Assam Agricultural University, Jorhat 785013, Assam

Study No. 150

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

*Study Sponsored by the **Ministry of Agriculture and Farmers' Welfare**, Government of India, New Delhi*

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**Dr. Anup K. Das**

**Agro- Economic Research Centre for North-East India**
**Assam Agricultural University, Jorhat**
**Assam, 2017**

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**Department of Agriculture, Cooperation and Farmers' Welfare**
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**Jorhat – 13, Assam**
**2017**

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## PREFACE

*The present study entitled, "Assessment of the Status of Dairying and Potential to Improve Socio-Economic Status of the Milk Producers and Convergence of all Central and State Schemes at District Level- A Study in Assam" was undertaken at the instance of the Ministry of Agriculture and Farmers' Welfare, Government of India and AERC, VVN, Gujarat was designated as coordinating centre for the study.*

*The dairy farming is an important enterprise that provides employment, income and nutritive food for millions of rural families and also supplies cow dung as organic manure to enrich the soil fertility and thus helps in increasing crop production. Assam, with vast natural endowment, has the enormous potentiality for the development of dairy sector.*

*The study covers 120 milk producers from DCS and another 120 from NDCS of four different districts, viz. Barpeta, Jorhat Kamrup and Nagaon in Assam. The findings of the study show that although the status of dairying in Assam is far from satisfactory level, there lies ample opportunities which still remain un realized because of a plethora of problems and difficulties. Optimum utilization of natural resources, creation of adequate health-care facilities for livestock, improvement of breeding programmes through Artificial Insemination, improvement of present milk marketing system and timely vaccination can go a long way in bringing marked changes in the lives of the milk producers of this part of the country.*

*I am grateful to AERC,VVN, Gujarat, for guiding our research team throughout the course of study and giving valuable comments on the draft report which have duly been incorporated. I am also grateful to the officials of the Directorate of Veterinary and Animal Husbandry, Directorate of Dairy Development, Assam, WAMUL, Dairy Cooperative Societies for their help and cooperation during the study. I am also grateful to Dr. A. Saikia, Professor (Horticulture) & Web Master, AAU for beautifully designing the cover page of the Report. I also thank all the sample respondents for their spontaneous cooperation during the field surveys.*

*Like all the studies, this is also a joint output of the centre. I am thankful to Dr. Jotin Bordoloi, Dr. Moromi Gogoi and Mr. Amarendra Ch. Ray for their timely help and intervention in accomplishing the study on time. The names of the other research staff associated with the study have been mentioned elsewhere in the report.*

*I hope that the results of the study will be useful for the planners, policy makers and researchers.*

*Anup K. Das*
Director in-charge
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## CONTENTS

## List of Tables

# List of Figures



# List of Box

# List of Abbreviations

| | | |
|---|---|---|
| A.I. | - | Artificial Insemination |
| A.I.C. | - | Artificial Insemination Centre |
| ALDA | - | Assam Livestock Development Agency |
| APART | - | Assam Project on Agribusiness and Rural Transformation |
| APEDA | - | Agricultural and Processed Food Products Export Development Authority |
| AACP-AF | - | Assam Agricultural Competitiveness Project-Additional Funding |
| AMCUs | - | Automated Milk Collection Units |
| Av. | - | Average |
| AVI | - | Animal Vaccine Institute |
| ARIASP | - | Assam Rural infrastructure and Agricultural Services Project |
| ASMM | - | Area Specific Mineral Mixture |
| B.Q. | - | Black Quarter |
| CMSGUY | - | Chief Minister Samagra Gramya Unnayan Yojana |
| CB | - | Cross Breed |
| CBF | - | Cattle Breeding Farm |
| CSS | - | Centrally Sponsored Scheme |
| CAMUL | - | Cachar and Karimganj Milk Producers' Cooperative Union Ltd. |
| DADF | - | Department of Animal Husbandry, Dairying and Fisheries, New Delhi |
| DCS | - | Dairy Cooperative Society |
| DES | - | Directorate of Economics and Statistics |
| DPMCUs | - | Data Processor-based Milk Collection Units |
| DPAP | - | Drought Prone Area Programme |
| EAMUL | - | East Assam Milk Producers' Cooperative Union Ltd. |
| EDA | - | Export Development Authority |
| E.T. | - | Enterotoxaemia |
| F.A.V.C. | - | First Aid Veterinary Centre |
| FDG | - | Focus Group Discussion |
| F.M.D. | - | Foot and Mouth Disease |
| FSSAI | - | Food Safety and Standards Authority of India |
| FASAR | - | Food and Agribusiness Strategic Advisory and Research |
| GCA | - | Gross Cropped Area |
| GDP | - | Gross Domestic Product |

| | | |
|---|---|---|
| GIA | - | Gross Irrigated Area |
| GNP | - | Gross National Product |
| GOA | - | Government of Assam |
| GOI | - | Government of India |
| GVA | - | Gross Value of Agriculture |
| GVO | - | Gross Value of Output |
| ha | - | Hectare |
| HF | - | Holstein Friesian |
| H.S. | - | Hemorrhagic Septicaemias |
| HH/hh | - | Household |
| IACBP | - | Indo-Australian Cattle Breeding Project |
| ICBP | - | Intensive Cattle Breeding Programme |
| ICDP | - | Intensive Cattle Development Programme |
| ICMR | - | Indian Council of Medical Research |
| IDA | - | International Development Association |
| IDDP | - | Integrated Dairy Development Programme |
| INAPH | - | Information Network for Animal Productivity and Health |
| ISP | - | International Organization for Standardization |
| KVK | - | Krishi Vigyan Kendra |
| LTPD | - | Litres per day |
| MAITs | - | Mobile Artificial Insemination Technicians |
| MMPO | - | Milk and Milk Product Order |
| NA | - | Not Available |
| NLM | - | National Livestock Mission |
| NCDFI | - | National Cooperative Dairy Federation of India |
| NDDB | - | National Dairy Development Board |
| NDP | - | National Dairy Plan |
| NERDDL | - | North Eastern Regional Disease Diagnostic Laboratory |
| Nos | - | Numbers |
| NPBBDD | - | National Programme for Bovine Breeding and Dairy Development |
| NPCBB | - | National Project on Cattle and Buffalo Breeding |
| OF | - | Operation Flood |
| OFP | - | Operation Flood Programme |
| RBP | - | Ration Balancing Programme |

| | | |
|---|---|---|
| R.P. | - | Rinderpest |
| SC | - | Scheduled Caste |
| SNF | - | Solid Not Fat |
| ST | - | Scheduled Tribe |
| SWOT | - | Strength, Weakness, Opportunity and Threat |
| TE | - | Triennium Endings |
| TDN | - | Total Digestible Nutrients TDN |
| V.D | - | Veterinary Dispensaries |
| WAMUL | - | West Assam Milk Producers Cooperative Union Ltd. |

# Executive Summary

Animal husbandry in India is an integral part of agricultural sector and plays an important role in providing employment and income to the rural people. The livestock sector has started receiving more and more weight age in the recent past. The dairy farming is the most significant secondary source of income that provides employment, income and nutritive food for millions of rural families and also supplies cow dung as organic manure to enrich the soil fertility. Milk production in India during the period 1950-51 to 2015-16, has increased from 17 million tonnes to 155.49 million tonnes as compared to 146.3 million tonnes during 2014-15, recording a growth of 6.28 per cent. The per capita milk availability in India in 2015-16 was 337 grams per day, an increase of 4.7 per cent over the previous year.

## Need of the study

It is well recognized that western, northern and southern parts of India have progressed significantly well in dairy sector while the eastern part of the country has lagged far behind in this endeavour. According to various estimates, the demand for milk and milk products is expected to grow at an annual incremental rate of 8-9 million tonnes, as against the present rise of about 5 million tonnes. To achieve the above growth, it is believed that the growth has to be inclusive and geographically more diffused. Quantum jump in milk production is possible through increase in productivity and by linking small holders to dairy cooperatives/producer groups/SHGs with forward linkages to milk processing. This means that the areas which have low levels of productivity, preponderance of low yielding non-descript animals, but rich in resource endowment and presence of good markets, would require focused attention of the policy makers. Therefore, a comprehensive assessment of the present status of dairy development in Assam has become imperative, particularly from the perspective of regional and national consideration.

The need for ascertaining different program of the Central and State Government relating to dairying, at the local level, arises from the fact that (i) there is presently no documentation on different schemes of the State and Central Governments, (ii) how far these schemes are mutually related, (iii) what is the system to converge them at the local level and how is the convergence process is enforced. These need to be studied from the perspective of a district so that the multiplicity of different schemes are known, target population are identified, conditions for their implementation are specified and the coordinating and controlling Departments of the Government are made accountable.

**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;

**Data and Methodology**

The present study for the State of Assam is based on both primary and secondary level data. The primary level data were collected from 4 districts of Assam *viz.*, Barpeta, Jorhat ,Kamrup and Nagaon, out of 9 (Nine) potential districts listed by NDDB, Anand from three Agro-Climatic Zones in Assam, having highest potentiality of milk production, in order to capture the holistic macro picture of the State. In Assam, out of three Milk Unions, only West Assam Milk Producers' Cooperative Union Limited (WAMUL) is functional. Three of the sample districts, selected for the study come under the WAMUL.

In the second stage, from each district 4 villages were selected. Out of these four villages, two villages nearer to the district headquarters were selected (one village having dairy cooperative and one village without dairy cooperative both located nearby) and other two villages were selected about 25-30 kms away from the sample district headquarters. In the third stage, from each village, 15 milk producers were selected randomly based on the number of bovine population- (a) Small Milk Producers (1-2 milch animal), (b) Medium Milk Producers (3-5 milch animal) and (c) Large Milk Producers (above 5 milch animals). Thus, the sum total of sample villages for the study stood at 16. Altogether, the study covered 240 sample milk producers. In addition to this, 1 milk union and 8 Primary Dairy Cooperative Societies were also selected for the study.

**Major Findings of the Study**

- The review of the status of Dairy development in Assam indicates that despite having sizeable number of cattle, milk production in the State is not up to the satisfactory level as the major percentage of the cattle population in the State are of non-descript type.
- It has also been observed that the indigenous cattle continues to contribute larger share of the State's total milk production with 54.31 per cent while the contribution of crossbred cow stood at 28.82 per cent only.
- The per capita /per day milk consumption in Assam is only 74 ml as against 208 ml per head per day as recommended by the ICMR.
- The pattern of utilization of milk indicates that 32.00 per cent of the total milk was consumed by households as fluid milk. Out of the remaining quantity, 46.00 per cent was sold as fluid milk and only 22.00 per cent was converted in to milk product.
- So far as availability of milk was concerned, Assam could produce only 35.81 per cent of the total milk requirement in the year 2015-16. As such, Assam is a deficit State in terms of milk production.
- At present, there are 341 numbers of primary dairy cooperative societies in the State. In 2015-16, the total members of the dairy cooperatives stood at 16 thousand in Assam. As against this, only about 42 thousand liters of liquid milk are marketed daily in the State by the dairy cooperative societies. As per NDDB Annual Reports, 2015-16, the percentage share of Assam in total milk procurement by cooperative sector in India was only 0.05.
- As per record available, there were three Milk Unions in Assam, covering most of the districts of the State, *i.e.* EAMUL, CAMUL and WAMUL. However, only WAMUL continues to remain operational these days. As such, it was taken for intensive study in consonance with the objective of this investigation. The NDDB is managing the WAMUL since April 2008. During 2015-16, the Union reported an average milk procurement of 21,783 kg per day with a peak procurement of 32,813 kg per day covering 3,894 dairy farmers organized in 169 functional milk producers' cooperative societies.
- Apart from the Central and State Government programs, the milk union has evolved a variety of schemes that provided incentives to the milk producers. However, the overall performance of most of the schemes has not been to the desired levels. The problems and difficulties lied with funding pattern and poor flexibility, *etc.* Most of the schemes were standing alone with meagre financial outlay.
- All the ongoing schemes relating to dairy development in Assam should be converged and put under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy

Development. Proper monitoring and implementation of dairy schemes/programmes together with convergence of existing schemes may bring in more efficiency in to the system.

- The total milk collection at PDCS was much higher than that of private dairy units, while per litre milk price was relatively lower in PDCS as compared to PDU.
- Season wise milk yield (per day) of selected milk producers shows that average yield rate of per local cow/day in rainy season for DCS milk producers varied from 1. 21 ltrs to 1.23 ltrs with an overall average of 1.22 ltrs. During winter season, average yield rate of per local cow/day was estimated at 1.33 and varied from 1.27 ltrs to 1.32 ltrs while in summer season average yield rate of per local cow/day varied from 1.23 ltrs to 1.26 ltrs with an overall average of 1.24 ltrs.
- On the other hand, in case of per cross- bred cow in rainy season, the average yield rate of milk per day varied from 4.47 ltrs to 5.75 ltrs with an overall average of 5.25 ltrs. During winter season, the average yield rate of per cross bred cow/day was estimated at 5.89 ltrs and varied from 4.60 ltrs to 5.98 ltrs while in summer season, average yield rate of per cross-bred cow/day varied from 4.44 ltrs to 5.90 ltrs with an overall average of 5.45 ltrs.
- Average yield rate of per local cow/day in rainy season for NDCS milk producers was found to be 1.22 ltrs. During winter season, average yield rate of per local cow/day was estimated at 1.32 ltrs while in summer season, average yield rate of per local cow/day is estimated 1.24 ltrs.
- On the other hand, average yield of milk per day, in case of per cross bred cow for the NDCS in rainy season varied from 3.85 ltrs to 4.41 ltrs with an overall average of 4.17 ltrs. During winter season, average yield rate of per cross bred cow/day was estimated at 4.96 ltrs and varied from 4.23 ltrs to 5.04 ltrs while in summer season, the average yield rate of per cross bred cow/day varied from 3.90 ltrs to 4.73 ltrs with an overall average of 4.51 ltrs. It was also noticed that yield of milk against the large milk producers was higher for both DCS and NDCS households.
- The DCS households were more aware about the various dairy development schemes/programmes and availed more benefits from those schemes.
- It was found that milk production and net return was not up to the desired level in case of NDCS households. It may be due to low milk productivity of cows with poor health, low feeding, un-scientific husbandry practices and low price offered by private agents/buyers.
- Large milk producers under DCS and NDCS situations utilised entire milk produced from local cows for home consumption. On an average, DCS households sold 70.40 per cent of

local cow milk and 96.30 per cent of cross-bred cow milk while NDCS households sold 60.75 per cent of local cow milk and 95.95 per cent cross -bred cow milk.

- The DCS sample households sold the entire milk produced by the local cows to the consumers at an average price of Rs.40.50/ltr. on monthly payment basis. They used to dispose entire amount of cross -bred cow milk to the dairy cooperative societies with weekly payment basis at an average price of Rs.35.33/ltr.
- The NDCS households sold entire marketable surplus obtained from local cows directly to the consumers at an average price of Rs.39.45/ltr. with monthly payment mode. On the other hand, they opted to sell the cross-bred cow milk to sweet shop/catering services (50.02%), private vendor/middle man (42.98%) both with weekly payment mode and to the consumers (6.99 %) with monthly payment basis. On an average, the price realized by the NDCS households stood at Rs. 33.17/ltr.
- The DCS households used to sell their marketable surplus of cross-bred cow milk to the dairy cooperative societies and they realized assured and reasonable price. But NDCS sample households used to sell their produce through different informal channels with relatively lower price as compared to the DCS sample.
- The DCS households received adequate supply of cattle feed both from cooperative society and private agent with credit facilities. But most of the respondents opined that the cost of cattle feed and mineral mixture was high. In case of NDCS households, the sample farmers did not get any support or benefits from the dairy cooperative societies existing in their locality and they were fully dependent on private agency for input and output services.
- Major infrastructural constraints in case of DCS households were lack of improved equipments, unavailability of emergency vaccine services, inadequate visit of veterinary staff, unavailability of cattle feed and fodder on credit *etc*. Together with these problems, the NDCS sample farmers also faced with the problem of lack of training facility on improved farm technology.
- The DCS households experienced the economic constraints like high cost of fodder seed, low price of milk, high cost of cross bred cow, high cost of medicine, high cost of cattle feed and mixture, low incentive for supplying milk, high charges of emergency veterinary services *etc*. The major economic constraints faced by the NDCS households were same as that of the DCS households. Additionally, they did not have any scope of availing loan from the society or Government for purchasing cattle.
- The DCS respondents encountered with very few marketing constraints as compared to NDCS sample.

- The common problems faced by both DCS and NDCS households were, poor irrigation facility to grow fodder crop, poor livestock extension services, poor knowledge about scientific animal husbandry practices, lack of awareness about quality milk production, lack of milk testing and animal screening facilities, lack of veterinary services and lack of finance to invest in dairy business for quality milk production.
- The major constraint as reported by the sample PDCS and PDU was the competition from imported dairy products. Competition from private dairy, unstable prices of milk, inability to market for value-added products and poor road infrastructure were the other marketing constraints faced by the both groups.
- The problems faced by the lone Milk Union in Assam were lack of skilled manpower, absence of suitable institutes in the North Eastern Region for better training and innovation, lack of availability of raw materials for manufacturing of cattle feed locally in a viable manner, lesser number of crossbred animals in the State and non-adherence to the principles of Anand pattern cooperatives/ three tier structure by the village level DCS.

**Conclusions and Recommendations**

On the basis of the field survey, careful observations and discussions held with the milk producers and other stakeholders associated with dairy, the following suggestions are offered for improvement of the dairy sector in Assam.

- The State Government should prioritize the strategies for dairy development in the State Plan to make a real breakthrough in the dairy sector.
- Productivity-led growth is essential for accelerated and sustainable growth of this sector. Composition of dairy cattle should be modified with introduction of adequate number of cross- bred cows.
- There is need to evolve a comprehensive dairy development policy in the State through genetic improvement of indigenous milch animals. Process should be initiated for production of good quality semen from high genetic sources. To achieve that, the existing semen stations should be strengthened and upgraded. Larger focus should be on field progeny testing for quality bull production.
- Revival of non functional Milk Unions *viz*. EAMUL located at Jorhat and CAMUL at Silchar can give a new lease of life to the dairy sector.
- In order to overcome the fodder deficit, the Animal Husbandry and Veterinary Department of the State, being the key player, can take up elaborate programmes for enhanced fodder production throughout the State.

- Establishment of organized network of market can benefit the livestock farmers in getting due share for their products. Networking of village level dairy co-operatives can benefit all the stakeholders on several fronts. Strengthening of market linkages through expansion of cooperatives and facilitating new models of dairy farming would go a long in further improving milk yield in the State.
- Convergence of some of the existing schemes may bring in more efficiency in to the system. The ongoing schemes and new initiatives should be placed under three mega schemes with wider freedom and flexibility for the State to choose the appropriate components.
- There is need to assist and train the milk producers in the field of breeding, feeding, animal management technique and marketing of milk and milk products in a cost effective manner.
- Some infrastructural development like road communication and transport is needed for transportation of fodder, feed concentrates, veterinary medicines and also transportation of milk to the consuming centres round the year.
- Livestock insurance coverage should be expanded to all types of production systems and species with appropriate incentive framework.
- Well-equipped laboratories for testing of adulterants, antibiotics residues, and food borne pathogens should be established to enhance safety and quality of animal feeds.
- Improving the farmers' access to institutional credit through simplification of procedures, reduction in interest rates, *etc.*

The status of dairying in Assam is far from satisfactory in terms of production and coverage despite the fact that there lies enormous potential which remains unrealized till date. The problems and difficulties encountered by all the stakeholders, once addressed, can gear up new vista for dairy development in the State of Assam. Development of dairy farming on sustainable basis through optimum utilization of natural resources, adequate health-care facilities for livestock, improvement of breeding programmes through Artificial Insemination, improvement of present milk marketing system and timely vaccination can go a long way in bringing marked changes in the lives of the milk producers of this part of the country.

***

# Chapter-1
# Introduction

## 1.1 Introduction

The demand for livestock products, especially for milk and meat, in India has increased considerably in the recent past, and has strong potential for further growth. Several socioeconomic indicators underline this trend. The per capita consumption of milk in many parts of the country is low compared to minimum nutritional standards and to that of many developed and developing countries. The demand for milk and dairy products is income-elastic and as such, growth in per capita income is expected to increase the demand for milk and milk products. Empirical evidences show that the composition of the food basket of an average Indian is gradually shifting towards livestock products (Radhakrishan and Ravi, 1990; Kumar, 1998). Other socioeconomic and demographic factors such as urbanization, changing food habits and lifestyle also reinforce growth in demand for dairy products.

Animal husbandry in India is an integral part of agriculture sector and plays an important role in providing employment and income to the rural people. The livestock sector has been receiving significant priority in India in the last couple of decades. The dairy farming is an important secondary source of income that provides employment, income and nutritive food for millions of rural families and also supplies *cow dung* as organic manure to enrich the soil fertility and thus help in increasing crop production.

India ranks first among the world's milk producing Nations since 1998 and has the largest bovine population in the World. Milk production in India during the period 1950-51 to 2015-16, has increased from 17 million tonnes to 155.49 million tonnes as compared to 146.3 million tonnes during 2014-15, recording a growth of 6.28 per cent. The per capita milk availability in 2015-16 was 337 grams per day, an increase of 4.7 per cent over the previous year. (Annual Report, 2015-16, NDDB). FAO reported 3.1% increase in world milk production from 765 million tonnes in 2013 to 789 million tonnes in 2014.

## 1.2 Contribution of Livestock Sector to the National Economy

Livestock sector in general and the dairy sector in particular have been among the few growth sectors in India. Dairying at the micro-level provides employment and income to more than 70 million farm families directly in India. Studies conducted across the country have indicated that on an average, a milch animal provides annual employment ranging from 90 to 150 days depending on the breed and region. Around 10 per cent of the agricultural

labourers seek gainful employment in dairy farming. It is estimated that each 6-10 kg per day of additional milk processed in India generate one person-day of employment for feeding and health care (National Livestock Policy, 1996; Mishra, 1999). With regard to income, an annual income of Rs. 1,200-10,000 per milch animal is realized, depending upon the breed and region. Dairying is found to provide about 20 per cent of farm employment and 30 per cent of family income (Ramasamy, 2000).

The percentage contribution of livestock in terms of gross value added in agriculture at current and constant price are given in Table-1.1.

**Table 1.1: Percentage contribution of Livestock to total Agriculture GVA**

| Year | GVA at Constant (2011-12) Basic Prices | | | | | GVA at Current Basic Prices | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | GVA-Agriculture | | GVA-livestock | | | GVA-Agriculture | | GVA-livestock | | |
| | (Rs. in Cr) | % to total GVA | (Rs. in Cr) | % to total GVA | % to Agri-culture | (Rs. in Cr) | % to total GVA | (Rs. in Cr) | % to total GVA | % to Agri-culture |
| 2011-12 | 982026 | 12.1 | 327301 | 4 | 23.8 | 982026 | 12.1 | 327301 | 4 | 23.8 |
| 2012-13 | 983873 | 11.5 | 344333 | 4 | 24.6 | 1090587 | 11.8 | 375254 | 4.1 | 24.3 |
| 2013-14 | 1025082 | 11.3 | 363448 | 4 | 24.8 | 1232116 | 11.9 | 429662 | 4.1 | 24.4 |
| 2014-15 | 992159 | 10 .2 | 389846 | 4 | 26.7 | 1252412 | 10.9 | 500405 | 4.4 | 26.9 |

Note: Agriculture includes crops and livestock
*Source:* *www.dahd.gov.in*

The share of gross value added of livestock sector to total agriculture (Crops & Livestock) has increased from 23.8% in 2011-12 to 26.7% in 2014-15 at constant prices. At current prices, the share has increased from 23.8% in 2011-12 to 26.9 % in 2014-15.The falling share of agriculture GVA to total GVA from all sectors and rising share of the livestock sector GVA in agricultural GVA indicates the growing importance of the livestock sector in the rural economy.

Table-1.2 shows the value of output received from various livestock groups during the period of 2011-12 to 2013-14. It is observed that the value of output from livestock sector increased from Rs. 4,85,103 crore in 2011-12 to Rs. 6,23,861 crore in 2013-14 *i.e* 28.60 per cent increased over the previous year. The value of output was found to be the highest from milk group followed by meat, dung, eggs and increment in stock in all the years.

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

| Item | Value of Output from Livestock Sector (at current prices) (Value = Rs. In Crores) | | | | | |
|---|---|---|---|---|---|---|
| | 2011-12 | | 2012-13 | | 2013-14 | |
| | Value | % to total | Value | % to total | Value | % to total |
| 1. Milk Group | 324895 | 66.97 | 368997 | 66.23 | 407396 | 65.3 |
| 2. Meat Group | 96287 | 19.85 | 114402 | 20.54 | 132360 | 21.22 |
| 3. Eggs | 16470 | 3.4 | 19352 | 3.47 | 22423 | 3.59 |
| 4. Dung | 32754 | 6.75 | 36936 | 6.63 | 41443 | 6.64 |
| 5. Increment in Stock | 9854 | 2.03 | 11609 | 2.08 | 12964 | 2.08 |
| 6. Others | 4843 | 1.00 | 5807 | 1.04 | 7275 | 1.17 |
| Value of Output (Livestock Sector) | 485103 | 100 | 557103 | 100 | 623861 | 100 |

Note: Others includes Wool & hair and Silk Worm Cocoons and Honey
*Source: www.nddb.coop*

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

Plan outlay for 2015-16 reflects a major compositional shift in the expenditure estimates. From the beginning of the planning period, Government of India has laid emphasis on the development of animal husbandry and dairy sector and allocated sizeable amount of fund for the development of the same. Table -1.3 shows that allocation on AH & D

**Table 1.3: Planned and Actual Expenditure on Animal Husbandry and Dairy Development during various Five-Year Plan periods (Rs. Crores at current prices)-All India**

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

*Source: GOI (2012)*

increased manifold over the plan period. The percentage expenditure on AH & D to total agriculture outlay was highest during the tenth five year plan followed by second and fourth

plan period. On the other hand, percentage expenditure on AH & D to total outlay was highest during the fourth five year plan and lowest in tenth plan period.

Plan wise outlay and expenditure under dairying in India has been increasing from first five year plan to twelfth five year plan. Table 1.4 indicates that total plan expenditure under animal husbandry from first plan increased from Rs.8.22 crores to Rs. 395.35 crores in 2015-16 (fourth year of twelfth plan) and during this period, expenditure on dairy development increased from Rs.7.78 crores to Rs. 119.13 crores.

