are presented in Figures 4.5 to 4.10.

Fig. 4.5: Ajmer Milk Union-Milk Procurement (2011-12 to 2014-15)

Fig. 4.6: Ajmer Milk Union-Milk Supply (2011-12 to 2014-15)

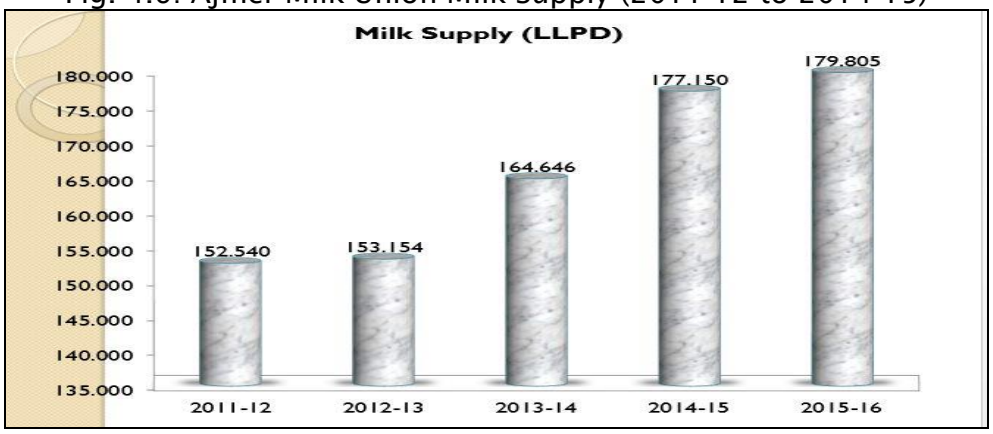


Fig. 4.7: Ajmer Milk Union-Milk Ghee Production (2011-12 to 2014-15)

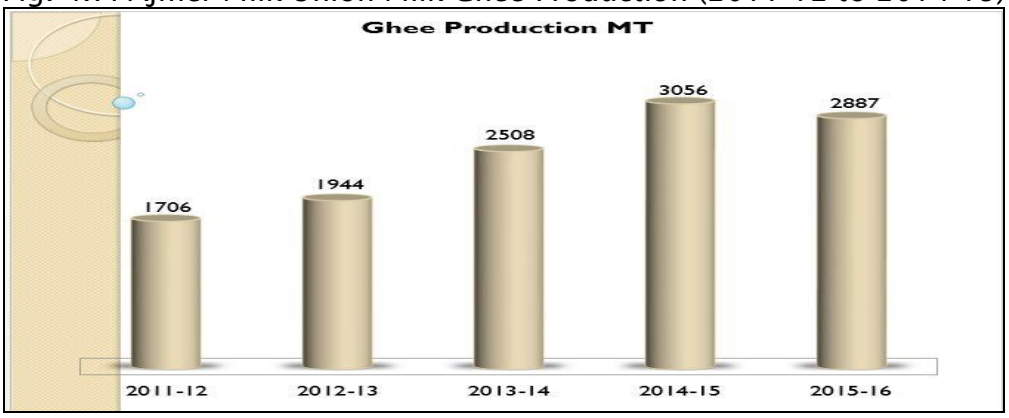


Fig. 4.8: Ajmer Milk Union-Cattle feed Sale (2011-12 to 2014-15)

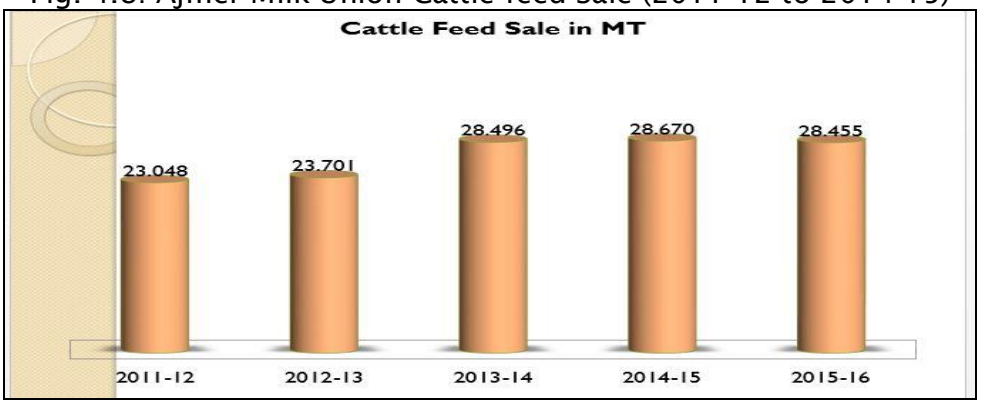
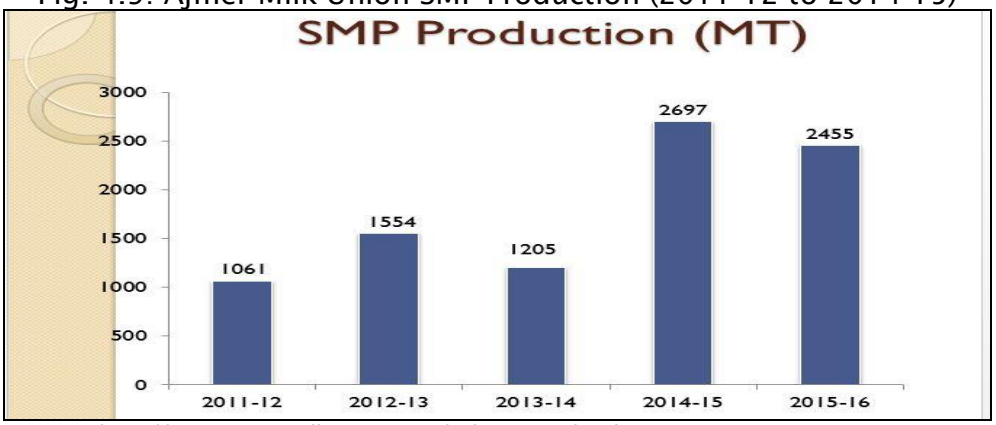
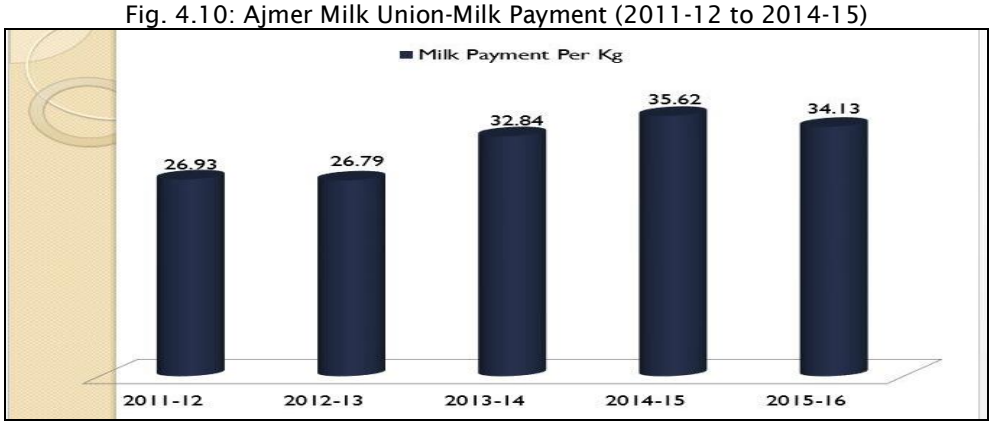


Fig. 4.9: Ajmer Milk Union-SMP Production (2011-12 to 2014-15)



Source: http://www.ajmermilkunion.com/achivments.html

Fig. 4.10: Ajmer Milk Union-Milk Payment (2011-12 to 2014-15)



4.1.3 Jalore

Jalore is known as Granite City. The district is bounded on the northwest by Barmer District, on the northeast by Pali District, on the southeast by Sirohi and by Banaskantha District of Gujarat state on the southwest. The total area of the district is 10,640 km^2 (4,108 sq mi). The altitude is 268 mts, latitude is 25.22 N and longitude is 72.58 E. The minimum and maximum temperatures of the district are 4 degrees and 50 degrees Celsius respectively. The average rainfall is 412 mm. The climate of district is dry and with extremes.Physio-graphically, the district is oblong in shape, extending up to Rann of Kutch (Gujarat). The region is generally plain but for some scattered thickly wooded hills in the north and some hillocks in the centre. Luni River is the main river in the district with its tributaries Jawai, Khari, Sukri, Bandi, and Sagi. All the rivers are seasonal. The economy of district is mainly based on agriculture and animal husbandry. The oilseeds especially mustard oil seed is predominant crop. Wheat, bajra, kharif pulses, barley, jowar and in very huge quantity of fleawort. In 2006, the Ministry of Panchayati Raj named Jalore one of the country's 250 most backward districts (out of a total of 640). It is one of the twelve districts in Rajasthan currently receiving funds from the Backward Regions Grant Fund Programme (BRGF)

Jalore Sirohi Milk Union is a Co-operative organization registered in 1986 under Rajasthan Cooperative Societies act 1965. It is an

affiliated milk union of Rajasthan Co-operative Dairy Federation Jaipur. Being a cooperative, it is to foster and strengthen backward linkages too; the milk producer, the livestock and the cooperative institutions. In addition to providing services viz., balanced animal feed, animal health & developmental services, JSMUL is now extending life & health insurance benefits to the farmers. The motto to pay remunerative price to its milk producers around the year at their door step along with technical input services and to provide quality products to consumer at competitive price. Presently, Union have 524 Milk producer cooperative societies registered in which about 36 thousand/ milk procured by about 13584 milk producers. The details about milk procurement by JSMUL are presented in Figures 4.11 to 4.14.

Fig. 4.11: JSMUL –Ghee Production (2011-12 to 2014-15)

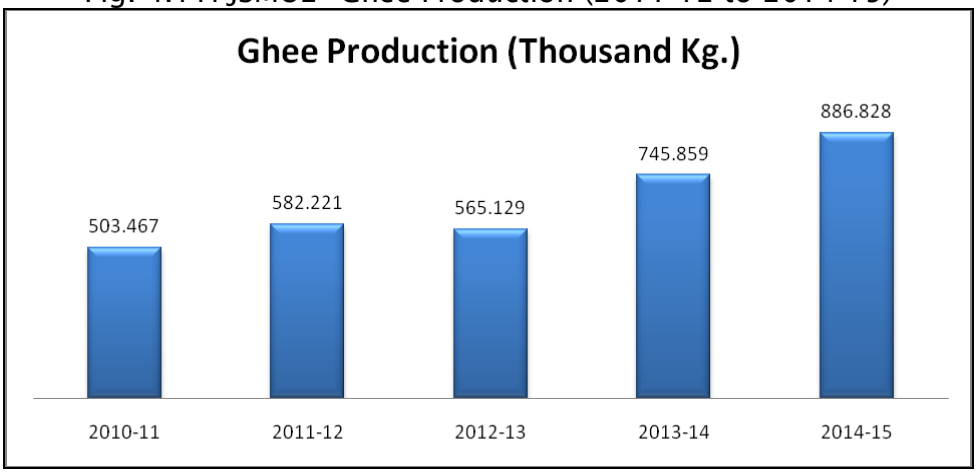
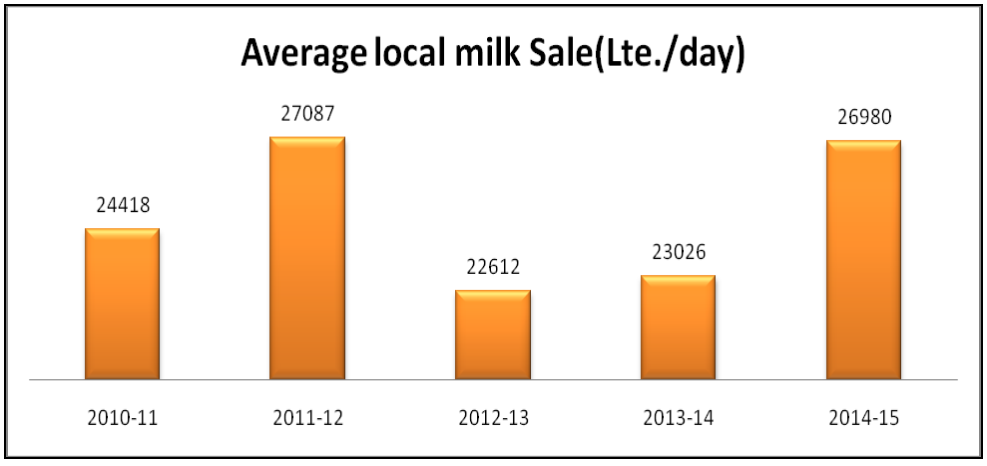


Fig. 4.12: JSMUL –Average Local Milk Sale (2011-12 to 2014-15)



Source: GOR (2015a).

Fig. 4.13: JSMUL –Milk Procurement (2011-12 to 2014-15)

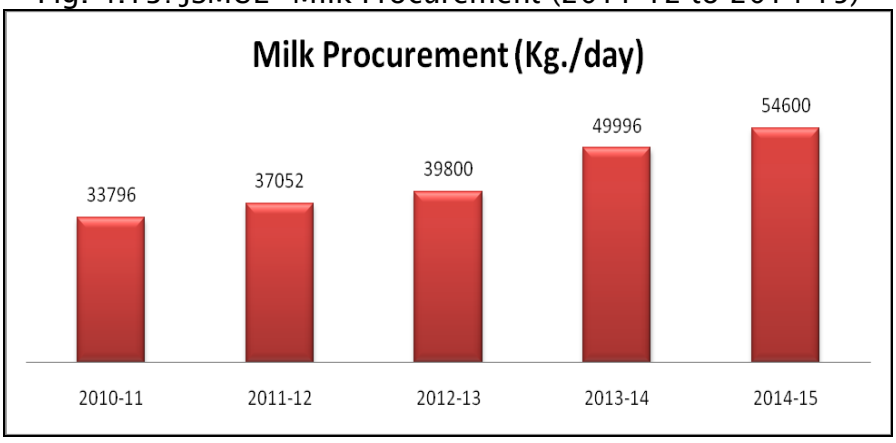
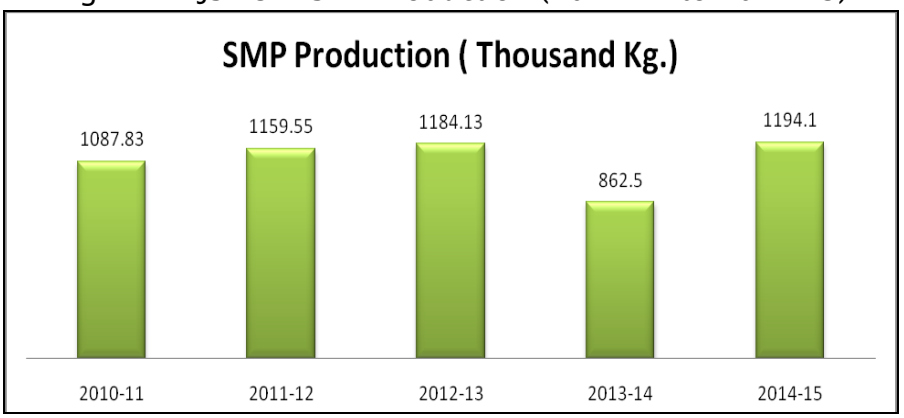


Fig. 4.14: JSMUL –SMP Production (2011-12 to 2014-15)



4.1.4 Dholpur

Dholpur district has an area of 3084 km². The Chambal River forms the southern boundary of the district, across which lies the state of Madhya Pradesh. The district is bounded by the state of Uttar Pradesh on the east and northeast, by Bharatpur district of Rajasthan on the northwest, and Karauli District of Rajasthan on the west. All along the bank of the Chambal River the district is deeply intersected by ravines; low ranges of hills in the western portion of the district supply quarries of fine-grained and easily worked red sandstone. The economy of the district is primarily agricultural. The regional language of Dholpur is "Braj Bhasha" that has fragrance of Bundelkhandi and Khadi bhasha. It is because Dholpur is situated at the center surrounded by three state of Braj kshetra, that are Rajasthan, Uttar Pradesh and Madhya Pradesh.

4.1.5 Cost of Milk Processing at Dairy Plant

Milk received from chilling centres or directly from milk collection centers was processed at dairy plant before manufacturing of the products. The various cost components were involved in the processing of milk are discussed and presented in Table 4.3. The share of water, electricity, generator and chilling charges per litre of milk processed is higher in GANGMUL (Rs 0.55 per litre) followed by JSMUL (0.46 per litre) and Ajmer (0.36 per litre). In GANGMUL, the cost of electricity and generator was high due to shortage of electricity supply and utilization of generator. The cost of furnace oil is higher in JSMUL (Rs 0.83 per litre) due to low supply of milk and increase in the price of coal during. The labour charges per litre of milk processed were observed to high in GANGMUL (Rs 0.75 per litre) due to increase milk supply in winter season which resulted in to employing more of temporary (casual) labour to meet the requirement of milk processing. Repairs and maintenance charges per litre of milk processed also highest in the JSMUL (Rs. 0.09 per litre) due to decrease in supply of milk. Thus it can be concluded that the average processing cost of a year for per litre milk was Rs. 1.98 to 2.47. The furnace oil and coal was the major cost component of the total cost. However, other major cost component were water, electricity and chilling charge, Depreciation and the interest on working capital.

Table 4.3: Average Cost of Milk Processing (Rs./Litre) at Dairy Plant

Sr. No.	Milk Union	Jalore-Sirohi	Sriganganagar	Ajmer	Bharatpur
1.	Water, electricity, generator and chilling charges	0.46	0.55	0.36	0.45
2.	Furnace oil and coal	0.83	0.59	0.74	0.70
3.	Chemicals, detergent and laboratory expenses	0.03	0.05	0.03	0.03
4.	Labour charges	0.68	0.75	0.49	0.65
5.	Repairs and maintenance	0.09	0.02	0.08	0.08
6.	Depreciation charges	0.14	0.14	0.14	0.14
7.	Interest on capital	0.24	0.27	0.07	0.20
	Total processing cost	**2.47**	**2.37**	**1.90**	**2.25**

Source: Data collected from selected Milk Unions 2014-15.

4.2 About Selected DCS and Non- DCS Villages

As mentioned above, four milk unions/district milk unions in Rajasthan state were selected. From each milk union/ district milk union/district, four villages were selected. From each milk union/ district union two villages having dairy cooperative and two villages without dairy cooperative were selected. Total numbers of selected village in Rajasthan were 16 (Table 4.4).

Table 4.4: List of Selected Village

District	Primary Dairy Cooperative Society		Private Dairy/ Vender / Agent	
	Tahsil	Village	Tahsil	Village
Jalore	Jaswantpura	Pavli	Bhinmal	Ved Bhadvi
Jalore	Raniwara	Rupawati khurd	Raniwara	Kabuli ki dani
Hanumangarh	Sangria	Nagrana	Hanumangarh	Makkasar
Hanumangarh	Hanumangarh	Manuka	Pilibanga	Ahmedpura
Dholpur	Sepau	Jaki	Sepau	Karimpur ka Pura
Dholpur	Sepau	Lodhpur	Sepau	Pathaina
Ajmer	Beawar	Sarmaliya	Beawar	Media
Ajmer	Ajmer	Saradhana	Ajmer	Dang Saradhana

Table: 4.5. General Information of Selected PDCS and Private Dairy Villages

Village Name	Total Number of Household in Village	Total Number of Dairy Farmers hh (approximately)	Male	Female	Total
Primary Dairy Cooperative Society					
Pavli	500	300	100	55	155
Rupawati khurd	400	300	0	120	120
Nagrana	600	500	90	10	100
Manuka	310	250	90	20	110
Jaki	200	100	60	24	84
Ladhpur	150	70	35	10	45
Sarmaliya	600	550	110	10	120
Saradhana	1750	850	400	50	450
Private Dairy/ Vendor/ Agent					
Vada Bhadvi	120	80	80	0	80
Kabuli ki dani	120	90	80	10	90
Makkasar	350	250	30	0	30
Ahmedpura	100	80	30	0	30
Karimpur ka pura	120	80	20	0	20
Pathana	150	70	25	0	25
Dang Saradhna	150	100	40	20	60
Media	70	65	25	0	25

Source: GOI (2011), Census 2011.

Table 4.5 shows that Saradhana village of Ajmer district milk union had the highest (1750) number of households as well as highest

number of members of societies, followed by Sarmaily village of Ajmer union. The highest number of female member was with Raniwara PDCS of JSMUL. Under Non PDCS category, Makkasar village of Hanumangarh district had the highest number of households and number of members, while same figure was lowest for Media village.

Table 4.6: Facilities Availability on Selected PDCS Villages

S. no.	Particulars	Pavli	Rupawati khurd	Nagrana	Manuka	Jakhi	Ladhpur	Sarmaliya	Saradhana
1	Road Connectivity	Pacca	Pacca	Pacca	Pacca	Pacca	Pacca	Pacca	Pacca
2	Name of Nearest Town/City	Bhinmal	Bhinmal	Sangria	Hanumangarh	Dholpur	Dholpur	Beawar	Ajmer
	Distance from Village (Kms)	12	55	11	28	10	12	10	20
3	Chilling Centre/BMC Capacity (liters)	10000	10000	1000	1000	24000	24000	4000	3000
	Distance from Village (Kms)	12	30	0	8	10	22	0	0
4	Availability of Electricity in village (No. of Hours in a day)	24	24	24	24	24	24	24	24
	Alternative Source of Power -	Generator	Generator	Generator	Generator	NA	NA	Generator	Generator
5	KVK/Extension Institution (Distance from Village (Kms))	90	125	11	28	15	22	15	10
6	Artificial Insemination Centre (Distance from Village (Kms))	1.5	5	0	0	2	3	0	0
7	Semen Collection Centre	Jaipur	Jaipur	Jaipur	Jaipur	Jaipur	Jaipur	Jaipur	Jaipur
8	Panchayati Breeding Bull	Personal	Personal	Personal	Personal	Personal	Personal	Personal	Personal
9	Veterinary Hospital/ Dispensary (Distance from Village (Kms))	1.5	5	11	7	6	15	6	0
10	Markets for Purchase of Cattle Feed (KMs)	12	30	11	28	28	22	11	25
11	Market for Sale and Purchase of Livestock Products	12	30	11	28	28	22	11	25
12	No. of Animal Health Camp organized during in 2015-16	1	1	1	0	0	0	1	1
13	No. of General Body Meeting conducted in 2015-16	1	1	1	0	0	0	1	0
14	Last Election Held in	Jun-15	Jun-15	Jun-15	Jul-15	Jul-15	Jul-15	Jul-15	Jun-16

Source: GOI (2011), Census 2011.

The information on basic facilities available in selected villages is presented in Tables 4.6 to 4.6a. It can be seen from the tables that all the selected villages of both groups are well connected through pucca road. Sarmaliya and Saradhana village of Ajmer district and Nagrana Village of Hanumangarh district has chilling centre/ BMC established in the village and all other villages having this facility available more than 10 km away from village. All selected villages have 24 hour electricity facility available. The selected PDCS villages of Hanumangarh and Ajmer have Artificial Insemination facility in village. The other facilities are located more than 10 KMs away at nearest town, mostly the taluka place. PDCS member receive support from dairy while non PDCS member never received any support of dairy union.