**Table 1.4: Outlay and Expenditure of Central and Centrally Sponsored Schemes under Animal Husbandry and Dairying sector from First Plan –all India**

(Rs. in crore)

| Plan/Year | Total Plan | Animal Husbandry | | Dairy Development | | Total (AH & DD) | |
|---|---|---|---|---|---|---|---|
| | Outlay | Outlay | Exp. | Outlay | Exp. | Outlay | Exp. |
| First Plan (1950-55) | 1960 | 14.19 | 8.22 | 7.81 | 7.78 | 22 | 16 |
| Second Plan (1955-60) | 4600 | 38.5 | 21.42 | 17.44 | 12.05 | 55.94 | 33.47 |
| Third Plan (1960-65) | 8576.5 | 54.44 | 43.4 | 36.08 | 33.6 | 90.52 | 77 |
| Annual Plan (1966-67) | 6625.4 | 41.33 | 34 | 26.14 | 25.7 | 67.47 | 59.7 |
| Fourth Plan (1967-72) | 15778.8 | 94.1 | 75.51 | 139 | 78.75 | 233.1 | 154.26 |
| Fifth Plan | 39426.2 | - | 178.43 | - | - | 437.54 | 232.46 |
| Sixth Plan (1980-85) | 97500 | 60.46 | 39.08 | 336.1 | 298.34 | 396.56 | 337.42 |
| Seventh Plan (1985-90) | 180000 | 165.19 | 102.35 | 302.75 | 374.43 | 467.94 | 476.78 |
| Annual Plan (1990-91) | - | 43.71 | 36.18 | 79.67 | 41.43 | 123.38 | 77.61 |
| Annual Plan (1991-92) | - | 57.97 | 43.28 | 97.49 | 77.99 | 155.46 | 121.27 |
| Eighth Plan (1992-97) | 434100.1 | 400 | 305.43 | 900 | 818.05 | 1300 | 1123.48 |
| Ninth Plan(1997-2002) | 1677.88 | 772.02 | 445.84 | 251.95 | 146.85 | 1023.97 | 592.69 |
| Tenth Plan (2002-07) | 2500 | 1425.87 | 1421.89 | 289.54 | 285.79 | 1715.41 | 1707.68 |
| Eleventh Plan | 8174 | 4870.53 | 2330.8 | 580 | 576.31 | 5450.53 | 2907.11 |
| 2007-08 | 910 | 350.92 | 338.14 | 88.5 | 111.5 | 439.42 | 449.63 |
| 2008-09 | 1000 | 481 | 444.54 | 98 | 97.9 | 579 | 542.64 |
| 2009-10 | 1100 | 558.29 | 435.84 | 101.1 | 85.93 | 659.39 | 521.77 |
| 2010-11 | 1300 | 792.15 | 668.75 | 87.76 | 84.77 | 879.91 | 753.52 |
| 2011-12 | 1600 | 874.36 | 722.88 | 250.25 | 196.21 | 1124.61 | 919.09 |
| Twelfth Plan | 14179 | 7829 | - | 3781 | - | - | - |
| 2012-13 | 1910 | 1063.1 | 881.45 | 392 | 523.51 | 1455.1 | 889.61 |
| 2013-14 | 2025 | 1051.49 | 917.16 | 580 | 501.59 | 1631.49 | 1418.75 |
| 2014-15 | 2174 | 1118.57 | 768.37 | 843.99 | 648.42 | 1962.56 | 1416.79 |
| 2015-16 | 1491 | 400.43 | 395.35 | 111.44 | 119.13 | 516.87 | 514.48 |

*Source: Plan Co-ordination Unit, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, GOI*

Table-1.5 shows the public spending on livestock sector in India. From the Table, it is found that composition of public spending on dairy development to total spending at 2004-05 prices was highest during TE 1992-93 (41.50 %) and TE 2000-01 (38.60 %). However, veterinary services and animal health (29.10 %) was recorded as highest during TE 2008-09.

**Table 1.5 :Public Spending on Livestock Sector in India**

| **Particulars** | **TE 1992-93** | **TE 2000-01** | **TE 2008-09** |
|---|---|---|---|
| Total spending (Rs crore at 2004-05 prices) | 3,739.60 | 4,156.10 | 4,726.10 |
| Public spending % of total agricultural spending | 13.60 | 9.90 | 4.60 |
| Public spending as % of livestock VOP | 3.60 | 2.80 | 2.30 |
| Composition of public spending (%) on dairy development | 41.50 | 38.60 | 25.00 |
| Veterinary services and animal health | 23.70 | 24.10 | 29.10 |
| Cattle and buffalo development | 14.00 | 11.70 | 10.50 |
| Sheep and wool development | 2.70 | 2.40 | 2.00 |
| Piggery development | 1.80 | 0.50 | 0.40 |
| Poultry development | 3.10 | 2.40 | 2.40 |
| Fodder development | 0.90 | 1.00 | 1.00 |
| Direction and administration | 4.20 | 8.70 | 19.10 |
| Research, education and extension | 2.20 | 3.00 | 3.00 |
| Others | 5.80 | 7.60 | 7.50 |

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

## 1.4 Dairy Development in India

Dairy development in India has been acclaimed as one of the most successful development programmes under the world's largest integrated dairy development programme, 'Operation Flood' (Shiyani, 1996; NAAS, 2003). Nearly 51 per cent of milk production is contributed by buffalo followed by cow (45%) and goats (4%). Most of the milk is produced by the animals reared by small and marginal farmers and landless labourers. The per capita availability of milk in the country has also increased significantly in recent times. This represents sustained growth in the availability of milk and milk products for our growing population.

Government of India is making continuous efforts for strengthening of the dairy sector through various Central Sector Schemes like "National Programme for Bovine Breeding and Dairy Development (NPBBDD)", "National Dairy Plan (Phase-I)" and "Dairy Entrepreneurship Development Scheme."

The restructured Scheme NPBBDD was launched by merging four ongoing schemes i.e. Intensive Dairy Development Programme (IDDP), Strengthening Infrastructure for

Quality & Clean Milk Production (SIQ&CMP), Assistance to Cooperatives and National Project for Cattle & Buffalo Breeding with the budget provision of Rs.1800 crores for implementation during the 12th Five Year Plan.

In order to meet the growing demand for milk with a focus to improve milch animal productivity and increase milk production, the Government approved National Dairy Plan Phase-I (NDP-I) in February, 2012 with a total investment of about Rs.2242 crore for the period 2011-12 to 2016-17. NDP-I would help to meet the projected national demand of 150 million tonnes of milk by 2016-17 from domestic production through productivity enhancement, strengthening and expanding village level infrastructure for milk procurement and providing the producers with greater access to markets. The strategy involved 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 the implementing agencies like State Dairy Cooperative Federations/Unions/Milk Producers Companies. NDP-I would focus on 15 major milk producing States - Uttar Pradesh, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Bihar, West Bengal, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, Orissa and Kerala which account for over 90 per cent of the country's milk production. Now the area of Operation of NDP-I has been extended to three more States i.e. Uttarakhand, Chhattisgarh and Jharkhand. Coverage of NDP- I will however be across the country in terms of benefits accruing from the scheme.

**1.5 Cooperative Dairy Sector in India**

Dairy cooperatives played an important role in milk production in India. Some of the States doing exceptionally well dairy co-operatives are Maharashtra, Gujarat, Rajasthan, Karnataka and Uttar Pradesh. In Tamilnadu also, the performance is commendable. While farmers' cooperatives of various types play a useful role in promoting rural development, dairy cooperatives have special attributes that make them particularly suitable for a select group of the society. They can facilitate the process of development & contribute handsomely to raise the standard of living of the poor.

The main constraint that milk producers seek to overcome by acting collectively is the marketing of their product. The need to be assured of a secure market is a real one. It can be met by dairy farmers cooperatively establishing their own collection system and milk treatment facility in order to convert their perishable primary produce, which requires special and timely attention, into products with longer-keeping quality for marketing purposes.

The number of Dairy cooperatives in India during the period 1980-81 to 2015-16, has increased from 13,284 to 1,70,992 contrasting to 1,65,835 during 2013-14. About 15.83 million farmers have been brought under the ambit of village level dairy corporative societies up to March, 2016. Liquid milk procurement per day by the cooperatives stood at 42.56 million tonnes during 2015-16. Most of the dairy cooperatives however have continued to support the dairy farmers by ensuring that the price paid to the farmers is protected. This has resulted in excessive supply of milk to the dairy cooperatives resulting in the accumulation of a large quantity of Skimmed Milk Powder (SMP) with them. According to some reports, private companies have reduced the procurement volume and prices of liquid milk, thereby affecting farmers' income and the viability of smallholder dairy farms. Further, many private dairy plants that generally produce powder and other value-added products, have either closed down their operations or scaled down their milk collection causing hardship to the dairy farmers. For obvious reason, there was some stress in the current State of affairs of the dairy industry. The Government of India, as a result, came

**Table 1.6: Growth of Dairy Cooperative Societies in India**

| **Particulars** | **1980-81** | **1990-91** | **2000-01** | **2013-14** | **2015-16** |
|---|---|---|---|---|---|
| Dairy cooperatives (Nos.) | 13284 | 63415 | 92206 | 165835 | 170992 |
| Members (in thousands) | 1747 | 7482 | 10738 | 15399 | 15835 |
| Milk Procurement (000 kg/day) | 2562 | 9702 | 16504 | 37953 | 42557 |
| Milk procured (million tonnes) | 0.94 | 3.54 | 6.02 | 13.85 | 15.53 |
| % of milk output procured | 3 | 6.6 | 7.5 | 9.5 | 10 |

*Source: NDDB, Various issues*

forward with several initiatives to address the problems encountered the dairy sector, *viz.* approval of the proposal of reprocessing cost of milk powder under RKVY and enhancement of custom duty on butter, butter oil and *ghee* from 30 per cent to 40 per cent. (Annual Report, 2015-16, NDDB). Table-1.6 shows the basic statistics of Dairy Cooperative Societies in India.

Table-1.7 depicts the percentage share of major States in total milk procurement by cooperative sectors in India during the period of 1980-81 and 2015-16. It is found that percentage share of milk procurement increased in almost all the States except for Haryana, Uttar Pradesh, West Bengal, Gujarat, Madhya Pradesh and Tamilnadu. Zone one-wise analysis show that in east and south zone, milk procurement by the Co-operative sector is in increasing trend while, it shows a negative trend in case of west and north zone.

**Table 1.7: Percentage Share of Major States in Total Milk Procurement by Cooperative Sector in India**

| States/Regions | Percentage Share of Major States in Total Milk Procurement by Cooperative sector in India | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980-81 | 1990-91 | 2000-01 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 |
| Haryana | 1.29 | 0.97 | 1.67 | 2.02 | 1.95 | 1.86 | 1.16 | 1.17 | 1.15 | 1.06 |
| Himachal Pradesh | 0 | 0.14 | 0.15 | 0.21 | 0.23 | 0.24 | 0.22 | 0.18 | 0.14 | 0.13 |
| J & K | 0 | 0.11 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.03 |
| Punjab | 2.93 | 4.06 | 5.53 | 3.68 | 3.96 | 3.87 | 3.75 | 3.37 | 3.37 | 3.27 |
| Rajasthan | 5.39 | 3.75 | 5.37 | 6.39 | 6.22 | 6.07 | 5.88 | 6.57 | 6.68 | 6.12 |
| Uttar Pradesh | 2.5 | 3.94 | 4.79 | 2 | 1.92 | 1.73 | 1.48 | 1.09 | 1.06 | 0.76 |
| Uttarakhand | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.37 | 0.41 |
| North | 12.1 | 12.98 | 17.51 | 14.31 | 14.29 | 13.76 | 12.49 | 12.38 | 12.81 | 11.77 |
| Assam | 0 | 0.04 | 0.02 | 0.02 | 0.02 | 0.02 | 0.05 | 0.07 | 0.06 | 0.05 |
| Bihar | 0.12 | 0.98 | 2 | 2.85 | 4.16 | 3.7 | 3.73 | 4.35 | 4.42 | 4.06 |
| Jharkhand | 0 | 0 | 0 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 | 0.04 | 0.14 |
| Meghalaya | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03 | 0.03 |
| Mizoram | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.02 | 0.02 |
| Nagaland | 0 | 0.01 | 0.02 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| Odisha | 0 | 0.42 | 0.57 | 0.93 | 1.05 | 1.05 | 1.16 | 1.14 | 1.16 | 1.23 |
| Sikkim | 0 | 0.04 | 0.04 | 0.05 | 0.07 | 0.05 | 0.04 | 0.04 | 0.04 | 0.07 |
| Tripura | 0 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| West Bengal | 1.21 | 0.54 | 1.24 | 1.01 | 1.04 | 0.76 | 0.52 | 0.47 | 0.41 | 0.37 |
| East | 1.33 | 2.06 | 3.89 | 4.92 | 6.38 | 5.61 | 5.53 | 6.11 | 6.19 | 5.99 |
| Chhattisgarh | 0 | 0 | 0 | 0.09 | 0.1 | 0.1 | 0.11 | 0.13 | 0.14 | 0.17 |
| Goa | 0 | 0.16 | 0.19 | 0.14 | 0.15 | 0.14 | 0.14 | 0.18 | 0.17 | 0.16 |
| Gujarat | 52.46 | 31.97 | 27.67 | 35 | 34.97 | 36.4 | 37.91 | 39.68 | 40.3 | 41.07 |
| Madhya Pradesh | 2.65 | 2.64 | 1.93 | 2.03 | 2.25 | 2.51 | 2.43 | 2.41 | 2.91 | 2.42 |
| Maharashtra | 6.44 | 19.29 | 18.05 | 12.18 | 11.59 | 10.9 | 10.11 | 9.02 | 8.54 | 8.56 |
| West | 61.55 | 54.07 | 47.85 | 49.45 | 49.04 | 50.07 | 50.7 | 51.43 | 52.06 | 52.39 |
| Andhra Pradesh | 3.08 | 7.86 | 5.33 | 5.58 | 5.24 | 5.24 | 5.94 | 5.06 | 3.22 | 3.13 |
| Karnataka | 10.19 | 9.45 | 11.43 | 13.78 | 14.29 | 14.9 | 14.95 | 15.11 | 15.44 | 15.23 |
| Kerala | 0 | 1.91 | 3.91 | 2.97 | 2.63 | 2.79 | 2.71 | 2.82 | 2.68 | 2.58 |
| Tamil Nadu | 11.75 | 11.4 | 9.8 | 8.8 | 8.01 | 7.53 | 7.59 | 6.98 | 6.42 | 7.14 |
| Telangana | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.11 | 1.67 |
| Pondicherry | 0 | 0.27 | 0.27 | 0.19 | 0.13 | 0.1 | 0.1 | 0.11 | 0.07 | 0.1 |
| South | 25.02 | 30.89 | 30.75 | 31.33 | 30.29 | 30.56 | 31.28 | 30.08 | 28.94 | 29.86 |

*Source: NDDB Annual Reports*

## 1.6 Growth and Compositional Changes in Livestock and Bovine Population

India has vast livestock base which plays a vital role in improving the socio-economic conditions of the rural masses. The species wise population of animals in India from 1951 to 2012 is given in Table -1.8. The livestock population in India increased from 292.8 million in 1951 to 512.06 million in 2012 as per 19$^{th}$ livestock Census in the country. Positive growth rate (2007-12) was found against the population of Buffaloes, Horses & Ponies, Mules and Mithuns while negative growth was recorded against Cattle, Sheep, Goats, Camels, Pigs, Donkeys and Yaks.

| **Table 1.8: Livestock Population in India during 1951-2012 as per Livestock Census** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ( In Million Numbers ) | | | | | | | | | | | | |
| **Species** | **1951** | **1956** | **1961** | **1966** | **1972** | **1977** | **1987** | **1997** | **2003** | **2007** | **2012** | **Growth Rate (%) 2007-12** |
| 1. Cattle | 155.3 | 158.7 | 175.6 | 176.2 | 178.3 | 180 | 200 | 198.9 | 185.2 | 199.1 | 190.9 | -4.10 |
| 2. Buffaloes | 43.40 | 44.9 | 51.20 | 53 | 57.4 | 62 | 76 | 89.92 | 97.92 | 105.3 | 108.7 | 3.19 |
| 3. Sheep | 39.10 | 39.3 | 40.20 | 42.4 | 40 | 41 | 45.7 | 57.49 | 61.47 | 71.56 | 65.07 | -9.07 |
| 4. Goats | 47.20 | 55.4 | 60.90 | 64.6 | 67.5 | 75.6 | 110 | 122.7 | 124.4 | 140.5 | 135.17 | -3.82 |
| 5. Horses & ponies | 1.50 | 1.50 | 1.30 | 1.1 | 0.9 | 0.9 | 0.8 | 0.83 | 0.75 | 0.61 | 0.63 | 3.28 |
| 6. Camels | 0.60 | 0.80 | 0.90 | 1 | 1.1 | 1.1 | 1 | 0.91 | 0.63 | 0.52 | 0.4 | -23.07 |
| 7. Pigs | 4.40 | 4.90 | 5.20 | 5 | 6.9 | 7.6 | 10.6 | 13.29 | 13.52 | 11.13 | 10.29 | -7.54 |
| 8. Mules | 0.06 | 0.04 | 0.05 | 0.08 | 0.08 | 0.09 | 0.17 | 0.22 | 0.18 | 0.14 | 0.2 | 42.85 |
| 9. Donkeys | 1.30 | 1.10 | 1.10 | 1.1 | 1 | 1 | 0.96 | 0.88 | 0.65 | 0.44 | 0.32 | -27.27 |
| 10. Yaks | - | - | 0.02 | 0.03 | 0.04 | 0.13 | 0.04 | 0.06 | 0.06 | 0.08 | 0.08 | -7.64 |
| 11. Mithuns | - | - | - | - | - | - | 0.12 | 0.18 | 0.28 | 0.26 | 0.3 | 15.28 |
| Total Livestock | 292.80 | 306.60 | 335.40 | 344.10 | 353.60 | 369 | 445 | 485.4 | 485 | 529.7 | 512.06 | -3.33 |

Note: Totals may not tally due to rounding of figures.

*Source: Livestock Census, Directorate of Economics & Statistics and Animal Husbandry, Statistics Division, Department of Animal Husbandry, Dairying & Fisheries, M/O Agriculture & FW.*

Table - 1.9 shows State wise bovine stock according to 19$^{th}$ Livestock Census in India. It has been observed from the table that Uttar Pradesh accounts for highest share (18.38%) of bovine stock in India followed by Rajasthan (10.06%), Madhya Pradesh (8.41%), Bihar (7.50%) and Gujarat (7.34%).

## Table 1.9: Milch Animal Population by States (2012)

| State / UT's | Adult Female Bovine Population by States (2012) (In thousands) | | | | | | Total Livestock | |
|---|---|---|---|---|---|---|---|---|
| | Crossbred Over 2 1/2 years | Indigenous Over 3 years | Total Cows | Female Buffalo >3 years | Total Cows & Buffaloes | % to all India total | (000) | % to all India total |
| A & N Islands | 8 | 10 | 18 | 2 | 20 | 0.02 | 155 | 0.03 |
| Andhra Pradesh | 1251 | 2228 | 3479 | 5763 | 9241 | 6.93 | 56099 | 10.96 |
| Arunachal Pradesh | 11 | 133 | 144 | 1 | 145 | 0.11 | 1413 | 0.28 |
| Assam | 175 | 3335 | 3531 | 157 | 3688 | 2.77 | 19082 | 3.73 |
| Bihar | 2023 | 3959 | 5982 | 4017 | 9999 | 7.5 | 32939 | 6.43 |
| Chandigarh | 5 | 1 | 6 | 10 | 16 | 0.01 | 24 | 0 |
| Chatisgarh | 89 | 3238 | 3327 | 409 | 3736 | 2.8 | 15044 | 2.94 |
| D & N Haveli | 0 | 9 | 9 | 1 | 10 | 0.01 | 50 | 0.01 |
| Daman & Diu | 0 | 1 | 1 | 0 | 1 | 0 | 5 | 0 |
| Goa | 10 | 14 | 25 | 16 | 41 | 0.03 | 146 | 0.03 |
| Gujarat | 1048 | 3092 | 4141 | 5646 | 9787 | 7.34 | 27128 | 5.3 |
| Haryana | 522 | 322 | 844 | 2914 | 3758 | 2.82 | 8820 | 1.72 |
| Himachal Pradesh | 549 | 403 | 952 | 423 | 1375 | 1.03 | 4844 | 0.95 |
| J& K | 703 | 525 | 1228 | 417 | 1644 | 1.23 | 9201 | 1.8 |
| Jharkhand | 137 | 2486 | 2622 | 398 | 3020 | 2.27 | 18053 | 3.53 |
| Karnataka | 1829 | 2540 | 4369 | 2056 | 6425 | 4.82 | 27702 | 5.41 |
| Kerala | 630 | 36 | 666 | 10 | 676 | 0.51 | 2735 | 0.53 |
| Lakshadweep | 0 | 2 | 2 | 0 | 2 | 0 | 50 | 0.01 |
| Madhya Pradesh | 415 | 6538 | 6954 | 4251 | 11204 | 8.41 | 36333 | 7.1 |
| Maharashtra | 2138 | 3302 | 5440 | 3359 | 8799 | 6.6 | 32489 | 6.34 |
| Manipur | 20 | 77 | 96 | 23 | 119 | 0.09 | 696 | 0.14 |
| Meghalaya | 19 | 333 | 352 | 4 | 357 | 0.27 | 1958 | 0.38 |
| Mizoram | 6 | 10 | 16 | 2 | 18 | 0.01 | 312 | 0.06 |
| Nagaland | 52 | 38 | 90 | 9 | 99 | 0.07 | 911 | 0.18 |
| Nct Of Delhi | 32 | 15 | 47 | 95 | 142 | 0.11 | 360 | 0.07 |
| Odisha | 575 | 2884 | 3459 | 250 | 3709 | 2.78 | 20732 | 4.05 |
| Pondicherry | 31 | 1 | 32 | 1 | 33 | 0.02 | 120 | 0.02 |
| Punjab | 1182 | 115 | 1297 | 2805 | 4101 | 3.08 | 8117 | 1.59 |
| Rajasthan | 929 | 5540 | 6470 | 6933 | 13403 | 10.06 | 57732 | 11.27 |
| Sikkim | 57 | 5 | 62 | 0 | 62 | 0.05 | 292 | 0.06 |
| Tamilnadu | 3411 | 1074 | 4485 | 423 | 4908 | 3.68 | 22723 | 4.44 |
| Tripura | 54 | 289 | 343 | 4 | 347 | 0.26 | 1936 | 0.38 |
| Uttar Pradesh | 1828 | 7241 | 9069 | 15432 | 24501 | 18.38 | 68715 | 13.42 |
| Uttarakhand | 259 | 548 | 807 | 582 | 1389 | 1.04 | 4795 | 0.94 |
| West Bengal | 1270 | 5053 | 6323 | 172 | 6494 | 4.87 | 30348 | 5.93 |
| ALL | 21268 | 55417 | 76685 | 56586 | 133271 | 100 | 512057 | 100 |

*Source: GOI (2016)*

### 1.7 Growth in Milk Production and Per Capita Availability

Table 1.10 shows the year- wise milk production and per capita availability in India (gram/day).Table shows that milk production has increased from 17 million tonnes in 1950-51 to 155.50 tonnes in 2015-16. Accordingly, per capita availability also increased from 130 gram/day to 337 gram/day during the same period. But India is yet to attain the RDA as prescribed by the ICMR, despite being the largest milk producing country in the world.

**Table 1.10 : Milk production and Per Capita Availability in India**

| Year | Production | | Per Capita Availability | |
|---|---|---|---|---|
| | Million Tonnes | Year to Year Growth in % | gms/day | Year to Year Growth in % |
| 1950-51 | 17 | - | 130 | - |
| 1960-61 | 20 | 1.76 | 126 | -0.31 |
| 1968-69 | 21.2 | 0.75 | 112 | -1.39 |
| 1973-74 | 23.2 | 1.18 | 110 | -0.22 |
| 1980-81 | 31.6 | 5.17 | 128 | 2.34 |
| 1990-91 | 53.9 | 7.06 | 176 | 3.75 |
| 1991-92 | 55.6 | 7.59 | 178 | 3.91 |
| 1992-93 | 58 | 4.32 | 182 | 2.25 |
| 1993-94 | 60.6 | 4.48 | 187 | 2.75 |
| 1994-95 | 63.8 | 5.28 | 194 | 3.74 |
| 1995-96 | 66.2 | 3.76 | 197 | 1.55 |
| 1996-97 | 69.1 | 4.38 | 202 | 2.54 |
| 1997-98 | 72.1 | 4.34 | 207 | 2.48 |
| 1998-99 | 75.4 | 4.58 | 213 | 2.90 |
| 1999-00 | 78.3 | 3.85 | 217 | 1.88 |
| 2000-01 | 80.6 | 2.94 | 220 | 1.38 |
| 2001-02 | 84.4 | 4.71 | 225 | 2.27 |
| 2002-03 | 86.2 | 2.13 | 230 | 2.22 |
| 2003-04 | 88.1 | 2.20 | 231 | 0.43 |
| 2004-05 | 92.5 | 4.99 | 233 | 0.87 |
| 2005-06 | 97.1 | 4.97 | 241 | 3.43 |
| 2006-07 | 102.6 | 5.66 | 251 | 4.15 |
| 2007-08 | 107.9 | 5.17 | 260 | 3.59 |
| 2008-09 | 112.2 | 3.99 | 266 | 2.31 |
| 2009-10 | 116.4 | 3.74 | 273 | 2.63 |
| 2010-11 | 121.8 | 4.64 | 281 | 2.93 |
| 2011-12 | 127.9 | 5.01 | 290 | 3.20 |
| 2012-13 | 132.4 | 3.52 | 299 | 3.10 |
| 2013-14 | 137.7 | 4.00 | 307 | 2.68 |
| 2014-15 | 146.3 | 6.25 | 322 | 4.89 |
| 2015-16 | 155.5 | 6.29 | 337 | 4.66 |

*Source: GOI (2016)*

The status of State- wise milk production and percentage share to total during 2001-02 to 2015-16 are presented in Table-1.11. It is seen that, Uttar Pradesh contributed highest amount of milk at all India total (17 percent), followed by Rajasthan (11.90 per cent), Gujarat (7.90 per cent) and Madhya Pradesh (7.80 per cent).