Table 4.6a: Facilities Availability on Selected Private dairy/ Vender/ agents

S.no.	Particulars	Vada Bhadvi	Kabuli ki dani	Makkasar	Ahmedpura	Karimpur ka pura	Pathaina	Dang Saradhna	Media
1	Road Connectivity	Pacca	Pacca	Pacca	Pacca	Pakka	Pakka	Pacca	Pacca
2	Name of Nearest Town/City	Bhinmal	Bhinmal	Hanuman garh	Pilibanga	Dholpur	Dholpur	Sarwar	Beawer
	Distance from Village (Kms)	12	20	4	8	15	12	15	5
3	Chilling Centre/BMC (Capacity (liters))	2000	NA	Milk Union	Milk Union	Sub centre	Sub centre	1000	1000
	Distance from Village (Kms)	12	35	4	25	15	12	0	0
4	Availability of Electricity in village (No. of Hours/day)	24	24	24	24	24	24	24	24
	Alternative Source of Power - Batteries/Generator	Generator	Generator	NA	NA	NA	NA	Generator	Generator
5	KVK/Extension Institution (Distance from Village (Kms))	90	130	8	28	20	16	35	25
6	Artificial Insemination Centre (Distance from Village (Kms))	1.5	5	0	5	9	8	0	5
7	Semen Collection Centre	Jaipur	Jaipur	Jaipur	Jaipur	Jaipur	Jaipur	Jaipur	Jaipur
8	Panchayati Breeding Bull	Personal	Personal	Personal	Personal	Personal	Personal	Personal	Personal
9	Veterinary Hospital/ Dispensary (Distance from Village (Kms))	1.5	5	0	8	15	28	30	5
10	Markets for Purchase of Cattle Feed (KMs)	12	30	4	8	15	28	15	5
11	Market for Sale and Purchase of Livestock Products	12	30	4	8	15	28	15	5
12	No. of Animal Health Camp organized during in 2015-16	0	0	0	0	0	0	0	0
13	No. of General Body Meeting conducted in 2015-16	0	0	0	0	0	0	0	0
14	Last Election Held in	0	0	0	0	0	0	0	0

4.3 Activities of Selected Dairy Cooperatives & Private Units

The data about the milk collection and sell of dairy co-operatives and private units in the selected villages is presented in Table 4.7. In all selected PDCS, fat content in milk ranges from 5.0 to 6.8. The milk production centers are villages therefore one dairy cooperative society receives milk from village producers and send to union. It was observed that the per month milk collection in primary dairy Co-operative Societies (PDCS) was ranges between 36 hundred to 84 thousand litres and almost all collected milk is sent to milk union (except in few PDCS which some quantity is sold to local people). The highest milk collection was noted in Saradhana milk cooperative society and the lowest milk collection was in Jaki milk cooperative society. In non-PDCS villages, milk collection was done by Private Dairy/ Vendor/ Agent. Private dairies and vendors are collecting 24 to 13 thousand liters of milk per month.

Table 4.7: Details of Milk Collection and sold in Selected PDCS and Private Dairy

Villages	Total milk collection (liters)	Av. Fat (%)	Total No. of milk producers	Milk sent to Milk Union (liters)	Milk sold @ dairy- Quantity (lit)	Milk sold @ dairy- Rate/lit (Rs.)
Primary Dairy Cooperative Society						
Pavli	16180	6.8	80	16180		
Rupawati khurd	15300	6.8	75	15300		
Nagrana	21650	6.5	60	21600	50	45
Manuka	10500	5.5	45	10500		
Jaki	3600	5.5	40	3600		
Ladhpur	4500	5.5	35	4500		
Sarmaliya	3600	7.4	120	3570	30	48
Saradhana	84400	6.6	600	80000	4400	47
Average	**19966**	**6.2**	**132**	**19406**	**1493**	**47**
Private Dairy/ Vendor/ Agent						
Vada Bhadvi	12050	7.2	33	12500	-	-
Kabuli ki dani	7800	5.9	100	7800	-	-
Makkasar	6000	5	30	-	6000	40*
Ahmedpura	4500	5	28	-	4500	45*
Karimpur ka pura	3600	6	21	-	3600	45*
Pathana	2400	5	15	-	2400	48*
Dang Saradhna	13200	7	35	13200	-	-
Media	12900	7.1	45	12900	-	-
Average	**7806**	**6**	**38**	**11600**	**4125**	**45***

Note *Milk Sold after cream separation.
Source: Collected from selected PDCS.

The dairy societies are engaged in various activities like supply of cattle feed and veterinary services to farmers along with its major activity of procurement of milk. It can be seen from the Table 4.8 that the highest quantity of cattle feed was purchased by 450 members of Saradhana PDCS of Ajmer district, while the lowest was in Jaki and Lodhpur PDCS of Dholpur district. The rate of prepared cattle feed (Sarasdan) was Rs. 18 per kg in selected PDCS. The mode of purchase of cattle feed and mineral mixture was in cash as well as on credit in all selected PDCS. The selected PDCS of Ajmer and Hanumangarh district had provided mineral mixture facility to all the pourer member of society. The rate of mineral mixture was Rs. 52 per kg in PDCS. In non PDCS selected villages, except one village of Jalore district, no private dairy and vender had provided cattle feed supply facility to milk producers (see Table. 4.8a).

Table 4.8: Concentrates supplied by the Selected PDCS during Last One Year

	Pavli	Rupawati khurd	Nagrana	Manuka	Jaki	Ladhpur	Sarmaliya	Saradhana
1.Concentrate prepared cattle feed								
Brand	Vatfan (maize + Jowar)	Saras	Saras	Saras	Saras	Saras	Saras	Saras
Total Quantity sold per month	5000	1500	4000	2500	1000	1500	6250	30000
No. of members purchased	38	60	50	30	30	28	60	450
Rate/Prices (Rs.)	32	980	980	980	980	980	960	740
On credit/cash	Cash/ Credit	Cash/ Credit	Cash/ Credit	Cash/ Credit	Cash/ Credit	Cash/ Credit	Cash/ Credit	Cash/ Credit
Market rate	50	50	50	50	50	50	50	50
1.2. Prepared Cattle Feed								
brand	Gomix	Saras dan	Saras Plan	Saras Plan			Saras gold	
unit code	1	1	1	1	NA	NA	1	NA
Quantity sold	76	5200	1000	500	NA	NA	6000	NA
No. of members purchased	30	60	50	25	NA	NA	70	NA
Rate/Prices (Rs.)	35	18	18	18	NA	NA	18	NA
On credit/cash	Cash/ Credit	Cash/ Credit	Cash/ Credit	Cash/ Credit	NA	NA	Cash/ Credit	NA
Market rate								
2. Supplements								
Mineral Mixture	Saras	Saras	Saras	Saras	Saras	Saras	Saras	Saras
brand								
unit code	NA	NA	1	1	NA	NA	1	1
Quantity sold	NA	NA	45	30	NA	NA	35	100
No. of members purchased	NA	NA	45	30	NA	NA	35	100
Rate/Prices (Rs.)	NA	NA	52	52	NA	NA	52	52
On credit/cash	NA	NA	Cash/ Credit	Cash/ Credit	NA	NA	Cash/ Credit	Cash/ Credit

Table 4.8a: concentrates supplied by the Selected Private Dairy during Last One Year

Particulars	Vada Bhadvi	Kabuli ki dani	Makkasar	Ahmedpura	Karimpur ka pura	Pathana	Dang Saradhna	Media
1.Concentrate prepared cattle feed								
Brand	By Saras							
Total Quantity sold per month	1200	NA	NA	NA	NA	NA	NA	NA
No. of members purchased	40	NA	NA	NA	NA	NA	NA	NA
Rate/Prices (Rs./bag)(1bag = 50kg)	1300	NA	NA	NA	NA	NA	NA	NA
On credit/cash	Cash	NA	NA	NA	NA	NA	NA	NA
Market rate	50	NA	NA	NA	NA	NA	NA	NA
1.2. Prepared Cattle Feed								
Brand	NA	NA	NA	NA	NA	NA	NA	NA
Total Quantity sold	NA	NA	NA	NA	NA	NA	NA	NA
No. of members purchased	NA	NA	NA	NA	NA	NA	NA	NA
Rate/Prices (Rs.)	NA	NA	NA	NA	NA	NA	NA	NA
On credit/cash	NA	NA	NA	NA	NA	NA	NA	NA
Market rate	NA	NA	NA	NA	NA	NA	NA	NA
2. Supplements								
2.1Mineral Mixture	NA	NA	NA	NA	NA	NA	NA	NA
brand	NA	NA	NA	NA	NA	NA	NA	NA
Total Quantity sold	NA	NA	NA	NA	NA	NA	NA	NA
No. of members purchased	NA	NA	NA	NA	NA	NA	NA	NA
Rate/Prices (Rs.)	NA	NA	NA	NA	NA	NA	NA	NA
On credit/cash	NA	NA	NA	NA	NA	NA	NA	NA

Veterinary and Breeding Services provided by the PDCS

Veterinary care facilities are gradually coming up to cover most of PDCS village. It can be seen from the Table 4.9 that almost all the selected village of PDCS were covered under vaccination programmes (such as FMD, HS, BQ,). On an average, beneficiary household had incurred medicine plus doctor (vaccination) fee cost ranging between Rs. 10 to 20/- per animal during the year. The average number of AI per conception rate in PDCS village was less than 2. On an average, every year total number of visit of veterinary doctor ranges between 3 to 4 only. The highest number of visits by veterinary doctor was recorded in Hanumangarh and Jalour district while the lowest were in Dholpur district. In non-PDCS villages, no veterinary facility was available, thus most them are dependent on the alternative source of medical support in nearby town or village. Further, it can be seen from

the Table 4.10 that the animals (local cow, cross breed and buffaloes) were affected by diseases (HS, FMD and BQ) in only two villages Raniwara village of Jalore district and Saradhana village of Ajmer district under selected PDCS.

Table 4.9: Veterinary and Breeding Services provided by Selected PDCS /Firm during Last One Year

Villages	Vaccinations**	Medicines + Doctor (Cost In Rs.)	Av. No. of visits by vet/year	Amount Rs.	No. of AI per conception
Primary Dairy Cooperative Society					
Pavli	FMD	20	5	150	2
Rupawati khurd	HS, BQ,FMD	15	4	150	1
Nagrana	HS, BQ,FMD	20	7	150	2
Manuka	HS, BQ,FMD	20	8	150	1
Jaki	FMD	10	1	180	2
Ladhpur	FMD	15	1	180	2
Sarmaliya	FMD	15	1	150	1
Saradhana	HS, BQ,FMD	15	3	150	2
Average		16.25	3.5	157.5	1.6
Private Dairy/ Vendor/ Agent					
Vada Bhadvi	NA	NA	NA	NA	NA
Kabuli ki dani	NA	NA	NA	NA	NA
Makkasar	NA	NA	NA	NA	NA
Ahmedpura	NA	NA	NA	NA	NA
Karimpur ka pura	NA	NA	NA	NA	NA
Pathana	NA	NA	NA	NA	NA
Dang Saradhna	NA	NA	NA	NA	NA
Media	NA	NA	NA	NA	NA
Average	NA	NA	NA	NA	NA

Table 4.10: Any Outbreak of Disease of Livestock during the past One Year in Selected PDCS

Particulars	Pavli	Rupawati khurd	Nagrana	Manuka	Jaki	Ladhpur	Sarmaliya	Saradhana
1. Animals Affected								
HS Haemorrhagic Septicemia)								
Local no.	NA	35	NA	NA	NA	NA	NA	45
Crossbred no.	NA	15	NA	NA	NA	NA	NA	45
Buffalo no.	NA	50	NA	NA	NA	NA	NA	360
2.1.FMD (Foot and Mouth Disease								
Local no.	NA	40	NA	NA	NA	NA	NA	100
Crossbred no.	NA	20	NA	NA	NA	NA	NA	50
Buffalo no.	NA	80	NA	NA	NA	NA	NA	500
2.2.BQ (Black Quarter)								
Local no.	NA	NA	NA	NA	NA	NA	NA	100
Crossbred no.	NA	NA	NA	NA	NA	NA	NA	60
Buffalo no.	NA	NA	NA	NA	NA	NA	NA	500
2.3.HS (Haemorrhagic Septicemia)								
Local no.	NA	60	NA	NA	NA	NA	NA	50
Crossbred no.	NA	10	NA	NA	NA	NA	NA	50
Buffalo no.	NA	75	NA	NA	NA	NA	NA	300

Training & Development Programmes organised

Training and development programmes organised by selected PDCS and Private Dairy units during last one year period is presented in Table 4.11. It can be seen that except one PDCS, no other PDCS and private units had organised training programme for their members. Only secretary of PDCS has received one/two day training. Out of eight selected PDCS villages, only Rupawati Khurd PDCS of Jalore district had trained few members in two training programmes.

Table 4.11: Training provided to members by Selected PDCS during Last One Year

Village	Pavli	Rupawati khurd	Nagrana	Manaka	Jaki	Lodhpur	Sarmaliya	Saradhana
Sr. No.1								
Training on	Milk Procur.	Milk Procur.	Milk Procur.	Milk Procur.	Milk Procur.	Milk Procur.	Milk Procur.	Milk Procur.
Period(Day)	1	1	1	1	1	1	1	1
No. of members participated	1	1	1	1	1	1	1	1
Any cost was charged-Frees	free	free	free	free	free	Free	free	free
Sr. No.2								
Training on	NA	Livestock Production	NA	NA	NA	NA	NA	NA
Period(Day)	NA	2	NA	NA	NA	NA	NA	NA
No. of members participated	NA	2	NA	NA	NA	NA	NA	NA
Any cost was charged-Frees	NA	free	NA	NA	NA	NA	NA	NA
Sr. No.3								
Training on	NA	Animal Health	NA	NA	NA	NA	NA	NA
Period(Day)	NA	3	NA	NA	NA	NA	NA	NA
No. of members participated	NA	12	NA	NA	NA	NA	NA	NA
Any cost was charged-Frees	NA	free	NA	NA	NA	NA	NA	NA

Source: Field survey data.

4.4 Socio-Economic Characteristics of Sample Households

The socio-economic characteristics of the sample households also have an important bearing on the decision to cultivate with rearing milch animal. The data reveals from Table 4.12 that the majority of decisions were taken by male members (94.17 per cent in case of DCS households and 88.33 per cent in case of NDCS households). Thus, females has little role in decision making. About 80 per cent sample households (HHs) belongs to OBC category followed by General category (17.50%) and remaining were from SC category. Almost same

trend was found in NDCS hh. Most of the households of both categories were from Hindu religion. The main occupation of the selected households was agriculture comprised of cultivation of land along with supportive allied activity of animal husbandry and dairying. The selected DCS household possess agriculture land about 5.19 hectare compared to 4.17 hectare with NDCS household. About 83 percent land was under irrigation in case of DCS hh, while NDCS household has about 76 per cent land under irrigation. As per income level classification of both groups, around 82-85 percent of households are categorized above poverty line. About 66 per cent households of DCS member have pucca structure while corresponding figure was 52.5 percent in case of non-DCS category.

Table 4.12: Socio-Economic Characteristics of Selected Households

Sr. No.	Particulars	Rajasthan State							
		DCS (n=120)				NDCS (n=120)			
1	Gender Decision Maker (%)	Small	Medium	Large	Overall	Small	Medium	Large	Overall
	Male	92.50	97.50	92.50	94.17	82.50	92.50	90.00	88.33
	Female	7.50	2.50	7.50	5.83	17.50	7.50	10.00	11.67
2	Religion (% to total)								
	Hindu	92.50	95.00	100.00	95.83	90.00	80.00	90.00	86.67
	Muslim	0.00	5.00	0.00	1.67	0.00	0.00	0.00	0.00
	Christian	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sikh	7.50	0.00	0.00	2.50	10.00	20.00	10.00	13.33
3	Social Group (% to total)								
	Scheduled Tribe	0.00	0.00	0.00	0.00	5.00	2.50	0.00	2.50
	Scheduled Caste	0.00	7.50	2.50	3.33	0.00	7.50	0.00	2.50
	Other Backward Class	82.50	77.50	80.00	80.00	82.50	77.50	87.50	82.50
	General/Open	17.50	15.00	17.50	5.83	12.50	12.50	12.50	12.50
4	Occupation (%)								
	Main/Principal								
	Cultivator	87.50	92.50	92.50	90.83	80.00	87.50	82.50	83.33
	AH & Dairying	12.50	7.50	7.50	9.17	17.50	5.00	12.50	11.67
	Service	0.00	0.00	0.00	0.00	2.50	7.50	5.00	5.00
	Subsidiary								
	Cultivator	10.00	7.50	2.50	6.67	12.50	7.50	15.00	11.67
	AH & Dairying	82.50	82.50	80.00	81.67	80.00	92.50	82.50	85.83
	Agri. Labour	7.50	10.00	17.50	11.67	5.00	0.00	2.50	2.50
5	Av. Operational land holding (area in ha)								
	Irrigated	4.15	4.73	4.04	4.31	2.90	3.03	3.58	3.17
	Un irrigated	0.70	0.55	1.39	0.88	0.85	1.09	1.06	1.00
	Total	4.85	5.28	5.43	5.19	3.75	4.12	4.64	4.17
6	Av. Exp. in dairy (years)	15.1	18.5	14.5	16.03	20.1	18.4	15.2	17.9
7	Income Group (%)								
	BPL	20.00	10.00	22.50	17.50	20.00	20.00	2.50	14.17
	APL	80.00	90.00	77.50	82.50	80.00	80.00	97.50	85.83
8	House Structure (%)								
	Pucca	57.50	67.50	72.50	65.83	47.50	45.00	65.00	52.50
	Semi-Pucca	20.00	17.50	15.00	17.50	15.00	35.00	15.00	24.17
	Kuccha	22.50	15.00	12.50	16.67	30.00	20.00	20.00	23.33

The family profile of selected sample households is presented in Table 4.13. It can be seen from this table that the average household size of both categories households was found to be 6.4 members. Across selected sample sizes (small, medium and Large), household size was relatively large in categories of small and medium in DCS as compared to NDCS (around 5.2 members). The family composition indicates that around 2.63 member were male, followed by 2.32 member female and remaining were children. Most of the respondents were male. The average age of male and female respondents of both categories ranges between 40-44 years. The average level of education of respondents indicates the lower rate of literacy (7-8 years) in both categories. About 3-4 family members are engaged in dairy work.

Table 4.13: Family Profile of Selected Households

Sr. No.	Particulars	Rajasthan							
		DCS (n=120)				NDCS (n=120)			
		Small	Medium	Large	Overall	Small	Medium	Large	Overall
1	Av. Household Size (Nos.)								
	Male	2.28	2.88	2.73	2.63	2.20	2.43	2.73	2.45
	Female	2.08	2.55	2.33	2.32	2.10	2.23	2.33	2.22
	Children(Below 15 Year)	1.50	1.53	1.38	1.47	1.45	1.75	2.10	1.77
	Total	5.86	6.96	6.44	6.42	5.75	6.40	7.15	6.43
2	Gender of Respondent/HH (%)								
	Male	92.50	97.50	92.50	94.17	82.50	92.50	90.00	88.33
	Female	7.50	2.50	7.50	5.83	17.50	7.50	10.00	11.67
3	Av. Age of respondent (years)								
	Male	42.55	44.81	41.40	42.92	43.78	44.86	43.11	43.92
	Female	32.25	40.15	52.66	41.68	40.37	50.00	35.25	41.87
4	Av. Age of family (years)	30.5	30.55	28.56	29.87	29.31	28.56	28.64	28.83
5	Av. Education of respondent (years)	7.75	6.85	7.05	7.21	7.03	9.02	9.28	8.44
6	Av. No. of Family members works in dairy	3.67	4.00	4.10	3.92	2.94	3.20	3.78	3.31

Source: Field survey data.

Cropping Pattern

The cropping pattern of the sample households is presented in Table 4.14. Out of the total gross cropped area by both categories, about 51-54 percent area under sown in kharif season, followed by rabi (41-44 per cent) and remaining area was in summer season. Among various crops, bajra and paddy were major kharif crops, gram was major rabi crop cultivated by farmers of all categories The important

cash crop was cotton and guar in kharif while rapeseed and mustard in rabi season. The cropping intensity was around 164 per cent in both categories.

Table 4.14: Cropping Pattern of Sample Household in Rajasthan (2015-16)

Season		Cropping Pattern (2015-16) Area in % to Gross Cropped Area							
		DCS n=120				NDCS n=120			
		Small	Medium	Large	Av	Small	Medium	Large	Av
Kharif	Food grains Crop	18.6	27.5	26.0	24.2	30.8	26.8	22.4	26.4
	Oilseeds	7.7	4.4	3.6	5.2	2.0	3.0	3.1	2.7
	Cotton	6.6	10.4	9.1	8.8	3.9	5.5	5.9	5.2
	Other crops	8.9	8.3	10.2	9.1	10.3	8.2	10.9	9.8
	Fodder Crop	5.9	5.8	7.2	6.3	4.5	6.5	10.0	7.2
	Total Kharif	47.6	56.4	56.1	53.5	51.5	50.0	52.3	51.3
Rabi	Food grains Crop	19.4	19.9	23.6	20.9	32.9	30.6	22.4	28.3
	Other crops	19.9	14.9	10.1	15.0	7.0	9.7	16.4	11.3
	Fodder Crop	5.6	4.6	5.7	5.3	4.5	3.4	4.3	4.0
	Total Rabi	44.9	39.4	39.4	41.2	44.4	43.6	43.1	43.7
Summer	Food grains Crop	3.2	0.8	1.8	1.9	2.9	2.4	0.3	1.8
	Other crops	0.5	0.6	0.2	0.4	0.7	2.7	0.1	1.2
	Fodder Crop	3.9	2.8	2.5	3.0	0.5	1.3	4.2	2.1
	Total summer	7.6	4.2	4.5	5.4	4.2	6.4	4.6	5.1
	GCA	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Cropping Intensity	169.9	173.8	149.3	163.9	160.4	170.7	160.3	163.7

Source: Field survey data.

4.5 Chapter Summary

The chapter presented the profile of the selected sample unions, sample villages and sample households. The most of selected sample households belongs to other backward class and were from hindu religion. The average size of household found to be 6.4 members having average age of respondents between 40 to 44 years. Around three members from each family were engaged in dairy activity. The operational land holding size was 5.19 hectare in case of DCS households, as compared to 4.17 hectare in NDCS households. The DCS households were found more experienced than NDCS household. In cropping pattern, significant area was allotted to fodder crops, may be due to requirement of fodder for dairy animals.

The next chapter presents cost of milk production and awareness about dairy programmes.

Chapter V

Cost of Milk Production & Awareness about the Schemes

5.1 Introduction:

After having discussed about the selected study area and characteristics of the sample households, this chapter discusses the data on various parameters collected from the DCS and the non-DCS households in order to work out the details on herd strength, Breedable animals, feed and fodder, labour use and expenditure on animal health, milk production and pattern of sale of milk.

5.2 Livestock holdings/Herd Strength

It is important to have information on distribution of local and crossbreed cows and buffaloes with selected households. The details on herd strength and cattle shed worked out in Tables 5.1. It can be seen that the total herd strength with DCS households was found to be 6.5, of which milch animals were estimated to be 4.2.In case of NDCS households, the herd strength was 5.9 animals of which 4.1 animals were milch animals. As per the methodology adopted for the study, as expected, highest size of the herd strength was observed in case of large size group of 9.8 and 9.0 animals respectively with DCS and NDCS households. Across the species, the share of buffaloes in total herd strength was found to be significant higher in case of DCS households (72 percent) as compared to NDCS households (59 percent). While share of local cattle in total herd strength was found to higher in case of NDCS households (about 24 per cent) than DCS households (about 17 %).Same trend was observed in case of cross bred cows which accounts for 17 percent share of NDCS household herd strength compared to 11 percent share of DCS household herd

size. Thus, DCS household herd strength was relatively higher and dominance with buffalo as compared to NDCS households.