**Table 1.11: State - wise milk production in India**

| State | Milk Production (000 tonnes) | | | | | % to all India Total |
|---|---|---|---|---|---|---|
| | 2001-02 | 2005-06 | 2010-11 | 2014-15 | 2015-16 | |
| Andhra Pradesh | 5814 | 7624 | 11203 | 9656 | 10817 | 7 |
| Arunachal Pradesh | 42 | 48 | 28 | 46 | 50 | 0 |
| Assam | 682 | 747 | 790 | 829 | 843 | 0.5 |
| Bihar | 2664 | 5060 | 6517 | 7775 | 8288 | 5.3 |
| Goa | 45 | 56 | 60 | 67 | 54 | 0 |
| Gujarat | 5862 | 6960 | 9321 | 11691 | 12262 | 7.9 |
| Haryana | 4978 | 5299 | 6267 | 7901 | 8381 | 5.4 |
| Himachal Pradesh | 756 | 869 | 1102 | 1172 | 1283 | 0.8 |
| J & K | 1360 | 1400 | 1609 | 1951 | 2273 | 1.5 |
| Karnataka | 4797 | 4022 | 5114 | 6121 | 6344 | 4.1 |
| Kerala | 2718 | 2063 | 2645 | 2711 | 2650 | 1.7 |
| Madhya Pradesh | 5283 | 6283 | 7514 | 10779 | 12148 | 7.8 |
| Maharashtra | 6094 | 6769 | 8044 | 9542 | 10153 | 6.5 |
| Manipur | 68 | 77 | 78 | 82 | 79 | 0.1 |
| Meghalaya | 66 | 73 | 79 | 83 | 84 | 0.1 |
| Mizoram | 14 | 15 | 11 | 20 | 22 | 0 |
| Nagaland | 57 | 74 | 76 | 76 | 77 | 0 |
| Orissa | 929 | 1342 | 1671 | 1903 | 1903 | 1.2 |
| Punjab | 7932 | 8909 | 9423 | 10351 | 10774 | 6.9 |
| Rajasthan | 7758 | 8713 | 13234 | 16934 | 18500 | 11.9 |
| Sikkim | 37 | 48 | 43 | 50 | 67 | 0 |
| Tamil Nadu | 4988 | 5474 | 6831 | 7132 | 7244 | 4.7 |
| Tripura | 90 | 87 | 104 | 141 | 152 | 0.1 |
| Uttar Pradesh | 14648 | 17356 | 21031 | 25198 | 26387 | 17 |
| West Bengal | 3515 | 3891 | 4471 | 4961 | 5038 | 3.2 |
| A&N Islands | 23 | 20 | 25 | 16 | 15 | 0 |
| Chandigarh | 43 | 46 | 45 | 44 | 43 | 0 |
| D&N Haveli | 8 | 5 | 11 | 9 | 9 | 0 |
| Daman & Diu | 1 | 1 | 1 | 1 | 1 | 0 |
| Delhi | 294 | 310 | 480 | 280 | 281 | 0.2 |
| Lakshadweep | 2 | 2 | 2 | 4 | 3 | 0 |
| Pondicherry | 37 | 43 | 47 | 48 | 48 | 0 |
| Chhattisgarh | 795 | 839 | 1029 | 1232 | 1277 | 0.8 |
| Uttarakhand | 1066 | 1206 | 1383 | 1565 | 1656 | 1.1 |
| Jharkhand | 940 | 1335 | 1555 | 1734 | 1812 | 1.2 |
| Telangana | - | - | - | 4207 | 4442 | 2.9 |
| All India | 84406 | 97066 | 121848 | 146314 | 155491 | 100 |

*Source: State/UT Animal Husbandry Departments, India*

Table-1.12 exhibits the per capita yield of milk per cow and per buffalo (kg) in India and some other selected countries. Table shows that per capita yield of milk is much lower in India as compared to the selected countries of the World except for Sri Lanka.

**Table 1.12 :Milk yield in India and other selected countries (2012)**

| Country | Yield (kg/animal) | |
|---|---|---|
| | **Cow** | **Buffalo** |
| India | 1196 | 1709.8 |
| Israel | 11579.7 | NA |
| Canada | 8816.8 | NA |
| Denmark | 8529.3 | NA |
| USA | 9841.3 | NA |
| Saudi Arabia | 10802.5 | NA |
| South Korea | 9895.8 | NA |
| Pakistan | 1263.5 | 1971 |
| Sri Lanka | 842.9 | 654.5 |
| World average | 2318.7 | 1612.4 |

Note: N.A. Not Available
*Source: FAOSTAT.*

## 1.8 Per Capita Milk availability in India

It has already been mentioned that per capita availability of milk in the country which was 130 gram per day during 1950-51 has increased to 337 gram per day in 2015-16 (4.7 per cent over the previous year) as against the world average of 293.7 grams per day during 2013. This indicates sustained growth in the availability of milk and milk products in India over the years.

Table 1.13 shows State wise growth of per capita availability of milk during 2009-10 to 2015-16 (gram/day). Table reflects that per capita availability of milk was highest in Punjab and lowest in Goa. The estimated ACGR (%) is found to be highest in Arunachal Pradesh (12.76) and lowest in Delhi (-13.79).

**Table 1.13: State wise Per Capita Availability of Milk during 2009-10 to 2015-16**

(figures in gram/day)

| Sl. No. | States/UTs | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 | ACGR (%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Andhra Pradesh | 342 | 364 | 391 | 409 | 413 | 436 | 475 | 5.13 |
| 2 | Arunachal Pradesh | 59 | 63 | 44 | 49 | 93 | 98 | 105 | 12.76 |
| 3 | Assam | 69 | 71 | 70 | 69 | 69 | 70 | 74 | 0.60 |
| 4 | Bihar | 175 | 184 | 175 | 188 | 195 | 208 | 219 | 3.73 |
| 5 | Chhattisgarh | 110 | 117 | 120 | 127 | 130 | 130 | 133 | 3.12 |
| 6 | Goa | 96 | 93 | 113 | 92 | 98 | 94 | 74 | -3.17 |
| 7 | Gujarat | 418 | 435 | 445 | 476 | 506 | 527 | 545 | 4.78 |
| 8 | Haryana | 662 | 679 | 720 | 767 | 800 | 839 | 877 | 5.02 |
| 9 | Himachal Pradesh | 397 | 446 | 447 | 460 | 461 | 466 | 505 | 3.05 |
| 10 | Jammu & Kashmir | 379 | 378 | 352 | 316 | 302 | 352 | 395 | -0.61 |
| 11 | Jharkhand | 130 | 136 | 145 | 146 | 146 | 147 | 152 | 2.28 |
| 12 | Karnataka | 226 | 237 | 244 | 262 | 272 | 276 | 282 | 3.92 |
| 13 | Kerala | 201 | 210 | 223 | 216 | 203 | 206 | 200 | -0.53 |
| 14 | Madhya Pradesh | 278 | 287 | 308 | 327 | 349 | 386 | 428 | 7.45 |
| 15 | Maharashtra | 190 | 197 | 206 | 213 | 219 | 228 | 239 | 3.79 |
| 16 | Manipur | 88 | 88 | 80 | 80 | 80 | 80 | 76 | -2.23 |
| 17 | Meghalaya | 83 | 83 | 74 | 83 | 84 | 84 | 83 | 0.54 |
| 18 | Mizoram | 29 | 31 | 35 | 36 | 40 | 53 | 57 | 12.24 |
| 19 | Nagaland | 96 | 93 | 108 | 94 | 95 | 88 | 89 | -1.65 |
| 20 | Odisha | 112 | 113 | 112 | 114 | 122 | 124 | 124 | 2.08 |
| 21 | Punjab | 944 | 937 | 945 | 961 | 980 | 1003 | 1032 | 1.58 |
| 22 | Rajasthan | 509 | 538 | 539 | 555 | 572 | 655 | 704 | 5.22 |
| 23 | Sikkim | 200 | 194 | 202 | 186 | 200 | 215 | 282 | 4.48 |
| 24 | Tamil Nadu | 278 | 278 | 265 | 541 | 280 | 282 | 283 | 0.49 |
| 25 | Tripura | 77 | 80 | 83 | 88 | 95 | 103 | 109 | 6.20 |
| 26 | Uttar Pradesh | 283 | 289 | 310 | 312 | 318 | 326 | 335 | 2.80 |
| 27 | Uttarakhand | 387 | 383 | 384 | 403 | 418 | 416 | 434 | 2.14 |
| 28 | West Bengal | 133 | 137 | 140 | 145 | 145 | 145 | 145 | 1.47 |
| 29 | A&N Islands | 137 | 142 | 187 | 131 | 84 | 90 | 87 | -10.40 |
| 30 | Chandigarh | 95 | 87 | 117 | 103 | 101 | 97 | 93 | 0.02 |
| 31 | Dadra & N. Haveli | 86 | 83 | 89 | 101 | 98 | 74 | 72 | -2.35 |
| 32 | Daman & Diu | 15 | 14 | 11 | 13 | 10 | 10 | 10 | -6.84 |
| 33 | Delhi | 72 | 72 | 82 | 41 | 39 | 37 | 36 | -13.79 |
| 34 | Lakshadweep | 84 | 71 | 85 | 82 | 219 | 147 | 113 | 12.47 |
| 35 | Puducherry | 96 | 94 | 99 | 113 | 111 | 110 | 108 | 2.83 |
| All India | | 273 | 281 | 290 | 299 | 307 | 322 | 337 | 3.49 |

*Source: Livestock Census, Directorate of Economics & Statistics and Animal Husbandry, Statistics Division, Department of Animal Husbandry*

## 1.9 Status of Availability of Feed and Fodder

The status and development of dairy sector is closely related with the production and supply of feed and fodder. Fodder production is also an important traditional part of the present cropping system both for conserved feed and fertility enhancement and maintenance. Up to 10% of the agricultural lands are cultivated with fodder crops. Lack of quality fodder

'especially during winter' is one of the major constraints to improve livestock production. Cattle are fed both on rangelands and in the sheds. In winter all livestock are fed indoors and rely on crop residues and conserved fodder. Fodder production and its utilization depend on the cropping pattern, climate, socioeconomic conditions and type of livestock. The cattle and buffaloes are normally fed on the fodder available from the cultivated areas, supplemented to a small extent by the harvested grasses. The three major sources of fodder supply are crop residues, cultivated fodder and fodder from common property resources like forests, permanent pastures and grazing lands.

At present, the country faces a net deficit of green fodder, dry crop residues and feeds. Moreover, available forages are poor in quality, being deficient in available energy, protein and minerals. To compensate for the low productivity of the livestock, farmers maintain a large herd of animals, which adds to the pressure on land and fodder resources.

Due to ever-increasing population pressure of human beings, the arable land is mainly used for food and cash crops, thus there is little chance of having good-quality arable land available for fodder production, unless milk production becomes remunerative to the farmer as compared to other crops.

Table-1.14 presents the State-wise area under fodder crops and permanent pasture & other grazing land and it's percentage to Gross Cropped Area (GCA). It is found that in India, only 2.80 per cent of the GCA was used for fodder crop cultivation and only 3.10 per cent of the GCA was earmarked as permanent pasture and grazing land. Among the States, Rajasthan has the highest area under fodder crops followed by Punjab and Haryana. In case of permanent pasture and grazing land, Himachal Pradesh occupied highest area followed by Chhattisgarh and Rajasthan. India could face a huge crisis in augmenting milk production, if the acute shortage of fodder supply is not dealt with soon. The fodder crisis may worsen further as large areas of Punjab, Haryana, Rajasthan and Western Uttar Pradesh have started getting scanty of monsoon rainfall for years together. According to an assessment made by the Ministry of Agriculture & FW, there is a large gap between demand and supply of green and dry fodder for the livestock in the Country. According to the study, the shortage of dry, fodder, green fodder and concentrate is as high as 40 per cent and fodder which is being only cultivated is about 4 per cent of the agricultural land which is not adequate enough to meet the requirement of fodder in the Country.

**Table 1.14 : State-wise Area under Fodder Cultivation and Permanent Pastures and Other Grazing Lands in India (000 ha)**

| States/UTs | Fodder Crops (2012-2013) | | Permanent Pastures and Other Grazing Land (2013-2014) | |
|---|---|---|---|---|
| | (000 ha) | % to GCA | (000 ha) | % to GCA |
| Andaman and Nicobar Islands | 0 | 0 | 4 | 0.5 |
| Andhra Pradesh | 87 | 0.3 | 212 | 1.3 |
| Arunachal Pradesh | 0 | 0 | 18 | 0.2 |
| Assam | 10 | 0.1 | 168 | 2.1 |
| Bihar | 24 | 0.3 | 15 | 0.2 |
| Chandigarh | 0 | 0 | 0 | 0 |
| Chhattisgarh | 1 | 0 | 882 | 6.5 |
| Dadra and Nagar Haveli | 1 | 2 | 1 | 2 |
| Daman and Diu | 0 | 0 | 0 | 0 |
| Delhi | 1 | 0.7 | 0 | 0 |
| Goa | 0 | 0 | 1 | 0.3 |
| Gujarat | 850 | 4.3 | 851 | 4.3 |
| Haryana | 432 | 9.8 | 26 | 0.6 |
| Himachal Pradesh | 8 | 0.1 | 1510 | 27.1 |
| Jammu and Kashmir | 53 | 0.2 | 114 | 0.5 |
| Jharkhand | 0 | 0 | 114 | 1.4 |
| Karnataka | 33 | 0.2 | 906 | 4.7 |
| Kerala | 5 | 0.1 | 0 | 0 |
| Lakshadweep | 0 | 0 | 0 | 0 |
| Madhya Pradesh | 406 | 1.3 | 1291 | 4.2 |
| Maharashtra | 901 | 2.9 | 1242 | 4 |
| Manipur | 0 | 0 | 1 | 0 |
| Meghalaya | 0 | 0 | 0 | 0 |
| Mizoram | 0 | 0 | 5 | 0.2 |
| Nagaland | 0 | 0 | 0 | 0 |
| Odisha | 0 | 0 | 524 | 3.4 |
| Puducherry | 0 | 0 | 0 | 0 |
| Punjab | 510 | 10.1 | 5 | 0.1 |
| Rajasthan | 4853 | 14.2 | 1694 | 4.9 |
| Sikkim | 0 | 0 | 0 | 0 |
| Tamil Nadu | 179 | 1.4 | 110 | 0.8 |
| Telangana | 0 | 0 | 302 | 2.6 |
| Tripura | 0 | 0 | 1 | 0.1 |
| Uttar Pradesh | 800 | 3.3 | 65 | 0.3 |
| Uttarakhand | 32 | 0.6 | 192 | 3.6 |
| West Bengal | 3 | 0 | 2 | 0 |
| India | 9188 | 2.8 | 10256 | 3.10 |

*Source: Livestock Census, Directorate of Economics & Statistics and Animal Husbandry, Statistics Division, Department of Animal Husbandry*

Table-1.15 shows the supply, demand and deficit of green and dry fodder during the period of 1995 -2025. It is found that demand and supply gap is increasing gradually during the reference period. According to the estimate, the projected deficit of green and dry fodder will be 64.21 per cent and 24.81 per cent respectively in 2020. The corresponding figures for 2025 were recorded at 64.87 per cent and 24.92 per cent.

**Table 1.15 : Supply and Demand of Green and Dry Fodder**

*(Figures in million tonnes)*

| Year | Supply | | Demand | | Deficit as % of Demand | |
|---|---|---|---|---|---|---|
| | Green | Dry | Green | Dry | Green | Dry |
| 1995 | 379.3 | 421 | 947 | 526 | 59.95 | 19.95 |
| 2000 | 384.5 | 428 | 988 | 549 | 61.10 | 21.93 |
| 2005 | 389.9 | 443 | 1025 | 569 | 61.96 | 22.08 |
| 2010 | 395.2 | 451 | 1061 | 589 | 62.76 | 23.46 |
| 2015 | 400.6 | 466 | 1097 | 609 | 63.50 | 23.56 |
| 2020 | 405.9 | 473 | 1134 | 630 | 64.21 | 24.81 |
| 2025 | 411.3 | 488 | 1170 | 650 | 64.87 | 24.92 |

*Source: Based on 10 &11th five year plan document Vision 2030.*

Not only India is facing fodder scarcity, simultaneously Indian feed and fodder for livestock are also having nutrients deficiency. It is found that the fodder qualities are not healthy and do not meet the feeding standards. The deficit in crude protein (CP) and total digestible nutrients (TDN) of livestock feed and fodder in India are given in tables.

Table 1.16 depicts the availability, requirement & deficit of crude protein (CP) & Total Digestible Nutrients (TDN).

**Table 1.16 : Availability, Requirement & Deficit of Crude Protein (CP) & Total Digestible Nutrients (TDN) including CP & TDN from concentrates**

| Year | Crude Protein (CP) and Total Digestible Nutrients (TDN) *(Figures in million tonnes)* | | | | | |
|---|---|---|---|---|---|---|
| | Requirement | | Availability | | Deficit (%) | |
| | CP | TDN | CP | TDN | CP | TDN |
| 2000 | 44.49 | 321.29 | 30.81 | 242.42 | 30.75 | 24.55 |
| 2005 | 46.12 | 333.11 | 32.62 | 253.63 | 29.27 | 23.86 |
| 2010 | 47.76 | 344.93 | 34.18 | 262.02 | 28.44 | 24.04 |
| 2015 | 49.39 | 356.73 | 35.98 | 273.24 | 27.15 | 23.41 |
| 2020 | 51.04 | 368.61 | 37.5 | 281.23 | 26.52 | 23.70 |
| 2025 | 52.68 | 380.49 | 39.31 | 292.45 | 25.38 | 23.14 |

*Source: www.indiastat.com*

Table-1.17 shows the availability, requirements and deficit of concentrates for livestock during the period from 2002-03 to 2006-07. It is found that the deficit ranged between 64.27 per cent to 63.03 per cent during the reference period.

**Table 1.17 :Availability, requirements and deficit of concentrates for livestock**

| Particulars | Availability, requirements and deficit of concentrates for livestock *(MT )* | | | | |
|---|---|---|---|---|---|
| | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 |
| Availability | 41.96 | 43.14 | 44.35 | 45.63 | 48.27 |
| Requirement | 117.44 | 120.52 | 123.59 | 127.09 | 130.55 |
| Deficit (%) | 64.27 | 64.21 | 64.12 | 64.1 | 63.03 |

*Source: www.indiastat.com*

**Table 1.18 : State-wise Availability and Requirement of Fodder in India (2008)**

*(Dry Matter in Million Tonnes)*

| States/UTs | Availability | | Requirement | |
|---|---|---|---|---|
| | Crop Residues | Greens | Crop Residues | Greens |
| Andhra Pradesh | 15.69 | 4.88 | 31.71 | 16.91 |
| Arunachal Pradesh | 0.47 | 1.57 | 1 | 0.53 |
| Assam | 5.82 | 0.95 | 12.39 | 6.61 |
| Bihar | 16.23 | 0.81 | 23.49 | 12.53 |
| Chhattisgarh | 9.93 | 2.83 | 14.93 | 7.96 |
| Goa | 0.13 | 0.05 | 0.15 | 0.08 |
| Gujarat | 10.61 | 14.48 | 22.32 | 11.9 |
| Haryana | 8.75 | 6.57 | 9.95 | 5.31 |
| Himachal Pradesh | 2.3 | 1.98 | 4.6 | 2.45 |
| Jammu and Kashmir | 2.53 | 0.64 | 6.79 | 3.62 |
| Jharkhand | 4.1 | 0.88 | 13.59 | 7.25 |
| Karnataka | 14.59 | 3.55 | 20.66 | 11.02 |
| Kerala | 0.71 | 0.39 | 2.91 | 1.55 |
| Madhya Pradesh | 24.3 | 11.65 | 37.41 | 19.95 |
| Maharashtra | 22.21 | 25.12 | 33.68 | 17.96 |
| Manipur | 0.36 | 0 | 0.72 | 0.38 |
| Meghalaya | 0.31 | 0.4 | 1.17 | 0.62 |
| Mizoram | 0.15 | 0.5 | 0.06 | 0.03 |
| Nagaland | 0.56 | 0.3 | 0.74 | 0.4 |
| Orissa | 12.25 | 2.46 | 22.27 | 11.88 |
| Punjab | 13.71 | 7.38 | 10.58 | 5.64 |
| Rajasthan | 21.67 | 33.53 | 33.53 | 17.88 |
| Sikkim | 0.23 | 0.01 | 0.25 | 0.13 |
| Tamil Nadu | 7.01 | 3.7 | 16.46 | 8.78 |
| Tripura | 0.53 | 0.19 | 1.09 | 0.58 |
| Uttar Pradesh | 42.07 | 15.73 | 57.19 | 30.5 |
| Uttarakhand | 2.05 | 1.73 | 4.9 | 2.61 |
| West Bengal | 13.77 | 0.51 | 30.3 | 16.16 |
| A& N Islands | 0.02 | 0 | 0.11 | 0.06 |
| Chandigarh | 0 | 0 | 0.04 | 0.02 |
| Dadra & Nagar Haveli | 0.04 | 0.2 | 0.8 | 0.4 |
| Daman and Diu | 0.01 | 0 | 0.1 | 0 |
| Delhi | 0.09 | 0.1 | 0.43 | 0.23 |
| Lakshadweep | 0 | 0 | 0.1 | 0 |
| Puducherry | 0.06 | 0.01 | 0.11 | 0.06 |
| India | 253.26 | 142.82 | 415.83 | 221.63 |

Table-1.18 presents the State- wise availability and requirement of fodder in India in the form of crop residues and green fodder. It shows that, almost all the States have deficit in

fodder production except for Mizoram, Arunachal Pradesh, Mizoram, Punjab, Gujarat, Haryana, Maharashtra and Rajasthan.

In animal feed supply, coarse cereals have a major role and four major cereals, viz. maize, barley, sorghum and pearl millet, account for about 44% of the total cereals. The role of food grains and especially of the coarse cereals in providing the balanced nutrition to the livestock for ensuring higher productivity needs no emphasis.

Table-1.19 depicts the production of coarse cereal in India during the period from 1950-51 to 2015-16.Table shows that percentage of coarse cereals to total cereal increased from 6.99 in 1950-51 to 16.28 in 2015-16 while percentage of maize to total coarse cereals raised from 0.79 to 8.90 during the same period.

**Table 1.19: Production of Coarse Cereals in India**

| Crops | Production of Coarse Cereals in India *(Figures in million tonnes)* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1950-51** | **1960-61** | **1970-71** | **1980-81** | **1990-91** | **2000-01** | **2010-11** | **2015-16** |
| Coarse Cereals | 15.38 | 23.74 | 30.55 | 29.02 | 32.70 | 31.08 | 43.4 | 38.4 |
| Total Cereals | 219.9 | 203.5 | 226.30 | 242.2 | 236.9 | 185.74 | 226.25 | 235.83 |
| Coarse cereals % to total cereals | 6.99 | 11.67 | 13.50 | 11.98 | 13.8 | 16.73 | 19.18 | 16.28 |
| Maize % to total coarse cereals | 0.79 | 2.00 | 3.31 | 2.87 | 3.76 | 6.48 | 9.60 | 8.90 |

*Source: Agricultural Statistics at a Glance (Various Issues), GOI*

Table-1.20 shows the region-wise cattle feed production in India during 2015.

**Table 1.20: Region-wise Cattle Feed Production in India**

| Region | States | Private Sector (million MT/year) | Cooperative Sector (million MT/year) | Total (million MT/year) | % Share |
|---|---|---|---|---|---|
| Western | Gujarat, Maharashtra, Goa, Madhya Pradesh | 1.8 | 1.7 | 3.5 | 48 |
| Northern | Punjab, Haryana, UP, Uttarakhand, Rajasthan | 0.8 | 0.42 | 1.22 | 17 |
| Southern | Karnataka, AP,TN, Kerala, Pondicherry | 1.2 | 1.11 | 2.31 | 31 |
| Eastern | Bihar, Jharkhand, Odisha, WB, Assam | 0.2 | 0.1 | 0.3 | 4 |

*Source: FASAR (Food and Agribusiness Strategic Advisory and Research) Team, "Indian Feed Industry: Revitalizing National Security" 2015, Yes Bank, https://www.yesbank.in*

Current consumption of cattle feed is approximately 7.5 million tonnes. But the current production can feed only about 7 per cent of the total breedable animals in India. Assuming 0.5 Kg of compound feed requirement (industry standards), the cattle feed requirement comes to about 67-70 million tonnes per year. The Table shows that, out of the total compound cattle feed production, 3.33 million MT (45%) were produced by cooperative

sector and the balance 55% (4 million MT) was produced by private sector. With increased participation of private sector in dairy industry, the scenario is expected to change gradually, resulting in increased feed consumption. According to industry estimates, the demand for cattle feed is expected to grow by 6 per cent, which is still below the potential growth levels.

## 1.10 Veterinary Infrastructure and Manpower

Although the livestock sector in India is registering phenomenal growth, several challenges are remaining like shortage in the number of veterinary institutions and veterinarians, poor collaborative research–academic– extension linkages, inadequate skills and knowledge among the academic staff, field veterinarians and para-veterinarians etc.

Table-1.21 shows the veterinary infrastructure and manpower available in India. Table shows that although number of veterinary institutions and veterinarians are increasing over the years, yet, the ratio of cattle to veterinary institutes and veterinarians are not in a favourable proportion. To meet the newer challenges confronting the livestock sector, both veterinary faculty and field veterinarians need to develop new skills for capacity development in the livestock sector.

**Table 1.21: Veterinary Infrastructure and Manpower in India**

| Year | No. of Veterinary Institutions | No. of Veterinarians | Cattle equivalent units per Veterinary Institutions | Cattle Equivalent Units per Veterinarians |
|---|---|---|---|---|
| 1982 | 33323 | 18000 | 8394 | 15540 |
| 1992 | 40586 | 33600 | 7632 | 9219 |
| 1997 | 50846 | 37200 | 6129 | 8377 |
| 2003 | 51973 | 38100 | 5926 | 8084 |
| 2007 | 52757 | 40421 | 6310 | 8236 |
| 2010 | 54906 | 50772 | 6375 | 6894 |

*Source: Birthal and Negi (2012).*

## 1.11 Need of the study

It is well recognized that western, northern and southern parts of India have progressed significantly well in dairy sector while the eastern part of the country has lagged far behind in this endeavour. It is also factually true that, the demand for milk and dairy products is expected grow at a higher rate compared to the previous decade due to accelerated economic growth. According to various estimates, the demand for milk and milk products is expected to grow at an annual incremental rate of 8-9 million tonnes, as against the present rise of about 5 million tonnes. To achieve the above growth, it is believed that the growth has to be inclusive and geographically more diffused. Quantum jump in milk

production is possible through increase in productivity and by linking small holders to dairy cooperatives/producer groups/SHGs with forward linkages to milk processing. This means that the areas which have low levels of productivity, preponderance of low yielding non-descript animals, but rich in resource endowment and presence of good markets, would require attention of the policy makers for initiating a focussed program for the study area. Therefore, a comprehensive assessment of the present status of dairy development in the Eastern India has become imperative, particularly from the perspective of regional and national consideration.

The need for ascertaining different program of the Central and State Government relating to dairying, at the local level, arises from the fact that (i) there is presently no documentation on different schemes of the State and Central Governments, (ii) how far these schemes are mutually related, (iii) what is the system to converge them at the local level and how is the convergence process is enforced. These need to be studied from the perspective of a district so that the multiplicity of different schemes are known, target population are identified, conditions for their implementation are specified and the coordinating and controlling Departments of the Government are made accountable.

### 1.12 Objectives of the study

Keeping in view of the importance of the subject, the objectives of the present study has been framed as under-

g) To assess the present status of dairying with reference to animal distribution, milk production, consumption and marketable surplus;
h) To identify the constraints in dairy development from supply side, institutional deficiency and processing infrastructure;
i) 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;
j) To highlight the facilitating factors that could help promoting dairy development to improve socio economic status of the milk producers;
k) To suggest broad areas for focussed interventions for promoting dairy development in the selected State and the way forward;
l) To suggest suitable policy measures to ensure compliance of effective convergence of various schemes for the benefits of dairy farmers;

## 1.13 Data and Methodology

The present study for the State of Assam is based on both primary and secondary level data. The primary data has been collected from respondent by using specially designed interview schedules and questionnaires designed by the coordinating centre (Agro-Economic Research Centre, VVN, Gujarat) for the study.

The primary level data were collected from 4 districts of Assam *viz.*, Barpeta, Jorhat, Kamrup and Nagaon out of 9 (Nine) potential districts listed by NDDB, Anand from three Agro-Climatic Zones in Assam, having highest potentiality of milk production, in order to capture the holistic macro picture of the State. In Assam, out of three Milk Unions, only West Assam Milk Producers' Cooperative Union Limited (WAMUL) is functional. Three of the sample districts, selected for the study come under the WAMUL.

In the second stage, from each district 4 villages were selected. Out of these four villages, two villages nearer to the district headquarters were selected (one village having dairy cooperative and one village without dairy cooperative-both located nearby) and other two villages were selected about 25-30 kms away from the sample district headquarters. In the third stage, from each village, 15 milk producers were selected randomly based on the number of bovine population- (a) Small Milk Producers (1-2 milch animal), (b) Medium Milk Producers (3-5 milch animal) and (c) Large Milk Producers (above 5 milch animals). Thus, the sum total of sample villages for the study stood at 16. Altogether, the study covered 240 sample milk producers. In addition to this, 1 milk union and 8 Primary Dairy Cooperative Societies were also selected for the study.

Table-1.22 presents the selected agro-climatic zones, districts, talukas, villages, primary dairy cooperative societies and milk union in Assam & Table -1.23 shows the breakup of selected DCS and NDCS milk producers in Assam.

The primary data relates to the year 2015-16.

During the period of primary data collection, four types of survey schedules were canvassed in the study area. These were as follows-

- **Household Survey Schedule 1.0:** To collect the information from the selected milk producers, well structured interview schedule was used covering some selected parameters such as: socio-economic characteristics, cropping pattern of sample household, herd strength & cattle shed, details of breedable animals on survey date, milk production, use and sale , season wise milk yield (per day), availability of water for dairy, labour use pattern in dairy/ involvement of rural men

and women in dairy activities, feed and fodder per animal at the time of survey (kg/animal/day), veterinary and breeding expenditure during last one year, awareness about the various schemes, service delivery, constraints faced in dairy

**Table 1.22: Selected Villages/Talukas/Districts/Milk unions in Assam**

| Sl. No. | Region/Agro-Climatic Zones | Selected Districts | Primary Dairy Cooperative Society | District Milk Unions | Selected Blocks | Selected Villages (DCS) | Selected Villages (NDCS) |
|---|---|---|---|---|---|---|---|
| 1 | Central Brahmaputra Valley Zone | Nagaon | Jamuna Valley DUSSL,Kapili DUSSL | WAMUL | Bimakandi, Dol Pukhuri | Changmaji Pathar, Bhimar Ali | Changmaji Mikir Gaon, Dhal Pukhuri |
| 2 | Lower Brahmaputra Valley Zone | Barpeta | Kamdhenu Dugdha Utpadak SSL,Himalaya DUSSL | WAMUL | Gobardhana, Bajali | Nitananda Panbari, Ratanpur | Bhogpur Tuple Panbari |
| 3 | Lower Brahmaputra Valley Zone | Kamrup | Uma Mahila DUSSL, Gorakhaya (Prasim) DUSSL | WAMUL | Hajo, Rangia | Ujankuri Balikuchi | Barchapari, PachimPar ,Baghbari |
| 4. | Upper Brahmaputra Valley Zone | Jorhat | Suravi DUSSL, Swarna Dhanu Parthamik DUSSL | | Dhekargorah, Titabar | Parbatia Gaon, Phalengi-chuk | Bhatemara Gaon , Benganakhowa |

**Table 1.23: Total numbers of selected DCS and NDCS Milk Producers in Assam**

| Districts | DCS | | | | NDCS | | | |
|---|---|---|---|---|---|---|---|---|
| | Small | Medium | Large | Total | Small | Medium | Large | Total |
| Nagaon | 10 | 10 | 10 | 30 | 10 | 10 | 10 | 30 |
| Barpeta | 10 | 10 | 10 | 30 | 10 | 10 | 10 | 30 |
| Kamrup | 10 | 10 | 10 | 30 | 10 | 10 | 10 | 30 |
| Jorhat | 10 | 10 | 10 | 30 | 10 | 10 | 10 | 30 |
| Assam | 40 | 40 | 40 | 120 | 40 | 40 | 40 | 120 |

and suggestion/s for improvement in adoption of dairy schemes, various aspects of rearing of animals and feeding pattern constraints, perception and awareness about Ration Balancing Programme (RBP), *etc*.

- **Household Schedule-Cost of Milk Production 2.0:** In order to estimate the cost of milk production, this schedule was canvassed among the selected milk producer households in addition to the information collected through Schedule 1.0.
- **Primary Dairy Cooperative Society/Private Dairy Unit Schedule/Agent Schedule 3.0:** The desired information from the respondent society/unit/agent were collected in this schedule on selected aspects such as : total number of members enrolled, availability of facilities, month wise milk collection and rate paid, concentrates supplied by the society/firm during last one year, veterinary and

breeding services provided by society/firm during last one year, any outbreak of disease of livestock during the past one year, training arranged/provided by the society during last one year, details of development programmes/support, effect of programmes on key variables, general opinion, perception, constraints and suggestions regarding particular program, constraints faced by PDCS/ private firm etc.

- **Milk Unions 4.0:** This schedule was designed to collect the information from the milk unions on related parameters such as: districts, villages and PDCS covered, details on milk collection/procurement, different programs/ schemes, year wise average cost of processing of milk (Rs/litre) dairy plant, production and marketing of different product, constraints faced, potential and suggestions for improvement.

(**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 and other related data were compiled from the offices of the NDDB and State Departments of AH, Veterinary & Dairy divisions. as well as from the Government publications, such as Livestock Census (Department of Animal Husbandry), Statistical Abstract of the State, Economic Surveys of Assam, Integrated Sample Survey Report, Statistical Handbook, Govt. of Assam and related web sites. Besides tabular analysis, annual compound growth rates were calculated to indicate an increase or decrease in livestock population and other related parameters during inter census periods.

### 1.14 Limitation of the study

The study is based on both primary and secondary level data and hence the accuracy of the results depends on the accuracy with which the data were generated. The study has got its own limitation as the primary information were collected through interactions with the sample milk producers of the State. The milk producers do not have the habit of proper record keeping in black and white. Most of their information are memory based. Also, there is a possibility of wrong entry despite our utmost care. Further, non-availability of official data on time is also another limitation of the study.

### 1.15 Organization of the report

The present study is organized as per guidelines developed by the coordinating centre. In view of the objectives, the study report was divided into nine major chapters including this introductory chapter. The introductory chapter presents the introductory notes,

need and scope of the study and sets out the main objectives of the study. It also presents 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 macro overview of dairy development in the State of Assam and the selected districts/Milk unions. It also analyses major trends in dairy sector, livestock production and milk productivity in selected State/districts using secondary level data. The review of milk cooperatives in Assam is presented in Chapter III. Chapter IV covers Government programmes & policies for development of dairy/ animal husbandry sector in Assam. It also deals with the convergence of the Government schemes. Chapter V reflects the socio-economic profile of the milk producers surveyed, selected primary dairy cooperative societies and Milk Unions of the State. Chapter VI covers the issues related to milk production in the selected households and awareness about the schemes, while issues related to milk consumption and marketable surplus are discussed in Chapter VII. Chapter VIII presents the various kinds of constraints faced by the selected households in production and marketing of milk and suggestions given and the last chapter presents the conclusions and recommendations emerged from the study.

***

## 2.1 Introduction

The dairy development in Assam was initiated in the latter part of the second Five Year Plan period with the basic concept of developing the dairy industry in the State through establishment of Town Milk supply Scheme almost in all important towns of Assam to feed the consumers hygienic, clean milk at reasonable price. Till February 1982, the Dairy development activities were carried out by the Director of Animal Husbandry and Veterinary Department. To expand the role of dairy activities in the State economy, the Govt. of Assam created a separate Directorate of Dairy Development bifurcating it from the A.H & Veterinary Department during the year 1982. The primary focus areas of dairy development in Assam are:

1. Procurement, processing and distribution of milk aiming at economic upliftment of rural milk producers and help urban consumers to get quality milk at a reasonable price.
2. Developing adequate infrastructure to ensure procurement and processing of milk produces in the State.
3. Organizing milk producers for efficient procurement, processing and marketing.
4. Awareness among the milk producers, traders and consumers regarding clean milk production and consumption.
5. To modernize the supply of inputs like Artificial Insemination, feed, fodder, animal health coverage and training etc. to the Dairy farmers in the milk shed areas linked with milk supply schemes and plans.
6. To help the villagers in marketing their produce by setting up of suitable transport and marketing organization.

***State Profile:***

Assam is situated in the North-Eastern region of India – bordering seven States *viz*. Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and West Bengal and two countries *viz.* Bangladesh and Bhutan. The geographical area of the State is 78,438 sq. km of which 98.4 per cent area is rural. Assam shares about 2.4 per cent of the country's total geographical area and provides shelter to 2.6 per cent population of the Country. Assam is a State of heterogeneous population with multiple socio-cultural and ethnic diversity. According to the Census of India, 2011 the population of Assam stands at 312.05 lakh of which 159.39 lakh are male and 152.66 lakh are female. The decadal growth of the State's

population has been worked out at 17.07 per cent during the decade 2001-2011 as against 17.68 per cent for the country as a whole. Out of the total population, 86 per cent live in rural areas and 14 per cent population live in urban areas of the State. While the percentage of rural population of the State stands much higher compared to All-India average (69 per cent), the proportion of urban population in the State has increased from 12.9 per cent in 2001 to 14 per cent in 2011. The density of the population of Assam has increased to 398 persons in 2011 from 340 persons per square meter in 2001 Census. The sex ratio of Assam has increased to 958 female per 1000 male in 2011 from 935 in 2001. Compared to overall sex ratio of the State, the child sex ratio (age-group 0-6 years) has gradually declined from 975 in 1991 to 967 in 2001 and further to 962 in 2011. On the other hand, sex ratio at birth (0-1 year) in Assam as per 2011 Census was calculated at 957 female per 1000 male.

The State has 33 districts, 80 Sub-Divisions and 219 blocks. Assam has total cropped area of 40.83 lakh hectares as per 2014-15 record, out of which net area sown is 28.27 lakh hectares. Major crop of the State is paddy and major fruits grown in the State are banana, pineapple, papaya, orange, Assam lemon and jackfruit. Amongst plantation crops, tea commands the most important place in the State.

Agriculture is considered as the mainstay of the economy of Assam. Agriculture and allied activities in Assam continue to be the dominant sources of livelihood for majority of its people. It still contributes more than one fourth (26.19 %) to the State's Net Domestic Product (NSDP) and supports about 70 Per cent of its population. The State of Assam experiences plenty of rainfall and possesses fertile land which is extremely advantageous for crop cultivation. The soil, topography, rainfall and climate of the State are quite congenial for producing a variety of crops in different crop seasons. However, agriculture in the State is characterized by low level of productivity due to recurring natural calamities, low level of mechanization, inadequate availability of quality inputs, poor soil health, low level of assured irrigation and inadequate marketing infrastructure. About 83 per cent of the total land holdings are small and marginal and is a major concern for formulation of any agricultural development strategy.

Table-2.1 gives the trend of land use pattern and cropping intensity in Assam for the period from 2000-01 to 2014-15. During the period, geographical area of the State was increased from 7843 thousand hectares to 7850 thousand hectares with an increase of 7 thousand hectares as per report of the geographical survey of the State.

**Table 2.1: Trend of Land Use Pattern and Cropping Intensity in Assam**

(Area in 000' hectare)

| Year | Geographical area | Net area sown | Area sown more than once | Total cropped area | Cropping intensity |
|---|---|---|---|---|---|
| 2000-01 | 7843 | 27.93 | 12.99 | 40.92 | 146.51 |
| 2001-02 | 7843 | 27.74 | 12.09 | 39.83 | 143.58 |
| 2002-03 | 7843 | 27.53 | 12.05 | 39.58 | 143.77 |
| 2003-04 | 7843 | 27.53 | 12.04 | 39.57 | 143.73 |
| 2004-05 | 7843 | 27.53 | 11.43 | 38.96 | 141.52 |
| 2005-06 | 7843 | 27.53 | 11.96 | 39.49 | 143.44 |
| 2006-07 | 7843 | 27.53 | 10.1 | 37.63 | 136.69 |
| 2007-08 | 7843 | 27.53 | 10.86 | 38.39 | 139.45 |
| 2008-09 | 7850 | 28.1 | 11.89 | 39.99 | 142.31 |
| 2009-10 | 7850 | 28.11 | 12.88 | 40.99 | 145.82 |
| 2010-11 | 7850 | 28.1 | 13.49 | 41.6 | 148.04 |
| 2011-12 | 7850 | 28.11 | 13.63 | 41.74 | 148.49 |
| 2012-13 | 7850 | 28.09 | 12.67 | 40.76 | 145.11 |
| 2013-14(E) | 7850 | 28.13 | 12.75 | 40.88 | 145.33 |
| 2014-15(E) | 7850 | 28.17 | 12.83 | 41 | 145.54 |
| CGR (%) | 0.009 | 0.16 | -0.64 | 0.31 | 0.15 |

*Source: Directorate of Economics & Statistics, Govt. of Assam*

There was a nominal increase in net sown area, area sown more than once and total cropped area and barren and uncultivated area and fallow land area was found to be the same during the period. Cropping intensity remained more or less same during the period.

Table-2.2 reveals the changes in cropping pattern in terms of percentage of cropped area to gross cropped area of the State. Among the cereal crops, rice dominates the cropping pattern scenario of Assam. It is the principal crop and staple food for the people of Assam. The area under autumn rice has declined from 11.19 per cent in 2004-05 to 4.81 per cent in 2014-15. Farmers are usually reluctant to go for this crop as pre-harvest loss is more as first shower of monsoon comes at the time of harvesting and immediately after harvesting they are to go for winter rice (*Sali* paddy). The winter rice area during the period under reference varied in between 41.99 per cent and 46.20 per cent. Summer rice has shown a sizeable increase in the area from 7.98 per cent to 10.21 per cent during the same period. It is basically due to creation of minor irrigation facility through STW and LLP. Farmers are also benefited for its higher yield rate resulting from application of modern package of practices.

**Table 2.2**
**Trend of cropping pattern of major crops in Assam during 2004-05 to 2014-15**

(Lakh Hectare)

| Year | Autumn Rice | Winter Rice | Summer Rice | Total Rice | Wheat | Maize | pulses | food - grains | Oil Seeds | Fibre | Suger cane | Gross Cropped Area |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4.36 (11.19) | 16.36 (41.99) | 3.11 (7.98) | 23.83 (61.17) | 0.64 (1.64) | 0.19 (0.49) | 1.15 (2.95) | 25.89 (66.45) | 2.84 (7.29) | 0.63 (1.62) | 0.24 0.62 | 38.96 |
| 2005-06 | 3.98 (10.08) | 17.07 (43.23) | 3.15 (7.98) | 24.2 (61.28) | 0.5 (1.27) | 0.19 (0.48) | 1.07 (2.71) | 26.04 (65.94) | 2.48 (6.28) | 0.62 (1.57) | 0.23 (0.58) | 39.49 |
| 2006-07 | 3.79 (10.07) | 14.98 (39.81) | 3.12 (8.29) | 21.9 (58.20) | 0.6 (1.59) | 0.19 (0.50) | 1.14 (3.03) | 23.9 (63.51) | 2.76 (7.33) | 0.63 (1.67) | 0.27 (0.72) | 37.63 |
| 2007-08 | 3.54 (9.22) | 16.47 (42.90) | 3.23 (8.41) | 23.24 (60.54) | 0.56 (1.46) | 0.18 (0.47) | 1.17 (3.05) | 25.22 (65.69) | 2.77 (7.22) | 0.65 (1.69) | 0.26 (0.68) | 38.39 |
| 2008-09 | 3.51 (8.78) | 17.73 (44.34) | 3.6 (9.00) | 24.84 (62.12) | 0.5 (1.25) | 0.17 (0.43) | 1.18 (2.95) | 26.42 (66.07) | 2.67 (6.68) | 0.65 (1.63) | 0.29 (0.73) | 39.99 |
| 2009-10 | 3.46 (8.44) | 17.89 (43.64) | 3.94 (9.61) | 25.3 (61.72) | 0.6 (1.46) | 0.19 (0.46) | 1.19 (2.90) | 26.99 (65.85) | 2.76 (6.73) | 0.7 (1.71) | 0.27 (0.66) | 40.99 |
| 2010-11 | 3.13 (7.96) | 18.59 (47.31) | 3.99 (10.15) | 25.71 (65.42) | 0.45 (1.15) | 0.2 (0.51) | 1.26 (3.21) | 27.66 (70.39) | 2.72 (6.92) | 0.67 (1.70) | 0.3 (0.76) | 39.3 |
| 2011-12 | 2.76 (6.61) | 18.76 (44.94) | 3.94 (9.44) | 26.46 (63.39) | 0.4 (0.96) | 0.21 (0.50) | 1.32 (3.16) | 27.43 (65.72) | 2.95 (7.07) | 0.72 (1.72) | 0.28 (0.67) | 41.74 |
| 2012-13 | 2.38 (5.84) | 18.57 (45.56) | 3.93 (9.64) | 24.88 (61.04) | 0.34 (0.83) | 0.24 (0.59) | 1.42 (3.48) | 26.92 (64.14) | 3.26 (8.00) | 0.71 1.69) | 0.29 (0.71) | 40.76 |
| 2013-14 | 2.23 (5.45) | 18.81 (46.01) | 3.99 (9.76) | 25.03 (61.23) | 0.31 (0.76) | 0.24 (0.59) | 1.5 (3.67) | 27.14 (66.39) | 3.25 (7.95) | 0.75 (1.74) | 0.29 (0.71) | 40.88 |
| 2014-15 | 1.96 (4.81) | 18.83 (46.20) | 4.16 (10.21) | 24.95 (61.21) | 0.24 (0.59) | 0.28 (0.69) | 1.48 (3.63) | 27 (66.24) | 3.28 (8.05) | 0.7 (1.72) | 0.3 (0.74) | 40.76 |

*Note:* Figures in Parentheses indicate Percentage to Gross Cropped Area.

*Source: Directorate of Economics and Statistics, Govt. of Assam.*

The area under wheat showed a decreasing trend from 1.64 per cent in 2005-06 to 0.59 per cent in 2014-15 while the area under maize increased during the period and so was observed in case of pulses area. In case of total oilseeds also, the area increased marginally from 7.29 per cent in 2004-05 to 8.05 per cent in 2014-15. The area under fibre crops varied in between 1.62 per cent and 1.72 per cent. Sugarcane is also an important *Kharif* crop (cash crop) of the State and its area increased marginally over the years during the reference period.

From the analysis of cropping pattern, it may be concluded that there were no significant changes in cropping pattern in the State during the period of study. Most of the time, seed was considered to be a major constraint. Existing irrigation potentials have not been utilized fully by the farmers due to some technical loopholes in the irrigation system. Rising input cost in one hand and lower productivity on the other, have resulted in continuous decline in profit per unit. Poor mechanization of agricultural activities & inefficient market net work also dampened the spirit of the farmers in accepting/ trying new crops. Higher production at a low cost is the solution of the problem by increasing the productivity per unit of land in consideration of the limitation of arable land in the State. Together with this, gross cropped area can be increased by double or multiple cropping practices.

**2.2 Role of Dairy Sector in the State Economy**

Animal husbandry is potentially one of the most important sectors for rapid socio-economic development of the State. Livestock is basically a component of production system and is contributing to the sustainable agricultural system. A reasonable level of growth is essential not only to achieve higher productivity level in livestock products but also for income generation of rural households of the State. Livestock in the State is thus highly livelihood oriented and is generally owned by small, marginal farmers and landless agricultural labourers.

Assam economy continues to be an agrarian economy as more than 85 per cent of the population is living in the rural areas and about 52 per cent of the total labour force is found to be engaged in agriculture and allied activities. Dairy sector has significant impact on employment generation in the State and plays a vital role in income generation of both the rural and semi-urban economy. The Animal Husbandry and Veterinary Department and Dairy Development Department of the State have been implementing various developmental programmes to create gainful employment/income opportunities in the rural areas with the objectives of boosting up of the socio-economic condition of the rural masses and enhancing the volume of livestock in the State so as to reduce the gap between demand and supply of these products. Assam, with vast natural endowment, has the enormous potentiality for the

development of dairy sector. The NDDB is reported to be keen to reach out to more farmers and create the requisite infrastructure for the development of the dairy sector in Assam.

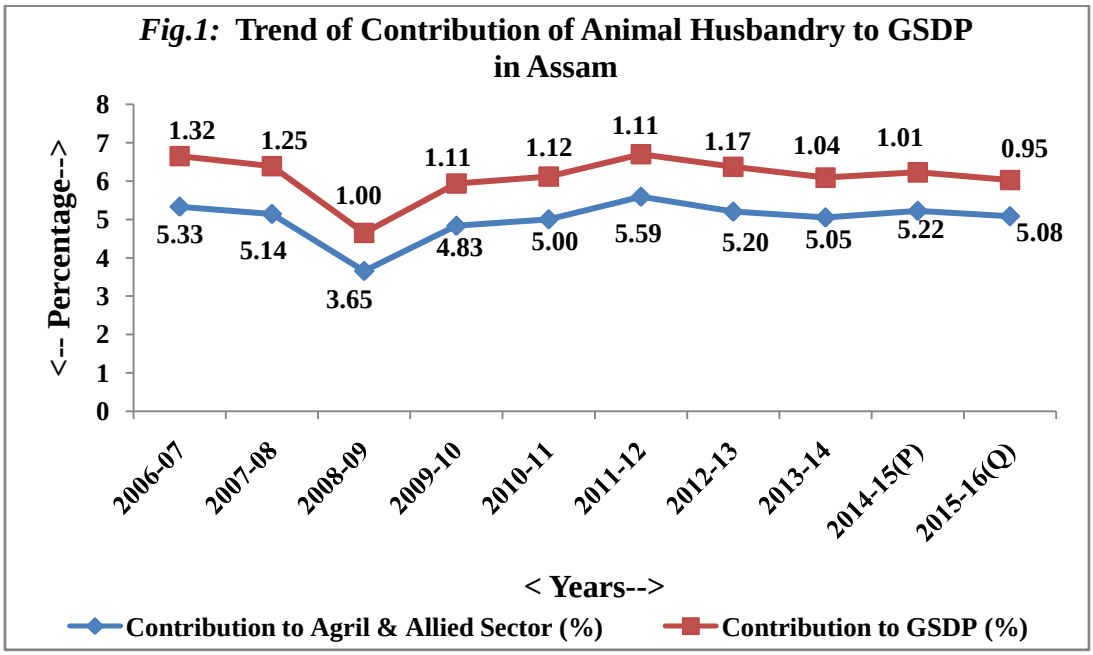
**2.3 Trend of Contribution of Animal Husbandry in GSDP**

Animal husbandry plays a pivotal role in the State rural economy. Table- 2.3 and Fig.1 deal with the trend of contribution of animal husbandry to GSDP in Assam.

**Table 2.3: Trend of Contribution of Animal Husbandry to GSDP in Assam**

| **Year** | **2006-07*** | **2007-08** | **2008-09** | **2009-10** | **2010-11** | **2011-12**** | **2012-13** | **2013-14** | **2014-15(P)** | **2015-16 (Q)** |
|---|---|---|---|---|---|---|---|---|---|---|
| Contribution to Agril & Allied Sector (%) | 5.33 | 5.14 | 3.65 | 4.83 | 5.00 | 5.59 | 5.20 | 5.05 | 5.22 | 5.08 |
| Contribution to GSDP (%) | 1.32 | 1.25 | 1.00 | 1.11 | 1.12 | 1.11 | 1.17 | 1.04 | 1.01 | 0.95 |

*Data during 2006-07 to 2010-11 refers to constant prices of 2004-05.
** Data during 2011-12 to 2015-16 refers to constant prices of 2001-12.
*Source: Directorate of Economics and Statistics, Assam, 2017*




The Table depicts that the contribution of animal husbandry to agril & allied sector during 2006-07 to 2015-16 has marginally declined from 5.33 per cent to 5.08 per cent while the contribution of animal husbandry to GSDP has shown a declining trend from 1.32 per cent to 0.95 per cent during the reference period. It might be due to higher contribution of secondary and tertiary sectors to the GSDP.

## 2.4 Composition of Livestock & details of Cow & Buffalo breeds in Assam

Table 2.4 presents growth of Livestock wealth in Assam and India. The Nineteenth Livestock Census (2012) of India has placed the total livestock population at 512.1 million, out of which, 19.62 million (3.83 per cent) belonged to Assam. It is evident from the table that the inter-census growth of livestock in Assam did not indicate any trend, rather it seemed to be erratic. At times, negative growth were also reported in some years (1972, 2003).