The investment in dairy enterprise on different item like cattle shed, storage for fodder was worked out. It can be observed from the table that on an average investment of Rs. 1.2 lakh was made on a pucca cattle shed, which varies from Rs. 0.5 lakh to 1.56 lakh across size groups. The investment increased with an increase in the size of cattle holding in both categories. The numbers of pucca cattle sheds were lesser in number in both DCS and NDCS categories.

Table 5.1: Details on Herd Strength & Cattle Shed

Sr. No.	Particulars	DCS (n=120)							
		Total Animal (No.)				Milch Animal (No)			
		Small	Medium	Large	Av	Small	Medium	Large	Av.
(I)	**NDCS (n=120)**								
A	Animals								
1	Local Cattle	0.9	1.0	1.3	1.1	0.3	0.5	0.9	0.6
2	Cross Breed	0.6	0.6	1.1	0.7	0.3	0.5	0.8	0.5
3	Buffalo	2.2	4.5	7.4	4.7	1.0	2.6	5.8	3.1
	Total	3.7	6.1	9.8	6.5	1.6	3.6	7.4	4.2
B	Cattle Shed	Number of Cattle shed (No.)				Ave. Expenditure on per Cattle shed (Rs.)			
		Small	Medium	Large	Total	Small	Medium	Large	Average
	Pucca	0.2	0.4	0.3	0.3	67777	125000	155833	120735
	Semi-Pucca	0.4	0.3	0.3	0.3	36071	47142	50000	43857
	Kuccha	0.4	0.4	0.4	0.4	13363	15593	20000	16320
	Total	1.0	1.1	1.0	1.0	39070	62578	75278	60304
(II)	**NDCS (n=120)**	**Small**	**Medium**	**Large**	**Total**	**Small**	**Medium**	**Large**	**Total**
1	Local Cattle	0.8	1.4	2.0	1.4	0.4	0.9	1.4	0.9
2	Cross Breed	0.5	1.0	1.6	1.0	0.3	0.5	1.2	0.7
3	Buffalo	1.9	3.1	5.5	3.5	1.0	2.3	4.3	2.5
	Total	3.2	5.5	9.0	5.9	1.6	3.7	6.9	4.1
	Cattle Shed	Number of Cattle shed (No.)				Ave. Expenditure on per Cattle shed (Rs.)			
		Small	medium	Large	Total	Small	medium	Large	Average
	Pucca	0.2	0.2	0.3	0.2	50916	118750	146666	115980
	Semi Pucca	0.2	0.3	0.3	0.2	35625	39000	64000	46964
	Kuccha	0.4	0.4	0.5	0.4	10107	10535	13638	11619
		1.0	0.8	1.0	0.9	32216	56095	74768	58188

Source: Field survey data

5.2.1 Details of Breedable Animals

Production traits of milch animals play a crucial role and have a profound influence on the cost and returns of dairy enterprise. There could be an endless list of various parameters which affect the economics of enterprise. But for this study, only some important traits like age of first calving, days in milk, proportion of milking and the yield of animals have been considered. Some auxiliary parameters, which play a crucial role and have a direct bearing on milk productivity and the economics of milk

production like the order of lactation, has also been analysed and presented in this section. Late maturity of the bovines resulting in the higher cost of rearing the animals to the age of first calving is one of the major causes responsible for the uneconomic nature of dairying in our country. The age at first calving is governed by biological factors like age at maturity and conception rate, which are again influenced by breeding, feeding, management and environment factors. The details of breedable animals with DCS category presented in Table 5.2 indicate that average age of animal was estimated to be 6.5 years. The average age of breedable animals was comparatively higher in case of animals reared by small farmers. While in case of different animals, the average age was varied from 5.92 to 6.38 years in local cow, 4.63 to 7.75 years in cross breed cattle and 6.11 to 7.24 years in case of buffaloes reared by the selected milk producers. The average age animal at first calving was the highest for buffaloes (42.66 months) followed by local cattle (39 months) and the lowest for cross breed cattle (33.4 months). On an average, 40.82 months was the age at first calving for all animals. The average lactation order among the small, medium and large category of all breedable animals was estimated to be 2.89, 2.64 and 2.65 respectively with an average of 2.73. While the average lactation order among local cow was varies from 2.10 to 2.83, it varies from 1.94 to 2.97 among crossbreed cow while the highest lactation order was noted in buffaloes which varies from 2.86 to 3.0.

The lactation length affects the total milk production and consequently the return from the dairy animals. The longer and prolonged dry period puts the dairy farmers in a disadvantageous position since the animals are to be fed and taken care of during this period too, increasing the cost of maintenance. The overall average length of lactation period estimated to be 231 days, which varies from 225.66 days to 235.31 days among all the animals. Lactation length was slightly higher in case of cross breed cows (260 days) against local cattle (238 days) and buffaloes (225 days). The average peak yield of all animals during last lactation period was 9.29 liters per day per animals. The milk yield was higher in

case of crossbreed cows (10.41 litres), followed by buffalo (9.29 litres) and local cows (7.34 litres). The same trend was observed in case of present lactation as well. It was very strange to note that no animal was covered with insurance.

Table 5.2: Details of Breedable Animals on Survey Date

Sr. No.	Particulars	Animal (DCS)															
		Local Cow				Crossbred Cow				Buffalo				Total			
		S	M	L	T	S	M	L	T	S	M	L	T	S	M	L	T
	Total no. of Animals	12	20	34	66	13	18	31	62	40	105	231	376	65	143	296	504
1	Age (year)	6.38	5.92	5.78	6.03	7.75	4.62	5.89	6.09	7.24	6.59	6.11	6.65	7.18	6.26	6.05	6.50
2	Age at First Calving (Month)	37.67	40.60	38.74	39.00	33.15	31.83	35.23	33.40	44.05	42.83	41.11	42.66	40.69	41.55	40.22	40.82
3	Lactation Order@	2.83	2.10	2.62	2.52	2.62	1.94	2.97	2.51	3.00	2.86	2.61	2.82	2.89	2.64	2.65	2.73
4	Length of Lactation on Period (Days)	238	231	245	238	249	275	257	260	226	231	219	225	232	235	226	231
5	Peak Yield-Lit/day/Animal																
	Last Lactation	7.60	7.36	7.06	7.34	10.45	11.31	9.48	10.41	9.50	9.04	9.32	9.29	9.34	9.21	9.31	9.29
	Present Lactation	6.50	7.75	7.60	7.28	11.23	11.83	9.65	10.90	9.15	9.10	9.30	9.18	9.45	9.39	9.37	9.40
6	Covered Under Insurance (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Sources: Field survey data.

The details of breedable animals in NDCS category are presented in Table 5.3. As seen in case of DCS households, the average age of animals was estimated to be 6.5 years, which varies from 6.11 years in case of local cows, 6.46 years in case of crossbreed cows and 6.76 years in case of buffaloes. Except in case of cross breed cows, the average age of breedable animals was comparatively higher in case of animals reared by small farmers. Across species, the average age was varied from 5.57 to 6.60 years in local cow, 5.82 to 6.69 years in cross breed cattle and 6.38 to 7.06 years in buffaloes reared by the milk producers. The average age at first calving was estimated to be 41.17 months, which was the highest for buffaloes (42.96 months) followed by local cattle (39.73 months) and the lowest was for cross breed cattle (36.67 months). The average age at first calving for the local cow, crossbred cow and buffalo category was found to be 39.73, 36.67 and 43.96 months respectively. The average lactation order among the local cow, crossbred cow and buffalo was found to be 2.78, 2.99 and 2.91 respectively. While the average lactation order among local cow varies from 2.22 to 3.19; 2.46 to 3.13 among crossbreed

cow and 2.67 to 3.03 among buffaloes. The overall average length of lactation period was estimated to be 233 days, which varies from 218 to 291 days. Among species, length of lactation period was highest in case of cross breed cows followed by local cows and buffaloes. It may be also observed that average milk yield of all animals during last lactation was estimated to 9.5 litres during last and present lactation period, which varies from 6.04 litres to 11.89 litres. The highest milk yield was recorded in case of crossbreed cows (11.33 litres) during last lactation period and 12.64 litres during present lactation period. It was again observed in case of NDCS households as well that no animal was covered with insurance.

Table 5.3: Details of Breedable Animals on Survey Date

Sr. No	Particulars	Animal (NDCS)															
		Local Cow				Crossbred Cow				Buffalo				Total			
		S	M	L	T	S	M	L	T	S	M	L	T	S	M	L	T
A	Total no. Of Animals	15	36	57	108	11	21	47	79	38	90	173	301	64	147	277	488
1	Age (year)	6.17	5.57	6.60	6.11	5.82	6.87	6.69	6.46	7.06	6.38	6.74	6.73	6.64	6.25	6.70	6.53
2	Age at First Calving (Month)	37.93	40.67	40.60	39.73	33.73	38.95	37.34	36.67	42.97	44.22	41.68	42.96	40.20	42.60	40.72	41.17
3	Lactation Order@	2.93	2.22	3.19	2.78	2.45	3.38	3.13	2.99	3.03	2.67	3.03	2.91	2.91	2.66	3.08	2.88
4	Length of Lactation on Period (Days)	229	238	228	231	250	291	267	269	218	231	223	224	227	242	231	233
5	Peak Yield- Lit/day/Animal																
	Last Lactation	6.86	6.04	6.77	6.89	11.89	11.17	10.92	11.33	9.67	8.75	9.09	9.17	10.07	8.96	9.31	9.45
	Present Lactation	6.97	6.99	6.18	6.71	12.73	12.90	12.28	12.64	9.55	10.22	10.45	10.07	9.96	8.49	10.06	9.50
6	Covered Under Insurance (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Source: Field survey data.

5.2.2 Season wise Milk yield per Day in Selected household

The season-wise average daily milk yield realised by the selected households are presented in Table 5.4. The milk yield of all species/breed was found higher in case of DCS households than NDCS households. Across the seasons, milk yield was found the highest during winter season followed by rainy and summer seasons. In DCS category, the average yield of milk was found to be maximum of 15.60 litres/day in case of buffalos during winter season realised by large size group, while the lowest was in case of local cow (4.8 litres/day) realised by small size group. In case of NDCS group, same trend was observed.

Table 5.4: Season wise Milk Yield (Per day) of Selected HH in Rajasthan 2015-16

Sr. No.	Particulars	Av. Yield (Lit/animal)											
		Local Cow				Crossbred Cow				Buffalo			
		S	M	L	Av.	S	M	L	Av.	S	M	L	Av.
	DCS (n=120)												
1	Rainy	5.4	6.1	6.0	5.8	10.5	12.6	12.2	11.8	9.3	11.4	14.3	11.7
2	Winter	6.1	6.2	7.1	6.5	11.9	14.6	13.1	13.2	9.8	12.5	15.6	12.6
3	Summer	4.8	5.1	5.1	5.0	9.3	10.2	10.5	10.0	7.8	9.9	12.8	10.2
	Av	5.4	5.8	6.1	5.8	10.5	12.5	11.9	11.6	9.0	11.3	14.2	11.5
	NDCS (n=120)												
1	Rainy	5.8	5.0	5.0	5.3	11.0	10.8	10.7	10.8	9.1	10.6	10.2	10.0
2	Winter	5.8	6.1	5.1	5.7	12.2	12.7	12.4	12.4	9.9	11.3	11.9	11.0
3	Summer	4.0	4.0	4.1	4.0	8.8	9.4	9.2	9.1	8.1	8.7	9.1	8.6
	Av	5.2	5.0	4.7	5.0	10.7	11.0	10.7	10.8	9.0	10.2	10.4	9.9

Source: Field survey data.

5.3 Labour Use Pattern in Dairy activities

Labour is another important component of cost in the maintenance of animals. Dairying is a labour intensive enterprise under Indian conditions. Labour is required for milking, feeding and looking after etc. Of the animals, rather it could be said that dairying provides regular employment throughout the year. The labour use pattern and involvement of rural men and women in dairy activities under DCS and NDCS categories milk producers are presented in Table 5.5. It can be seen that the under fodder management, at overall level, average one male and one female family worker were engaged per day for the period of about 0.32 hours and 0.28 hours respectively under DCS and 0.30 hours and 0.26 hours, respectively under NDCS group. Though some of the household had hired the casual labours, which were mainly used for agriculture activities, the tendency of having permanent labour was very rare and found with few households only. The hired labour for fodder management, only medium and large cattle holders had hired who worked in grass collection and fodder management for the period of 0.17 hours and 0.19 hours under DCS category and 0.27 hours and 0.28 hours while in NDCS category respectively. For cattle shed management also, same family member were engaged in cleaning, washing, watering and dung collection for the period of around 0.35 hours and 0.25 hours respectively on an average per day under both categories. Under milking, family labour use pattern was about

for 0.17 hours to 0.22 hours. However, for animal health, selected households had spent around 0.10 hours per day in both categories. As expected, small size households have spend more time on dairy activities than other groups.

Table 5.5: Labour Use Pattern/Involvement of Men and Women in Dairy activities

SL	Particulars	DCS				NDCS			
1	**A. Fodder management**	S	M	L	Av	S	M	L	Av
	Avg. No. of family labour Male(day)	1.15	1.05	0.95	1.05	0.8	1.2	1.2	1.1
	Avg. No. of family labour Female(per day)	1.03	0.93	1.1	1.02	0.8	1.1	1.1	1
	Avg. No. of hired labour male(per day)	0	0.03	0.03	0.02	0	0.3	0.3	0.02
	Ave. No. of hired labour female(per day)	0	0.03	0.03	0.02	0	0.3	0.3	0.02
	Total time (in hours) worked family labour Male(per day/per person)	0.45	0.2	0.3	0.32	0.45	0.25	0.2	0.3
	Total Hours worked family labour Female(per day/per person)	0.35	0.2	0.3	0.28	0.35	0.25	0.2	0.26
	Total Hours worked hired labour Male (per day/Per person)	0	0.25	0.28	0.17	0	0.28	0.38	0.27
	Total Hours worked hired labour Female(per day/Per person)	0	0.25	0.31	0.19	0	0.3	0.35	0.28
2	**B. Shed management**								
	Avg. No. of family labour Male(day)	0.78	0.65	0.73	0.72	0.5	0.9	0.9	0.8
	Avg. No. of family labour Female(per day)	1.25	1.25	1.45	1.32	1	1.5	1.5	1.3
	Avg. No. of hired labour male(per day)	0	0	0.03	0.01	0	0	0.3	0.1
	Avg. No. of hired labour female(per day)	0	0	0.03	0.01	0	0	0.3	0.1
	Total Hours worked family labour Male(per day/per person)	0.15	0.2	0.05	0.35	0.21	0.2	0.2	0.35
	Total Hours worked family labour Female(per day/per person)	0.25	0.3	0.2	0.25	0.25	0.35	0.2	0.26
	Total Hours worked hired labour Male(per day/Per person)	0	0	0.35	0.11	0	0	0.3	0.1
	Total Hours worked hired labour Female(per day/Per person)	0	0	0.45	0.15	0	0	0.35	0.11
3	**C. Milking**								
	Avg. No. of family labour Male(day)	0.8	0.73	0.65	0.73	0.5	0.8	0.8	0.7
	Avg. No. of family labour Female(per day)	1.08	1.15	1.38	1.2	1	1.4	1.3	1.3
	Avg. No. of hired labour male(per day)	0	0	0.10	0.03	0	0	0.1	0
	Ave. No. of hired labour female(per day)	0	0	0.03	0.01	0	0	0.1	0
	Total Hours worked family labour Male(per day/per person)	0.15	0.26	0.10	0.17	0.16	0.33	0.15	0.22
	Total Hours worked family labour Female(per day/per person)	0.16	0.20	0.15	0.17	0.2	0.25	0.15	0.20
	Total Hours worked hired labour Male(per day/Per person)	Neg.	0	0.15	0.05	Neg.	0	0.20	0.06
	Total Hours worked hired labour Female(per day/Per person)	Neg.	0	0.15	0.05	Neg.	0	0.15	0.05
4	**D. Animal health**								
	Avg. No. of family labour Male(day)	0.98	0.98	0.95	0.97	0.7	1	0.9	0.9
	Avg. No. of family labour Female(per day)	0.4	0.43	0.53	0.45	0.3	0.4	0.4	0.4
	Avg. No. of hired labour male(per day)	0	0	0	0	0	0	0	0
	Avg. No. of hired labour female(per day)	0	0	0	0	0	0	0	0
	Total Hours worked family labour Male(per day/per person)	0.05	0.10	0.10	0.08	0.10	0.10	0.15	0.12
	Total Hours worked family labour Female(per day/per person)	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	Total Hours worked hired labour Male(per day/Per person)	0	0	0	0	0	0	0	0
	Total Hours worked hired labour Female(per day/Per person)	0	0	0	0	0	0	0	0
	Male-labour rate-Rs per day	126	126	132	128	130	133	135	133
	Female-labour rate-Rs per day	106	108	110	108	110	112	112	111

Notes: Neg.- Hired labour by few households on very limited way.
Sources: Field survey data.

5.4 Feed and Fodder feeded per animal at the time of survey

The importance of adequate quantity and quality of fodder and feed for achieving increase in milk production can hardly be over emphasised. Milch animals can exhibit their full genetic potential only under adequate and balanced feeding and management conditions. The study of feeding practice, thus, is of utmost importance before embarking upon the economic analysis of dairy enterprise. As it was expected Rajasthan state being rainfed area, the selected households were heavily dependent on self cultivated fodder with supported purchased fodder to feed their animals. The animals were also feeded with concentrates and supplement which were mostly purchased from the market. In study area, the green fodder generally feeded to the animals comprised of jowar, maize, bajra, and lucern in kharif season. In rabi season, berseen, oat, grass, rijka fodder is used as a feed to the animals. Wheat straw, jowar, maize, bajra stalks are the popular dry fodders being feeded to the animals. A small quantity of concentrate mixture was also feeded to their milking animals. The dry animals, heifers and calves are rarely feeded with concentrate mixture, except few milk producers.

The details on quantity of dry fodders, green fodders and the concentrate mixture feeded to the various breeds of cattle and buffaloes on are given in Table 5.5a and 5.5b. It can be observed from these tables that on an average 7.74 kgs of dry fodder were feeded to animal/day, with an average of 7.68 kgs, 7.76 kgs and 7.77 kgs feeded to local cow, crossbred cow and buffalo per day respectively. About 8.18 kg of green fodder being feeded to selected animal, while across the species the corresponding figure was 8.15 kgs, 8.23 kgs and 8.25 kgs for local cow, crossbred cow and buffalo per day respectively. In case of concentrates, it was estimated that on an average 2.99 kgs concentrates was feeded. The quantity of concentrates feeded increased with species, i. e local cattle, crossbred and buffalo, which

were 2.85 kgs, 3.01 kgs and 3.11 kgs of concentrate mixture being feeded to respectively. Only a few milk producers had feeded compound supplement like mineral mixture and mustard oil to animals. It could be further observed that through no definite trend in terms of feeding per day to animal could be ascertained, but the large size milk producers had feeded slightly higher quantity of green fodder and concentrates as compared to the other farm categories. No grazing hours were reported by DCS households.

Table 5.6a: Feed and Fodder per Animal at the time of Survey in DCS

Sr. No	Particulars	Feed and Fodder per Animal (Kg/Ani./day)- DCS															
		Small				Medium				Large				Total			
		Cattle		buff	Av	Cattle		buff	Av	Cattle		buff	Av	Cattle		buff	Av
		LC	CB			LC	CB			LC	CB			LC	CB		
A	Stall-feeding quantity fed (kg)																
i)	Ave. Dry fodder																
		7.15	7.89	7.24	7.43	7.63	7.58	7.72	7.64	8.27	7.81	8.36	8.15	7.68	7.76	7.77	7.74
ii)	Avg Green fodder																
		7.12	7.28	7.88	7.43	8.85	8.73	8.61	8.73	8.49	8.37	8.25	8.37	8.15	8.13	8.25	8.18
iii)	Concentrates (kg) Avg																
		2.41	2.8	2.9	2.70	3.05	3.1	3.21	3.12	3.08	3.12	3.22	3.14	2.85	3.01	3.11	2.99
iv)	Supplements (Gm)																
	MM Avg	50.1	51.2	53.1	51.5	52.5	51.5	60.5	54.8	61.5	61.5	62.5	61.9	54.7	54.7	58.7	56.0
	Oil Avg	120.0	125.2	135.3	126.8	132.1	139.7	137.3	136.4	135.0	132.6	150.2	139.3	129.0	132.5	140.9	134.2
B	Grazing Hours	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Sources: Field survey data

In case of NDCS households, the data revealed that the quantity of dry fodder fed per day a local cow, crossbred and buffalo was almost same as notices in case of DCS. The quantity of green fodder feeded was 7.98 kgs, 8.46 kgs and 9.18 kgs to local cow, crossbred and buffalo respectively. The total average quantity of concentrate feeded was estimated to be 3.26 kg, 3.53 kg and 3.76 kg by respective categories. The average quantity of mineral mixture feeded to animal was estimated to be 51.3 gms. The animals were grazed every day for about 1.22 hours.

Table 5.6b: Feed and Fodder per Animal at the time of Survey in NDCS

Sr. No.	Particulars	Feed and Fodder per Animal (Kg/Ani./day)- NDCS															
		Small				Medium				Large				Total			
		Cattle		buff	Av	Cattle		buff	Av	Cattle		buff	Av	Cattle		buff	Av
		LC	CB			LC	CB			LC	CB			LC	CB		
A	Stall-feeding quantity fed (kg)																
i)	Ave. Dry fodder (Kg/Ani./day)																
		6.21	7.11	7.85	7.06	7.55	8.85	8.95	8.45	8.25	8.55	8.96	8.59	7.34	8.17	8.59	8.03
ii)	Avg Green fodder																
		7.21	7.38	8.88	7.82	8.16	8.5	8.83	8.50	8.57	9.5	9.84	9.30	7.98	8.46	9.18	8.54
iii)	Avg Concentrates																
		2.5	2.8	3	2.77	3.27	3.52	3.77	3.52	4.02	4.27	4.52	4.27	3.26	3.53	3.76	3.52
iv)	Supplements (Gm)																
	Mineral Mixture	50.12	50.46	50.7	50.43	51.01	51.3	51.59	51.30	51.88	52.17	52.46	52.17	51.00	51.31	51.58	51.30
	Mustard Oil Avg	150.45	160.15	155.25	155.28	160.08	162.48	164.88	162.48	167.28	169.68	172.08	169.68	159.27	164.10	164.07	162.48
C	Grazing Hours for Grazing																
	Av. Time (hours/day)	5	0	5	3.33	5	5	6	5.3	0	0	0	0.00	3.3	2.2	3.66	1.22

Sources: Field survey data

5.5 Availability of Water for Dairy in DCS category of milk Producers

Rajasthan has always been a water deficit area. The average rainfall is 531 mm against national average of 1200 mm while desert areas have an average of 380 mm. The rivers of the state are rain-fed and there is no perennial river in the state except Chambal. Water resources in the state are not only scarce but have a highly uneven distribution both in time and space with most of the available water resources been confined to south and south-eastern part of the State. The source-wise water availability in different season for dairy purpose is given in Tables 5.7 and 5.8. It can be seen that the main sources of water for dairy purpose were farm pond, tubewell, open well and village talawadi. About 30-35 per cent of the sample milk producers had used farm pond, about 25-30 per cent had used tube well; 10-15 per cent had used open well and rest of dairy farmers fetched water from village talawadi for dairy purpose having average distance of 150-300 meter from the cattle shed.