**Table 2.4: Growth of the Livestock in Assam and India**

| Sl. No | Livestock Census Year | Total Livestock (000) | | % Share of Assam to All India | % Growth of Assam between two Census |
|---|---|---|---|---|---|
| | | All India | Assam | | |
| 1 | 1966 | 344111 | 8450 | 2.46 | - |
| 2 | 1972 | 353338 | 8010 | 2.26 | - 5.21 |
| 3 | 1977 | 369525 | 9580 | 2.59 | 19.60 |
| 4 | 1983 | 419588 | 10140 | 2.42 | 5.85 |
| 5 | 1987 | 445285 | 11320 | 2.57 | 11.63 |
| 6 | 1993 | 470830 | 12940 | 2.75 | 14.31 |
| 7 | 1997 | 485385 | 21210 | 4.37 | 63.91 |
| 8 | 2003 | 485002 | 14450 | 2.98 | -31.87 |
| 9 | 2007 | 529698 | 18570 | 3.35 | 28.51 |
| 10 | 2012 | 512057 | 19620 | 3.83 | 5.65 |

Note: Figures without Dog & Rabbit.
*Source: GOI (2016) & GOA (2016)*

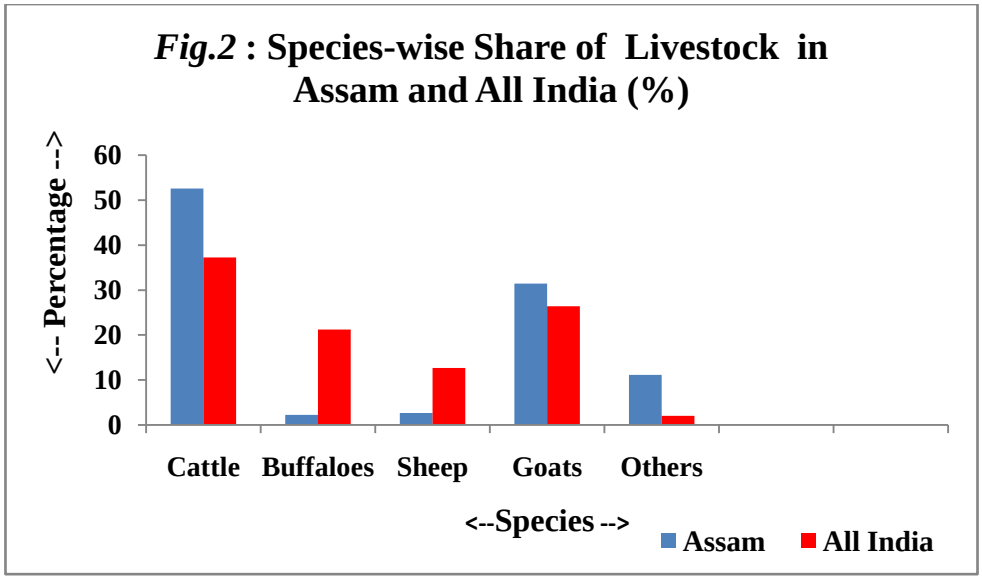
**Table 2.5: Species-wise Livestock Population & its share in Total Livestock**

(In 000' )

| Sl. No. | Particulars | Assam -2012 | | | India 2012 | |
|---|---|---|---|---|---|---|
| | | Livestock | % share in India | % share in total Livestock | Livestock | % share in Total Livestock |
| 1 | Cattle | 10310 | 5.40 | 52.55 | 190904 | 37.28 |
| 2 | Buffaloes | 440 | 0.40 | 2.24 | 108702 | 21.22 |
| 3 | Sheep | 520 | 0.80 | 2.65 | 65069 | 12.70 |
| 4 | Goats | 6170 | 4.56 | 31.45 | 135173 | 26.40 |
| 5 | Others | 2180 | 17.86 | 11.11 | 12209 | 2.00 |
| 6 | Total Livestock | 19620 | 3.83 | 100.00 | 512057 | 100.00 |

Note: Figures without Dog & Rabbit.
*Source: GOI (2016) & GOA (2016)*

The species-wise livestock population & its share to total livestock in Assam *vis-a vis* India are presented in Table 2.5 & fig.2. It is seen that the cattle population in Assam constituted 52.55 per cent of the total livestock population while the corresponding figure for India stood at 37.28 per cent.




The growth and composition of livestock population in Assam during 1966 to 2012 as per different Livestock Censuses are presented in Table-2.6. According to the Livestock Census 2012, the cattle population constituted the largest group with more than 10 millions cattle population which however, was 1.20 per cent less, as compared to 2007 Livestock Census. This decline may perhaps be attributed to declining growth rate (-5.80 per cent) of cross breed cattle.

**Table 2.6: Livestock Population in Assam during 1966-2012 as per Livestock Census**

*(In million nos.)*

| Sl. No. | Year | 1966 | 1972 | 1979 | 1982 | 1988 | 1992 | 1997 | 2003 | 2007 | 2012 | Growth Rate(%) 2007-12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Live ock** | | | | | | | | | | | |
| 1 | Local | 6.10 | 5.80 | 6.60 | 6.60 | 7.05 | 7.48 | 7.66 | 7.98 | 9.68 | 9.91 | 4.60 |
| I | Cross breed | 0.00 | 0.00 | 0.00 | 0.15 | 0.23 | 0.30 | 0.39 | 0.44 | 0.69 | 0.40 | -5.80 |
| Ii | Total Cattle | 6.10 | 5.80 | 6.60 | 6.75 | 7.28 | 7.79 | 8.05 | 8.42 | 10.37 | 10.31 | -1.20 |
| 2 | Buffaloes | 0.54 | 0.49 | 0.73 | 0.56 | 0.62 | 0.65 | 0.73 | 0.68 | 0.53 | 0.44 | -1.80 |
| 3 | Sheep | 0.05 | 0.05 | 0.06 | 0.05 | 0.07 | 0.08 | 0.08 | 0.15 | 0.36 | 0.52 | 3.20 |
| 4 | Goat | 1.46 | 1.26 | 1.66 | 1.73 | 2.13 | 2.64 | 2.68 | 2.99 | 4.38 | 6.17 | 35.8 |
| 5 | Others | 0.30 | 0.41 | 0.53 | 1.05 | 1.22 | 1.78 | 9.68 | 2.21 | 2.93 | 2.18 | -15.00 |
| Total Livestock | | 8.46 | 8.00 | 9.58 | 10.14 | 11.45 | 12.94 | 21.21 | 14.45 | 17.77 | 19.61 | 36.80 |

*Source: Different Livestock Census in Assam, Directorate of Animal Husbandry and Veterinary, Assam*

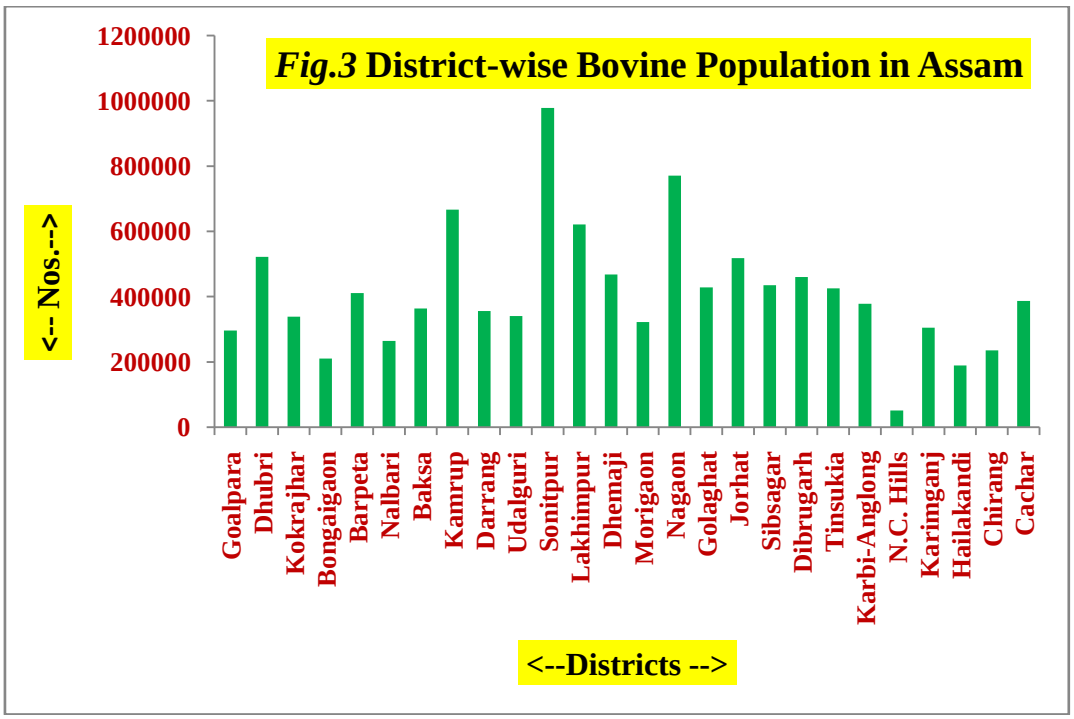
Table- 2.7 and Fig.3 represent district wise bovine population in Assam as per 2012 Livestock Census. Table shows that the highest bovine population dominated district is Sonitpur (978398 nos. of bovine population) and lowest bovine population was recorded in the district of North Cachar Hills (51252 nos.).

**Table 2.7: District-wise Bovine population in Assam as per 2012 Livestock Census**

(In Nos.)

| Sl. No. | District | Crossbred Cattle | Indigenous Cattle | Buffalo | Total Bovine population |
|---|---|---|---|---|---|
| 1 | Goalpara | 4120 | 284374 | 7283 | 295777 |
| 2 | Dhubri | 6077 | 502284 | 13043 | 521404 |
| 3 | Kokrajhar | 2423 | 323239 | 13290 | 338952 |
| 4 | Bongaigaon | 6847 | 202043 | 1783 | 210673 |
| 5 | Barpeta | 37074 | 346474 | 27044 | 410592 |
| 6 | Nalbari | 24648 | 235502 | 4552 | 264702 |
| 7 | Baksa | 7625 | 353762 | 2528 | 363915 |
| 8 | Kamrup | 44887 | 612778 | 8837 | 666502 |
| 9 | Darrang | 11349 | 331676 | 12522 | 355547 |
| 10 | Udalguri | 6338 | 332767 | 1775 | 340880 |
| 11 | Sonitpur | 34963 | 907329 | 36106 | 978398 |
| 12 | Lakhimpur | 3900 | 603782 | 13819 | 621501 |
| 13 | Dhemaji | 826 | 452564 | 14547 | 467937 |
| 14 | Morigaon | 27777 | 290064 | 4179 | 322020 |
| 15 | Nagaon | 43421 | 719439 | 7445 | 770305 |
| 16 | Golaghat | 10712 | 402175 | 15153 | 428040 |
| 17 | Jorhat | 11893 | 479602 | 26449 | 517944 |
| 18 | Sibsagar | 9307 | 401792 | 24406 | 435505 |
| 19 | Dibrugarh | 9681 | 438400 | 12312 | 460393 |
| 20 | Tinsukia | 12749 | 395788 | 17247 | 425784 |
| 21 | Karbi-Anglong | 23221 | 340122 | 14935 | 378278 |
| 22 | N.C. Hills | 3848 | 23110 | 24294 | 51252 |
| 23 | Karimganj | 16917 | 247787 | 40041 | 304745 |
| 24 | Hailakandi | 12759 | 148753 | 27947 | 189459 |
| 25 | Chirang | 1712 | 226159 | 7692 | 235563 |
| 26 | Cachar | 20828 | 309937 | 56036 | 386801 |
| ASSAM | | 395902 | 9911702 | 435265 | 10742869 |

***Source**: Directorate of Animal Husbandry and Veterinary, Assam*



## 2.5 Year wise Outlay and Expenditure on Animal Husbandry

Table -2.8 shows year wise outlay and expenditure on Animal Husbandry in Assam. The Table reflects that the outlay on animal husbandry increased from 434.90 lakh in 2000-01 to 3027.78 in 2015-16 while during this period, the actual expenditure varied between 434.90 to 222.14 lakh. The amount seems to be insufficient to meet the demand of milk product in the State. Moreover, the highest sanction amount of Rs. 1,645.86 lakhs in 2009-10 which came down to Rs. 222.14 lakhs in 2015-16 is a matter of great concern.

**Table 2.8: Year wise outlay and expenditure on Animal Husbandry in Assam (Under State Plan and CSS)**

| Year | Outlay (lakh) | Actual Expenditure (Lakh) |
|---|---|---|
| 2000-01 | 434.90 | 434.90 |
| 2001-02 | 1095.00 | 153.56 |
| 2002-03 | 1095.00 | 333.09 |
| 2003-04 | 1182.00 | 228.60 |
| 2004-05 | 1116.00 | 267.34 |
| 2005-06 | 1821.00 | 776.63 |
| 2006-07 | 1333.00 | 60.00 |
| 2007-08 | 1395.16 | 121.50 |
| 2008-09 | 2409.16 | 367.08 |
| 2009-10 | 2714.16 | 1645.86 |
| 2010-11 | 2466.27 | 1227.00 |
| 2011-12 | 2906.95 | 2182.38 |
| 2012-13 | 2454.59 | 1940.61 |
| 2013-14 | 3113.76 | 215.42 |
| 2014-15 | 2643.25 | 872.28 |
| 2015-16 | 3027.78 | 222.14 |

***Source**: Dairy Department, Assam*

## 2.6 Growth in Milk Production and Productivity (Regional trend)

Table- 2.9 and Fig.4 show the share of milk production by cow, buffaloes and goat and per capita availability of milk during 2000 -2001 to 2014-15 in Assam. Altogether cattle milk contributed 82.61 per cent of the total milk production of the State. Share of Buffalo milk to total milk production was recorded at 14.46 per cent and that of goat milk was 2.94 per cent. Total milk production highest (2.13 per cent) followed by cattle (0.92 per cent) while it was negative in case of goat.

Contrary to the recommended norms of Indian Council of Medical Research (ICMR) which is 208 ml per head per day, the per capita /per day milk consumption in Assam is only 74 ml. There has been a steady growth of milk production in Assam in recent period. However, estimated per day per capita consumption has remained almost same with the commensurating increase in population.

**Table 2.9 : Share of Milk Production by Cow, Buffaloes and Goats in Assam**

| Year | Cattle (Million Litres) | Buffalo (Million Liters) | Goat (Million Liters) | Total (Million Liters) | Per capita availability (Gram/Day) |
|---|---|---|---|---|---|
| 2000-01 | 612 (83.15) | 98(13.32) | 26(3.53) | 736 (100) | 70 |
| 2001-02 | 628 (83.73) | 97(12.93) | 25(3.33) | 750(100) | 71 |
| 2002-03 | 647 (83.70) | 98(12.68) | 28(3.62) | 773(100) | 71 |
| 2003-04 | 662 (83.27) | 100(12.58) | 33(4.15) | 795(100) | 72 |
| 2004-05 | 681 (83.87) | 102(12.56) | 29(3.57) | 812(100) | 72 |
| 2005-06 | 689 (83.82) | 103(12.53) | 30(3.65) | 822(100) | 70 |
| 2006-07 | 690 (83.84) | 105(12.76) | 28(3.40) | 823(100) | 70 |
| 2007-08 | 687 (83.37) | 109(13.23) | 27(3.28) | 824(100) | 69 |
| 2008-09 | 691 (83.56) | 110(13.30) | 26(3.14) | 827(100) | 70 |
| 2009-10 | 698 (84.10) | 108(13.01) | 24(2.89) | 830(100) | 69 |
| 2010-11 | 702(84.27) | 106(12.73) | 25(3.00) | 833(100) | 71 |
| 2011-12 | 692(82.51) | 123.4(14.71) | 23(2.74) | 838.7(100) | 70 |
| 2012-13 | 697.4(82.55) | 128.7(15.23) | 18.7(2.21) | 844.8(100) | 69 |
| 2013-14 | 712.66(83.13) | 128.5(14.99) | 16.1(1.88) | 857.26(100) | 72 |
| 2014-15 | 721.09(82.61) | 126.2(14.46) | 25.6(2.93) | 872.89(100) | 74 |
| ACGR(%) | 0.92 | 2.13 | -2.47 | 0.98 | 0.05 |

Note: Figures in Parentheses indicate % share of milk production to total
*Source: Directorate of Animal Husbandry and Veterinary, Guwahati*

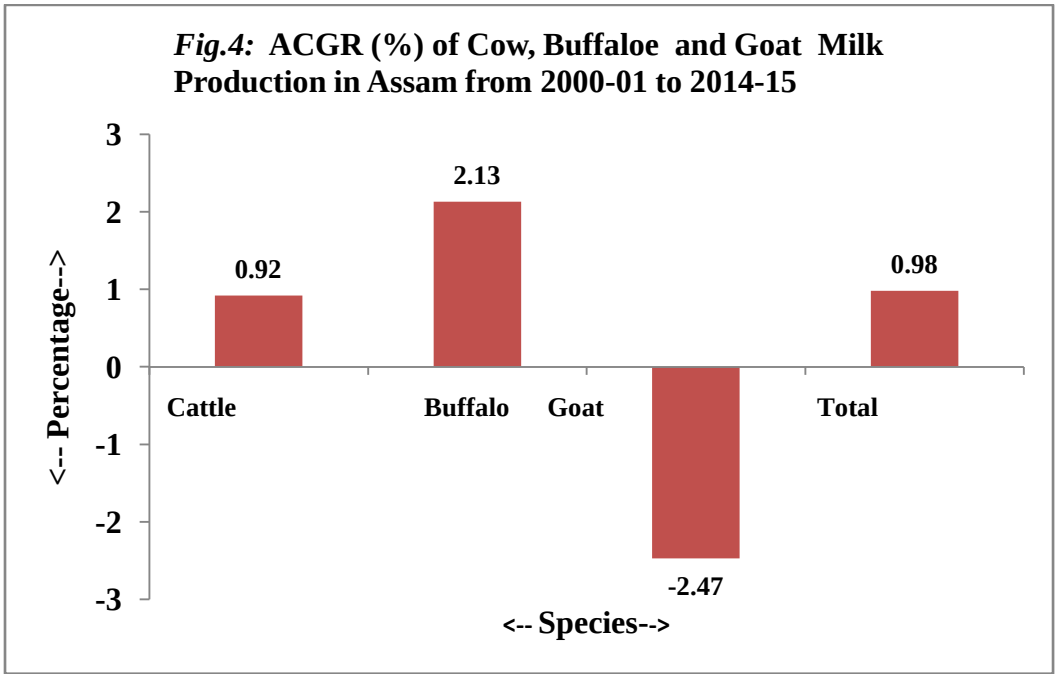



***Fig.4:*** **ACGR (%) of Cow, Buffaloe and Goat Milk Production in Assam from 2000-01 to 2014-15**

Table- 2.10 shows the district- wise bovine milk production in Assam for the year 2013-14. From the analysis, it has been observed that, indigenous cattle continues to contribute larger share of the State's total milk production *i.e.* 54.31 per cent of the entire milk production while the contribution of cross breed cows stood at 28.82 per cent only.

**Table 2.10: District wise Bovine Milk Production in Assam, 2013-14**

| Sl. No. | District | Indigenous Cattle | Crossbred Cattle | Buffalo | Goat | Total Milk (in Liters) |
|---|---|---|---|---|---|---|
| 1 | Goalpara | 13393629 | 6081229 | 3264506 | 617969 | 23357333 |
| 2 | Dhubri | 23541839 | 10110509 | 7751676 | 839453 | 42243477 |
| 3 | Kokrajhar | 21201338 | 5499032 | 5891643 | 696156 | 33288169 |
| 4 | Bongaigaon | 17601581 | 11222411 | 3264359 | 637247 | 32725598 |
| 5 | Barpeta | 22300308 | 15813443 | 4425319 | 687571 | 43226641 |
| 6 | Nalbari | 13703060 | 10905483 | 2953595 | 597694 | 28159832 |
| 7 | Baksa | 10939326 | 3456270 | 1177447 | 390074 | 15963117 |
| 8 | Kamrup | 23052811 | 25560374 | 4403722 | 930750 | 53947657 |
| 9 | Darrang | 17593391 | 16069358 | 7165256 | 1300043 | 42128048 |
| 10 | Udalguri | 15330715 | 4510654 | 2430603 | 496381 | 22768353 |
| 11 | Sonitpur | 28545680 | 13066958 | 8303887 | 750315 | 50666840 |
| 12 | Lakhimpur | 25636095 | 6425275 | 4097979 | 570807 | 36730156 |
| 13 | Dhemaji | 20560931 | 3791888 | 5370805 | 675181 | 30398805 |
| 14 | Morigaon | 13620178 | 9863664 | 2364799 | 407983 | 26256624 |
| 15 | Nagaon | 22526364 | 13551729 | 6188021 | 730218 | 42996332 |
| 16 | Golaghat | 21730050 | 8768221 | 4943026 | 680654 | 36121951 |
| 17 | Jorhat | 16751899 | 20573871 | 5448376 | 548634 | 43322780 |
| 18 | Sibsagar | 19703339 | 7657991 | 4687408 | 623674 | 32672412 |
| 19 | Dibrugarh | 21435296 | 12401464 | 5847242 | 637110 | 40321112 |
| 20 | Tinsukia | 21455841 | 7577022 | 5016487 | 643555 | 34692905 |
| 21 | Karbi-Anglong | 21052546 | 10297786 | 11644577 | 914257 | 43909166 |
| 22 | N.C. Hills | 7801208 | 2903946 | 4454028 | 329672 | 15488854 |
| 23 | Karimganj | 16903584 | 6768237 | 6794276 | 470669 | 30936766 |
| 24 | Hailakandi | 7846877 | 3644267 | 3478579 | 343011 | 15312734 |
| 25 | Cachar | 21385249 | 10544063 | 7191670 | 628559 | 39749541 |
| ASSAM | | 465613135 | 247065145 | 128559286 | 16147637 | 857385203 |

***Source:*** *Directorate of Animal Husbandry and Veterinary, Assam*

Table 2.11 shows district-wise milk production in Assam during 2001-02 to 2014-15.The estimated ACGR (%) was found to be positive with Baksa topping the list (18.40) in 11 districts while negative ACGR (%) was recorded against 15 other districts.

## Table 2.11 District wise milk production in the State of Assam since 2001-02 to 2014-15

**(Million Ltr.)**

| Sl. No. | Districts | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 | ACGR (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Goalpara | 19.84 | 28.65 | 28.17 | 28.08 | 26.77 | 27.89 | 31.11 | 28.50 | 25.42 | 24.53 | 24.59 | 22.68 | 23.36 | 25.15 | -1.78 |
| 2 | Dhubri | 30.69 | 41.10 | 47.11 | 44.77 | 45.95 | 42.32 | 43.82 | 39.22 | 40.13 | 39.43 | 39.23 | 40.57 | 42.24 | 34.69 | -1.45 |
| 3 | Kokrajhar | 24.90 | 31.23 | 28.55 | 28.84 | 29.75 | 31.52 | 32.02 | 27.14 | 29.74 | 27.29 | 30.06 | 30.40 | 33.29 | 22.26 | -0..75 |
| 4 | Bongaigaon | 30.20 | 30.45 | 31.45 | 28.91 | 29.10 | 27.68 | 33.75 | 28.91 | 30.78 | 33.49 | 31.32 | 36.38 | 32.73 | 15.21 | -1.38 |
| 5 | Barpeta | 34.87 | 35.98 | 37.41 | 37.81 | 35.65 | 40.80 | 43.91 | 41.22 | 41.17 | 50.09 | 43.66 | 47.79 | 43.23 | 23.82 | 0.06 |
| 6 | Nalbari | 26.35 | 27.85 | 27.18 | 26.55 | 28.12 | 31.23 | 34.08 | 28.78 | 34.05 | 27.73 | 30.40 | 28.71 | 28.16 | 46.64 | 1.99 |
| 7 | Baska | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 14.96 | 13.69 | 16.09 | 16.19 | 15.96 | 31.99 | 18.40 |
| 8 | Kamrup | 71.30 | 57.98 | 54.69 | 60.25 | 63.84 | 56.52 | 51.75 | 56.21 | 56.07 | 63.54 | 55.02 | 67.85 | 53.95 | 19.66 | -3.36 |
| 9 | Darrang | 49.47 | 43.04 | 48.55 | 46.41 | 44.13 | 45.18 | 48.71 | 46.35 | 45.07 | 40.57 | 46.38 | 35.09 | 42.13 | 68.69 | 0.46 |
| 10 | Udalguri | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 18.49 | 20.21 | 18.14 | 19.60 | 22.77 | 39.29 | |
| 11 | Sonitpur | 54.15 | 48.33 | 50.87 | 53.12 | 55.40 | 50.78 | 53.55 | 54.15 | 51.13 | 49.62 | 48.19 | 47.02 | 50.67 | 22.65 | -3.01 |
| 12 | Lakhimpur | 27.27 | 35.43 | 36.55 | 41.27 | 39.36 | 37.30 | 37.47 | 37.09 | 30.63 | 31.60 | 29.20 | 28.47 | 36.73 | 54.49 | -0.17 |
| 13 | Dhemaji | 22.31 | 37.12 | 39.63 | 36.04 | 33.46 | 39.23 | 35.47 | 35.12 | 27.62 | 31.21 | 27.48 | 25.64 | 30.40 | 33.44 | -2.50 |
| 14 | Morigaon | 23.24 | 19.07 | 19.38 | 18.02 | 20.70 | 21.85 | 22.11 | 24.91 | 25.04 | 28.31 | 24.20 | 28.95 | 26.26 | 26.35 | 3.62 |
| 15 | Nagoan | 44.75 | 41.30 | 47.19 | 49.39 | 52.34 | 47.90 | 46.45 | 50.34 | 43.66 | 44.35 | 42.55 | 45.00 | 43.00 | 29.10 | -2.05 |
| 16 | Golaghat | 36.01 | 33.44 | 34.47 | 34.00 | 33.05 | 39.08 | 34.50 | 36.63 | 33.98 | 35.42 | 35.77 | 36.15 | 36.12 | 49.76 | 1.60 |
| 17 | Jorhat | 29.47 | 30.51 | 30.22 | 32.29 | 26.95 | 27.30 | 26.23 | 27.56 | 39.71 | 38.12 | 41.54 | 44.58 | 43.32 | 32.09 | 3.22 |
| 18 | Sibsagar | 26.72 | 30.87 | 28.47 | 32.85 | 29.45 | 32.18 | 27.80 | 29.26 | 29.56 | 31.10 | 29.95 | 33.40 | 32.67 | 39.49 | 1.26 |
| 19 | Dibrugarh | 35.00 | 40.54 | 43.44 | 46.33 | 47.54 | 44.34 | 44.59 | 42.38 | 36.70 | 39.50 | 39.71 | 40.83 | 40.32 | 34.59 | -1.52 |
| 20 | Tinsukia | 36.26 | 35.33 | 38.41 | 35.07 | 45.06 | 31.22 | 36.60 | 38.97 | 33.68 | 36.00 | 34.19 | 33.81 | 34.69 | 33.82 | -0.84 |
| 21 | Karbi Anglong | 40.18 | 41.92 | 42.31 | 50.27 | 50.30 | 55.57 | 49.53 | 55.59 | 49.59 | 42.00 | 53.27 | 40.21 | 43.91 | 34.97 | -1.19 |
| 22 | N.C. Hills | 12.45 | 13.13 | 13.60 | 13.87 | 11.96 | 14.83 | 16.23 | 19.32 | 16.40 | 12.50 | 16.50 | 13.44 | 15.49 | 44.68 | 4.78 |
| 23 | Karimganj | 28.99 | 25.20 | 27.26 | 24.88 | 27.18 | 27.06 | 27.98 | 27.49 | 29.03 | 25.43 | 32.53 | 26.66 | 30.94 | 16.09 | -0.73 |
| 24 | Hailakandi | 11.91 | 11.21 | 10.29 | 10.53 | 9.86 | 12.93 | 11.35 | 14.63 | 12.45 | 12.35 | 12.86 | 18.09 | 15.31 | 31.44 | 6.31 |
| 25 | Cachar | 33.88 | 33.49 | 30.38 | 32.53 | 35.72 | 38.03 | 35.39 | 37.24 | 34.80 | 34.64 | 35.55 | 37.36 | 39.75 | 19.21 | -0.31 |
| 26 | Chirang | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 43.44 | - |
| TOTAL | | 750.00 | 773.00 | 795.00 | 812.00 | 822.00 | 823.00 | 824.00 | 827.00 | 830.00 | 833.00 | 838.70 | 844.80 | 857.26 | 872.89 | 0.75 |

*Source: Different Issues of Integrated Sample Survey, Directorate of Animal Husbandry & Veterinary, Govt. of Assam*

### 2.7.1 Milk Consumption and Marketable Surplus

Year wise utilization pattern of milk during the period from 2005-06 to 2014-15 has been shown in Table -2.12. The Table shows that during 2014-15, 32.00 per cent of the total milk was consumed by households as fluid milk. Out of the remaining quantity 46.00 per cent was sold as fluid milk and only 22.00 per cent was converted into milk products.