Table 5.7: Availability of Water for Dairy in DCS category of milk Producers

Sr. No	Season	Rainy				Winter				Summer			
		S	M	L	Avg.	S	M	L	Avg.	S	M	L	Avg.
A	Source of Water Available for Dairy Purpose												
1	Open Well	15.00	7.50	10.00	10.83	15.00	7.50	10.00	10.83	22.50	12.50	12.50	15.83
2	Tubewell	25.00	22.50	25.00	24.17	25.00	22.50	25.00	24.17	27.50	35.00	30.00	30.83
3	River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Canal	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	0.00	0.00
5	Village Talawadi	25.00	25.00	22.50	24.17	25.00	25.00	22.50	24.17	20.00	20.00	20.00	20.00
6	Farm Pond	30.00	40.00	37.50	35.83	30.00	40.00	37.50	35.83	30.00	32.50	37.50	33.33
	Av. Distance (Mtrs)	150	350	250	250	150	350	250	250	350	350	250	316.7
B	Supply of Water is adequate												
1	Yes	97.50	90.00	82.50	90.00	97.50	90.00	82.50	90.00	62.50	60.00	55.00	59.17
2	No	2.50	10.00	17.50	10.00	2.50	10.00	17.50	10.00	37.50	40.00	45.00	40.83
C	Water Quality (Village talawadi/Tanker)												
1	Normal	90.00	92.50	90.00	90.83	90.00	92.50	90.00	90.83	90.00	92.50	90.00	90.83
2	Poor	10.00	7.50	10.00	9.17	10.00	7.50	10.00	9.17	10.00	7.50	10.00	9.17
3	Very Poor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D	Alternative source of Water supply in shortage												
1	Open Well	15.00	22.50	15.00	17.50	15.00	22.50	15.00	17.50	15.00	22.50	15.00	17.50
2	TubeWell	85.00	77.50	85.00	82.50	85.00	77.50	85.00	82.50	85.00	77.50	85.00	82.50
3	River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Canal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Village Talawadi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Farm Pond	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Av. Distance Meters)	800	1250	850	967	800	1250	850	967	800	1250	850	967
E	Payment Made (Rs)	282	320	290	297	285	313	287	295	285	329	285	300

Sources: Field survey data

Table 5.8: Availability of Water for Dairy in NDCS category of milk Producers

Sr.N	Season	Rainy				Winter				Summer			
		Small	Medium	Large	Ave	Small	Medium	Large	Ave	Small	Medium	Large	Ave
A	Source of Water Available for Dairy Purpose												
1	Open Well	10.00	22.50	10.00	14.17	15.00	12.50	10.00	12.50	15.00	20.00	15.00	16.67
2	Tubewell	12.50	25.00	25.00	20.83	17.50	25.00	25.00	22.50	37.50	45.00	37.50	40.00
3	River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Canal	2.50	0.00	0.00	0.83	0.00	10.00	7.50	5.83	0.00	0.00	0.00	0.00
5	Village Talawadi	30.00	20.00	25.00	25.00	32.50	20.00	25.00	25.83	15.00	10.00	12.50	12.50
6	Farm Pond	45.00	32.50	40.00	39.17	35.00	32.50	32.50	33.33	32.50	25.00	35.00	30.83
	Av. Distance (Meters)	100.00	155.00	115.00	123.33	100.00	155.00	115.00	123.33	125.0	160.00	140.00	141.7
B	Supply of Water is adequate												
1	Yes	80.00	85.00	85.00	83.33	80.00	85.00	85.00	83.33	50.00	60.00	52.50	54.17
2	No	20.00	15.00	15.00	16.67	20.00	15.00	15.00	16.67	50.00	40.00	47.50	45.83
C	Water Quality (Village talawadi/Tanker)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	Normal	85.00	87.50	95.00	89.17	85.00	87.50	95.00	89.17	85.00	87.50	95.00	89.17
2	Poor	15.00	12.50	5.00	10.83	15.00	12.50	5.00	10.83	15.00	12.50	5.00	10.83
3	Very Poor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D	Alternative source of Water supply in shortage												
1	Open Well	22.50	32.50	22.50	25.83	22.50	32.50	22.50	25.83	22.50	32.50	22.50	25.83
2	TubeWell	77.50	67.50	77.50	74.17	77.50	67.50	77.50	74.17	77.50	67.50	77.50	74.17
3	River	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Canal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Village Talawadi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Farm Pond	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Av. Distance (Meters)	800.0	916.0	950.0	888.66	800.0	916.0	950.0	888.66	800.0	916.0	950.0	888.66
E	Payment Made for Water, If any (Rs)	280.50	299.10	303.08	294.22	280.50	299.10	303.08	294.22	280.50	299.10	303.08	294.22

Sources: Field survey data

About 90-95 per cent of households had mentioned that supply of water is adequate. The 80-85 per cent milk producers had tube well

and 10-15 per cent households had open well as an alternative source of water supply in case of shortage of water for dairy purpose, which was available at the distance of 850 -1000 meters. Some of the dairy households had purchase the water from neighbouring farmer and had paid charges towards same, which varied from Rs. 280-320 per year in DCS category. In case of NDCS households, same trend was observed.

5.6 Details on Veterinary and Breeding Services and Expenditures

The details of veterinary and breeding expenditure incurred during last one year by DCS and NDCS households are presented in Tables 5.9 and 5.10. It can be seen from the table that almost 85 per cent of animals were given vaccinations (such as FMD, HS, BQ etc), which was mostly received free of cost. The vaccination percentage of total animals in DCS category was 84.72 per cent in which maximum coverage of 90.91 per cent was registered in case of crossbred cows, while minimum coverage of 82.09 per cent was in case of buffalo at overall level. In case of NDCS households, the vaccination percentage was lower as compared to DCS animals. Besides, some of the selected households had incurred expenditure on medicine and doctor as and when some of animals fell sick. On an average, DCS household had incurred medicine plus doctor fee cost ranges between Rs. 600-850/- per animal during the year, while corresponding figure for NDCS was at higher side which ranges between Rs. 925-1290/animal. The farmers kept close contact with the dairy co-operative society because of the variety of services it offered i.e. milk marketing, feed supply, A.I. and veterinary clinical services. Therefore the cooperative was an important source of information to farmers in all locations and wealth groups.

During the visit to field and discussion with the selected households, it was observed that despite of various efforts made by the government; availability of veterinary doctor at village level is one of the bottlenecks in dairy development. It can be seen from the table that

on an average, every year total number of visit by veterinary doctor ranges between 2 to 3 only. Thus, most of the households had depended on the alternative source of advisory and medical support for their animals.

Table 5.9: Veterinary and Breeding Expenditure (2015-16) DCS

SL	Vaccination	Veterinary and Breeding Expenditure during 2015-16 (DCS)															
		Small				Medium				Large				Total			
		LC	CB	B	Total	LC	CB	B	Total	LC	CB	B	Total	LC	CB	B	Total
A	Total Animal	12	20	34	66	13	18	31	62	40	105	231	376	65	143	296	504
	HS	1	1	2	4	1	1	4	6	2	5	5	12	4	7	11	22
	BQ	2	2	3	7	2	3	6	11	2	10	15	27	6	15	24	45
	FMD	3	4	8	15	3	6	6	15	10	24	31	65	16	34	45	95
	HS, BQ, FMD	3	10	15	28	4	6	10	20	21	58	138	217	28	74	163	265
	vaccination % of total animal	75	85	82.35	81.82	76.92	88.89	83.87	83.87	87.50	92.38	81.82	85.37	83.08	90.91	82.09	84.72
B	Medicines + Doctor (Rs)	605	785	605	665	732	832	781	782	722	841	832	798	686	820	740	749
C	Av. No. of Vet Visit./Year	2.65	2.87	2.67	2.73	2.24	3.02	3.50	2.92	3.01	2.94	2.87	2.94	2.63	2.94	3.01	2.86
D	Service																
	AI	8	18	22	48	7	15	21	43	25	98	195	318	40	131	238	409
	Amount	99	136	120	118	105	131	126	121	102	138	134	125	102	135	127	121
	Natural service	4	2	12	18	6	3	10	19	15	6	36	57	25	11	58	94
	Amount	474	582	478	511	515	567	619	567	671	623	775	690	554	591	624	589
E	No. of AI/ conception	1.37	1.85	1.26	1.49	1.49	2.85	1.34	1.89	1.43	2.30	1.53	1.75	1.43	2.33	1.38	1.71
F	Paid to vet. Doctor (Rs/visit)	140	168	122	143	125	184	131	147	151	188	176	172	139	180	143	154

Sources: Field survey data.

Table 5.10: Veterinary and Breeding Expenditure (2015-16) NDCS

Sr.	Vaccination	Veterinary and Breeding Expenditure during 2015-16 (NDCS)															
		Small				Medium				Large				Total			
		LC	CB	B	Total	LC	CB	B	Total	LC	CB	B	Total	LC	CB	B	Total
A	Total Animals	15	36	57	108	11	21	47	79	38	90	173	301	64	147	277	488
	HS	0	2	2	4	0	0	1	1	0	5	10	15	0	7	13	20
	BQ	0	2	5	7	0	0	1	1	0	6	16	22	0	8	22	30
	FMD	4	6	7	17	1	5	8	14	5	10	30	45	10	21	45	76
	HS, BQ, FMD	4	16	25	45	3	8	21	32	10	39	71	120	17	63	117	197
	vaccination % of total animal	53.3	72.2	68.4	67.6	36.4	61.9	66.0	60.8	39.5	66.7	73.4	67.1	42.2	67.4	71.1	67.1
B	Medicines + Doctor (Rs)	940	1068	950	986	925	1184	1032	1047	1151	1289	1176	1205	1005	1180	1053	1079
C	Av. No. of Vet Visit./Year	1.65	1.47	1.57	1.56	2.14	2.01	2.50	2.21	2.10	2.94	2.87	2.61	1.96	2.14	2.31	2.13
D	Service																
	AI	6	22	31	59	6	18	34	58	28	58	90	176	40.0	98.0	155.0	293
	Amount	157	161	166	161	171	166	162	166	155	170	155	160	161	165	161	163
	Natural service	9	14	26	49	5	3	13	21	10	32	83	125	24	49	122	195
	Amount	478	515	567	520	609	654	698	654	743	787	832	787	610	652	699	654
E	No. of AI/ conception	2.00	2.15	1.76	1.97	1.49	2.11	2.34	1.98	1.93	2.30	2.22	2.15	1.81	2.19	2.11	2.03
F	Paid to vet. Doctor (Rs/visit)	190	218	172	194	175	234	182	197	201	239	226	222	189	230	193	204

5.7 Awareness about various schemes among milk Producers:

The details about the awareness about various Government and dairy cooperative schemes among selected DCS household and non-DCS households are presented in Table 5.11. It can be seen from the table that more than 80 percent of DCS were aware about the vaccination and Artificial Insemination (AI) programme, while corresponding figure for the non DCS household was about 70 percent. However, some of the DCS and NDCS household did not prefer the AI and vaccination programme as they opined that after vaccination milch animal suffer from fever and other diseases as well as vaccination quality in very poor, while some of the NDCS households mentioned that vaccination rate was very high. In case of awareness about artificial insemination programme, it was observed that around 73 percent DCS households were aware about the programme, while corresponding figure for NDCS households was hardly around 53 percent. While two third of DCS households were about dairy development programmes while one third of total NDCS households were aware about same. The source of information about schemes and programmes was dairy cooperative society for DCS embers while NDS households had to depend on media and fellow milk producer. Thus, it clearly indicates that association of milk producer with the dairy cooperative make them aware about the schemes and programmes. About one third of DCS households had mentioned that they have beneficiated with such schemes. To obtain the benefit of such scheme, DCS household member had to visit about 1.5 times to the dairy cooperative society and no bribe was paid to avail the benefit. The beneficiated households mentioned that they had received quality material and satisfied with the same. Thus, members of milk cooperative society are heavily beneficiated in dairy development because of their association with dairy cooperative society.

Table 5.11: Awareness about various schemes

Sr. No	Particulars	DCS (response in (%)				NDCS (response in (%)			
		S	M	L	Av	S	M	L	Av
1	Awareness about different Vaccinations schemes/programmes (%)								
	Yes	87.50	82.50	85.00	85.00	62.50	80.00	70.00	70.83
	No	12.50	17.50	15.00	15.00	37.50	20.00	100.00	52.50
	if yes, have you preferred for your animal:								
	Yes	85.00	77.50	85.00	82.50	55.00	75.00	67.50	65.83
	No	15.00	22.50	15.00	17.50	45.00	25.00	32.50	34.17
	if No, Why?-reasons	after vaccination cow Become sick				Not availability at village level			
		Vaccination Quality is Poor				Vaccination rate is very high			
						after vaccination cow Become sick, Not aware, Vaccination Quality is Poor			
2	Awareness about Artificial Insemination (AI) programmes (%)								
	Yes	85.0	80.0	85.0	83.3	65.0	70.0	80.0	71.7
	No	15.0	20.0	15.0	16.7	35.0	30.0	20.0	28.3
	if yes, have you preferred for your animal:								
	Yes	80.0	67.5	72.5	73.3	45.0	55.0	60.0	53.3
	No	20.0	32.5	27.5	26.7	55.0	45.0	40.0	46.7
	if No, Why?-reasons	Success ratio very low				Success ratio very low			
		Semen Quality is Poor				Not available at village level			
		Repeat Breeding High				Ai Charge is very high			
		Untrained AI Worker,				Untrained AI Worker, Semen Quality is Poor. Repeat Breeding High			
3	Awareness about any dairy development scheme/programmes (%)								
	Yes	50.0	75.0	75.0	66.7	37.5	30.0	30.0	32.5
	No	50.0	25.0	25.0	33.3	62.5	70.0	70.0	67.5
	if yes, what are those Specify	RBP							
		PROGENY TESTING,INSURANCE SCHEMES FOR MEMBERS, HEALTH INSURANCE				RBP			
		FODDER DEVELOPMENT,				FODDER DEVELOPMENT			
		SARAS SURAKSHA KAVACH YOJANA, JANANI SURAKSHA YOJANA				SARAS SURAKSHA KAVACH YOJANA			
4	Sources of information about these schemes (%)								
A	Govt. Animal Husbandry Department								
B	Dairy Cooperative/Milk Union	85	85	85	85	0	20	30	16.67
C	Media (Press/TV)	80	80	80	80	60	75	65	65.00
D	Fellow farmer/dairy owner/neighbour	10	15	20	15	40	40	60	50.00
E	Other								
5	Have you benefited with any dairy development scheme/programmes (%)								
	Yes	37.50	30.00	45.00	37.50	0.00	0.00	0.00	0.00
	No	62.50	70.00	55.00	62.50	100.00	100.00	100.00	100.00
	If benefited, please provide following								
I	Av. No. of visits to concern office	1.25	1.60	1.70	1.52	-	-	-	-
II	Wage days lost, if any (Rs.)	0.66	0.66	0.66	0.66	-	-	-	-
III	Total Expenditure to avail scheme (doc/travel/etc)	53.30	60.00	80.00	57.76	-	-	-	-
IV	Bribe paid to any one	0.00	0.00	0.00	0.00	-	-	-	-
V	Quality of material received	0.00	0.00	0.00	0.00	-	-	-	-
	Good	100.00	100.00	100.00	100.00	-	-	-	-
	Bad	0.00	0.00	0.00	0.00	-	-	-	-
VI	Satisfied with benefit received (%)	0.00	0.00	0.00	0.00	-	-	-	-
	Yes	100.00	100.00	100.00	100.00	-	-	-	-
	No	0.00	0.00	0.00	0.00	-	-	-	-

Sources: Field survey data

5.8 Cost of Milk Production

Analysis of cost of milk production provides clues to the decision making bodies and helps the decision support system to understand whether or not farmers get remunerative prices. Generally, dairy farmers can increase their family income in two ways *i.e.*, by increasing milk productivity as well as by reducing cost of milk production. The first alternative is limited as productivity enhancement of the individual milch animal is influenced by certain biological as well as climatic factors such as genetic potential of the animal, climatic parameter like temperature, rainfall, relative humidity, etc. These externalities by no means are subjected to control by the farmer and therefore, an economic sense can only be applied on the latter issue. The second alternative can be achieved through judicious use of various factors of production. Therefore, before presenting the cost of milk production, it is important to discuss the cost of milk production. The details of per unit dairy input price incurred by different category of DCS and NDCS household are presented in Table 5.12. The cost of production of milk and net returns realised by the sample households are presented in Tables 5.13 to 5.14. It can be seen from these tables that feed and fodder feeded to different species of animals accounted for a major share of expenditure on milk production. The feed and fodder accounted for two third of milk production cost in case of DCS households, however same was as higher as around 74 per cent in case of NDCS households. Besides, about 6 per cent of total expenditure incurred was spend on veterinary services by NDCS households, while the corresponding figure for DCS was much lower i.e. around 4 per cent only. The labour cost was accounted for about 30 per cent in case of DCS households, while same was around 22 percent in case of NDCS households. This may be due to the fact that DCS households receive the support from the dairy cooperatives in terms of advisory in dairy development activities.

Table 5.12: Details of per unit cost of Dairy input

Sr. No	Particulars	Unit	Details of per unit cost of Dairy input							
			DCS				NDCS			
A	Fodder		Small	Medium	Large	Av	Small	Medium	Large	Av
	1. Dry Fodder	(Rs./kg)	3.8	4.12	4.21	4.04	3.87	4.25	4.3	4.14
	2.Green Fodder		1.87	2.15	2.20	2.07	1.87	2.18	2.12	2.06
	3.Concentrate		18.54	19.03	19.58	19.05	19.37	19.15	19.39	19.3
	Prepared		23.07	24.31	25.66	24.35	24.62	24.67	25.66	24.98
	Home Prepared		14	13.75	13.5	13.75	14.11	13.63	13.12	13.62
	4.**Supplements**		77.5	82	83.57	81.02	80	85	92.2	85.73
B	Grazing Contract									
	Daily basis		0	0	0	0	0	0	0	0
	Monthly basis		0	0	0	0	0	0	0	0
	Yearly basis		0	0	0	0	0	0	0	0
B	Labour Wages (for Dairy activities)									
	Men	per day	125.5	125.63	132.25	127.79	130.3	133	134.5	132.6
	Women	per day	105.5	108.25	110.38	108.04	110.3	111.8	112.3	111.47
C	Permanent Labour (for Dairy activities)									
	Cash	monthly	4000	4250	5071	4440.33	4100	4450.61	5100	4550.2
	Kind									
D	Rental Value of Land	Rs./ha								
E	Water Charges paid if any	per year	318.75	326.25	344.74	329.91	316.25	328.75	346.25	330.42
F	Present Value of Adult Animals	Rs./Animal								
	Local Caw		25567	25833.3	27500	26300.1	21250	23000	24483	22911
	Crossbred Cow		44250	47500	51111.1	47620.4	42500	46666.7	50000	46388.9
	Buffalo		48750	53350	52631.5	51577.2	48750	45882.4	51714.3	48782.2
G	Dung*									
	% Of Dung used as -Manure		80.62	86.42	88.75	85.26	81.25	83.75	89.37	84.79
	Dung Cakes		19.38	13.58	11.25	14.74	17.75	16.25	10.62	14.87
H	Equipments	Rs./ Items								
	Chaff Cutter		5500	9062.5	12187.5	8916.67	5437.5	9750	12250	9145.83
	Bucket		381.25	393.75	406.25	393.75	375	381.25	387.5	381.25
	Hoe		182.5	218.75	275	225.42	156.25	225	221.87	201.04
	Milk Cane		0	1350	1356.25	902.08	0	0	1516.66	505.55
	Measurement		100	123.33	133.33	118.89	102.5	108.33	112.5	107.78
	Any Other		-	-	-	-	-	-	-	-

Source: Field survey data

The net returns realised by the DCS households was higher than NDCS households, except large group of NDCS which has realised more returns. It was due to fact that milk rate received by the NDCS households was relatively higher than DCS households, as they had sold the milk to the private vendors in bulk. This was also possible because large group has larger amount of marketable surplus than other groups. On an average, net return of about Rs. 22/animal/day or Rs. 2.84/litre/animal/day was realised by the DCS households as compared to Rs. 16/ lit/animal/day or Rs. 2.11/liter/animal/day realised by the NDCS households. The highest net return by DCS

households was recorded in case of buffaloes, followed by crossbred cows and the lowest was in case of local cows. However, in case of NDCS households, the highest net return per animal was recorded in cross breed cows, followed by local cows and the lowest was in buffalos. Low margins for NDCS dairy producers may be due to low milk productivity from animals with low genetic potential, poor health, feeding and husbandry practises low price offered by private agent/agency. Therefore, there is a huge scope to enhance producers' income from dairy by enhancing animals productivity, improving management practise, and ensuing remunerative prices.

Table 5.13: Cost of Milk Production and Returns incurred by DCS household

Sr. No	Particulars	Small -DCS				Medium- DCS			
		Cattle		buff	Av	Cattle		buff	Av
		LC	CB			LC	CB		
A	**Stall-feeding quantity fed (kg)**								
i)	Total Dry Fodder (Rs./Animal/Day)	27.17	29.98	27.51	28.22	31.44	31.23	31.81	31.49
ii)	Total Green Fodder (Rs./Animal/Day)	13.31	13.61	14.74	13.89	19.03	18.77	18.51	18.77
iii)	Total Concentrates (Rs./Animal/Day)	44.67	51.90	53.75	50.11	58.04	58.99	61.09	59.37
iv)	Total Supplements (Rs./Animal/Day)	13.18	13.67	14.60	13.82	15.13	15.68	16.22	15.68
	Total feed & fodder (Rs./Animal/Day)	98.34 (70.86)	109.16 (71.77)	110.60 (72.50)	106.03 (71.74)	123.64 (72.35)	124.67 (71.47)	127.63 (72.15)	125.31 (71.99)
B	Grazing Hours	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
C	Labour								
	Male (Rs./Day)	18.83	18.83	18.83	18.83	22.14	22.14	22.14	22.14
	Female (Rs./Day)	16.62	16.62	16.62	16.62	19.62	19.62	19.62	19.62
	Total labour	35.44 (25.54)	35.44 (23.30)	35.44 (23.23)	35.44 (23.98)	41.76 (24.44)	41.76 (23.94)	41.76 (23.61)	41.76 (23.99)
D	Veterinary Cost (Rs./Animal/Day)	5.00 (3.60)	7.50 (4.93)	6.50 (4.26)	6.33 (4.28)	5.50 (3.22)	8.00 (4.59)	7.50 (4.24)	7.00 (4.02)
	Total Cost (Rs./Animal/Day)	**138.78 (100.0)**	**152.11 (100.0)**	**152.54 (100.0)**	**147.81 (100.0)**	**170.90 (100.0)**	**174.43 (100.0)**	**176.89 (100.0)**	**174.07 (100.0)**
E	Returns								
	(Litre/Animal)	6.78	7.15	7.09	7.01	8.14	8.50	8.68	8.44
	Price (Rs. /litre)	22.22	23.53	23.53	23.09	23.25	23.00	23.93	23.39
	Milk Production (Production*Avg Price)	150.74	168.26	166.78	161.83	189.22	195.50	207.67	197.41
	Income from Dung (Rs./Animal/Day)	4.00	4.25	6.00	4.75	4.00	4.25	6.00	4.75
	Average Income (Rs./Animal/Day)	**154.74**	**172.51**	**172.78**	**166.58**	**193.22**	**199.75**	**213.67**	**202.16**
F	**Net Return (RS./Animal/Day)**	**15.96**	**20.41**	**20.24**	**18.77**	**22.32**	**25.32**	**36.78**	**28.09**
G	**Net Return (RS./lit/animal/day)**	2.35	2.85	2.85	2.68	2.74	2.98	4.24	3.33

Source: Field Survey Data.

Table 5.13 continues.....

Sr. No	Particulars	Large- DCS				Average- DCS			
		Cattle		buff	Av	Cattle		buff	Av
		LC	CB			LC	CB		
A	**Stall-feeding quantity fed (kg)**								
i)	Total Dry Fodder (Rs./Animal/Day)	34.82	32.88	35.20	34.30	31.05	31.38	31.42	31.28
ii)	Total Green Fodder (Rs./Animal/Day)	18.68	18.41	18.15	18.41	15.24	15.20	15.43	15.29
iii)	Total Concentrates (Rs./Animal/Day)	60.31	61.09	63.05	61.48	54.29	57.34	59.24	56.95
iv)	Total Supplements (Rs./Animal/Day)	16.42	16.22	17.78	16.81	14.73	15.01	16.01	15.25
	Total feed & fodder (Rs./Animal/Day)	130.22 (63.14)	128.60 (61.85)	134.17 (63.41)	131.00 (62.80)	115.31 (66.45)	118.93 (66.11)	122.09 (67.11)	118.78 (66.56)
B	Grazing Hours	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
C	Labour								
	Male (Rs./Day)	35.21	35.21	35.21	35.21	23.16	23.16	23.16	23.16
	Female (Rs./Day)	35.32	35.32	35.32	35.32	29.71	29.71	29.71	29.71
	Total labour	70.53 (34.20)	70.53 (33.92)	70.53 (33.33)	70.53 (33.81)	52.87 (30.47)	52.87 (29.39)	52.87 (29.06)	52.87 (29.63)
D	Veterinary Cost (Rs./Animal/Day)	5.50 (2.67)	8.80 (4.23)	6.90 (3.26)	7.07 (3.39)	5.33 (3.07)	8.10 (4.50)	6.97 (3.83)	6.80 (3.81)
	Total Cost (Rs./Animal/Day)	**206.25 (100.0)**	**207.94 (100.0)**	**211.61 (100.0)**	**208.60 (100.0)**	**173.52 (100.0)**	**179.90 (100.0)**	**181.93 (100.0)**	**178.45 (100.0)**
E	Returns								
	(Litre/Animal)	8.05	7.40	7.53	7.66	7.66	7.68	7.77	7.70
	Price (Rs. /litre)	27.56	30.96	30.56	29.69	24.35	25.83	26.01	25.39
	Milk Production (Production*Avg Price)	221.89	228.92	230.26	227.45	186.42	198.42	201.99	195.58
	Income from Dung (Rs./Animal/Day)	4.00	4.25	6.00	4.75	4.00	4.25	6.00	4.75
	Average Income (Rs./Animal/Day)	**225.89**	**233.17**	**236.26**	**232.20**	**190.42**	**202.67**	**207.99**	**200.33**
F	**Net Return (RS./Animal/Day)**	**19.63**	**25.24**	**24.65**	**23.60**	**16.90**	**22.77**	**26.06**	**21.88**
G	**Net Return (RS./lit/animal/day)**	2.44	3.41	3.27	3.08	2.21	2.96	3.35	2.84

Note: Figures in parenthesis are percentage to total cost of milk production.
Source: Field Survey Data.

Low productivity of milk animals is a serious constraint to dairy development. The productivity of dairy animals could be increased by crossbreeding low-yielding nondescript cows with high-yielding selected indigenous purebreds or suitable exotic breeds in a phased manner. The cattle-breeding policy should not only focus on milk yield but should also provide for the production of good-quality bullocks to meet the draft-power requirements of agriculture. Upgrading

nondescript buffalo through selective breeding with high-yielding purebreds such as Murrah, Mehsani or Nili Ravi should be given high priority in all areas where buffalo are well-adapted to the agro-climatic conditions.

Table: 5.14: Cost of Milk Production and Returns incurred by NDCS household,

Sr. No.	Particulars	Small -NDCS				Medium- NDCS			
		Cattle		buff	Av	Cattle		buff	Av
		LC	CB			LC	CB		
A	Stall-feeding quantity fed (kg)								
i)	Total Dry Fodder (Rs./Animal/Day)	24.03	27.52	30.38	27.32	32.09	37.61	38.04	35.91
ii)	Total Green Fodder (Rs./Animal/Day)	13.48	13.80	16.61	14.62	17.79	18.53	19.25	18.53
iii)	Total Concentrates (Rs./Animal/Day)	50.91	57.02	61.10	56.41	69.16	74.45	79.74	74.45
iv)	Total Supplements (Rs./Animal/Day)	16.05	16.85	16.48	16.46	17.94	18.17	18.40	18.17
	Total feed & fodder (Rs./Animal/Day)	**104.47 (67.89)**	**115.19 (69.76)**	**124.56 (71.59)**	**114.81 (69.84)**	**136.98 (72.85)**	**148.76 (74.62)**	**155.42 (75.10)**	**147.06 (74.23)**
B	Grazing Hours	5	0	5	3.33	5	5	6	5.3
C	Labour								
	Male (Rs./Day)	21.50	21.50	21.50	21.50	20.12	20.12	20.12	20.12
	Female (Rs./Day)	19.92	19.92	19.92	19.92	19.92	19.92	19.92	19.92
	Total labour	**41.42 (26.92)**	**41.42 (25.09)**	**41.42 (23.81)**	**41.42 (25.20)**	**40.04 (21.30)**	**40.04 (20.09)**	**40.04 (19.35)**	**40.04 (20.21)**
D	Veterinary Cost (Rs./Animal/Day)	8.00 (5.20)	8.50 (5.15)	8.00 (4.60)	8.17 (4.97)	11.00 (5.85)	10.55 (5.29)	11.50 (5.56)	11.02 (5.56)
	Total Cost (Rs./Animal/Day)	**153.90 (100.00)**	**165.11 (100.00)**	**173.98 (100.00)**	**164.40 (100.00)**	**188.02 (100.00)**	**199.35 (100.00)**	**206.96 (100.00)**	**198.12 (100.00)**
E	Returns								
	Milk Production (Litre/Animal)	6.03	6.26	6.88	6.39	9.09	9.15	8.70	8.98
	Price (Rs. /litre)	26.80	27.05	27.24	27.03	23.41	23.83	26.40	24.55
	Milk Production (Production*Avg Price)	161.69	169.29	187.33	172.71	212.78	218.13	229.77	220.48
	Income from Dung (Rs./Animal/Day)	4.25	4.75	5.50	4.83	4.50	4.25	6.00	4.92
	Average Income (Rs./Animal/Day)	**165.94**	**174.04**	**192.83**	**177.54**	**217.28**	**222.38**	**235.77**	**225.40**
F	**Net Return (RS./Animal/Day)**	**12.05**	**8.93**	**18.86**	**13.14**	**29.26**	**23.03**	**28.80**	**27.28**
G	**Net Return (RS./lit/animal/day)**	2.00	1.43	2.74	2.06	3.22	2.52	3.31	3.04

Source: Field Survey Data.

Table 5.14 continues……

Sr. No	Particulars	Large- NDCS				Average- NDCS			
		Cattle		buff	Av	Cattle		buff	Av
		LC	CB			LC	CB		
A	Stall-feeding quantity fed (kg)								
i)	Total Dry Fodder (Rs./Animal/Day)	35.48	36.77	38.53	36.94	30.39	33.82	35.56	33.24
ii)	Total Green Fodder (Rs./Animal/Day)	18.17	20.14	20.86	19.72	16.41	17.40	18.88	17.56
iii)	Total Concentrates (Rs./Animal/Day)	64.60	64.60	75.29	69.95	69.44	75.19	80.09	74.98
iv)	Total Supplements (Rs./Animal/Day)	20.21	20.45	20.70	20.45	17.57	18.30	18.61	18.74
	Total feed & fodder (Rs./Animal/Day)	**138.45 (71.95)**	**141.96 (71.97)**	**155.38 (74.07)**	**147.05 (72.94)**	**133.82 (71.90)**	**144.71 (73.29)**	**153.15 (74.44)**	**144.53 (73.34)**
B	Grazing Hours	0	0	0	0	3.3	2.2	3.66	1.22
C	Labour								
	Male (Rs./Day)	26.56	26.56	26.56	26.56	23.54	23.54	23.54	23.54
	Female (Rs./Day)	19.92	19.92	19.92	19.92	19.92	19.92	19.92	19.92
	Total labour	**46.49 (24.16)**	**46.49 (23.57)**	**46.49 (22.16)**	**46.49 (23.06)**	**43.46 (23.35)**	**43.46 (22.01)**	**43.46 (21.12)**	**43.46 (22.05)**
D	Veterinary Cost (Rs./Animal/Day)	7.50 (3.90)	8.80 (4.46)	7.90 (3.77)	8.07 (4.00)	8.83 (4.75)	9.28 (4.70	9.13 (4.44	9.08 (4.61)
	Total Cost (Rs./Animal/Day)	**192.44 (100.00)**	**197.24 (100.00)**	**209.77 (100.00)**	**201.61 (100.00)**	**186.11 (100.0)**	**197.46 (100.0)**	**205.74 (100.0)**	**197.07 (100.00)**
E	Returns								
	Milk Production (Litre/Animal)	7.74	6.62	6.95	7.10	7.62	7.34	7.51	7.49
	Price (Rs. /litre)	28.98	33.17	33.13	31.76	26.40	28.02	28.92	27.78
	Milk Production (Production*Avg Price)	224.23	219.64	230.25	225.59	201.15	205.76	217.21	208.10
	Income from Dung (Rs./Animal/Day)	4.50	4.75	6.25	5.17	4.00	4.25	6.00	4.75
	Average Income (Rs./Animal/Day)	**228.73**	**224.39**	**236.50**	**230.75**	**205.15**	**210.01**	**223.21**	**212.85**
F	**Net Return (RS./Animal/Day)**	**36.30**	**27.14**	**26.73**	**29.15**	**19.04**	**12.56**	**17.47**	**15.78**
G	**Net Return (RS./lit/animal/day)**	4.69	4.10	3.85	4.11	2.50	1.71	2.33	2.11

Note: Figures in parenthesis are percentage to total cost of milk production.
Source: Field Survey Data.

5.9 Chapter Summery

It was observed that the total herd strength with DCS households was higher (6.5) than NDCS household (5.9). The average age of animal was estimated to be 6.5 years and age at first calving for all animals was 40.82 months. The average lactation order among all breedable animals was estimated to be 2.73 with average length of lactation period of 231 days. The milk yield was found higher in case of crossbreed cows, followed by buffalo and local cows. It was very strange to note that no animal was covered with insurance. Almost same trend was observed in case of NDCS households. Across the seasons, milk yield was found the highest during winter season

followed by rainy and summer season. As expected, small size households had spend more time on dairy activities than other groups. On an average about 8 kgs of dry fodder were feeded to animal/day. Only a few milk producers had feeded compound supplement like mineral mixture and mustard oil to animals. The main sources of water for dairy purpose were farm pond, tubewell, open well and village talawadi. Almost 85 per cent of animals were given vaccinations, which was mostly received free of cost, while vaccination percentage was lower in NDCS. Besides, some of the selected households had incurred expenditure on medicine and doctor as and when some of animals fell sick. Despite of various efforts made by the government, availability of veterinary doctor at village level is one of the bottlenecks in dairy development. Every year total number of visit by veterinary doctor ranges between 2 to 3 only. Thus, most of the households had dependent on the alternative source of advisory and medical support for their animals. In case of awareness about various programmes, majority of DCS households were aware about dairy development programmes while lesser number of NDCS households were aware about same. The feed and fodder accounted for two third of milk production cost in case of DCS households, however same was as higher as around 74 per cent in case of NDCS households. The net returns realised by the DCS households was higher than NDCS households, except large group of NDCS which has realised more returns. Low margins for NDCS dairy producers may be due to low milk productivity from animals with low genetic potential, poor health, feeding and husbandry practises low price offered by private agent/agency. Therefore, there is a huge scope to enhance producers' income from dairy by enhancing animal productivity, improving management practise, and ensuing remunerative prices.

The next chapter presents the details about milk consumption & marketable surplus.

Chapter VI

Milk Consumption & Marketable Surplus

6.1 Introduction

Production is one end of the economic problem, the other end being the marketing and distribution. Larger milk production does not necessarily mean larger marketed surplus. The marketed surplus depends upon the socio-economic status of rural households, level of milk production and the available market infrastructure. An attempt has been made here to present the production, consumption and marketed surplus of milk at DCS and NDCS household level.

6.2 Use of Milk at Home and Processing

The total milk production of all selected household, the percentage of milk consumed in fluid form and in the form of milk products has been presented in Tables 6.1 and 6.2. It can be seen from these tables that out of the total milk produced by all animals in DCS and NDCS category of sample milk producers, higher share of milk produced was consumed at home by DCS households (about 30%) compared to NDCS households (about 24 %). The remaining 70 per cent milk by DCS households was sold to the society, while NDCS households sold 77 per cent of total milk produce to private agents/consumer/sweet shop owner. Thus, share of consumption of milk to total milk drawn by DCS households was relatively better and therefore marketed surplus was lower in DCS than NDCS households. Across the groups, the share of milk consumption at home decreases with increase in the size of herd in both the categories. Across the species and groups, it was observed that selected households of both the groups (DCS & NDCS) had preferred to consume more share of milk to total milk drawn of local cows followed by cross breed cows and buffaloes. The highest share of 50.4 per cent of milk drawn by small group from

local cows was consumed at home and the lowest (12.2%) was by large group in case of buffalo milk in both categories.

Table 6.1: Milk Production and Use (Yesterday) by DCS milk producers

Sr. No.	Particulars	Milk Production and Use (Yesterday) by DCS milk producers							
		LC				CB			
		S	M	L	T	S	M	L	T
1	Milk Drawn (Lit/Day)	81.4	149.0	241.0	471.4	72.0	153.0	176.0	401.0
2	Use of Milk-Home lit								
	For Direct Consumption	37.0 (45.45)	52.5 (35.23)	30.0 (12.45)	119.5 (25.35)	19.0 (26.39)	33.5 (21.90)	28.5 (16.19)	81.0 (20.2)
	For Processing	4.0 (4.91)	9.5 (6.38)	12.0 (4.98)	25.5 (5.41)	6.0 (8.33)	15.5 (10.13)	17.0 (9.66)	38.5 (9.60)
	Total	(50.37)	(41.61)	(17.43)	(30.76)	(34.72)	(32.03)	(25.85)	(29.8)
3	Raw/Liquid Milk sold (Lit)	40.4 (49.63)	87.0 (58.39)	199.0 (82.57)	326.4 (69.24)	47.0 (65.28)	104.0 (67.97)	130.5 (74.15)	281.5 (70.2)
Sr. No.	Particulars	DCS							
		B				Total			
		S	M	L	T	S	M	L	T
1	Milk Drawn (Lit/Day)	338.0	619.0	1278.5	2235.5	491.4	921.0	1695.5	3107.9
2	Use of Milk at Home (lit)								
	For Direct Consumption	61.0 (18.05)	77.5 (12.52)	104.0 (8.13)	242.5 (10.85)	117.0 (23.81)	163.5 (17.75)	162.5 (9.58)	443.0 (14.25)
	For Processing	23.0 (6.80)	22.5 (3.63)	52.0 (4.07)	97.5 (4.36)	33.0 (6.72)	47.5 (5.16)	81.0 (4.78)	161.5 (5.20)
	Total	(24.85)	(16.16)	(12.20)	(15.21)	(30.53)	(22.91)	(14.36)	(19.45)
3	Raw/Liquid Milk sold (Lit)	254.0 (75.15)	519.0 (83.84)	1122.5 (87.80)	1895.5 (84.79)	341.4 (69.47)	710.0 (77.09)	1452.0 (85.64)	2503.4 (80.55)

Table 6.2: Milk Production and Use (Yesterday) by NDCS milk producers

Sr. No.	Particulars	Milk Production and Use (Yesterday) by NDCS milk producers							
		LC				CB			
		S	M	L	T	S	M	L	T
1	Milk Drawn (Lit/Day)	105.5	205.5	392	703	144	146	362	652
2	Use of Milk-Home (lit)								
	For Direct Consumption	40	47.5	57	144.5	28	26	50	104
		(37.91)	(23.11)	(14.54)	(20.55)	(19.44)	(17.81)	(13.81)	(15.95)
	For Processing	10.5	13	4	27.5	13	8	27	48
		(9.95)	(6.33)	(1.02)	(3.91)	(9.03)	(5.48)	(7.46)	(7.36)
	Total Consumption	(47.87)	(29.44)	(15.56)	(24.47)	(28.47)	(23.29)	(21.27)	(23.31)
3	Raw/Liquid Milk sold (Lit)	55	145	331	531	103	112	285	500
		(52.13)	(70.56)	(84.44)	(75.53)	(71.53)	(76.71)	(78.73)	(76.69)
		B				Total			
1	Milk Drawn (Lit/Day)	294	506	1029.5	1829.5	543.5	857.5	1783.5	3184.5
2	Use of Milk Home (lit)								
	For Direct Consumption	56	66	74.5	196.5	126	139.5	181.5	447
		(19.05)	(13.04)	(7.24)	(10.74)	(23.18)	(16.27)	(10.18)	(14.04)
	For Processing	22	18	46	86	43.5	39	77	159.5
		(7.48)	(3.56)	(4.47)	(4.70)	(8.00)	(4.55)	(4.32)	(5.01)
	Total Consumption	(26.53)	(16.60)	(11.70)	(15.44)	(31.19)	(20.82)	(14.49)	(19.05)
3	Raw/Liquid Milk sold (Lit)	216	422	909	1547	374	679	1525	2578
		(73.47)	(83.40)	(88.30)	(84.56)	(68.81)	(79.18)	(85.51)	(80.95)

Note: Figures in bracket are percentage to total
Source: Field Survey Data.

6.3 Sale of Milk and Cost of Milk Marketing

After having preferred to consume around 20 per cent of total milk production at household level, the remaining milk was sold out. The details of milk sold to various agencies have been presented in Table 6.3 and 6.4. It can be seen from the Table 6.3 that DCS households had sold all remaining liquid milk to cooperative society. The maximum share in total milk produced was sold by large category farmer and the lowest was by the small size group, as mentioned earlier. Across the breed, the highest share of milk sold to total quantity drawn was recorded in case of buffalos (about 85 %), followed by 70 percent in case of cross breed cows and 69 per cent in case of local cows. The payment was received almost weekly and on an average milk producer had to travel 0.82 kms distance to pour milk which cost him around Rs. 1.6 per day. On an average, Rs. 30/litre price was realised by the households, the highest was in case of Rs. 32.4/litre in case of buffalo and the lowest of Rs. 23/litre in case of local cows.

Table 6.3: Milk Sale and Cost of Milk Marketing by DCS milk Producers

Sr. No.	Particulars	Milk Sale and Cost of Milk Marketing by DCS milk Producers							
		Local Cow				Cross Bred			
		S	M	L	T	S	M	L	T
i)	**Cooperative Society**								
	Total Quantity (Lit)	40.4 (49.63)	87.0 (58.39)	199.0 (82.57)	326.4 (69.24)	47.0 (65.28)	104.0 (67.97)	130.5 (74.15)	281.5 (70.2)
	Price (Rs./Lit)	22.2	23.5	23.5	23.1	23.3	23.0	23.9	23.4
	Payment								
	Daily								
	Weekly	100	100	100	100	100	100	100	100
	Monthly								
	Distance (Kms)	0.31	0.73	0.38	0.47	0.8	0.77	2.61	1.39
	Transport Charges (Rs.)	0	1.25	2.25	1.17	0	1.02	5.26	2.09
Sr. No	Particulars	DCS							
		Buffalo				Total			
i)	**Cooperative Society**	S	M	L	T	S	M	L	T
	Total Quantity (Lit)	254.0 (75.15)	519.0 (83.84)	1122.5 (87.80)	1895.5 (84.79)	341.4 (69.47)	710.0 (77.09)	1452.0 (85.64)	2503.4 (80.55)
	Price (Rs./Lit)	31.6	33.0	32.6	32.4	28.0	30.6	30.5	29.7
	Payment								
	Daily								
	Weekly	100	100	100	100	100	100	100	100
	Monthly								
	Distance (Kms)	0.46	0.45	0.84	0.58	0.52	0.65	1.28	0.82
	Transport Charges (Rs.)	0.25	0.66	3.78	1.56	0.08	0.98	3.76	1.60

Note: Figures in bracket are percentage to total
Source: Field Survey Data.

Table 6.4: Milk Sale and Cost of Milk Marketing by NDCS milk producers

Sr. No.	Particulars	Milk Sale and Cost of Milk Marketing by NDCS milk producers							
		LC				CB			
		S	M	L	T	S	M	L	T
A	**Marketable Surplus (Lit)**	55	145	331	531	103	112	285	500
1	Agency (may be multiple)								
i)	**Retail Shop**								
	Total Quantity (Lit)	29.0	106.0	175.0	310.0	45.0	49.00	230.0	324.0
		(52.73)	(73.10)	(52.87)	(58.38)	(43.69)	(43.75)	(80.70)	(64.80)
	Price (Rs./Lit)	24.0	25.0	27.05	25.35	27.20	25.50	26.21	26.30
	Payment - Weekly	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Distance (Kms)	4.25	5.15	6.10	5.17	5.35	5.78	6.20	5.78
	Transport Charges (Rs.)	11.10	12.25	14.40	12.58	11.88	13.53	15.18	13.53
ii)	**Consumer**								
	Total Quantity (Lit)	0.00	8.00	16.00	24.00	0.00	30.00	0.0	30.00
		(0.00)	(5.52)	(4.83)	(4.52)	(0.00)	(26.79)	(0.0)	(6.00)
	Price (Rs./Lit)	0.00	35.00	30.00	32.50	0.00	25.0	0.0	25.0
	Payment- Monthly	0.00	100.0	100.0	100.0	0.00	100.0	0.00	100.0
	Transport Charges (Rs.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iii)	**Private Vendor/ Middlemen**								
	Total Quantity (Lit)	7.00	19.0	140.0	166.0	0.00	33.0	25.0	58.0
		(12.73)	(13.10)	(42.30)	(31.26)	(0.00)	(29.46)	(8.77)	(11.60)
	Price (Rs./Lit)	25.00	23.40	24.67	24.36	0.00	24.00	23.00	23.50
	Payment-Monthly	100.0	100.	100.0	100.0	100.0	100.0	100.0	100.0
	Distance (Kms)								
	Transport Charges (Rs.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iv)	Sweet Shop/ Creameries/ Catering Services/others								
	Total Quantity (Lit)	19.00	12.00	0.00	31.00	58.00	0.00	30.00	88.00
		(34.55)	(8.28)	(0.00)	(5.84)	(56.31)	(0.00)	(10.53)	(17.60)
	Price (Rs./Lit)	26.00	26.00	0.00	26.00	27.66	0.00	30.00	28.83
	Payment - Weekly	100.0	100.0	0.00	100.0	100.0	0.00	100.0	100.0
	Distance (Kms)	0.70	1.10	0.00	0.90	1.90	0.00	1.70	1.80
	Transport Charges (Rs.)	1.53	2.50	0.00	2.02	2.57	0.00	2.87	2.72
Sr. No.	Particulars	NDCS							
		B				Total			
A	**Marketable Surplus (Lit)**	216	422	909	1547	374	679	1525	2578
i	**Retail Shop**								
	Total Quantity (Lit)	121.0	313.5	353.5	788.0	195.0	468.5	758.5	1402
		(56.02)	(74.29)	(38.89)	(50.94)	(52.14)	(69.00)	(49.74)	(54.38)
	Price (Rs./Lit)	34.78	35.00	35.78	35.19	28.66	28.50	29.68	28.95
	Payment-Weekly	100.0	100.0	100.0	100.0	100.	100.0	100.0	100.0
	Distance (Kms)	5.63	6.05	6.28	5.99	5.08	5.65	6.19	5.64
	Transport Charges (Rs.)	13.83	14.48	15.63	14.65	12.27	13.42	15.07	13.59
ii	**Consumer**								
	Total Quantity (Lit)	3.0	20.0	55.0	78.0	3.0	58.0	71.0	132.0
		(1.39)	(4.74)	(6.05)	(5.04)	(0.80)	(8.54)	(4.66)	(5.12)
	Price (Rs./Lit)	30.00	37.50	35.00	34.17	30.0	32.5	37.0	33.17
	Payment- Monthly	100.0	100.00	100.00	100.0	100.0	100.0	100.0	100.0
	Transport Charges (Rs.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iii	**Private Vendor/ Middlemen**								
	Total Quantity (Lit)	49.0	88.50	407.50	545.0	56.0	140.5	572.5	769.0
		(22.69)	(20.97)	(44.83)	(35.23)	(14.97)	(20.69)	(37.54)	(29.83)
	Price (Rs./Lit)	25.00	27.00	27.57	26.52	25.0	24.80	25.08	24.96
	Payment - Monthly	100.0	100.0	100.00	100.0	100.0	100.0	100.0	100.0
	Distance (Kms)								
	Transport Charges (Rs.)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iv	Sweet Shop/ Creameries/ others								
	Total Quantity (Lit)	43.00	0.00	93.00	116.00	120.0	12.00	123.0	255.0
		(19.91)	(0.00)	(10.23)	(7.50)	(32.09)	(1.77)	(8.07)	(9.89)
	Price (Rs./Lit)	26.15	0.00	34.15	30.15	26.60	26.00	32.08	28.23
	Payment - Weekly	100.0	0.00	100.0	100.0	100.0	100.0	100.0	100.0
	Distance (Kms)	1.10	0.00	1.90	1.50	1.23	0.37	1.20	0.93
	Transport Charges (Rs.)	3.02	0.00	3.32	3.17	2.37	0.83	2.06	1.75

Note: Figures in bracket are percentage to total
Source: Field Survey Data.