**Table 2.12: Year -wise Milk Utilization Pattern in Assam (2005-06 to 2014-15)**

(million litres)

| Milk Product | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 |
|---|---|---|---|---|---|---|---|---|---|---|
| Consumed as fluid milk by household | 371.54 (45.20) | 381.05 (46.30) | 374.10 (45.40) | 372.15 (45.00) | 398.40 (48.00) | 316.54 (38.00) | 301.93 (36.00) | 304.13 (36.00) | 300.04 (35.00) | 279.32 (32.00) |
| Sold as Fluid milk | 136.45 (16.60) | 149.79 (18.20) | 210.12 (25.50) | 235.70 (28.50) | 249.00 (30.00) | 333.20 (40.00) | 352.25 (42.00) | 354.82 (42.00) | 368.62 (43.00) | 401.53 (46.00) |
| Converted into milk products | 314.00 (38.20) | 292.17 (35.50) | 239.78 (29.10) | 219.16 (26.50) | 182.60 (22.00) | 183.26 (22.00) | 184.51 (22.00) | 185.86 (22.00) | 188.60 (22.00) | 192.04 (22.00) |
| Total | 822.00 (100.00) | 823.00 (100.00) | 824.00 (100.00) | 827.00 (100.00) | 830.00 (100.00) | 833.00 (100.00) | 838.70 (100.00) | 844.80 (100.00) | 857.26 (100.00) | 872.89 (100.00) |

*Source: Integrated Sample Survey Report, 2014-15, Animal Husbandry and Veterinary Department, Assam*

### 2.7.2 Requirement and Availability of Milk

According to the Sample Survey results for the year 2014-15 published by the Directorate of Animal Husbandry & Veterinary, Assam there exists large gap between the requirement and availability of milk in the State. It is seen from the Table -2.13 that the

**Table 2.13: Requirement and Availability/Deficit of Milk in Assam**

(Milk in million ltrs)

| Year | Requirement | Availability | Deficit |
|---|---|---|---|
| 2011-12 | 2338 | 839(35.89) | 15009 (64.16) |
| 2012-13 | 2395 | 845 (35.28) | 1550 (64.72) |
| 2013-14 | 2423 | 857 (35.27) | 1566 (64.63) |
| 2014-15 | 2452 | 873 (35.60) | 1579 (64.40) |
| 2015-16 | 2480 | 888 (35.81) | 1592 (64.19) |

Note: Figures in bracket shows the availability and deficit of milk in per cent to total requirement.

*Source: Economic Survey, Assam, 2016-17*

availability of milk in the State is 35.81 per cent of the total requirement during the year 2015-16. The Table clearly indicates that Assam is a deficit State in terms of milk production. This deficit is met by the supply of milk from outside the State especially from 'AMUL' (Gujarat). Although the Department does not carry out any survey on the requirement of

livestock products, it prepares a departmental estimate on the basis of requirement norms prescribed by the ICMR.

## 2.8 Status of Availability of Feed and Fodder

Feed and fodder is one of the most important contributing factors for the growth of livestock sector. It is estimated that 60-70 per cent of the total cost of livestock production is attributed to feed and fodder. Due to heavy rainfall in the entire North East region and for availability of wild grasses in plenty, in the entire region monsoon season; farmers in this part of the country are not habituated with fodder cultivation. The Department has therefore started programme to popularize fodder cultivation at institutional waste land, to strengthen and revamp the Regional Feed Testing Laboratory, located at Khanapara and to establish Silage making unit in each Government Livestock Farm for demonstration purpose. The Animal Husbandry and Veterinary department, Assam has also proposed for establishment of 6 (six) numbers of feed mill and fodder block making units in PPP mode to provide available source of fodder for cattle to enhance the desired milk production. During 2012-13, the area under fodder crops was 10,000 hectares which was only 0.1 per cent of the Gross Cropped Area of the State despite the fact that there are 1,68,000 hectares of permanent pasture and grazing land in Assam. In 2008, the availability of crop residues and green fodder in Assam was 5.82 Million Tonnes and 0.95 Million Tonnes respectively while the requirement of these two items stood at 12.39 Million Tonnes and 6.61 Million Tonnes in corresponding order.

## 2.9 Infrastructure Development

In Assam, organized development of dairy processing infrastructure was initiated even before the launch of Operation Flood Phase-I. The first processing plant in the State was established at Jorhat in 1966 with daily milk processing capacity of 5,000 litres. During the 1970s, emphasis was laid on the creation of infrastructure for intermediate preservation of fresh milk and consequently, a number of chilling plants were commissioned in different districts of the State. In the subsequent years, additional processing infrastructure was built up in the State with the initiative from the Government, and cooperative and private sectors. In recent years, the number of milk pasteurization plants has increased three-fold, from 3 in 2002 to 9 plants in 2008. The total installed capacity of these 9 plants was 159 thousand litres per day (LPD), more than double of 2002. The Government, cooperative and private sectors account for 17 per cent, 38 per cent and 45 per cent of the installed capacity, respectively. Table- 2.14 describes the year- wise milk processing in the State. The Table indicates that the

quantity of milk processed has increased from 2.88 million tonnes in 2000-01 to 21.72 million tonnes during 2014-15. Table also depicts that the value of milk and its products also increased from Rs.4.61 crore to Rs.86.87 crore during the reference period.

**Table 2.14: Year-wise Milk Processing in Assam**

| Years | Quantity (Million tonnes) | Value (Rs in crore) |
|---|---|---|
| 2000-01 | 2.88 | 4.61 |
| 2001-02 | 2.88 | 5.19 |
| 2002-03 | 2.88 | 5.77 |
| 2003-04 | 3.43 | 7.55 |
| 2004-05 | 8.14 | 19.53 |
| 2005-06 | 5.99 | 15.56 |
| 2006-07 | 5.88 | 16.45 |
| 2007-08 | 6.02 | 18.07 |
| 2008-09 | 6.35 | 20.32 |
| 2009-10 | 6.31 | 21.47 |
| 2010-11 | 7.23 | 26.02 |
| 2011-12 | 15.22 | 54.79 |
| 2012-13 | 17.05 | 64.77 |
| 2013-14 | 18.87 | 71.71 |
| 2014-15 | 21.72 | 86.87 |

*Source: Directorate of Dairy Development, Govt. of Assam*

The semen station at Khanapara was initiated at 1968-69 under the Intensive Cattle Development Project (ICDP). Later, the station was updated in the year 1975-76 under the Indo-Australian Cattle Breeding Project (IACBP) for production of chilled semen till the beginning of 1995-96. In the year 1995-96, under the ARIASP (khanapara), Semen Station was strengthened with new Bulls and equipments for production of Frozen Semen. The production of Frozen Semen was temporarily suspended due to transfer of old semen station of Khanapara to the new one located at Barpeta which was commissioned from March, 2015. Till date 200,000 Frozen Semen doses of pure Jersy and H.F. have been produced. The Semen produced are distributed in the field after CMU evaluation. The ALDA was established under the Society's Act as per guidelines of National Project on Cattle and Buffalo Breeding (NPCBB) and it started functioning from 2004.

District-wise veterinary infrastructure available in Assam are presented in Table-2.15. It is found that existing infrastructure is not at all sufficient enough against the number of bovine population (1.07 crores). In aggregate, there are 22 veterinary hospitals, 385 veterinary dispensaries, 756 first-aid centres, 129 block veterinary dispensaries, 39 Key

village centres, 34 regional artificial insemination centres, 20 RP check post and 14 BCPP check post with an overall total of 1399 numbers of infrastructure facilities created in Assam.

**Table 2.15: District-wise Veterinary Infrastructure in Assam**

| Districts | Hospitals | Dispensaries | Sub-Centre First Aid Centre | Block Veterinary Dispen-saries | Key-Village Centre | Regional Artificial Insemination Centre | R.P Check Post | BCPP Check Post | Total |
|---|---|---|---|---|---|---|---|---|---|
| Goalpara | 1 | 11 | 20 | 4 | 1 | 0 | 0 | 0 | 37 |
| Dhubri | 1 | 16 | 27 | 7 | 3 | 2 | 1 | 0 | 57 |
| Kokrajhar | 1 | 10 | 25 | 4 | 3 | 2 | 1 | 0 | 46 |
| Bongaigaon | 0 | 11 | 14 | 3 | 0 | 1 | 0 | 0 | 29 |
| Barpeta | 1 | 13 | 32 | 7 | 4 | 1 | 0 | 0 | 58 |
| Nalbari | 1 | 40 | 60 | 9 | 3 | 1 | 0 | 0 | 114 |
| Baska | 0 | 11 | 5 | 4 | 0 | 0 | 0 | 0 | 20 |
| Kamrup | 2 | 27 | 44 | 6 | 1 | 6 | 0 | 0 | 86 |
| Darrang | 1 | 10 | 21 | 3 | 1 | 1 | 0 | 0 | 37 |
| Udalguri | 0 | 6 | 9 | 2 | 2 | 1 | 1 | 0 | 21 |
| Sonitpur | 2 | 17 | 65 | 7 | 4 | 3 | 1 | 2 | 101 |
| Lakhimpur | 1 | 11 | 51 | 5 | 0 | 1 | 1 | 2 | 72 |
| Dhemaji | 0 | 12 | 17 | 3 | 1 | 1 | 0 | 1 | 35 |
| Morigaon | 0 | 9 | 26 | 4 | 2 | 1 | 0 | 0 | 42 |
| Nagoan | 1 | 40 | 60 | 9 | 3 | 1 | 0 | 0 | 114 |
| Golaghat | 1 | 11 | 28 | 4 | 1 | 2 | 1 | 1 | 49 |
| Jorhat | 1 | 21 | 42 | 8 | 0 | 1 | 0 | 2 | 75 |
| Sivasagar | 2 | 20 | 20 | 5 | 0 | 1 | 1 | 2 | 51 |
| Dibrugarh | 1 | 13 | 31 | 7 | 0 | 1 | 1 | 2 | 56 |
| Tinsukia | 0 | 17 | 27 | 6 | 0 | 1 | 1 | 2 | 54 |
| Karbi Anglong | 0 | 10 | 42 | 10 | 0 | 1 | 1 | 0 | 64 |
| Dema Hasao | 0 | 8 | 16 | 2 | 5 | 1 | 1 | 0 | 33 |
| Karimganj | 1 | 10 | 20 | 4 | 0 | 1 | 3 | 0 | 39 |
| Hailakandi | 0 | 6 | 19 | 4 | 1 | 1 | 3 | 0 | 34 |
| Cachar | 4 | 17 | 27 | 0 | 4 | 2 | 3 | 0 | 57 |
| Chirang | 0 | 8 | 8 | 2 | 0 | 0 | 0 | 0 | 18 |
| TOTAL | 22 | 385 | 756 | 129 | 39 | 34 | 20 | 14 | 1399 |

*Source: Animal Husbandry and Veterinary Department, Assam, 2016*

The present status of dairy sector in Assam may be summarised as follows:

a. The milk production in Assam has been increased from 824 million litres in 2006-07 to 872 million litres in 2014-15.
b. The milk processing capacity has been increased from 15,000 litres per day in 2006-07 to 2,17,000 litres per day in 2014-15.
c. Delivery of clean milk to the consumers concept of any time milk through Milk Vending Machine has been started from 2008-09.
d. Comprehensive network of Bulk Milk Coolers has been initiated in the State to facilitate processing of milk from 2009-10.
e. Automatic milk collection units in 65 locations in the State are being set up since 2008-09.

f. 341 dairy Cooperative Societies have been established.

g. 396 Milk Producers Institutions have been started.

For efficient maintenance of cold chain from producer level to consumers' level, following steps have been taken:

1. Upgraded 2 numbers of Milk Processing Plants *i.e,* Nagaon and Bokakhat Milk Processing Plants from 2000 ltrs to 5000 ltrs.
2. Revived 10 defunct Chilling Plants.
3. Established 59 numbers of Bulk Milk Coolers in the State.
4. Established 53 Milk Collection Centre with Automatic Milk Collection Units.
5. Procured 17 numbers of Road Milk Tanker.
6. Established a central Milk Testing Laboratory at Khanapara for cheeking quality of milk for the consumers.

Table-2.16 reflects the district-wise status of infrastructure under dairy development in Assam. The Table shows that there are 312 numbers of Dairy Co-operative Societies and 396 numbers of Milk Producers Institutions in Assam.

**2.10 Chapter Summary**

The review of the status of Dairy development in Assam indicates that despite having sizeable number of cattle, milk production in the State is not up to the satisfactory level as the major percentage of the cattle population in the State are of none-descript type. According to the Livestock Census 2012, the cattle population constitutes the largest group with more than 10 millions, which however, 1.20 per cent less as compared to 2007 Livestock Census. This decline in case of cross breed cattle was recorded at (-) 5.80 per cent.

Total milk production in Assam during 2014-15 was 872.98 million litres, against 857.39 million litres during 2013-14. The estimated ACGR (%) of milk production by buffaloes was found to be the highest (2.13 per cent) followed by cattle (0.92 per cent), while it was negative in case of goat.

Contrary to the recommended norms of Indian Council Medical Research (ICMR) which is 208 ml per head per day, per capita /per day milk consumption in Assam is only 74 ml. There has been a steady growth of milk production in Assam in recent period. However, estimated per day per capita consumption has remained almost same with continuous increase in population.

**Table 2.16: Status of Infrastructure under the Department of Dairy Development in Assam as on March, 2016**

| S. N | District | Organization of DCS/MPI | | Under IDDP Scheme | | | | Under CMP Scheme | | Under World bank project | | Under RKVY Scheme | | Under other programme (State Plan) | | Total | | New BMC excluding machinery | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Bulk Milk Cooler(BMC) | | Chilling Centre | | Bulk Milk Cooler(BMC) | | Chilling Centre/BMC | | Chilling Centre/BMC | | Chilling Centre/BMC | | Chilling Created | | Chilling Facility | |
| | | Dairy Cooperative Societies | Milk Producers Institution | Qty | Capacity (In TLPD) | Qty | Capacity (In TLPD) | Qty | Capacity (In TLPD) | Qty | Capacity (In TLPD) | Qty | Capacity (In TLPD) | Qty | Capacity (In TLPD) | Qty | Capacity (In TLPD) | Qty | Capacity (In TLPD) |
| 1 | Kamrup | 39 | 110 | | | | | | | | | 1 | 0.50 | 1 | 2.00 | 2 | 2.50 | 1 | 1.00 |
| 2 | Nalbari | | | | | | | | | | | | | 1 | 2.00 | 1 | 2.00 | | |
| 3 | Barpeta | 63 | 20 | | | | | | | | | 2 | 1.00 | 1 | 2.00 | 3 | 3.00 | 2 | 2.00 |
| 4 | Darrang | 38 | | | | | | 3 | 1.50 | | | 1 | 0.50 | 4 | 3.50 | 8 | 5.50 | | |
| 5 | Nagaon | 47 | 181 | | | | | | | 4 | 4.00 | 1 | 0.50 | 4 | 6.00 | 9 | 10.50 | | |
| 6 | Marigaon | 33 | 70 | | | | | 2 | 1.00 | | | | | 2 | 2.50 | 4 | 3.50 | | |
| 7 | Sonitpur | 25 | | | | | | | | 1 | 1.00 | 1 | 0.50 | 1 | 2.00 | 3 | 3.50 | | |
| 8 | Sivasagar | | | | | | | | | | | 1 | 0.50 | 1 | 1.00 | 2 | 1.50 | 1 | 1.00 |
| 9 | Jorhat | 35 | | | | | | | | 1 | 1.00 | 2 | 1.00 | | | 3 | 2.00 | | |
| 10 | Golaghat | 35 | | | | | | | | 1 | 0.50 | | | | | 1 | 0.50 | | |
| 11 | Cachar | 26 | | | | | | | | | | | | | | 0 | 0.00 | 1 | 1.00 |
| 12 | Karimganj | | | | | 1 | 2.00 | | | | | | | | | 1 | 2.00 | 1 | 1.00 |
| 13 | Hailakandi | | | | | 1 | 2.00 | | | | | | | | | 1 | 2.00 | 1 | 1.00 |
| 14 | Dhubri | | | | | | | | | | | | | 3 | 3.00 | 3 | 3.00 | | |
| 15 | Goalapara | | | | | | | | | | | 1 | 0.50 | 2 | 2.50 | 3 | 3.00 | | |
| 16 | Bongaigaon | | | | | | | | | | | 1 | 0.50 | 1 | 1.00 | 2 | 1.50 | | |
| 17 | Karbi Anglong | | | | | | | | | | | 2 | 1.00 | | | 2 | 1.00 | | |
| 18 | Dima Hasao | | | | | | | | | | | | | | | 0 | 0.00 | | |
| 19 | Lakhimpur | | | | | | | | | | | 1 | 0.50 | 2 | 2.00 | 3 | 2.50 | 1 | 1.00 |
| 20 | Dhemaji | | | | | | | | | | | | | | | 0 | 0.00 | | |
| 21 | Tinsukia | | 15 | | | | | | | | | 1 | 0.50 | 3 | 4.00 | 4 | 4.50 | | |
| 22 | Dibrugarh | | | | | | | | | | | | | 3 | 1.50 | 3 | 1.50 | | |
| **Total** | | **341** | **396** | **0** | **0** | **2** | **4.00** | **5** | **2.50** | **7** | **6.50** | **15** | **7.50** | **29** | **35.00** | **58** | **55.50** | **8** | **8.00** |

*Source: Directorate of Dairy Development, Govt. of Assam*

It has also been observed that the indigenous cattle continues to contribute larger share of the State's total milk production, with 54.31 per cent while the contribution of crossbreed cow stood at 28.82 per cent only.

The pattern of utilization of milk indicates that 32.00 per cent of the total milk was consumed by households as fluid milk. Out of the remaining quantity, 46.00 per cent was sold as fluid milk, and only 22.00 per cent was converted in to milk product. So far as availability of milk was concerned, Assam could produce only 35.81 per cent of the total milk requirement in the year 2015-16. As such, Assam is a deficit State in terms of milk production.

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# Chapter-III
# Status of Dairy Development Institutions in Assam

## 3.1 Introduction

In this chapter, an attempt has been made to present the status of dairy development institutions in Assam. A variety of institutional and infrastructure supports are required to facilitate growth of dairy sector. These may include credit institutions, farmer training facilities, milk collection centres, processing and marketing facilities, dairy farmer co-operatives, milk unions and research & extension services. Lack of these supports may put dairy development programmes in peril. As cited by many of the researchers, most of the dairy farmers are resource poor smallholders who mainly depend on borrowings from various sources. Most of these farmers have little formal education with limited command over dairy husbandry. It is therefore important to impart training to these groups of farmers to make them aware and skilled in scientific dairy farming. Once dairy production begins, a milk collection and cooling centre is required to collect milk from the dairy farms and then to transport the milk to a milk processing plant for processing and packaging, as well as marketing of the products. Farmers also require supportive extension services to provide Artificial Insemination & other animal health care (such as vaccination) facilities to improve their farm efficiency. All these require a strong institutional network to support.

## 3.2 Dairy Development Institutions

The Directorate of Animal Husbandry and Veterinary is one of the major departments under the Department of Animal Husbandry and Veterinary, Government of Assam which looks after the different activities for development of livestock sectors. The functions of the Directorate of Animal Husbandry and Veterinary include

- To improve training of Veterinary doctors as well as Para-Vets
- To improve veterinary research in the State
- To reduce disease occurrence and mortality of livestock and birds through timely preventive and curative measures.
- To increase crossbred livestock population through induction and up gradation programme.
- To establish and popularize backyard farming of poultry and other birds.
- To popularize small ruminants and piggery farming.

- To educate farmers on various aspects of livestock management, including fodder cultivation
- To render extension services in order to provide self employment opportunities amongst unemployed youths and under privileged of the State

Assam Livestock Development Agency (ALDA) was registered under Society Act as per guide lines given by the National Project on Cattle and Buffalo Breeding (NPCBB), GOI. This agency under NPCBB has been involved in the supply of genetic material to the participating agencies. ALDA started functioning in the State from the year 2004, successfully completed NPCBB Phase – I and started implementing Phase – II which is still going on. During the process ALDA expanded the AI network to the entire State as per the guideline of NPCBB and achieved considerable progress in terms of A.I. coverage and semen production. Under NPCBB Phase – II the State also established one State of the art Frozen semen Bull Station at Barpeta to cater to the needs of State's own breeding network expansion.

**Objectives**

The objectives of the ALDA are

- Production of clean & quality Frozen semen
- Expansion of the State cattle breeding network for increased coverage of A.I.
- Strengthen & streamline the existing Frozen semen & Liquid nitrogen distribution network
- Capacity building of field AI workers.
- Creation of awareness
- Self employment generation
- Risk Management

The North Eastern Regional Disease Diagnostic Laboratory (NERDDL) was established in Guwahati in 2003 with 100% assistance from Government of India as the referral laboratory for the North-East States. It is equipped with Modern animal disease diagnostic equipments, two BSL-II level lab and One Mobile BSL-III lab.

**Major Activities**

Major activities of NERDDL include

- Processing of samples for diagnosis and surveillance of various diseases of the livestock population
- Imparting training to scientists/veterinarians of the entire NE region on regular basis

- Coordinating with all the NE States and GOI regarding diagnosis and control of animal diseases

In Assam, the Directorate of Dairy Development initially covered all of their activities on procurement, processing and distribution of milk. One of their major aims was to supplement the incomes of the rural milk producers and to provide good quality milk to the urban consumers at a reasonable price. However, this objective underwent changes over the years and the Directorate has started giving more importance on facilitating and regulatory role.

## Mission

The mission of the Dairy Department is to

- Act as a facilitator to dairy farmers and other stakeholders
- Act as a regulator of market milk and other products to ensure food safety as per statutory provisions

## Functions

Main functions of the Dept. of the Dairy Development include as :

- Awareness and capacity building of stakeholders in the sector
- Exposure visits for Farmers and Departmental Officers
- Formation of DCSs, Milk Unions and Dairy Federation
- Creation of need-based infrastructures for various stakeholders
- Quality check of milk and milk products under FSSAI
- Checking and inspection of manufacturing facilities of milk and milk products in the State.

## 3.2.1 Dairy Development through Cooperative/Milk Unions in Assam

In Assam, dairy cooperative model is a three-tiered structure with the dairy cooperative societies at the village level, a milk union at the district level and a federation of member unions at the State level. The three tire model helps in – (1) Establishment of a direct linkage between milk producers and consumers by eliminating middlemen (2) Milk Producers (farmers) control procurement, processing and marketing (3) Professional management.

The three tier structure is discussed in the under noted paragraphs:

**1. Primary Village Co-operative Society:** Primary dairy cooperative society (DCS) is formed by milk producers. One village or a group of villages forms the basic unit of the primary cooperative. Only dairy farmers are allowed to enroll as members and they must commit to supplying milk exclusively to that cooperative. Any producer can become a DCS

member by buying a share and committing to sell milk only to the society. Each DCS has a milk collection centre where members are to take the milk every day. The milk of the members tested for quality based on the percentage of *FAT and SNF* on permanent basis. At the end of each year, a portion of the profits of the DCS paid to each member as a patronage bonus based on the quantity of milk procured. This also acts as a vital link for various productivity enhancement and development programmes designed for the dairy farmers. Main aim of the milk cooperative society is to bring the milk producers under the ambit of an organized network.

**2. District Union:** A District Cooperative Milk Producers' Union is owned by the dairy cooperative societies. It is a Union of primary village co-operative societies within a district. The Union buys the milk from all the societies, processes and then sells fluid milk and milk products. Union also provides a range of inputs and services to village co-operative societies and their members *viz.* feed, veterinary care, artificial insemination to sustain the growth of milk production etc. Union also arranges staff training and provides consultancy services to the village co-operative society leaders and staff.

**3. The State Federation:** The cooperative milk producers' unions in the State form a State Federation which is an apex marketing body responsible for marketing of milk and milk products of the member unions. The Federation also plays an important role in the overall development of the district unions federated to it.