In case of NDCS category, the per cent share of total marketable milk estimated to be about 81 percent, which varied from 68.81 per cent to 85.51 per cent across the species. The highest marketed surplus went to retail shop (54.38%) followed by middle man (29.83%) and to the sweet shop (9.89%). The transport charges were high in case of milk sold to retail shop. The highest average price realised by the milk producer towards sale of milk to consumer (Rs. 33.17/litre) followed by sale to retail shop (Rs. 29/litre), private vendor (Rs. 25/litre) and the lowest was when it was sold to sweet shop/others (Rs. 28.23/litre). The milk producers received the payment on weekly basis from retail shop and sweet shop owners while monthly payment pattern was in place in case of milk sold to consumer and private vendors. The maximum distance was travelled by milk producer to pour milk to retail shop wand thus significant transport charges milk producer had to bear, while in case of consumer, no such hassle was faced by milk producer. As seen earlier, buffalo milk fetched highest per litre price in all herd size groups.

6.4 Details about Income received from Dairying and its use

As dairy activities are carried out mostly at household level and it has been observed that most of labour engaged in dairy activities were family labour, it is expected the dominance of female member in dairying activity as well as handling the income and expenditure of dairy. It can be seen from the Table 6.5 that at overall level, 45-49 per cent male members had handled the income received from sale of milk in DCS and NDCS categories. However, females dominated the handling of income received from the sale of milk products. Out of the income generated from the sale of milk and milk products, the maximum share was spent on family expenditure followed by animal feed and health. In majority of the cases, income from dairy as well as expenditure on dairy was handled by the female members. It may due to the fact that distance between the households and different middle man i.e. vendor,

sweetshops, consumers and retailer. Thus, female pour milk every day in dairy cooperative and also collect the money toward same.

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

Particulars	Details about Income received from Dairying and its use											
	Male				Female				Both			
DCS	Small	Medium	Large	Av	Small	Medium	Av	Total	Small	Medium	Large	Av
Income handle from dairy (sale of milk)	40.00	50.00	45.00	45.00	30.00	27.50	27.50	28.33	30.00	22.50	27.50	26.67
Income handle from sale of products	47.50	27.50	42.50	39.17	52.50	72.50	57.50	60.83	0.00	0.00	0.00	0.00
Income handle from sale of dung /FYM	25.00	45.00	30.00	33.33	5.00	7.50	0.00	4.17	0.00	0.00	0.00	0.00
Income spent on (share in approx.)												
Family Exp	47.19	48.93	51.10	49.08	44.67	49.81	50.52	48.34	28.33	31.11	36.36	31.94
Animal Feed /and Health	52.81	51.07	48.90	50.92	55.33	50.19	49.48	51.66	71.67	68.89	63.64	68.06
NDCS												
Income handle from dairy (sale of milk)	42.50	60.00	45.00	49.17	25.00	17.50	30.00	24.17	32.50	22.50	25.00	26.67
Income handle from sale of products	2.50	12.50	30.00	15.00	0.00	20.00	37.50	19.17	0.00	37.50	20.00	19.17
Income handle from sale of dung /FYM	0.00	30.00	45.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Income spent on (share in approx.)												
Family Exp	60.00	56.46	64.72	60.39	70.00	57.14	64.17	63.77	57.31	70.56	64.00	63.95
Animal Feed /and Health	40.00	43.54	35.28	39.61	30.00	42.86	35.83	36.23	42.69	29.44	36.00	36.05

Source: Field Survey Data.

6.5 Constraints faced in Milk Marketing:

In spite of various developments in dairy sector over the period of time, milk marketing in India remains grossly primitive compared to its western counterparts. It begins with the largely unregulated sector, which handles the majority of the milk production, providing ample opportunity for malpractice. Some of the common forms of malpractice include false measurements in the selling of milk and adulteration of milk. Another major impediment to an efficient marketing system is the presence of numerous intermediaries, which take advantage of producers' weakness. In many cases, intermediaries dictate the price by advancing a loan to the milk producers. Producers' bargaining power is also limited because of perishability and bulkiness of milk. In addition,

the lack of proper infrastructure for transportation, distribution, and storage also makes milk procurement difficult.

On the other hand, it will be impossible for most producers to market their milk without the presence of these market intermediaries. The Cooperative Societies Act continues to be restrictive rather than enabling, even though the Anand Pattern milk producers' co-operatives have emerged as the most stunningly effective institutional model for milk marketing. Political and bureaucratic interference, delayed payments to the primary producers, and the decision-making power of the administrators over marketing of milk and milk products by the district-level union and the state-level federation also adversely affect the growth of dairy co-operatives. The cooperative laws in general have inhibited the emergence of true leadership, professional management, and democratic functioning of the co-operatives.

6.6 Chapter Summary:

The chapter presents the details on milk consumption and marketable surplus at sample households. The highest milk consumption as fluid was observed in Hanumangarh district and lowest in Dholpur district in selected study area. Around 20 per cent of total milk production had directly and indirectly as processed form consumed at home by milk producers of DCS and NDCS categories and remaining milk was sold to various agencies. The share of consumption of milk and milk products to total milk produced reduces with the increase in the size of holding. As expected, small milk producers consumed larger proportion of milk produced followed by medium milk producer and the lowest was in case of large milk producers. The range of milk sale was found to be 70-80 per cent of total. However, across the milch animal holding group, there are variations. Small milk producers have used more share of milk used for the home purpose and used for preparation of further value added products, such as ghee, curd, etc.

The disposal pattern indicates that in case of all the DCS households, they had sold milk to dairy cooperative societies and got weekly payment. The distance of dairy societies was quite closer and thus very meager cost was incurred on transportation. The milk rate realized by the milk producer was around Rs. 22-23 in case of cow milk and around Rs. 23-33 in case of buffalo milk. The NDCS households opted to sale their milk to private milk plant which was maximum 2 kms away from the households for which they incurred around Rs. 2-3 cost as transportation cost. The payment was provided as per requirement and milk rate realized was high as compared to DCS members. Few of NDCS members have sold the milk to private vendor/shop/middlemen as well as to catering services. Thus, unlike of almost 100 per cent sale to dairy cooperative society by DCS households, NDCS households had to sale to variety of customers, where in rates are relatively lower and other facilities may not have available as like in dairy cooperatives. Thus, in case of NDCS households, marketing channels remains traditions and more than 81 per cent of marketable surplus in milk is sold through informal channels. This is in sharp contrast to sale of milk by DCS households to dairy cooperatives.

The next chapter presents the constraints faced in production and marketing of milk and suggestions made by the sample respondents.

Chapter VII

Constraints faced in Production and Marketing of Milk and Suggestions

7.1 Introduction:

Extension and advisory services also play an important role in enabling application of new knowledge by livestock producers. Dairy/livestock extension services can help to assist milk producers at every stage of production, from improved animal husbandry through to better quality milk and increased production. However, compared to its contribution in the economy, livestock sector has received much less resources and institutional support and thus livestock extension remains grossly neglected.

7.2 Service Delivery System

It can be seen in the Tables 7.1 and 7.2 that the different kinds of input and output delivery are provided by cooperative society and private agent. About 90 per cent of DCS milk producers reported that supply of cattle feed under input delivery systems was adequate and also got credit facility for cattle feed and fodder. Majority of milk producer (92%) reported that cost of cattle feed and mineral mixture was high. About 75 per cent households responded that EVS (Emergency Veterinary Services) was not available from PDCS which they availed from private agent and charges of EVS was very high (average Rs. 1200/visit with medicines). About 70 per cent of milk producer responded that the vaccines availability was adequate and provided by government on the demands of PDCS in the village. More than 75 per cent household responded positively for quality and requisite quantity of vaccines. Around 72-75 per cent milk producers told that the semen at the AI centre was adequate.

Table 7.1: Service Delivery System in DCS Category

Sr. No.	Particulars	PDCS			Private Agent			Govt.		
A	INPUT DELIVERY (%)	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
1	Supply of Cattle Feed									
	Adequate	90.0	92.5	87.5	7.5	5.0	10.0	--	--	--
	Inadequate	2.5	2.5	0.0	0.0	0.0	2.5	--	--	--
	Not Available	0.0	0.0	0.0	0.0	0.0	0.0			
2	Cattle feed and fodder seed on Credit									
	Available	87.5	95.0	90.0	12.5	5.0	10.0	--	--	--
	Not Available	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
3	Cost of cattle feed and mineral mixture									
	High	87.5	95.0	90.0	12.5	5.0	10.0	--	--	--
	ok	0.0	0.0	0.0	0.0	0.0	0.0			
	Not Available	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
4	Emergency Veterinary Services (EVS)									
	Available	--	--	--	67.5	80.0	77.5	--	--	--
	Not Available	--	--	--	32.5	20.0	22.5	--	--	--
	Charges for EVS									
	High	--	--	--	77.5	80.0	85.0			
	Medium	--	--	--	22.5	20.0	15.0	--	--	--
	Low	--	--	--	0.0	0.0	0.0	--	--	--
	Rs/Visit	--	--	--	750.0	971.1	989.9	--	--	--
	Emergency Charge(Rs/Visit)	--	--	--	1015.0	1328.1	1340.3	--	--	--
5	Vaccines									
	Adequate	--	--	--	--	--	--	75.0	77.5	70.0
	Inadequate	--	--	--	--	--	--	15.0	15.0	20.0
	Not Available							10.0	7.5	10.0
6	Delivery and applications of quality and requisite quantity of vaccines									
	Yes	--	--	--	--	--	--	75.0	77.5	70.0
	No	--	--	--	--	--	--	15.0	15.0	20.0
7	Semen at the AI centre									
	Adequate	72.5	62.5	75.0	27.5	37.5	25.0	--	--	--
	Inadequate	0.0	0.0	0.0	0.0	0.0	0.0			
	Not Available	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
8	Provision of loan in society or govt. for Purchasing cattle									
	Adequate	0.0	0.0	0.0	--	--	--	--	--	--
	Inadequate	0.0	0.0	0.0	--	--	--	--	--	--
	Not Available	100.0	100.0	100.0						
9	Charges for insurance (Rs. /animal)									
	Very high	--	--	--	--	--	--	--	--	--
	High				--	--	--	--	--	--
	Medium	--	--	--	--	--	--	--	--	--
10	Technical Guidance	55.0	65.0	60.0	--	--	--	--	--	--
B	OUTPUT DELIVERY									
1	Milk Price(Rs./lit	0.0	0.0	0.0	--	--	--	--	--	--
	Adequate	5.0	2.5	2.5	--	--	--	--	--	--
	Low	95.0	97.5	97.5	--	--	--	--	--	--
2	Payment of Milk									
	Immediate	0.0	0.0	0.0	--	--	--	--	--	--
	Within 2 days	0.0	0.0	0.0						
	Within 15 days	100.0	100.0	100.0	--	--	--	--	--	--
	monthly	0.0	0.0	0.0	--	--	--	--	--	--
3	incentives or bonus for supplying milk									
	Adequate	30.0	25.0	12.5						
	Low	70.0	75.0	87.5	--	--	--	--	--	--
	No Available	0.0	0.0	0.0	--	--	--	--	--	--
4	Acceptability cross-bred cow milk in family									
	Poor	17.5	12.5	20.0	--	--	--	--	--	--
	Acceptable	82.5	87.5	80.0	--	--	--	--	--	--
	Not acceptable	0.0	0.0	0.0						
5	Advance payment for milk by society/vendors									
	Available	30.0	25.0	25.0	--	--	--	--	--	--
	Not available	70.0	75.0	75.0	--	--	--	--	--	--

Table 7.2: Service Delivery System in NDCS Category

Sl	Particulars	NDCS								
		PDCS			Private Agent			Govt.		
A	INPUT DELIVERY (%)	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
1	Supply of Cattle Feed									
	Adequate	--	--	--	80.0	72.5	67.5	0.0	0.0	0.0
	Inadequate	--	--	--	20.0	27.5	32.5	0.0	0.0	0.0
	Not Available	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0
2	Cattle feed and fodder seed on Credit									
	Available	--	--	--	50.0	32.5	55.0	0.0	0.0	0.0
	Not Available	--	--	--	50.0	67.5	45.0	0.0	0.0	0.0
3	Cost of cattle feed and mineral mixture									
	High	--	--	--	95.0	80.0	85.0	0.0	0.0	0.0
	ok	--	--	--	5.0	20.0	15.0	0.0	0.0	0.0
	Not Available	--	--	--	0.0	0.0	0.0	0.0	0.0	0.0
4	**Emergency Veterinary Services (EVS)**									
	Available	--	--	--	--	--	--	32.5	47.5	35.0
	Not Available	--	--	--	--	--	--	67.5	52.5	65.0
	Charges for EVS									
	High	--	--	--	--	--	--	90.0	90.0	95.0
	Medium	--	--	--	--	--	--	10.0	5.0	10.0
	Low	--	--	--	--	--	--	0.0	0.0	0.0
	Rs/Visit	--	--	--	--	--	--	885.7	981.4	1125.4
	Emergency Charge (Rs/Visit)	--	--	--	--	--	--	1071.5	1376.2	1668.8
5	Vaccines									
	Adequate	--	--	--	--	--	--	42.5	55.0	47.5
	Inadequate	--	--	--	--	--	--	0.0	0.0	0.0
	Not Available	--	--	--	--	--	--	57.5	30.0	52.5
6	Delivery and applications of quality and requisite quantity of vaccines									
	Yes	--	--	--	--	--	--	42.5	55.0	47.5
	No	--	--	--	--	--	--	57.5	30.0	52.5
7	Semen - AI centre	--	--	--	0.0	0.0	0.0	--	--	--
	Adequate	--	--	--	35.0	30.0	55.0	--	--	--
	Inadequate	--	--	--	0.0	0.0	0.0	--	--	--
	Not Available	--	--	--	65.0	70.0	45.0	--	--	--
8	Provision of loan in society or govt. for Purchasing cattle									
	Adequate	--	--	--	--	--	--	--	--	--
	Inadequate	--	--	--	--	--	--	--	--	--
	Not Available	--	--	--	100.0	100.0	100.0	--	--	--
9	Charges for insurance (Rs. /animal)									
	Very high	--	--	--	--	--	--	--	--	--
	High	--	--	--	--	--	--	--	--	--
	Medium	--	--	--	--	--	--	--	--	--
10	Technical Guidance	--	--	--	30.0	20.0	25.0	--	--	--
B	**OUTPUT DELIVERY**									
1	Milk Price(Rs./lit)									
	Adequate	--	--	--	7.5	5.0	5.0	--	--	--
	Low	--	--	--	92.5	95.0	95.0	--	--	--
2	Payment of Milk									
	Immediate	--	--	--	0.0	0.0	0.0	--	--	--
	Within 2 days	--	--	--	0.0	0.0	12.5	--	--	--
	Within 15 days	--	--	--	55.0	30.0	25.0	--	--	--
	monthly	--	--	--	45.0	70.0	62.5	--	--	--
3	incentives or bonus for supplying milk									
	Adequate	--	--	--	0.0	0.0	0.0	--	--	--
	Low	--	--	--	0.0	0.0	0.0	--	--	--
	No Available	--	--	--	100.0	100.0	100.0	--	--	--
4	Acceptability cross-bred cow milk in family									
	Poor	--	--	--	5.0	12.5	7.5	--	--	--
	Acceptable	--	--	--	95.0	87.5	92.5	--	--	--
	Not acceptable	--	--	--	0.0	0.0	0.0	--	--	--
5	Advance payment for milk by society/vendors									
	Available	--	--	--	45.0	37.5	40.0	--	--	--
	Not available	--	--	--	55.0	62.5	60.0	--	--	--

7.3 Constraints faced by Milk Producers

Dairy farming plays an important role in social and economical livelihood of the farmers. The factors like low productivity of local breeds, inadequate knowledge about balanced feeding and low conception rate through AI (Surve, 2007) are the major constraints in dairy farming. Improved management practices have been prescribed by various research and development organizations to improve the dairy production but the farmers face various constraints in adoption of these practices. Constraints are the circumstances or the causes which prohibit the dairy farmers from adoption of the improved management practices. Constraints imply the problems or difficulties faced by dairy farmers while adopting day-to-day animal husbandry practices in their dairy enterprise.

7.3.1 Infrastructural Constraints

It can be seen from the Table 7.3 that the lack of training facilities was major a constraint (more than 75 per cent respondent always faced this constraint) followed by the constraints like lack of improved equipment (50.83%), Infrequent visit of veterinary staff (40.%), low average milk yield of the milk animals (33.33%) and occasional availability of semen at the AI centre (25.0 %). Similarly under NDCS category, major constraint was lack of training facilities (55% respondents) followed by Infrequent visit of veterinary staff (49.17), Unavailability of emergency veterinary services (37.50), Low average milk yield of the milk animals (31.67 %) and occasional availability of semen at the AI centre (30.0 %). Thus, the lack of training facility was the major constraint faced by both the categories. About more than 50 per cent of milk producers under DCS as well as NDCS respondent had never faced the constraints such as irregular and inadequate supply of cattle feed, unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day. The

vaccines were in plenty as reported by milk producer of DCS and more than 70 per cent never faced the problem, but 29.17 per cent NDCS respondent had faced this problem always. More than 40 per cent of milk producer of both categories sometime faced the constraints of unavailability of green/ dry fodder throughout the year and low average milk yield of milk animals.

Table 7.3 Details on Infrastructural Constraints faced by Selected Households

% to total responses

Sr. No.	Particulars	DCS				NDCS			
		Small	Medium	Large	Av.	Small	Medium	Large	Av.
1	Lack of improved equipments								
	Never	32.50	32.50	30.00	31.67	30.00	50.00	32.50	37.50
	Sometime	17.50	17.50	17.50	17.50	37.50	22.50	40.00	33.33
	Always	50.00	50.00	52.50	50.83	32.50	27.50	27.50	29.17
2	Irregular & inadequate supply of cattle feed								
	Never	70.00	80.00	72.50	74.17	62.50	55.00	72.50	63.33
	Sometime	25.00	17.50	22.50	21.67	20.00	25.00	27.50	24.17
	Always	5.00	2.50	5.00	4.17	17.50	20.00	0.00	12.50
3	Unavailability of emergency veterinary services								
	Never	35.00	42.50	20.00	32.50	27.50	35.00	30.00	30.83
	Sometime	35.00	25.00	57.50	39.17	30.00	35.00	30.00	31.67
	Always	30.00	32.50	22.50	28.33	42.50	30.00	40.00	37.50
4	Infrequent visit of veterinary staff								
	Never	22.50	25.00	30.00	25.83	15.00	15.00	10.00	13.33
	Sometime	42.50	37.50	22.50	34.17	25.00	40.00	47.50	37.50
	Always	35.00	37.50	47.50	40.00	60.00	45.00	42.50	49.17
5	Unavailability of vaccines								
	Never	65.00	72.50	77.50	71.67	35.00	52.50	45.00	44.17
	Sometime	30.00	15.00	12.50	19.17	20.00	27.50	32.50	26.67
	Always	5.00	12.50	10.00	9.17	45.00	20.00	22.50	29.17
6	Occasional Availability of semen at the AI centre								
	Never	57.50	60.00	62.50	60.00	37.50	67.50	32.50	45.83
	Sometime	12.50	15.00	17.50	15.00	32.50	17.50	22.50	24.17
	Always	30.00	25.00	20.00	25.00	30.00	15.00	45.00	30.00
7	Lack of training facilities								
	Never	10.00	5.00	12.50	9.17	15.00	12.50	17.50	15.00
	Sometime	12.50	2.50	20.00	11.67	37.50	30.00	22.50	30.00
	Always	77.50	92.50	67.50	79.17	47.50	57.50	60.00	55.00
8	Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day								
	Never	40.00	42.50	67.50	50.00	50.00	67.50	62.50	60.00
	Sometime	50.00	52.50	30.00	44.17	45.00	32.50	35.00	37.50
	Always	10.00	5.00	2.50	5.83	5.00	0.00	2.50	2.50
9	Unavailability of green/dry fodder throughout the year								
	Never	50.00	47.50	27.50	41.67	27.50	27.50	27.50	27.50
	Sometime	42.50	45.00	57.50	48.33	50.00	42.50	37.50	43.33
	Always	7.50	7.50	15.00	10.00	22.50	30.00	35.00	29.17
10	Unavailability of cattle feed and fodder seed on credit								
	Never	62.50	70.00	65.00	65.83	45.00	45.00	55.00	48.33
	Sometime	25.00	15.00	25.00	21.67	35.00	27.50	22.50	28.33
	Always	12.50	15.00	10.00	12.50	20.00	27.50	22.50	23.33
11	Low average milk yield of the milk animals								
	Never	27.50	30.00	20.00	25.83	35.00	27.50	22.50	28.33
	Sometime	45.00	35.00	42.50	40.83	42.50	40.00	37.50	40.00
	Always	27.50	35.00	37.50	33.33	22.50	32.50	40.00	31.67

Source: Field Survey Data.

7.3.2 Economic Constraints

The economic constraints faced by selected DCS and NDCS household are presented in Table 7.4. It can be seen in table that under both categories of milk producers, about 74.17 per cent had responded that there were always incidences of high cost of fodder seed. Nearly 65 per cent of the DCS and NDCS farmers reported the lower productivity of milk of the local breeds was the major constraint followed by high cost of veterinary medicines.