### 3.2.2 Primary Dairy Cooperative Societies in Assam

Milk cooperatives are now playing a significant role in the socio-economic development of the State. Mahatma Gandhi said that future of India lies in its villages. Unfortunately, Assam in spite of being an agrarian society with around 85 per cent of its population still residing in the villages lags behind in most of the sectoral development. Rural sector is a major contributor to the overall GDP of the nation and as such, an inclusive growth is a must to reap the benefits of development across the sectors. The Cooperatives may cover almost all activities of the rural economy and thus have tremendous potential to take up the relevant activities for the benefits of the rural masses. While farmers' cooperatives of various types play a useful role in promoting rural development, dairy cooperatives have special relevance particularly in the areas where milk production is a major source of livelihood. Most of these cooperatives are the members of the West Assam Milk Producers Union Ltd. (WAMUL) and East Assam Milk Producers Cooperative Union Ltd. (EAMUL) (defunct). These cooperatives sell their surplus milk to their Union.

At present, there are 341 numbers of primary dairy cooperative societies in the State. These societies are formed as per the Assam Cooperative Societies Act, 2007, which came into force in 2012. In 2015-16, the total members of the dairy cooperatives stood at 16 thousand in Assam. As against this, only about 42 thousand liters of liquid milk are marketed daily in the State by the dairy cooperative societies. As per NDDB Annual reports 2015-16, the percentage share of Assam in total milk procurement by cooperative sector in India was only 0.05.

**Table 3.1: District wise number of Dairy Co-operative Societies, 2016**

| Sl.No | District | No. of Co-operative Society (In nos.) | Geographical Area (ha.) | Area Coverage per Dairy Cooperative (ha.) |
|---|---|---|---|---|
| 1 | Kamrup | 39 | 423701 | 10864 |
| 2 | Nalbari | - | | |
| 3 | Barpeta | 63 | 225069 | 3573 |
| 4 | Darrang | 38 | 180707 | 4755 |
| 5 | Nagaon | 47 | 411030 | 8745 |
| 6 | Marigaon | 33 | 158765 | 4811 |
| 7 | Sonitpur | 25 | 532298 | 21292 |
| 8 | Sivasagar | - | - | - |
| 9 | Jorhat | 35 | 285100 | 8146 |
| 10 | Golaghat | 35 | 354070 | 10116 |
| 11 | Cachar | 26 | 377610 | 14523 |
| 12 | Karimganj | - | - | - |
| 13 | Hailakandi | - | - | - |
| 14 | Dhubri | - | - | - |
| 15 | Goalapara | - | - | - |
| 16 | Bongaigaon | - | - | - |
| 17 | Karbi Anglong | - | - | - |
| 18 | Dima Hasao | - | - | - |
| 19 | Lakhimpur | - | - | - |
| 20 | Dhemaji | - | - | - |
| 21 | Tinsukia | - | - | - |
| 22 | Dibrugarh | - | - | - |
| 23 | Baska | - | - | - |
| 24 | Udalguri | - | - | - |
| 25 | N.C.Hills | - | - | - |
| 26 | Chirang | - | - | - |
| Total | | 341 | 2948350 | 8646 |

*Source: Directorate of Dairy Development, Govt. of Assam and area coverage per dairy cooperative is computed.*

## 3.2.3 Geographical Coverage

In Assam, Dairy Development institutions are less developed as compared to the advanced milk producing States in the country. District wise geographical coverage of dairy cooperative societies are presented in Table 3.1. It shows that the co-operative societies were mostly found in 9 districts only out of 26 districts of Assam. The highest geographical area of 5, 32,298 hectares was covered under Sonitpur district and the lowest area coverage was recorded in the district of Marigaon (1,58,765 hectares). In aggregate, area

under each co-operative was recorded at 8,646 hectares. The table reflects that the status of dairy cooperatives in the State still in infant stage in spite of continuous efforts put in by the Directorate of Dairy Development to bring the milk producers under dairy cooperative systems.

### 3.2.4 West Assam Milk Producers' Cooperative Union Limited (WAMUL)

It has already been mentioned elsewhere in the report that in Assam, out of three Milk Unions, only WAMUL is functional. The WAMUL covers three of our sample districts i.e. Barpeta, Kamrup and Nagaon.

The NDDB is managing WAMUL since April 2008. During 2015-16, the Union reported an average milk procurement of 21,783 kg per day with a peak procurement of 32,813 kg per day, covering 3,894 dairy farmers organized in 169 functional milk producers' cooperative societies. The Union in the year, has made a significant stride by handling an additional milk procurement of over Rs.1.50 crore from its dairy farmers. Moreover, for promoting clean and hygienic handling of fresh milk by the dairy farmers, this year, the Union has distributed stainless steel milk jars with a capacity of five litres and 10 litres to over 1,700 dairy farmers. During 2015-16, the Union sold 43,830 litres of packed liquid milk per day under the brand *'Purabi'* and also launched *'Purabi Taza'*, a new product in 200 ml pouch. The Union has achieved a sales turnover of Rs.725 million compared to Rs. 651 million in the previous year. During the year, WAMUL received financial assistance from the Government of Assam under the World Bank-funded Assam Agricultural Competitiveness Project-Additional Funding (AACP-AF) Project. This support has enabled the WAMUL to formally train 120 Mobile Artificial Insemination Technicians (MAITs) for carrying out doorstep AI delivery services in Nagaon district. As on March 2016, the MAITs have performed 43,076 AI services covering around 960 villages which have resulted in the birth of 5,091 calves of which 2,801 are female. The project has also started organizing veterinary and animal health camps for enhancing the productive life cycle of the animals. The WAMUL had initiated ration balancing advisory services by training 10 of its MAITs as Local Resource Persons (LRPs). During the year, greater degree of transparency was established in the village-level milk collection process through installation of 25 Data Processor-based Milk Collection Units (DPMCUs) and two Automated Milk Collection Units (AMCUs). This has resulted in remarkable improvement in the quality of locally procured milk.

The WAMUL organized a Milk Producers' Meet in May 2015 and celebrated Purabi Milk Day in December 2015. The function was graced by the Chairman, NDDB the

progressive milk producers, including women, were felicitated during the programme. (Annual Report 2015-16, NDDB).

**Table 3.2 Sales Turnover and Gross Margin by Selling Liquid Milk & Milk Products of Milk Union (WAMUL)**

| Particulars | Apr-14 | May-14 | Jun-14 | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales turnover from Milk Business (Rs/ Ltr) | 38.6 | 41.8 | 40.53 | 41.02 | 41.3 | 41.33 | 41.23 | 40.54 | 42.79 | 40.6 | 46.77 | 46.19 |
| Operating Profit(Rs/ Ltr) | -0.36 | 0.22 | -1.19 | -1.75 | -0.48 | -1.65 | -0.28 | 0.03 | 0.64 | 2.9 | 5.1 | 3.7 |
| Other Income(Rs/ Ltr) | 0.41 | 0.76 | 0.64 | 0.52 | 0.57 | 0.31 | 0.68 | 0.62 | 0.52 | 0.91 | -1.09 | 0.13 |
| Gross Margin from Sales(Rs/ Ltr) | 0.05 | 0.98 | -0.55 | -1.23 | 0.09 | -1.34 | 0.4 | 0.65 | 1.16 | 3.81 | 4.01 | 3.83 |

*Source : WAMUL*

Table 3.2 shows sales turnover and gross margin by selling liquid milk & milk products of WAMUL. The table depicts that the sales turnover from milk business increased from Rs. 38.60/ Ltr from the month of April, 2014 to Rs. 46.19/ Ltr for the month of March, 2015 while during this period gross margin from sales increased from Rs. 0.05/ Ltr to Rs.3.83/Ltr.

## 3.3 Pattern of Pricing and Marketing

The role of dairy cooperatives in procurement of milk and providing necessary services to the dairy farmers make them distinct among the other channels of milk marketing. The dairy farmers selling the milk to the dairy cooperatives get fair prices of their product. Milk union collects the milk through their Milk Van from the cooperatives. Milk price is paid to the dairy cooperative society by the union on the basis of two axis *FAT* and *SNF* content of raw milk. These centres (co-operative Society) also provide financial support and pay the money to the dairy farmers at certain intervals. Thus, the dairy farmers used to get reasonably good amount from the dairy cooperatives.

## 3.4 Institutional Weakness/Deficiency/Inefficiency

The financial problem was found to be the most significant constraint faced by the dairy cooperatives. Among the infrastructural constraints, non-availability and infrequent visit of veterinary practitioners were the main constraints. Not exercising proper management practices by the cooperative societies in favour of their attached farms was a major managerial problem. Lack of technical guidance was severe among the members of

cooperative farms. As regards the socio psychological issues are concerned, lack of time due to pre-occupation with domestic /agricultural work and lack of cooperation and coordination among the members were major constraints. The main constraint that milk producers usually seek to overcome by acting collectively is the marketing of their product. As a matter of fact, they need to be assured of a secure market to sell their highly perishable produces. It can be met by the dairy farmers themselves by organizing their own collection system and milk treatment facility. This is the rationale behind the establishment of DCS and it has helped the dairy farmers a lot in converting their primary produce in to other value-added products with longer keeping quality for marketing purposes. The other constraint with this channel is delay in payments by the dairy cooperatives. The poor households are unable to wait for longer periods to get the payments and thereby prefer to transact their marketable surplus through other channels. A major area of weakness of the primary dairy co-operatives is that they function merely as milk vendors, purchasing milk from the members and selling it to the milk union. Dairy development is an integrated process. As such, success can only be achieved if the primary dairy co-operative societies came forward to adopt an integrated approach to address the issues at appropriate level.

**3.5 Chapter Summary**

In Assam, dairy development model is a three-tiered structure with the dairy cooperative societies at the village level, a milk union at the district level and a federation of member unions at the State level. The three tire model helps in – (1) Establishment of a direct linkage between milk producers and consumers by eliminating middlemen (2) Milk Producers (farmers) control procurement, processing and marketing (3) Professional management.

At present, there are 341 numbers of primary dairy cooperative societies in the State. These societies are formed as per the Assam Cooperative Societies Act was passed in 2007, which came into force in 2012. In 2015-16, the total members of the dairy cooperatives stood at 16 thousand in Assam. As against this, only about 42 thousand liters of liquid milk are marketed daily in the State by the dairy cooperative societies. As per NDDB Annual reports 2015-16, the percentage share of Assam in total milk procurement by cooperative sector in India was only 0.05.

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The financial problem was found to be the most significant constraint faced by the dairy cooperatives. Among the infrastructural constraints, non-availability and infrequent visit of veterinary practitioners were the main constraints. Not exercising proper management practices by the cooperative societies in favour of their attached farms was a major managerial problem. Lack of technical guidance was severe among the members of cooperative farms. As regards the socio psychological issues are concerned, lack of time due to pre occupation with domestic / agricultural work and lack of cooperation and coordination among the members were major constraints. The main constraint that milk producers usually seek to overcome by acting collectively is the marketing of their product. As a matter of fact, they need to be assured of a secure market to sell their highly perishable produces. It can be met by the dairy farmers themselves by organizing their own collection system and milk treatment facility. This is the rationale behind the establishment of DCS and it has helped the dairy farmers a lot in converting their primary produce in to other value-added products with longer keeping quality for marketing purposes. The other constraint with this channel is delay in payments by the dairy cooperatives. The poor households are unable to wait for longer periods to get the payments and thereby prefer to transact their marketable surplus through other channels. A major area of weakness of the primary dairy co-operatives is that they function merely as milk vendors, purchasing milk from the members and selling it to the milk union. Dairy development is an integrated process. As such, success can only be achieved if the primary dairy co-operative societies came forward to adopt an integrated approach to address the issues at appropriate level.

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# Chapter-IV
# Policies and Programmes/Schemes for Dairy Development & Convergence of Schemes

## 4.1Introduction

For promotion of dairying involving milk producers, the Department of Animal Husbandry and Dairying is the parent department, mandated to implement different schemes and programs of the Governments. The resources to implement different schemes and programs are provided through State budgets and Central grants. Many Government welfare schemes are implemented for dairy development and are funded through budgetary previsions of multiple departments.

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. Given the diversity in social and economic contexts, district level milk unions have also drawn up various schemes to promote dairy development. Needless to say, the schemes are intended to encourage the milk producers to go for dairy farming on more scientific line. Convergence of different State and Central Government programmes in a given territory provide forward and backward linkages to any development programme, thereby enhancing the efficiency of implementation. Convergence of different programs also enhances sustainability. Different programmes with similar objectives can very well be amalgamated to reap the benefits to the fullest extent. This will ultimately improve the milk production, resulting in socio-economic improvement in the line of the dairy farmers of the State. The convergence theory is also desirable from the standpoint of use of scare public resources.

In this chapter, an attempt has been made to analyze different policies and programmes/Schemes launched by the Central Govt., State Govt. and Milk Unions for dairy development in Assam.

## 4.2Regulatory Framework for the Dairy Processing Sector

The livestock sector is a State subject in India and is governed by various need-based State level Acts apart from notifications, e.g., notification for tax exemption in Animal Feed, *etc*. Some of the major State level Acts in Assam are, The Assam Cattle Diseases Act of 1948 (to prevent spread of contagious diseases); The Assam Cattle Preservation Act of 1950 (Amendment 1976, Preservation of certain cattle by controlling the slaughter); The Cattle Trespass Assam (Amendment) Act of 1936 (to protect crops), and Livestock Importation Act (to regulate import of livestock / products) *etc*. A regular review of these Acts is deemed

**Box 4.1 : Food laws applicable to food and related products in India**

- Prevention of Food Adulteration Act (PFA), 1954 and Rules (Ministry of Health & Family Welfare)
- The Standards of Weights and Measures Act, 1976, and Standards of Weights and Measures (Packaged Commodities) Rules, 1977
- Agriculture Produce (Grading & Marking) Act (Ministry of Rural Development),2008
- Essential Commodities Act, 1955(Ministry of Food & Consumer Affairs).
- Fruit Products Order (FPO), 1995.
- Meat Food Products Order, 1973 (MFPO).
- Milk and Milk Products Order, 1992.
- The Infant Milk Substitutes, Feeding Bottles and Infant Foods (Regulation of Production, Supply and Distribution) Act, 1992 and Rules 1993.
- The Insecticide Act, 1968.
- Export (Quality Control and Inspection) Act, 1963.
- Environment Protection Act, 1986.
- Pollution Control (Ministry of Environment and Forests), 1974
- Industrial Licenses under Industries (Development & Regulation) Act, 1951 for liquor manufacture.
- Bureau of Indian Standards Act, 1986 which is the largest body for formulating standards for various food items
- Vegetable Oil Control Orders 1998
- The Solvent Extracted Oil, Deoiled Meal and Edible Flour (Control) Order ,1967

necessary in the light of the changing scenarios. It is noteworthy to mention that the Government of India has established the "The Food Safety and Standards Authority of India" under the new Food Safety and Standards Act of 2006 as a statutory body with its jurisdiction all over the country. The Authority lays down scientific standards for articles of food and regulates the manufacturing, processing, distribution, sale and importation of food so as to ensure safe and wholesome food for human consumption. A large number of new rules, which are currently under consideration of the Authority, pertain to livestock products. The strict implementation of the rule by the FSSAI in the future is going to change the production and marketing of livestock products in India. This change in the field of food safety regulation necessitates services focused at building the capacity of farmers and other value chain players to conform to the provisions of the food laws in India as enforced by the by the Director

General of Health Services, Ministry of Health and Family Welfare, GOI. There are various food laws applicable to food and related products in India (Box 4.1).

***Milk and Milk Product Order 1992***

The Government of India had promulgated the Milk and Milk Product Order (MMPO) 1992 on 9/6/92 under the provisions of Essential Commodities Act, 1955 consequent to de-licensing of Dairy Sector in 1991. As per the provisions of this order, any person/dairy plant handling more than 10,000 liters per day of milk or 500 MT of milk solids per annum needs to be registered with the Registering Authority appointed by Central Government. The objective of the order is to maintain and increase the supply of liquid milk of desired quality in the interest of the general public and also for regulating the production, processing and distribution of milk and milk products.

For faster growth of dairy sector, Government of India has amended MMPO, 1992 from time to time in order to make it more liberal and oriented to facilitate the dairy entrepreneurs (Box 4.2). The Government of India has notified the last amendment proposals in the official Gazette on 26/3/02. Now there is no restriction on setting up of

**Box 4.2 Salient Features of the New Amendments Made**

- The provision of assigning milk shed has been done away with.
- The registrations under MMPO-92 will now cover sanitary, hygienic condition, quality and food safety measures as specified in 5th Schedule of MMPO-1992.
- The provision of inspection of dairy plant has been made flexible.
- The provision to grant registration in 90 days has been reduced to 45 days subject to submission of application in complete form.
- The power or registration of State Registering Authority has been raised from 1.00 lakh litres per day to 2.00 litres per day.
- Altogether the Central and the State Registering Authorities have registered 818 units with combined milk processing capacity of 952.93 lakh litre per day in Co-operative, Private and Government Sector as on 31.3.2007.

*Source: http://dahd.nic/sites/default/files/NLP%20 Final11.pdf*

new milk processing, while noting that the requirement of registration is for enforcing the prescribed Sanitary, Hygienic Conditions and Quality and Food Safety Measures as specified in the 5th Schedule of MMPO,1992.

**4.3 Impact of Operation Flood and Reasons for failure, if any**

National Dairy Development Board (NDDB) was formed in 1965 to promote, plan and organize dairy development through cooperative principles. Operation Flood (OF) was

launched in 1970 which is considered to be the world's largest dairy development programme. It was implemented in different parts of the country in three phases, *viz.* Phase I (1970–1980), Phase II (1981–1985) and Phase III (1985–1996). The summary of the achievements of operation flood in the major States of India is presented in Table 4.1. The milk production in India had registered significant growth during the second phase of Operation Flood programme.

The OF programme was launched in Assam in the year 1977 to boost up milk production through co-operative dairying. The co-operative dairying opened ways to organized marketing. However, in order to make dairying a worthwhile proposition, a remunerative market was very essential. A positive pricing policy helps in accelerating production and productivity, while a faulty pricing policy encourages adulteration of milk as well as malpractices. The successful implementation of OF between 1970-1996 has brought India to the forefront of milk production in the world. But the benefits of "OF"

**Table 4.1: Salient Features of Operation Flood in India**

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

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

by and large, could not reach Assam much, may be due to the reason that "OF" was confined to those regions only, which were better endowed and relatively higher in productivity with easy access to urban and peri-urban markets. From the available records, it is evident that dairy development programs have not received the importance they actually deserve in the State.

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

There are many success stories in genetic improvement in advanced dairy producing countries. Remarkable increase in average lactation yields has been achieved over the years, and a continuous effort is on to breed the farmer's herd with superior germplasm. The import and export of the cattle/ buffalo germplasm is under the restricted list and is allowed against license issued by the Directorate General of Foreign Trade, Ministry of Commerce on the

recommendation of the Department of Animal Husbandry dairying & Fisheries. There is demand for the germplasm of Indian breeds of cattle and buffaloes in South America, South Asia and other countries. Towards conservation of the rich diversity of indigenous breeds, it is important to broadly identify the germplasm of cattle and buffalo meant for breeding purposes and for export. As introduction of temperate dairy breeds in the country for crossbreeding indigenous non - descript cattle has been accepted for quite some time and need was felt by a number of State Governments/ Organizations to import exotic germplasm to produce quality cross -bred animals, the Central Government issued guidelines (Guidelines for export /import of bovine germplasm (Revised April, 2016) for processing such applications for import and export of bovine germplasm, in order to streamline the procedures and ensure efficient and transparent processing.

India is moving fast in exports of livestock products. The total exports recorded a whopping 60 per cent growth during the last three financial years and buffalo meat covered 89 per cent of the total exports during 2014-15 and India stands as the largest exporter country. India is considered as world's 5th largest meat producer with 6.3 million tonnes which account for 3% of world meat production of 220 million tonnes. The support from the Government continues to help in boosting the meat industry. A grant up to Rs 15 crore is still offered to set up new abattoirs or modernize the existing ones. Indian meat is gaining preference in global markets as it is 20 per cent cheaper than Brazilian meat. The cost of rearing of animals in Brazil is higher as they are meant for slaughtering alone. In India, the water buffaloes are reared and used as milch animals and sent for slaughtering once they are considered unproductive. Beef exports from India more than trebled from around 0.6 million tonnes to over 2 million tonnes between 2009 and 2014. The export value more than quadrupled from US$ 1,163.54 in 2009-10 (April-March) to US$ 4,781.18 million in 2014-15. India's buffalo meat exports have been growing at an average of nearly 14 per cent each year since 2011. According to Department of Animal husbandry, Dairying and Fisheries, India produces 14.3 lakh tonnes of beef of which 11 lakh tonnes are from buffalo-meat and 3.3 lakh tonnes are from cattle.

All exported meat products must be sourced from abattoirs and meat processing plants registered with APEDA. Export shipments are subject to compulsory microbiological and other testing for the issuance of animal health certificates by the certified GOI agency. Since most Indian States restrict or prohibit cow slaughter due to religious sensitivities, India's carabeef sector mainly depends on unproductive water buffalo and water buffalo bulls from the dairy sector. In 2015, several Indian States, including Maharashtra and Haryana, enacted

stringent legislation to completely prohibit the cattle slaughter. However, industry sources indicate that these legislations have not had a major impact on the carabeef trade and supply chain. All Indian States except Kerala, West Bengal and north eastern States prohibit the slaughter of cattle of any age, including for both female and male calves.

Once a net importer, India has now turned a net exporter of dairy products. The value of dairy exports in 2013-14 was US$ 546.1 million. Saudi Arabia, Bangladesh, UAE, Egypt, Nepal, Singapore and Pakistan are among the top export destinations for dairy products from India. India's import of dairy products during 2012-13 and 2013-14 accounted for US$ 30.65 and 35 million respectively. Milk and cream concentrates, powders, and cheese are major products imported among the dairy products. New Zealand, France and Australia are the major suppliers of dairy products to India.

**4.5 Maintenance of Progeny History of Dairy Animal**

Given the fact that stress due to climate variability and availability of feed will be a pressing constraint, more emphasis is required to be paid in promoting indigenous breed. As the milk productivity of our animals is relatively low and there are high variability in the economic traits of cows, there exists ample scope for improvement of milk production and consequently marketable surplus of milk for processing by systematic implementation of genetic improvement of cattle and buffaloes through progeny testing and capacity building of different States, Union Territories, Government institutes, dairy development agencies and public-private partnership for overall improvement of dairy animals in the country.

Genetic improvement of dairy animals depends on the type of genetic resources available in the country. The types of bovine genetic resources vary in different agro-climatic regions and even within a particular region of the country. The global cattle and buffalo population indicate that there are 861 and 74 recognized cattle and buffalo breeds, respectively in the world and out of that India has 30 recognized cattle breeds and 15 breeds of Indian buffaloes. Among fifteen breeds of buffalo, eight breeds have a sizeable breedable population and are recognized. In India most of the indigenous cattle breeds have been developed from *Bos indicus* origin. The cattle breeds are different morphologically with different types of horns; long drooping ears, prominent dewlaps and hump over the withers. But the animals are suitable to variable climatic conditions because of different sweat glands and are more tolerant to enzootic diseases. Like cattle, the buffalo breeds are also morphologically different, but with same range of average productivity. In spite of low productivity, the country possesses some of the best breeds of cattle and buffaloes in the world. The rural household usually has different types of genetic resources, such as

indigenous pure breed of cattle, pure breed of buffalo, non-descript cattle, graded buffaloes, different types of crossbred animals and various combinations of the above. The herd size in India is predominantly very small whether in organized or rural sector. As such, it is important to maintain the progeny history of all dairy animals.

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

It has already been mentioned elsewhere in this chapter that as a part of agriculture, the dairy sector in India comes under the State subject. The Central Government, however, has taken the 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 livelihood 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 the budget allocation under plan periods. 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, as against 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 classify dairy sector policies in the country in the post independence period into distinct phases: Pre-operation Flood (1950s & 1960s; Operation Flood to the Pre-reforms Period, (1970s & 1980s); Post-reform Period (Post 1991); and Post MMPO period (2002) (Box 4.3).

| Box 4.3: Summary of Indian dairy sector policy changes: 1950s to 2002s | |
|---|---|
| Pre-Operation Flood Period 1950s and 1960 | > Focus on urban consumers<br>> Promotion of govt. owned dairy plants and peri-urban dairying<br>> Limited practice of crossbreeding introduced in 1960s<br>> Failure of urban milk schemes recognized<br>> Stagnant Production;<br>> Decline in per capita milk availability |
| Operation Flood Period 1970s and 1980s | > Missing Link between rural producer and urban consumer<br>> Launch of Operation Flood Programme in 1970<br>> White Revolution: Institutional innovation, linked rural producers with urban consumers; reduced transactions costs through cooperatives<br>> Import substitution strategy through tariffs and Non-tariff barriers<br>> Restricted competition within organized sector through licensing and preference for cooperatives<br>> Large public investment (Coops) in processing infrastructure<br>> Significant increase in milk production and per capita availability |
| Post Macro-Reforms Period1990s | > Industrial licensing for setting up milk processing facilities abolished<br>> 1992 - Reintroduction of licensing through Milk and Milk Products Order (MMPO)<br>> Milk shed area concept introduced for procurement of raw milk<br>> Signed the URAA in 1994 and became member of the WTO in 1995<br>> Non -tariff barriers (NTBs) such as quantitative restrictions (QRs), removed<br>> Amendments in the MMPO |
| Post- MMPO Period 2002 | > 2002 - MMPO amended<br>>. Licensing requirements abolished<br>> No milk shed area requirement for setting up milk but food safety and hygiene requirements |

*Source: Sharma and Singh, 2007.*

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), Assistance 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 approved National Dairy Plan Phase-I (NDP-I) in February, 2012 with a total investment of about Rs.2,242 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 the 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 the end implementing agencies like State Dairy Cooperative Federations/Unions/Milk Producers Companies.

The overall performance of most of the schemes has not been satisfactory to the desired levels (GOI, 2012). The major problems lied with funding pattern and poor flexibility, *etc.* Most of the schemes were standing alone with meagre financial outlay and their implementation across all the State resulted in dilution of the focus. States have their own specific needs and problems but are notable to address them comprehensively due to inadequate financial resources of their own, and they have to essentially look forward to the Central assistance. In fact, it would be useful to exploit the regional strengths using a regionally differentiated approach for exploring the potential.

Assam's economy is predominantly rural based. As such, focused and coordinated efforts by the Government to develop every village in an integrated manner based on its strength are the keys for improved growth, development and employment. The Government policies should be focused on the poorest and the weakest whose control over his own life and destiny can be restored. Major Programmes/Schemes for dairy development in Assam by Central, State and Milk Union are presented in Table 4.2. The table shows that there are 12 (twelve) numbers of Central/ Centrally Sponsored, 9(nine) numbers of State sponsored and 3(three) numbers of Milk Union sponsored schemes are in operation in Assam.