Table 7.4 Details on Economics Constraints faced by Selected Households

Sr. No.	Particulars	DCS				NDCS			
		Small	Medium	Large	Av.	Small	Medium	Large	Av.
1	High cost of fodder seed								
	Never	15.00	20.00	10.00	15.00	7.50	10.00	12.50	10.00
	Sometime	10.00	7.50	15.00	10.83	15.00	12.50	20.00	15.83
	Always	75.00	72.50	75.00	74.17	77.50	77.50	67.50	74.17
2	Delay in payment of milk								
	Never	82.50	80.00	75.00	79.17	77.50	67.50	50.00	65.00
	Sometime	12.50	12.50	12.50	12.50	17.50	20.00	30.00	22.50
	Always	5.00	7.50	12.50	8.33	5.00	12.50	20.00	12.50
3	Low price of milk offered								
	Never	20.00	20.00	10.00	16.67	25.00	25.00	12.50	20.83
	Sometime	12.50	5.00	12.50	10.00	15.00	27.50	35.00	25.83
	Always	67.50	75.00	77.50	73.33	60.00	47.50	52.50	53.33
4	High cost of cross bred cow								
	Never	17.50	40.00	35.00	30.83	42.50	25.00	17.50	28.33
	Sometime	40.00	20.00	22.50	27.50	22.50	15.00	45.00	27.50
	Always	42.50	40.00	42.50	41.67	35.00	60.00	37.50	44.17
5	High cost of veterinary medicines								
	Never	5.00	5.00	10.00	6.67	10.00	5.00	10.00	8.33
	Sometime	50.00	40.00	27.50	39.17	50.00	30.00	40.00	40.00
	Always	45.00	55.00	62.50	54.17	40.00	65.00	50.00	51.67
6	High cost of cattle feed and mineral mixture								
	Never	20.00	17.50	7.50	15.00	12.50	10.00	5.00	9.17
	Sometime	37.50	37.50	42.50	39.17	15.00	35.00	35.00	28.33
	Always	42.50	45.00	50.00	45.83	72.50	55.00	60.00	62.50
7	Low provision of loan in society or govt. for purchasing cattle								
	Never	35.00	32.50	15.00	27.50	25.00	42.50	40.00	35.83
	Sometime	15.00	17.50	20.00	17.50	15.00	15.00	12.50	14.17
	Always	50.00	50.00	65.00	55.00	60.00	42.50	47.50	50.00
8	Low incentives or bonus for supplying milk								
	Never	45.00	42.50	37.50	41.67	50.00	40.00	32.50	40.83
	Sometime	15.00	22.50	25.00	20.83	20.00	20.00	42.50	27.50
	Always	40.00	35.00	37.50	37.50	30.00	40.00	25.00	31.67
9	High charges of emergency veterinary services								
	Never	17.50	10.00	12.50	13.33	47.50	12.50	7.50	22.50
	Sometime	10.00	22.50	17.50	16.67	12.50	22.50	37.50	24.17
	Always	72.50	67.50	70.00	70.00	40.00	65.00	55.00	53.33
10	High charges for insurance								
	Never	62.50	70.00	67.50	66.67	65.00	52.50	65.00	60.83
	Sometime	5.00	7.50	12.50	8.33	15.00	30.00	20.00	21.67
	Always	32.50	22.50	20.00	25.00	20.00	17.50	15.00	17.50

Source: Field Survey Data.

About 73.33 per cent of milk producer of DCS reported of having always low price of milk offered by Milk union. Also 44.17 per cent in

NDCS and 41.67 per cent in DCS categories had reported that high cost for crossbred cow. Besides, there was high cost of cattle feed and mineral mixture. Thus, the rearing of milch animals was more costly for NDCS as compared to DCS due to high cost of cattle feed and mineral mixture. On the other hand almost all the milk producers under DCS and NDCS categories had responded that there were always, high charges of emergency veterinary services and low provision of loan in society or govt. for purchasing of milch animals in state.

7.3.3 Marketing Constraints

The goal of any marketing program is to move the product from the producer to the consumers in an economical and orderly manner, which satisfies the customers and provides a reasonable profit to the producer and processor. Therefore, with a proper perspective, marketing as an approach can provide a meaningful direction to the dairy development effort. The absence of an efficient market is a problem for feed inputs as well as for the industry's output of milk. The marketing constraints faced by DCS and NDCS are presented in Table 7.5. It can be seen in the table the majority of DCS farmers (50.82%) reported that low risk taking behaviour was major marketing constraints. In case of NDCS, about 60 per cent responded of having less knowledge about marketing strategies was major constraint followed by low risk taking behaviour and no or less advance payment for milk by society/venders.

7.3.4 Technical Constraints

The technical Constraints faced by DCS and NDCS are presented in Table 7.6. It can be seen from table that on an average more than 75 per cent of milk producer in both category DCS and NDCS had responded that there was always lack of technical guidance. Also 61.67 per cent in NDCS and 41.67 per cent in DCS household reported that they poor knowledge about feeding and health care. About more than 45 per cent of milk producers both DCS and NDCS categories had always faced the major problem of lack of knowledge about cheap and scientific housing of

animal followed by poor conception rate through artificial insemination and unavailability of high genetic merit bull in selected sample.

Table 7.5 Details on Marketing Constraints faced by Selected Households

Sr No.	Constraints	DCS				NDCS			
		Small	Medium	Large	Av.	Small	Medium	Large	Av.
1	Irregular sell of milk								
	Never	100.00	97.50	90.00	95.83	55.00	85.00	67.50	69.17
	Sometime	0.00	0.00	7.50	2.50	37.50	7.50	17.50	20.83
	Always	0.00	2.50	2.50	1.67	7.50	7.50	15.00	10.00
2	Lack of time for marketing								
	Never	55.00	50.00	37.50	47.50	25.00	25.00	50.00	33.33
	Sometime	25.00	22.50	32.50	26.67	47.50	30.00	30.00	35.83
	Always	20.00	27.50	30.00	25.83	27.50	45.00	20.00	30.83
3	Less knowledge about marketing strategies								
	Never	60.00	45.00	57.50	54.17	12.50	15.00	15.00	14.17
	Sometime	32.50	42.50	32.50	35.83	27.50	15.00	35.00	25.83
	Always	7.50	12.50	10.00	10.00	60.00	70.00	50.00	60.00
4	Low risk taking behaviour								
	Never	25.00	20.00	27.50	24.17	32.50	35.00	17.50	28.33
	Sometime	30.00	30.00	15.00	25.00	32.50	15.00	27.50	25.00
	Always	45.00	50.00	57.50	50.83	35.00	50.00	55.00	46.67
5	No or less advance payment for milk by society/venders								
	Never	40.00	50.00	55.00	48.33	55.00	40.00	45.00	46.67
	Sometime	30.00	30.00	17.50	25.83	27.50	27.50	12.50	22.50
	Always	30.00	20.00	27.50	25.83	17.50	32.50	42.50	30.83
6	Inability to market for value added products								
	Never	55.00	60.00	62.50	59.17	55.00	47.50	62.50	55.00
	Sometime	22.50	25.00	17.50	21.67	20.00	40.00	30.00	30.00
	Always	22.50	15.00	20.00	19.17	25.00	12.50	7.50	15.00

Source: Field Survey Data.

Table 7.6 Details on Technical Constraints faced by Selected Households

Sr. No.	Constraints	DCS				NDCS			
		Small	Medium	Large	Av.	Small	Medium	Large	Av.
1	Lack of technical guidance								
	Never	2.50	7.50	10.00	6.67	20.00	7.50	15.00	14.17
	Sometime	17.50	12.50	20.00	16.67	5.00	12.50	7.50	8.33
	Always	80.00	80.00	70.00	76.67	75.00	80.00	77.50	77.50
2	Unavailability of high genetic merit bull								
	Never	37.50	40.00	47.50	41.67	25.00	20.00	15.00	20.00
	Sometime	27.50	7.50	15.00	16.67	42.50	35.00	32.50	36.67
	Always	35.00	52.50	37.50	41.67	32.50	45.00	52.50	43.33
3	Poor conception rate through artificial insemination								
	Never	30.00	37.50	32.50	33.33	37.50	20.00	17.50	25.00
	Sometime	32.50	25.00	25.00	27.50	30.00	42.50	30.00	34.17
	Always	37.50	37.50	42.50	39.17	32.50	37.50	52.50	40.83
4	Poor knowledge about Feeding and health care								
	Never	15.00	20.00	15.00	16.67	5.00	22.50	5.00	10.83
	Sometime	40.00	35.00	50.00	41.67	32.50	25.00	25.00	27.50
	Always	45.00	45.00	35.00	41.67	62.50	52.50	70.00	61.67
5	Lack of knowledge about cheap & scientific housing of animal								
	Never	30.00	30.00	27.50	29.17	17.50	30.00	15.00	20.83
	Sometime	22.50	20.00	30.00	24.17	32.50	27.50	40.00	33.33
	Always	47.50	50.00	42.50	46.67	50.00	42.50	45.00	45.83

7.3.5 Social constraints

Social constraints faced by both categories are presented in Table 7.7. It can be seen in the table about 48.33 per cent NDCS households and 34.18 per cent DCS respondent reported of having lack of purchasing power. About more than 65 per cent respondent of DCS reported the lack of cooperation and coordination among members and meant for influential people was not a serious problem. Thus the lack of purchasing power is serious social constraint followed by milk produces in study area.

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

Sr. No	Constraints	DCS				NDCS			
		Small	Medium	Large	Av.	Small	Medium	Large	Av.
1	Lower socio- economic conditions								
	Never	55.00	47.50	60.00	54.17	40.00	47.50	40.00	42.50
	Sometime	25.00	20.00	10.00	18.33	20.00	17.50	20.00	19.17
	Always	20.00	32.50	30.00	27.50	40.00	35.00	40.00	38.33
2	Lack of purchasing power								
	Never	42.50	35.00	55.00	44.17	27.50	22.50	25.00	25.00
	Sometime	27.50	25.00	12.50	21.67	27.50	35.00	17.50	26.67
	Always	30.00	40.00	32.50	34.17	45.00	42.50	57.50	48.33
3	Lack of time due to busy in domestic/ agricultural work								
	Never	35.00	47.50	27.50	36.67	42.50	40.00	25.00	35.83
	Sometime	37.50	35.00	37.50	36.67	42.50	50.00	37.50	43.33
	Always	27.50	17.50	35.00	26.67	15.00	10.00	37.50	20.83
4	Lack of cooperation and coordination among members								
	Never	72.50	82.50	77.50	77.50	60.00	60.00	67.50	62.50
	Sometime	25.00	15.00	17.50	19.17	25.00	32.50	22.50	26.67
	Always	2.50	2.50	5.00	3.33	15.00	7.50	10.00	10.83
5	Milk producers are meant for influential people								
	Never	77.50	82.50	77.50	79.17	47.50	45.00	50.00	47.50
	Sometime	20.00	17.50	22.50	20.00	30.00	45.00	30.00	35.00
	Always	2.50	0.00	0.00	0.83	22.50	10.00	20.00	17.50
6	Milk of cross-bred cow has poor acceptability (family members)								
	Never	70.00	72.50	57.50	66.67	55.00	65.00	67.50	62.50
	Sometime	25.00	17.50	27.50	23.33	30.00	27.50	17.50	25.00
	Always	5.00	10.00	15.00	10.00	15.00	7.50	15.00	12.50

Source: Field Survey Data.

7.3.6 Other constraints

Table 7.8 highlights all other constraints faced by the milk producers. Most of households reported the constraints such as lack of awareness about quality milk production, poor housing to milch animals, poor knowledge about scientific animal husbandry practices and dairy farming.

Table 7.8: Details on Other Constraints faced by Selected Households

Sr. No	Constraints	DCS				NDCS			
		Small	Medium	Large	Av.	Small	Medium	Large	Av.
1	Unavailability of chilling facilities at village level for milk preservation	70.00	55.00	37.50	54.17	65.00	67.50	60.00	64.17
2	Diversion of feed and fodder ingredients for industrial use	7.50	2.50	2.50	4.17	7.50	2.50	7.50	5.83
3	Majority of grazing lands are either degraded or encroached	12.50	17.50	20.00	16.67	12.50	17.50	12.50	14.17
4	Poor access to organized markets deprive farmers in getting proper milk price	27.50	32.50	32.50	30.83	52.50	47.50	37.50	45.83
5	Irregular quality electricity supply	25.00	30.00	40.00	31.67	55.00	32.50	47.50	45.00
6	Poor irrigation facility to grow fodder crops	20.00	20.00	37.50	25.83	32.50	40.00	52.50	41.67
7	Non availability of improved fodder seed	22.50	37.50	45.00	35.00	50.00	60.00	52.50	54.17
8	Poor livestock extension services	60.00	55.00	57.50	57.50	60.00	65.00	75.00	66.67
9	Poor knowledge about scientific animal husbandry practices and dairy farming	70.00	60.00	60.00	63.33	67.50	65.00	62.50	65.00
10	Poor knowledge of mastitis (mastitis in dairy animal) in dairy animals	32.50	35.00	22.50	30.00	40.00	35.00	17.50	30.83
11	Lack of awareness about quality milk production	62.50	65.00	70.00	65.83	67.50	65.00	70.00	67.50
12	Poor housing to milch animals	70.00	65.00	57.50	64.17	65.00	67.50	62.50	65.00
13	Unavailability of medicine and equipment required for quality milk production	50.00	52.50	65.00	55.83	45.00	55.00	55.00	51.67
14	Lack of milk testing and animal screening facilities	20.00	25.00	27.50	24.17	17.50	17.50	30.00	21.67
15	Lack of veterinary services in village for quality milk production	40.00	37.50	67.50	48.33	70.00	75.00	67.50	70.83
16	Lack of nutrition's feed for quality milk production	42.50	35.00	57.50	45.00	57.50	50.00	40.00	49.17
17	Lack of ecto parasites control programmes	25.00	22.50	22.50	23.33	32.50	22.50	17.50	24.17
18	Lack of finance to invest in dairy business for quality milk production/ Inadequate finance	32.50	32.50	15.00	26.67	27.50	25.00	27.50	26.67
19	Lack of necessary space required for tying the milking animals	17.50	20.00	17.50	18.33	10.00	15.00	7.50	10.83
20	Lack of marketing facility for dairy business	32.50	37.50	52.50	40.83	45.00	57.50	35.00	45.83
21	Uneconomical capital investment on quality milk production	22.50	25.00	30.00	25.83	20.00	25.00	20.00	21.67
22	Lack of water supply	35.00	22.50	17.50	25.00	37.50	30.00	32.50	33.33
23	Inadequate labour supply	15.00	15.00	12.50	14.17	10.00	10.00	12.50	10.83
24	Ecological factors- High heat/temperature, High cold, etc	60.00	47.50	32.50	46.67	40.00	50.00	67.50	52.50
25	Competition from established and large units	10.00	12.50	7.50	10.00	22.50	15.00	12.50	16.67
26	Difficulty to store milk in summer	40.00	30.00	47.50	39.17	55.00	50.00	57.50	54.17
27	low acceptability of AI in buffalo	42.50	27.50	30.00	33.33	37.50	35.00	45.00	39.17
28	Disease outbreak: mortality and morbidity	10.00	15.00	12.50	12.50	10.00	7.50	15.00	10.83
29	Politics in Cooperative is not good	12.50	5.00	10.00	9.17	17.50	12.50	15.00	15.00

Source: Field Survey Data.

In NDCS category, about 70.83 per cent respondents reported the lack of veterinary services in village for quality milk production as major

constraints followed by lack of awareness about quality milk production (67.50%), Poor livestock extension services (66.67%), Unavailability of chilling facilities at village level for milk preservation (64.17%), Non availability of improved fodder seed (54.17%), Unavailability of medicine and equipment required for quality milk production (51.67%) were other constraints faced. Also lack of finance, necessary space, marketing facility, lack of water supply and labour, storage access to AI and disease control were faced by milk producers in the State

7.4 Suggestions by Milk Producer

In order to have corrective steps in existing scheme, attempt was made to have suggestions on same. The DCS households had offered suggestions than NDCS households are presented in Table 7.9. It can be seen from the table that most of selected DCS households suggested the enhanced milk price for the producers, availability of concentrates at cheaper rate and in time, distribution of veterinary literature in village, simplified procedure for loan, availability of marketing facilities at village level for the outlet of milk and milk products, improvement i service delivery then dairy as business more profitable and sustainable. In case of NDCS households, majority of respondents (80.8 %) emphasized on requirement of veterinary literature in village followed by need of marketing facilities at village level for the outlet of milk and milk products (74.2 %), improvement in service delivery (60.8 %), arranging technical knowledge to manage the dairy enterprise, enhanced milk price for the producers and simple procedure for loan are the major suggestion for development of dairy sector in selected area.

Table: 7.9 Suggestions for improvement in adoption of dairy schemes

Sr. No.	Particulars	Suggestions- DCS				Suggestions- NDCS			
		Small	Medium	Large	Av.	Small	Medium	Large	Av.
1	Marketing facilities be provided at village level for the outlet of milk and milk products	62.50	47.50	37.50	49.17	65.0	77.5	80.0	74.2
2	Providing technical knowledge to manage the dairy Enterprise	52.50	42.50	37.50	44.17	67.5	60.0	47.5	58.3
3	There should be regular and planned supply of vaccines (100%)	37.50	20.00	30.00	29.17	35.0	7.5	32.5	25.0
4	Subsidies should be given on certain inputs like veterinary medicines, fodder seeds, etc.	45.00	37.50	40.00	40.83	42.5	40.0	52.5	45.0
5	Enhanced milk price for the producers	62.50	45.00	57.50	55.00	45.0	50.0	55.0	50.0
6	Loan sanction procedure should be made easy	65.00	47.50	37.50	50.00	60.0	50.0	42.5	50.8
7	The loan amount for the purchase dairy animals need to be increased	35.00	27.50	27.50	30.00	37.5	27.5	40.0	35.0
8	Concentrates should be made available at cheaper rate and in time	62.50	42.50	57.50	54.17	22.5	30.0	37.5	30.0
9	Providing proper A.I. facility at village level /door step	52.50	27.50	30.00	36.67	30.0	30.0	47.5	35.8
10	Cost of veterinary services need to be reduced	45.00	37.50	35.00	39.17	45.0	40.0	45.0	43.3
11	Provide veterinary literature in village	60.00	52.50	40.00	50.83	80.0	80.0	82.5	80.8
12	Small scale dairy industries be encouraged at village level	32.50	20.00	20.00	24.17	20.0	17.5	17.5	18.3
13	Need to improve service delivery	57.50	70.00	65.00	64.17	67.5	62.5	52.5	60.8

Source: Field Survey Data.

7.5 Constraints faced by PDCS /Private Dairy Units

The constraints (such as milk supply related, infrastructure related and marketing related) faced by the selected primary dairy cooperative societies and private dairy units are presented in Tables 7.10 to 7.12. It can be seen from the tables that in case of milk supply related constraints, top three constraints faced by both the groups are high numbers of small producers, irregular and inadequate supply of milk, unavailability of fodder throughout the years and low average milk yield of milk animals in area. Besides, these DCS faced problems of not having the provision of advance payment for milk to milk producers, which was sometime available with PDUs. PDUs also faced unavailability of vaccines and AI facility at village level.

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

S. No	Constraints	Milk Supply related Constraints faced by (% to total responses)							
		PDCS (% to total responses)				PDU (% to total responses)			
		Jalore	Hanumangarh	Dholpur	Ajmer	Jalore	Hanumangarh	Dholpur	Ajmer
1	High number of small producers								
	Never								
	Sometime								
	Always	100	100	100	100	100	100	100	100
2	No or less provision for advance payment for milk by society or vendors								
	Never								
	Sometime					100	100	100	100
	Always	100	100	100	100				
3	Unable to provide cattle feed and fodder seed on credit to members								
	Never								
	Sometime	100	100	100	100				
	Always					100	100	100	100
4	Poor Quality milk								
	Never		100	100	100				
	Sometime	100				100	100	100	100
	Always								
5	Irregular & inadequate supply of milk								
	Never								
	Sometime		100		100				
	Always	100		100		100	100	100	100
6	Late delivery								
	Never			100					
	Sometime	100	100		100	100			
	Always						100	100	100
7	Unavailability of emergency veterinary services								
	Never				100				
	Sometime		100	100					100
	Always	100				100	100	100	
8	Infrequent visit of veterinary staff								
	Never								
	Sometime		100		100				100
	Always	100		100		100	100	100	
9	Unavailability of vaccines								
	Never	100		100	100				
	Sometime		100						
	Always					100	100	100	100
10	Occasional availability of semen at the AI centre								
	Never	100		100					
	Sometime		100		100			100	
	Always					100	100		100
11	Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day								
	Never				100			100	
	Sometime	100	100	100		100	100		100
	Always								
12	Unavailability of green/ dry fodder throughout the year								
	Never		100						
	Sometime	100		100	100	100	100	100	100
	Always								
13	Low average milk yield of the milk animals in area								
	Never								
	Sometime				100				100
	Always	100	100	100		100	100	100	
14	Lack of cooperation and coordination among members								
	Never	100	100	100					
	Sometime				100	100	100	100	100
	Always								

Source: Field Survey Data.

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

No.	Constraints	Infrastructure related Constraints faced by (% to total responses)							
		PDCS (% to total responses)				PDCS (% to total responses)			
		Jalore	Hanumangarh	Dholpur	Ajmer	Jalore	Hanumangarh	Dholpur	Ajmer
1	Unavailability of chilling facilities at village level for milk preservation.								
	Never		100		100				
	Sometime								
	Always	100		100		100	100	100	100
2	Lack of improved equipments								
	Never		100	100	100			100	100
	Sometime	100				100	100		
	Always								
3	Lack of necessary space required for dairy operation								
	Never								
	Sometime	100	100	100	100	100	100	100	100
	Always								
4	Lack of training facilities								
	Never								
	Sometime								
	Always	100	100	100	100	100	100	100	100

Source: Field Survey Data.

Table7.12: Market related Constraints faced by the PDCS & Private Dairy Units

No.	Constraints	Market related Constraints faced by (% to total responses)							
		PDCS (% to total responses)				PDCS (% to total responses)			
		Jalore	Hanumangarh	Dholpur	Ajmer	Jalore	Hanumangarh	Dholpur	Ajmer
1	Inability to market for value-added products								
	Never	100	100	100	100				
	Sometime								
	Always					100	100	100	100
2	Competition from private dairy								
	Never								
	Sometime								
	Always	100	100	100	100	100	100	100	100
3	Poor Road infrastructure								
	Never					100	100		
	Sometime	100	100	100					
	Always				100			100	100
4	Unstable prices of milk								
	Never								
	Sometime	100	100	100	100				
	Always					100	100	100	100
5	Completion from imported dairy product								
	Never								
	Sometime	100	100	100	100				
	Always					100	100	100	100

Source: Field Survey Data.

The top two infrastructure related constraints were unavailability of chilling facilities at village level for milk preservation and lack of training facilities. Few of them also faced Lack of necessary space required for dairy operation. While competition from private dairy and Inability to market for value-added products were the major marketing related constraints faced by the both groups. Besides, PDU faced the problem of unstable prices of milk.

7.6 Constraints faced by Milk Unions

Besides the milk producers, milk unions have also faced the constraints, which are presented in Table 7.13. It can be seen from the table that out of the four selected dairy milk unions, two are located in developed cities like Hanumangarh, Ajmer and Jalour and are located on the main city of the state. While Bharatpur district milk unions are located in interior regions of the selected district of the state, that to these areas are not that developed and thus they face some constraints. The shortage of man power and technical constraint like veterinary doctor and maximum work is conducted by contract labours in selected all milk union. Besides, during lean season, this dairy faces the problems of working capital. The dairy producers in this area are mostly illiterate and thus do not have much awareness about the schemes. In case of Bharatpur dairy, the cooperative dairy sector is very slow progress due to high competition to private dairy. Overall, all the dairy unions have bright future subject to no political interfere in the working of unions.

Table 7.13: Constraints faced by Milk Unions-Rajasthan

Sl	Particulars	Constraints faced by Milk Unions-Rajasthan			
1	Milk Union	**Jalor-Sirohi**	**Sriganganagar**	**Ajmer**	**Bharatpur**
2	Constraints faced				
a	Manpower Constraints (eg. Problems In Recruiting Staff, Etc.)	• Union has shortage of Man power due to vacant post. Since a long time not admitted post	• Milk union has only 108 employees against the sanction strength of 214. • Maximum work is conducted by contract labours. All officers having more than one charge of department. Due to shorten of staff work suffered.	• Recruitment Process under going on through RCDF and Govt. of Rajasthan	Union has shortage of Man power due to vacant post. Since a long time not admitted post
b	Technical Constraints	Union have required a Vetenary doctor and some technical staff for doing technical work	Milk union has shortage of technical staff. Due to shortage of technical staff work is conducted by using contract man power. It effect the work quality.	No	Required Veterinary Doctor and Clinic with staff
c	Governance Issues	Union has separate elected board. It short out issue related policy or financial matter in board meeting.	Procurement Price is being control by RCDF HQ. Recruitment not being permit by RCDF HQ due to not clearance of govt at Rajasthan finance department. Political interference much more and defect work of Milk union.	Union have not any issues	Union have not any issues
d	Financial Constraints	Milk Union is in good conditions.	Milk Union is in good conditions. At present Union cumulative profit is Rs 481.94 Lacs	1 Dairy Business is a seasonal Business ,during the lean season Dairy Industry is having the short fall of working capital & some time banks are not fund cooperatives. 2 The Farmers are not aware of different finance schemes of banks, so cooperative have to work as a mediator for banks to provide the fund to the farmers. 3 Some region are unable to provide direct payment to the Milk Producers because of availability of Banks in villages.	1. Low milk production at the time of summer season and this time short fall of working capital.
3	Any Other suggestion	-	-	-	-
4	Potential For Future	Cold storage facility required at jalore for marketing purpose	-	Future of Dairy cooperative will be very bright , if there no political interfere in dairy sector	Future of Dairy cooperative will be very bright due to Bovine Population has 67 % increases in over the previous census.

7.7 Chapter Summary:

The performance of the dairy sector in depends on many factors includes input supply (particularly feed) and service provision (veterinary service and Artificial Insemination (AI) or breed) or output services. DCS and NDCS households are fully depending on the agent or private agency to get support for emergency veterinary services. DCS households recorded the adequate supply of cattle feed while NDCS households did not have facility to get any support from the dairy cooperatives existing in their area, they are fully depend on the agent or private agency to get support for input and output service systems.

The major constraints faced by the milk producers are highlighted. Constraints imply the problems or difficulties faced by dairy farmers while adopting day-to-day animal husbandry practices in their dairy enterprise. Here, constraints are studied under five categories i.e. Infrastructural, Economic, Marketing, Technical and Socio-Psychological constraints. Regarding Infrastructural Constraints, it was observed that majority of the respondents were facing the constraint of low milk production yield and unavailability of feed and fodder throughout year. In NDCS category also faced some other constraint like unavailability of vaccine and veterinary service. About economics constraints, majority of the dairy farmers faced high cost of feed and fodder, veterinary service and price offer of milk offer and lack of loan facility as their constraint. Regarding marketing constraints, few are faced less knowledge about marketing strategies and lack of facility less advance payment for milk. Regarding technical constraints, most of the respondents, opined to have inadequate guidance of AI, feeding and health care of animal, high genetic merit bull as their constraint. the lack of purchasing power is serious social constraint followed by lower socio economic condition faced by NDCS. Other major constraints was Lack of veterinary services in village for quality milk production followed

by Lack of awareness about quality milk production, Poor livestock extension services, Unavailability of chilling facilities at village level for milk preservation, Non availability of improved fodder seed, Unavailability of medicine and equipment required for quality milk production

The constraints (such as milk supply related, infrastructure related and marketing related) were also faced by the selected primary dairy cooperative societies and private dairy units. In case of milk supply related constraints, top three constraints faced by both the groups are high numbers of small producers, irregular and inadequate supply of milk, unavailability of fodder throughout the years and low average milk yield of milk animals in area. Regarding infrastructure related constraints were unavailability of chilling facilities at village level for milk preservation and lack of training facilities. Few of them also faced Lack of necessary space required for dairy operation. Selected milk unions have also faced the constraints, they faced the problem of shortage of man power and technical constraint like veterinary doctor and maximum work is conducted by contract labours in selected all milk union. Besides, during lean season, this dairy faces the problems of working capital. Overall, all the dairy unions have bright future subject to no political interfere in the working of unions.

The next chapter presents the conclusions and recommendations.

Chapter VIII

Conclusions and Recommendations

Animal husbandry and livestock is highly potential sector contributing a lot in Rajasthan economy, especially of rural economy. This sector has also the highest potential for rural self-employment generation at the lowest possible investment per unit. The state of Rajasthan is rich in livestock wealth. State is blessed with the best breeds of cattle, sheep and camels of the country. The climatic conditions are adverse with scarcity of water for irrigation and erratic rains with very low average annual rainfall. These conditions leave a little scope for crop production and enhance the importance of animal husbandry over the crop production especially during recurrent droughts. The state ranks 1st in goat and camel population, ranks 2nd in buffalo population and rank 3rd in sheep population of the country. The significant share of Camels (81.37 %) and Donkeys (25.56 %) in national stock has also been recorded (2012). Main strengths of livestock sector in the State is that it produces 11 per cent milk, 35 per cent wool and 10 per cent meat of the country.

Rajasthan has some of the nationally recognized breeds of milch and draught cattle viz. Ralhi. Tharparkar, Gir, Kankrej, Sahiwal and Nagauri. Malvi and Haryana have their home tracts in Rajasthan. This indicates that the cattle in the state are of better quality in comparison to those found in other parts of the country. However, the number of high yielding indigenous pure bred cattle is reducing and number of non-descript cattle is increasing. The productivity of non-descript cattle is very low and needs to be improved. The above observations indicate that the status of dairy development in the study area is low in comparison to its potential, despite the fact that this region has

relatively superior resource endowment. The dairy cooperative structure in the area has been weak in comparison to elsewhere in the country. The coverage of dairy cooperatives in terms of villages, milk producers and share of milk procurement in surplus milk is low. There are areas of concern that constrain realization of full potential of this sector. Feed and fodder availability in a drought prone area of the State is a major constraint of dairy development in Rajasthan. Another issue related to the organization of production system. In general the system of production is extensive in nature. Though technological dualism persists, the system of dairying in and around the urban areas is based on improved breeds and intensive technological input use, while the rural system of production is characterized by low input and low technology. Therefore, present study was undertaken with an objective assessment of the status of dairying and potential to improve socio economic status of the milk producers. From the data and discussion presented in Chapter 1 to 7, it can be concluded and suggested as follows:

- It was pronounced that the productivity of the buffaloes and local cows maintained by the all category of dairy farms were lower than crossbred cows across all categories of dairy farms, therefore there is a need to make efforts to increase the productivity of buffaloes and local cows by upgrading the animals and scientific dairy farming practices should be disseminate to milk producer.
- Feed cost represented one of the major cost components within dairy farming and was an obvious cost to be reduced. Arrangement to provide green and dry fodder in adequate quantity and at a reasonable price to the milk producers particularly during off seasons be made.

- The major constraint in milk marketing is the involvement of the unorganized sector. Changing the dairy-cooperative laws and regulations can reduce the unorganized sector's role in milk marketing. Strengthening the infrastructure for milk collection, transportation, processing, packaging, pricing, and marketing through dairy co-operatives can also change the minds of the milk producers.
- The livestock services like artificial insemination/natural service, vaccination, de-worming, etc are time-sensitive and government institutions are not able to deliver in time due to financial as well as bureaucratic constraints. Therefore, there is a need to re-orient the government policy for delivery of livestock services and involve major stakeholder.
- The public provisioning of veterinary inputs delivery system should be strengthened by invigorating the extension machineries, so that the needy farmers could benefit from it. There is a need to make greater efforts to educate and assist the milk producers in respect to latest breeding, feeding and animal management technique.
- It was observed that the awareness about the dairy schemes among selected households was very poor. Therefore, there is a need to increase use advanced technology such as mobile phones in dairying for effective dissemination of livestock related information in general and dairying in particular.
- The selected households seldom aware about the livestock insurance. As insurance of livestock is the best safeguard for minimising the risk especially small holder producers, there is a need to increase the awareness and mandatory provision of the companies to undertaken livestock insurance of interested milk producers.

- The role of institutions in dairy farming especially district dairy cooperatives need to be strengthened and there should be less bureaucratic and political interference in managing cooperative run dairies.
- The co-operative structure is very weak in Bharatpur regions of the state. Therefore, there is a need to support the MPCs as well as union in this areas for balanced development of dairy sector.
- The major constraints faced by the selected primary dairy cooperative societies and private dairy units were high numbers of small producers, irregular and inadequate supply of milk, unavailability of fodder throughout the years and low average milk yield of milk animals in area. Regarding infrastructure related constraints were unavailability of chilling facilities at village level for milk preservation and lack of training facilities. Few of them also faced Lack of necessary space required for dairy operation.
- The milk Unions are primarily engaged in manufacturing value added milk, butter, ice cream, peda, dehi, etc., in addition to milk sale. These milk produce are aimed at urban consumers whereas the attention of the dairy management should be focused to the welfare of the farmers' members. The union dairy should revised milk procurement price so as to factors like cost variation and seasonality in milk production could be taken into account.
- There are number of schemes that provide incentives to the milk producers, however most of the schemes were stand alone with meagre financial outlay. In fact it would be beneficial to harness the regional strengths using a regionally differentiated approach for exploiting the potential. On the line of suggestion made by the Working Group for 12th FYP, all the ongoing schemes should be converged and put under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development.

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Annexures

A1. Features of Agro Climatic Regions of Rajasthan

Zone	Rainfall	Major Crops	Types of Soil	Districts
IA-Arid Western	200-370	Mostly rainfed crops like bajra, kharif pulses, guar etc. are grown during the kharif season. Rabi crops like wheat, rape-seed and mustard are grown only in areas where irrigation water is available.	Desert Soils and sand dunes aeolian soil, coarse sand texture some places alcareous	Barmer, Jodhpur
IB-irrigated North Western	100-350	Amongst the kharif crops cotton, sugarcane and pulses are of importance. In the rabi season, wheat, mustard, gram, vegetables and fruits are produced.	Alluvial deposits calcareous, high soluble	Sriganganagar ,Hanumangarh
IC-Hyper Arid Partial Irrigated Zone	100-350	Mostly rainfed crops like bajra, kharif pulses, guar etc. are own during the kharif season. Rabi crops like wheat, rape-seed and mustard are grown only in areas where irrigation water is available.	Desert Soils and sand dunes aeolian soil loamy coarse in	Bikaner, Jaisalmer, Churu
IIA-Internal Drainage dry zone	300-500	Bajra, sesamum and kharif pulses are the main crops of the rainy season. Wheat, barley, mustard and gram are grown as irrigated crops or on conserved soil	Sandy loa m, shallow	Nagaur, Sikar, Jhunjhunu
IIB-Transitional Plain of Luni Basin	300-500	The area produces bajra, maize, guar, sesamum and pulses in the kharif season. In the rabi season, wheat, barley and mustard are the dominant crops, especially in irrigated areas.	Red desert soils in Jodhpur, Jalore & Pali sierozems in Pali & Sirohi	Jalore, Pali, Sirohi
IIIA-Semi-Arid Eastern Plain	500-700	In the total gross cultivated area of this zone, bajra, sorghum and pulses are grown in the kharif season, and wheat, barley, gram, mustard in the rabi season.	Sierozen, eastern part alluvial, west north west lithosols, foot hills, brown soils	Jaipur, Ajmer, Dausa. Tonk
IIIB-Flood Prone Eastern Plain	500-700	The region produces bajra, sorghum, maize, sugarcane, sesamum and a variety of pulses in the kharif season. Wheat, barley, gram and mustard are the dominant crops during rabi season.	Alluvial prone to water logging nature of recently alluvial	Alwar, Dholpur, Bharatpur, S.Madhopur, Karauli
IVA-Sub humid Southern	500-900	The area produces maize as the chief food crop of the Kharif season but in irrigated areas, paddy is also grown. In the Rabi season, wheat, gram and oil seeds are the main crops. In areas of black soil, cotton and	Soils are lithososat in foot hills & alliuvials in plains	Bhilwara, Rajsamand, Chittoregarh
IVB-Humid southern	500-1100	Cotton and sugarcane are the chief cash crops grown in the black soil region. Maize, sorghum and paddy are the chief food crops of the Kharif season. Groundnut, mustard, sesamum and rapeseed are also grown.	Predominantly reddish medium texture, well drainedcalcareous,	Dungarpur, Udaipur, Banswara, Pratapgar h
V-Humid Southern Eastern Plain	650-1000	Paddy and sorghum are the chief food crops grown in the Kharif season. This area is suitable for soyabeen crop also. Wheat, barley, grain and mustard are grown in winter.	Black of alluvial origin, clay loam, groundwater salinity.	Kota, Jhalawar, Bundi, Baran

Source: http://www.rajkrishi.gov.in (Department of Agriculture, Government of Rajasthan.

A2 General Statistics: Rajasthan vs. India

Particulars	Unit	Year	Rajasthan	India
Number of major cattle	Nos	2015	3	36
Number of major buffalo	"	"		13
Milk Production				
Total Milk production	000MT	2014-15	16,934	146,313
Crossbred	"	"	1,840	36,938
Indigenous	"	"	4,286	29,484
Buffalo	"	"	8,985	74,709
Goats	"	"	1,822	5,180
Per capita milk availability	Grams/day	2013-14	572	307
Egg production	Millions	2014-15	1,320	78,484
Estimated meat	000 MT	"	180.1	6,691
Marine & inland fish	''	2013-14	35.1	9,579
Wool production	000 Kg	2014-15	14,463	48,139
Veterinary Infrastructure & Services				
Veterinary institutes	Nos	2014-15	4,696	61,123
Semen Production Center	''	''	2	58
AI centers	''	''	6,728	88,095
AI done	0	''	3,386	63,204
Vaccinations Done			13,059	
H.S. Vaccination	''	2014-15	5,305	
B.Q. vaccinations	''	"	1,216	
FMD vaccinations	''	"	6,538	
Agricultural Resources				
Forest cover	%	2012-13	8	21.3
Pasture and Grazing	000 Ha	''	1,694	10,240
Pasture & Grazing	%	''	4.9	3.3
Area under fodder crops	000 Ha	''	4,853	9,188
Gross irrigated area (% to	%	''	39.4	47.6
Cropping intensity	"	''	137	139
Irrigation intensity	"	''	126	138
Ground water status (2011 vs 2009)				
Safe	% of blocks	2011 & (2009)	10 (13)	69 (73)
Semi Critical	''	''	8 (7)	11 (9)
Critical	''	''	10 (10)	3 (3)

Source: NDDB (2016).

A3. Cattle and Buffalo Breeds of Rajasthan – 2012

('000)

Category			Total Male	Milch Female	Total Female
Cattle	Jersey	Exotic	11.6	41.5	68.7
		Crossbred	85.4	268.4	469.1
	Holstein Friesian	Exotic	11.2	38.2	70.20
		Crossbred	130.3	512.1	1,018.80
	Gir	Pure	70.0	155.4	259.1
		Graded	85.9	205.2	358.3
	Hariana	Pure	34.9	117.5	195.8
		Graded	33.1	102.3	179.6
	Kankrej	Pure	79.3	218.1	372.4
		Graded	75.9	135.6	240
	Malvi	Pure	203.8	164.2	271.8
		Graded	83.2	67.4	111.4
	Nagori	Pure	59.7	190.9	309.9
		Graded	23.9	67.4	109.6
	Rathi	Pure	137.5	405.6	722.3
		Graded	54.5	163.1	303.9
	Tharparkar	Pure	22.7	65.7	109.7
		Graded	59.0	169.9	294.9
Buffalo	Murrah	Pure	236.1	934.4	1,682
		Graded	518.9	2,181	4,011.60
	Surti	Pure	53.9	255.8	449.3
		Graded	46.6	191.5	342.3

Source: NDDB (2016).

A4. Year & District-wise Total Milk Production Density

Districts	Milk Production Density (kg/day/sq km)						
	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Ajmer	148	157	163	175	192	198	219
Alwar	270	276	279	303	324	331	365
Banswara	80	85	88	94	105	110	135
Baran	83	85	87	93	89	94	96
Barmer	40	43	43	46	60	59	58
Bharatpur	233	238	242	262	162	181	187
Bhilwara	99	105	113	120	128	127	128
Bikaner	48	53	57	60	38	43	44
Bundi	111	117	120	129	195	188	184
Chittaurgarh	93	98	102	109	96	102	134
Churu	67	71	72	77	65	71	71
Dausa	192	199	202	218	327	329	339
Dhaulpur	182	186	188	204	176	179	170
Dungarpur	113	119	122	131	156	153	180
Ganganagar	129	138	147	157	128	138	137
Hanumangarh	107	114	119	127	109	118	121
Jaipur	243	252	263	282	231	255	266
Jaisalmer	10	11	12	12	16	17	18
Jalor	87	91	93	100	83	90	96
Jhalawar	82	86	88	94	128	130	138
Jhunjhunun	175	179	187	200	239	247	253
Jodhpur	77	83	86	92	93	92	94
Karauli	124	127	128	139	109	120	135
Kota	74	77	79	85	107	110	119
Nagaur	62	66	67	72	86	87	88
Pali	76	79	81	87	130	123	136
Rajsamand	131	136	141	152	139	148	155
S.Madhopur	139	143	145	156	179	179	195
Sikar	205	212	219	235	274	262	253
Sirohi	91	96	98	105	110	113	109
Tonk	65	68	69	75	125	124	116
Udaipur	81	85	89	95	79	87	89
Pratapgarh	-	-	-	-	-	-	-
Rajasthan	91	96	99	106	108	112	117

Source: NDDB (2016).

Appendix I

Comments on draft report received from Agro-Economic Research Centre, Gokhale Institute of Politics & Economics (Deemed University), Pune, (M.S.)

Comments on draft report

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 Rajasthan
2.	Date of receipt of the Draft report	28th June , 2017
3.	Date of dispatch of the comments	30th June 2017
4.	Comments on the Objectives of the study	Objectives of the study have been satisfied.
5.	Comments on the methodology	Proper sampling and methodology have been used.
6.	Comments on analysis, organization, presentation etc.	Detailed analysis is undertaken. 1. Minor editing is required. For example on page on p 23 'Main strengths of livestock sector…". The sentence needs correction. Similarly the sentence on p 36 " with the purpose….RLDB " needs to be completed. On p 55 it should be "crores" and not crones. There may be such editing issues which need to be corrected. 2. With respect to analysis from page 123 to 126, certain issues may be discussed more, if necessary. First of all across the tables 5.13 to 5.16, "total" may be replaced by "average". The net return per litre can also be indicated. While comparing Table 5.14 with Table 5.16, it was observed that NCDS households seem to perform better than DCS households, in terms of lower cost and better price and therefore higher returns. This issue can be further discussed.
7.	References:	Major references covered
8.	General remarks:	The study is a comprehensive study on dairy sector in Rajasthan and appropriate policy measures have been 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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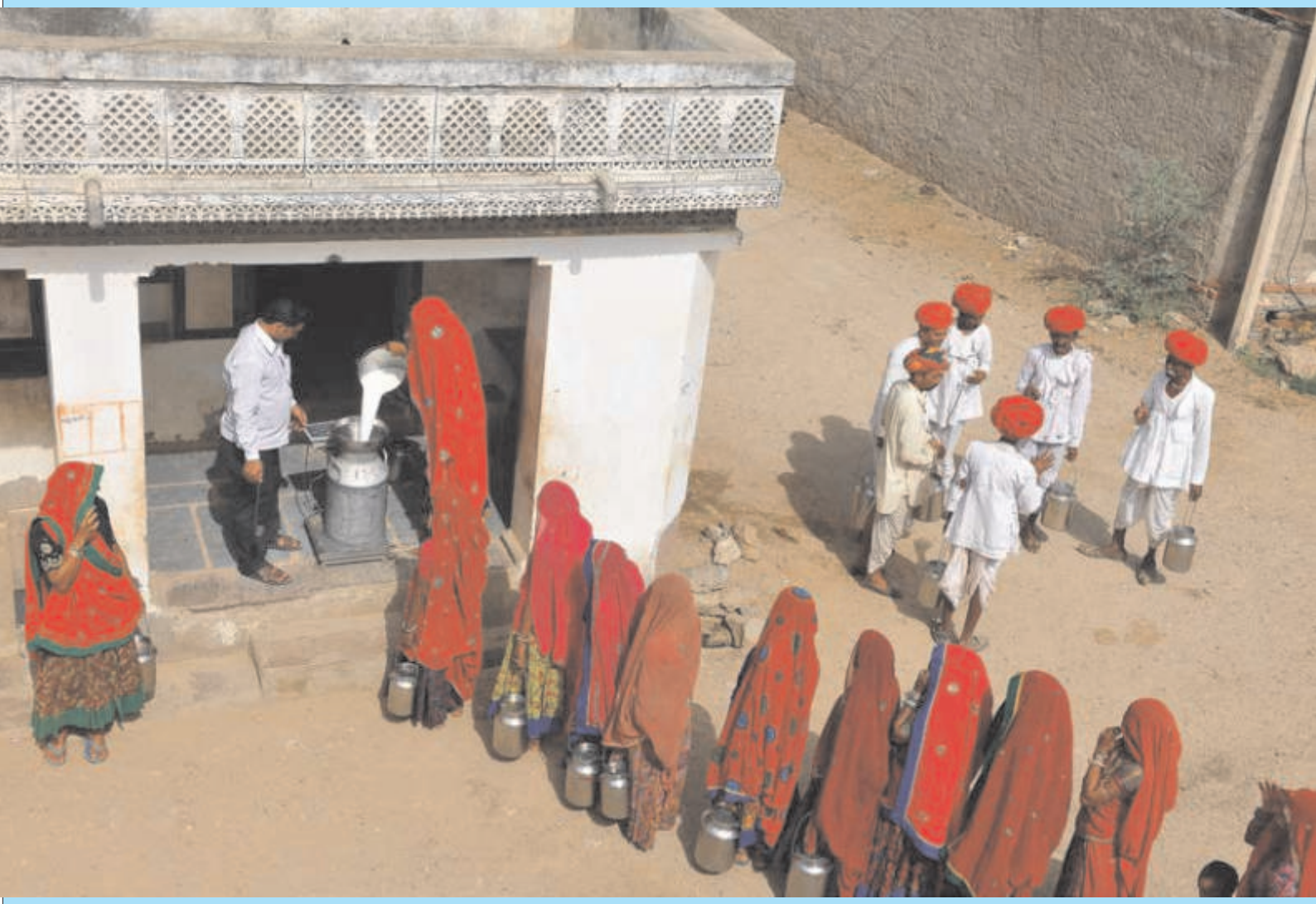
Appendix II

Action taken by the authors based on the comments received

- All the comments made by the expert have been addressed at the appropriate places in the final report.

H. Sharma and S. S. Kalamkar



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