## Table 4.2: Policies/ Schemes Implemented in Assam

| No | Activity | Scheme/ Institutions | Central/ State | Nodal Dept. | Relative Components/Description |
|---|---|---|---|---|---|
| **A** | **Central Govt.** | | | | |
| 1. | Dairy Development and infrastructure | Dairy Entrepreneurship Development Scheme (DEDS) | NABARD | CBs, RRBS,UBs, SCBs, SCARDB, institutions, which are eligible for refinance from NABARD | Farmers, individual entrepreneurs and groups of unorganized and organized sector. Groups of unorganized sector which includes SHGs on behalf of their members, Dairy Cooperative Societies, Milk Unions on behalf of their members, Milk Federations, Panchayati Raj Institution (PRIs) etc. are eligible under the scheme. Back ended capital subsidy @25% of the project cost for general category and 33% for SC/ST farmers. The component-wise subsidy ceiling will be subject to indicative cost arrived by NABARD from time to time. |
| 2 | Animal Husbandry & Dairy Development | Rashtriya Krishi Vikas Yojana | Central Sector | Ministry of Agriculture and Farmers welfare | 100% Grants would be provided to the States by Central Government. |
| | | | 7 | | |
| 3 | Livestock Health | Livestock Health and Disease Control | Centrally Sponsored | Department of Animal Husbandry | Livestock Health & Disease Control (LH & DC) during 10th plan, a Centrally sponsored macro-management scheme called "Livestock Health and Disease Control" implemented with an outlay of Rs 525.00 crores. |
| 4 | Cattle and Buffalo Breeding | National Project for Cattle and Buffalo Breeding (NPCBB) | Centrally Sponsored | Department of Animal Husbandry | The project envisages 100% grant-in-aid to Implementing Agencies. The Centrally sponsored scheme NPCBB has been launched in 2006-07 for up gradation of indigenous cattle and buffalo. Production of quality Frozen Semen Required for Artificial Insemination (AI) of cattle/buffalo is one of the basic objectives of the scheme. The supply of all logistic like Liquid Nitrogen etc required for AI is to be provided under this project. Training of Veterinarians and Para Veterinarians with the new technology is also a part of the scheme, A new AI Frozen Semen Production Centre (FSBS) has been established at Barpeta district for production of quality Frozen Semen under this scheme. From 2015-16, the scheme has been renamed as NPBB (National Project on Bovine Breeding) and the funding has been routed through the Department. This scheme is implemented by Assam Livestock Development Agency (ALDA). |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Livestock Insurance<br>. | Livestock Insurance | Centrally Sponsored | Government of India | The Livestock Insurance Scheme, a Centrally sponsored scheme, was implemented on a pilot basis by the Ministry of Agriculture & Farmers Welfare , Dept. of A.H.D. & Fisheries. The premium of the insurance is subsidized to the tune of 50%. The entire cost of the subsidy is being borne by the Central Government. The benefit of subsidy is being provided to a maximum of 2 animals per beneficiary for a policy of maximum of three years. The scheme is being implemented in all States except Goa through the State Livestock Development Boards of respective States |
| 6 | Livestock Census | Livestock Census | Central Sector Scheme | State Government | It is a Central Sector Scheme with 100% Central assistance. The ultimate responsibility for conducting the Livestock Census rests with the Animal Husbandry Departments of the States/UTs. The Central Government coordinates the work of the States and gives necessary guidance to ensure uniformity in collection of census data. |
| 7 | Livestock | National Programme for Prevention of Animal Diseases | Central Sector | All State Governments/U T Administration. | 100% Centrally assisted scheme to prevent ingress of livestock diseases, to provide export certificate for livestock and livestock products. Other components include monitoring of the quality of vaccines and biologicals, Strengthening of Central/Regional Disease Diagnostic Laboratories. Implementing Agencies *etc.* |
| 8 | Livestock Health | National Livestock Mission (NLM) | Central Sector | Department of Animal Husbandry & Vety. Assam | NLM was launched in Assam in 2014-15 with the constitution of the State Level Sanctioning and Monitoring Committee (SLMC), with the Chief Secretary, Govt. of Assam as Chairperson and Principal Secretary to the Govt. of Assam, AH & Veterinary Department as Member Secretary. District Livestock Mission Committees (DLMCs) were also constituted with the Deputy Commissioners as Chairmans and district-level Veterinary Officers of respective districts as Member Secretaries. NLM has been formulated by subsuming and modifying of seven Centrally Sponsored Schemes and Seven Central Schemes under Mission Module.<br>The Centrally Sponsored Schemes are**:**<br>○ Central Fodder Development Organization<br>○ Central Sheep Breeding Farm |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | ○ Central Poultry Development Organization<br>○ Integrated Development of Small Ruminants and Rabbits<br>○ Piggery Development<br>○ Poultry Venture Capital Fund<br>○ Salvaging and Rearing of Male Buffalo Calves<br>The Central Schemes are:<br>○ Centrally Sponsored Fodder and Feed Development Scheme<br>○ Conservation of Threatened Breeds of Livestock<br>○ Poultry Development<br>○ Utilization of Fallen Animals<br>○ Livestock Insurance<br>○ Establishment of Rural Slaughterhouses, including mobile slaughter plants<br>○ Modernization of Rural Slaughterhouses |
| 9 | Livestock Health | National Animal Disease Reporting System | Central Sector | Department of Animal Husbandry & Vety. Assam | NADRS is a 100 % Central assistance scheme implemented since 2011-12. This includes disease reporting system from identified block areas of HQ through specially designed software and using internet facilities. The report needs to be submitted to Govt. for preparation of disease mapping etc. |
| 10 | Livestock Health | Establishment & Strengthening of Veterinary Hospital and Dispensaries (ESVHD) | Central Sector | Department of Animal Husbandry & Vety. Assam | Centrally sponsored scheme ESVHD was launched during the year 2010-11. The fund is being provided by Govt. of India on 90:10 sharing basis between Central and State Govt. The Govt. of India introduced this scheme for establishment/ re construction of new Hospitals /Dispensaries, up gradation of existing Veterinary Hospitals and Dispensaries for improving efficiency as per approved norms.' |
| 11 | Livestock Health | Assistance to State for Control of Animal Diseases (ASCAD) | Central Sector | Department of Animal Husbandry & Vety. Assam | This is a Centrally sponsored scheme ASCAD is implemented by the Govt. of India through State Government since 2005-06. The fund for this component provides to the State for control of economically important and zoonotic disease of livelihood through immunization, strengthening of existing State Veterinary Biological production unit, holding of workshop/ seminars, training of veterinarians & para vets. The project is being implemented on 90:10 sharing basis. |

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| 12 | Livestock Health | National Control Programme of Brucellosis (NCPB) | Central Sector | Department of Animal Husbandry & Vety. Assam | The objective of this project is to reduce Brucellosis, an economically important disease that causes abortions and infertility in animals. Central assistance is provided to the State for mass vaccination of all female calves between 6-8 months in the areas where incidence of the disease is high |
| **B** | **State Govt.** | | | | |
| 1 | Dairy Development | Chief Minister Samagra Gramya Unnayan Yojana (CMSGUY) | State | Directorate of Animal Husbandry & Vety. Assam | A mega mission, CMSGUY has been launched during 2016-17 for the overall development of the rural areas of the State and to double the farmer's income in Assam by 2021-22 coinciding with 75 years of India's Independence. The Assam Milk, Meat and Egg Mission is an important project under this, to be undertaken by the Directorate of Animal Husbandry and Veterinary, to make Assam self-sufficient in milk production focused interventions in critical areas required by the rural dairy farmers of Assam by organizing and strengthening the existing and new dairy groups such as Dairy Cooperative Societies (DCS), Livestock Cooperative Societies (LCS), Self Help Groups (SHGs) etc. |
| 2 | Dairy Development | Assam Agricultural Competitiveness Projct(AACP) | State | Directorate of Dairy Development | The objective of the project in respect of Dairy Development is to organize the dispersed dairy farmers into Dairy Cooperative Society (DCS) and Self Help Group (SHG) and Milk Producers Institutions (MPIs) to provide both forward and backward linkage to them in order to strengthen their capacity, make them more competitive and economically sustainable and to make them able to take advantage of emerging commercial opportunities. A substantial number of dispersed dairy farmers have been organized in viable groups with assured linkages under AACP |
| 3 | Dairy Development | Chief Minister's Special Package for Dhemaji District | State | Directorate of Dairy Development | The Dairy Development Department has proposed to establish 13 nos. of Commercial Dairy Farms in the district as well as to complete on-going project of 5000 LPD Dairy Plant. In addition, the Department has planned for up gradation of existing Lahowal Milk Processing Plant. |

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|---|---|---|---|---|---|
| 4 | Livestock Health | Fodder Development | State | Directorate of Animal Husbandry & Vety. Assam | The Department has planned to popularize fodder cultivation at institutional waste land, strengthen and revamp the Regional Feed Testing Laboratory, located at Khanapara and establish Silage making unit in each Government Livestock Farm for demonstration purpose. The Department has also proposed establishment of 6(six) numbers of feed mill and fodder block making units in PPP mode to provide available source of fodder for cattle to enhance milk production. |
| 5 | Dairy Development | Integrated Support Services for creation of milk surplus district | State | Directorate of Dairy Development | The scheme envisages providing support services to identify dairy clusters of Barpeta district and Sadiya sub division for enhancement of milk production and livelihood avenues to the poor dairy farmers and to make the district as milk surplus district. |
| 6 | Support Inputs | Support Inputs to Dairy Co-operative Societies (DCSs) | State | Directorate of Dairy Development | The Dairy Co-operative Societies organized under AACP and IDDP are doing well in milk production. To provide input support for clean milk production as well as for enhancement of milk production, the State Dairy Development has Department has proposed to give cattle feeds, green fodder, milk procurement inputs, feed supplements *etc.* to the members of DCSs. |
| 7 | Dairy Development | Schemes for Women | State | Directorate of Dairy Development | For economic empowerment of the womenfolk (Empowerment) involved in dairy farming, the Dairy Development department has taken special initiative since 2013-14 by forming women groups like Dairy Cooperative Societies, Self Help Groups so that they can avail easy credit, inputs and marketing facilities under the Milk Village scheme. The department also initiated training to give updated exposure and skill development on the animal rearing front and other management activities including marketing of their produce. |

| | | | | | |
|---|---|---|---|---|---|
| 8 | Dairy Development | Employment Generation | State | Directorate of Dairy Development | 1. All the existing and new Schemes/ projects under the Dairy Development, Assam will be carried out in synchronization with each other irrespective of source of fund to achieve the common objective, i.e. to increase overall milk production in the State thereby giving livelihood avenues to the poor dairy farmers.<br>2. The proposed acquisition of Bulk Milk Cooler will be installed under different Dairy Cooperatives to create employment avenues in the State.<br>3. The Department has proposed to provide financial assistance to prospective dairy entrepreneurs to establish commercial dairy farm in urban areas for which 66.66 per cent of the total unit costs will be provided through bank finance and remaining 33.33 per cent will be as Govt. Subsidy. |
| 9 | Dairy Development | Village Milk Scheme 2015-18 | State | Directorate of Dairy Development | It is a 100% grants-in-aid scheme for a Joint Liability Group (JLG) comprising of seven (7) Schedule Caste Dairy Farmers who are experienced in rearing cross bred milch cattle. The Scheme will cover the cost of 10 cattle including transportation, insurance of Rs.5,00,000.00. District Implementing Officer of the Dairy Development Dept. will be the implementing agency of the scheme. The beneficiary will be selected by the SC Welfare Board of the respective Sub-division as per their existing norms. The fund released from the Govt. would be transferred directly to the account of JLG which will be operated by the Secretary of JLG and the District Implementing Officer. The milch animals/Pregnant heifers will be procured by the JLG in coordination with District |
| **C** | **Milk Union Sponsored** | | | | |
| 1 | Development | Assistance to Co-operatives | Milk Union | WAMUL | Revival of WAMUL with improvement in milk procurement, processing and marketing. WAMUL has been turn around and has been able to share out its surplus to the milk producers |

| | | | | | |
|---|---|---|---|---|---|
| 2 | Dairy Development | Intensive Dairy Development Programme (IDDP) | Milk Union | WAMUL | Improvement in milk procurement by increasing the no of milk producers and milk marketing with a linkage to WAMUL. Creation of bulk milk cooling facilities at the village level. |
| 3 | Animal Production | Assam Dairy Development Plan (ADDP) | Milk Union | WAMUL | Provide doorstep AI delivery services & Animal Health care. |

*Source: GOI, GOA & WAMUL*

### 4.7 Convergence of Schemes Suggested

As suggested by Working Group for 12th five year plan (GOI, 2012), all the ongoing schemes should be classified under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development. As per suggestion of the working group, an attempt has been made here to classify the major schemes of dairying in Assam into three major heads as indicated in the Table 4.3.

**Table 4.3: Convergence of Schemes Suggested**

| No. | Activity | Scheme/ Institutions | Central/ State |
|---|---|---|---|
| **A** | **Animal Production** | | |
| 1 | Cattle and Buffalo Breeding | National Project for Cattle and Buffalo Breeding (NPCBB) | Centrally Sponsored |
| 2 | Animal Production | Assam Dairy Development Plan (ADDP) | Milk Union |
| **B** | **Livestock Health** | | |
| 1 | Livestock Health | Livestock Health and Disease Control | Centrally Sponsored |
| 2 | Livestock Health | National Programme for Prevention of Animal Diseases | Central |
| 3 | Livestock Health | National Livestock Mission (NLM) | Central |
| 4 | Livestock Health | National Animal Disease Reporting System | Central |
| 5 | Livestock Health | Establishment & Strengthening of Veterinary Hospital and Dispensaries (ESVHD) | Central |
| 6 | Livestock Health | Assistance to State for control of Animal Diseases (ASCAD) | Central |
| 7 | Livestock Health | Fodder Development | State |
| 8 | Livestock l Health | **National Control Programme of Brucellosis (NCPB)** | Central |
| **C** | **Dairy Development** | | |
| 1 | Dairy Development and infrastructure | Development and infrastructure Dairy Entrepreneurship p Development Scheme (DEDS) | NABARD |
| 2 | Animal Husbandry & Dairy Development | Rashtriya Krishi Vikas Yojana (RKVY) | Central |
| 3 | Dairy Development | Chief Minister Samagra Gramya Unnayan Yojana (CMSGUY) | State |
| 4 | Dairy Development | Assam Agricultural Competitiveness Project(AACP) | State |
| 5 | Dairy Development | Chief Minister's Special Package for Dhemaji District | State |

| | | | |
|---|---|---|---|
| 6 | Dairy Development | Integrated Support Services for creation of milk surplus district | State |
| 7 | Inputs Support | Support Inputs to Dairy Co-operative Societies (DCSs) | State |
| 8 | Dairy Development | Schemes for Women | State |
| 9 | Dairy Development | Employment Generation | State |
| 10 | Dairy Development | Village Milk Scheme 2015-18 | State |
| 11 | Dairy Development | Assistance to Co-operatives | Milk Union |
| 12 | Dairy Development | Intensive Dairy Development Programme (IDDP) | Milk Union |
| D | **Other** | | |
| 1 | Livestock Insurance | Livestock Insurance | Central |
| 2 | Livestock Census | Livestock Census | Central |

*Source: GOI, GOA & WAMUL*

Thus, the convergence of existing schemes may bring in more efficiency in to the system and will facilitate proper monitoring & supervision. At the same time, focused interventions should be aimed at in critical areas and required by the dairy farmers of Assam by organizing and strengthening the existing and new dairy groups such as Dairy Cooperative Societies, Livestock Cooperative Societies, Self Help Groups *etc*. A right kind of approach can really help and motivate the farmers to go for dairy as a viable source of primary livelihood avenue.

### 4.8 NDDB-Satellite Mapping to boost Dairy Farming

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

### 4.9 Chapter Summary

This chapter summarizes the Government policies, together with programmes and schemes that have been implemented in Assam over the years. Apart from the Central and State Government programs, the milk union has evolved a variety of schemes that provided incentives to the milk producers. The National Livestock Policy 2013 formulated by the Central Government aims at increasing livestock productivity and production in a sustainable manner, while protecting the environment, preserving animal bio-diversity, ensuring bio-

security and farmers' livelihood. However, the overall performance of most of the schemes has not been to the desired levels. Problems lied with funding pattern and poor flexibility, *etc.* Most of the schemes were standing alone with meagre financial outlay. Their implementation across all the States has resulted in dilution of the focus. States have their own specific needs and problems but are notable to address them comprehensively due to inadequate financial resources of their own and therefore they have to essentially look forward to the Central assistance.

All the ongoing schemes relating to dairy development in Assam should be converged and put under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development. Proper monitoring and implementation of dairy schemes/programmes together with convergence of existing schemes may bring in more efficiency in to the system. At the same time, focused interventions should be aimed at in critical areas required by the dairy farmers of Assam by organizing and strengthening the existing and new dairy groups such as Dairy Cooperative Societies, Livestock Cooperative Societies, and Self Help Groups *etc*. Once done successfully, it will help and motivate the farmers to go for it as a viable source of primary livelihood avenue.

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# Chapter-V
# Socio-Economic Profile of Selected Milk Union, DCS/Private Dairy Units and Milk Producers

## 5.1 About Selected Study Area and Milk Union

In this chapter an attempt, has been made to present the socio-economic profile of selected milk union, DCS/Private Dairy Units and milk producers**.**

The basic indicators of selected districts of Assam, pertaining to the present study are depicted in Table-5.1. The table shows that among the selected districts, Nagaon district has the highest Gross Cropped area of 2,99,322 hectares while the Jorhat district has the lowest Gross Cropped area of 1,74,280 hectares.

**Table 5.1: Basic indicators of selected districts of Assam**

| **Agricultural Profile:** | **Districts** | | | |
|---|---|---|---|---|
| | **Kamrup** | **Barpeta** | **Nagaon** | **Jorhat** |
| Geographical Area(Ha) | 308684 | 225069 | 411030 | 285100 |
| Net Cropped Area(Ha) | 120240 | 159311 | 235626 | 120240 |
| Gross Cropped Area(Ha) | 186647 | 254698 | 299322 | 174280 |
| Area Sown more than Once(Ha) | 9393 | 95387 | 63696 | 54040 |
| Cropping Intensity (%) | 155.23 | 159.87 | 127.03 | 144.94 |
| **Demographic Profile:** | | | | |
| Total Population as per 2011 census(Persons) | 1517542 | 1693622 | 2823768 | 1092256 |
| Literacy Rate (%) | 77.55 | 63.81 | 72.37 | 82.15 |
| % of rural population | 91.62 | 91.3 | 86.91 | 79.81 |
| Decadal growth rate (%) | 15.69 | 21.43 | 22 | 9.31 |

*Source: Directorate of Economics & Statistics, Govt. of Assam*

### 5.1.1 About the Selected Milk Union

It has already been mentioned elsewhere in the report that in Assam, out of three Milk Unions, only WAMUL is functional. WAMUL covers three sample districts i.e. Kamrup, Barpeta and Nagaon.

The detail about milk collection/procurement of WAMUL is presented in Table 5.2. The table depicts that during 2015-16, WAMUL's total milk procurement was 7973271 Ltr. while numbers of DCS members and pourer members of the Union stood at 381 and 3513 respectively.

**Table 5.2: Details on milk collection/ procurement of Milk Union (WAMUL)**

| Particulars | Milk 2015-16 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Apr-15** | **May-15** | **Jun-15** | **Jul-15** | **Aug-15** | **Sep-15** | **Oct-15** | **Nov-15** | **Dec-15** | **Jan-16** | **Feb-16** | **Mar-16** | **Total** |
| 1.Milk Procurement (lit.) | 750050 | 821724 | 734523 | 592372 | 532595 | 397978 | 425959 | 566378 | 632160 | 638418 | 863532 | 1017526 | 7973217 |
| 2.DCS Members (no.) | 660 | 641 | 641 | 643 | 647 | 645 | 683 | 691 | 689 | 682 | 683 | 381 | 381 |
| 3.Pourer Members (no.) | 2994 | 3391 | 3406 | 2940 | 2516 | 2170 | 1912 | 2170 | 2451 | 2855 | 3121 | 3513 | 3513 |
| ***Total*** | 3654 | 4032 | 4047 | 3583 | 3163 | 2815 | 2595 | 2861 | 3140 | 3537 | 3804 | 3894 | 3894 |
| 4.Av. Milk Fat % | 3.94 | 3.92 | 3.96 | 3.93 | 3.99 | 3.95 | 4 | 4.14 | 4.44 | 4.48 | 4.32 | 4.16 | 4.12 |
| 5.Av. Milk SNF % | 7.85 | 7.84 | 7.8 | 7.79 | 7.82 | 7.76 | 7.78 | 7.93 | 8.22 | 8.22 | 8.14 | 8.19 | 7.98 |
| 6.Daily milk yield (lit. per day) | 25002 | 26507 | 24484 | 19109 | 17180 | 13266 | 13741 | 18879 | 20392 | 20594 | 29777 | 32823 | 21785 |
| 7.Mineral Mixture Sale (kg.) | 100 | 660 | 960 | 1040 | 420 | 285 | 570 | 580 | 880 | 640 | 740 | 760 | 7635 |
| 8.Calsagar Sale (kg.) | 0 | 20 | 60 | 0 | 100 | 0 | 160 | 20 | 20 | 60 | 20 | 0 | 460 |
| 9.Cattle Feed Sale (kg.) | - | 20000 | - | 20000 | 20000 | - | - | - | 60000 | - | 40000 | - | 160000 |
| 10.Bypass Fat Sale (kg.) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | - |
| 11.De-wormer (no. of strips) | 0 | 20 | 0 | 0 | 0 | 0 | 250 | 0 | 200 | 276 | 310 | 300 | 1356 |
| 12.Veterinary camps (no.) | 12 | 18 | 16 | 15 | 16 | 20 | 22 | 18 | 25 | 30 | 28 | 27 | 247 |

*Source: WAMUL*

**Table -5.3 Particulars of Liquid Milk and Milk Products of Milk Union (WAMUL)**

| Particulars | Unit | Apr-14 | May-14 | Jun-14 | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Loose Milk Army | Ltr | 270040 | 260680 | 254840 | 290000 | 295240 | 300760 | 301120 | 293600 | 175400 | 0 | 0 | 0 | 2441680 |
| Smart Milk | Ltr | 922062 | 827773 | 808999 | 888936 | 906631 | 837764 | 847346 | 807364 | 943671 | 115621 3 | 107893 1 | 115339 0 | 1117907 9 |
| Standard Milk | Ltr | 80976 | 92725 | 93283 | 115558 | 123680 | 121899 | 64510 | 102738 | 118944 | 141719 | 130493 | 142970 | 1329495 |
| Plain Curd | Kg | 8544 | 8517 | 6313 | 8518 | 8039 | 7274 | 6089 | 5321 | 4950 | 10190 | 7563 | 10984 | 92301 |
| Sweet Curd | Kg | 18451 | 11477 | 16803 | 27737 | 24793 | 22289 | 21374 | 13386 | 7736 | 14327 | 12672 | 21333 | 212377 |
| Paneer | Kg | 3833 | 5329 | 5320 | 5328 | 5322 | 5069 | 3563 | 6178 | 7020 | 7682 | 7217 | 7878 | 69739 |
| Cream | Kg | 4557 | 721 | 602 | 863 | 766 | 465 | 501 | 766 | 3560 | 7075 | 1431 | 1104 | 22412 |

*Source: WAMUL*



**Table-5.4 Manufacturing Cost of Liquid Milk and Milk Products of Milk Union (WAMUL)**

| Particulars | Unit | Apr-14 | May-14 | Jun-14 | Jul-14 | Aug-14 | Sep-14 | Oct-14 | Nov-14 | Dec-14 | Jan-15 | Feb-15 | Mar-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Material/Packing Cost | Rs/ Ltr | 35.49 | 37.81 | 37.92 | 39.21 | 38.37 | 39.22 | 37.69 | 36.73 | 38.03 | 33.05 | 35.96 | 36.74 |
| Other Variable Cost/Processing Cost | Rs/ Ltr | 1.3 | 1.4 | 1.38 | 1.44 | 1.4 | 1.49 | 1.49 | 1.36 | 1.35 | 1.66 | 1.74 | 2.09 |
| Fixed Cost | Rs/ Ltr | 2.17 | 2.37 | 2.42 | 2.12 | 2.01 | 2.27 | 2.33 | 2.42 | 2.77 | 2.99 | 3.97 | 3.66 |

*Source: WAMUL*

Table-5.3 represents the particulars of liquid milk and milk products by WAMUL. Table shows that during 2014-15, the Milk Union procured 2441680 Ltrs. of loose milk, 11179079 Ltrs. as smart milk and 1329495 Ltrs. as standard milk while during this period they processed 92301 kg. of plain curd, 212377 kg. sweet curd, 69739 kg paneer and 22412 kg. of cream.

Table 5.4 depicts the manufacturing cost of liquid milk and milk products of WAMUL. From the analysis of the Table, it has been observed that per litre material /packing cost were to be the highest which varied from Rs.33.05 (Oct, 2014) to 39.21 ((July, 2014). Per litre other variable cost ranged between Rs.1.30 (April, 2014) and Rs.2.09 (March, 2015) while the per litre fixed cost varied from Rs.2.01 (August, 2014) to Rs.3.97 (March, 2015).

## 5.2 Selected Village Areas

The information such as number of member villages, population structure, infrastructure facilities, agricultural scenario etc. of the selected DCS and NDCS villages are presented in Table-5.5 and Table-5.6. According to the Tables, highest no. of households and population was found in Parbatia gaon of Jorhat district in case of DCS villages and Bhatemara village in the same district in case of NDCS villages. In DCS villages, no ST population was found in Kamrup and Barpeta districts except for a very small numbers in Changmazi Pathar in Nagaon district and Parbatia Gaon in Jorhat district. In case of NDCS villages no ST population was observed in Nagaon, Barpeta and Jorhat district. Only a few people under ST category were found in Barchapari village of Kamrup district. Drinking water facility was available in both the DCS and NDCS villages. Irrigation facility was very poor in the sample villages of both the situations. In case of DCS villages, highest percentage of irrigated area was reported in Ratnapur village in Barpeta district and under NDCS villages, highest irrigated area was found in Changmazi Mikir gaon of Nagaon district.

**Table 5.5: Basic Details of Selected DCS Villages (2011 Census)**

| Particulars | Basic Details of Selected DCS Villages | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Nagaon | | Kamrup | | Barpeta | | Jorhat | |
| | Changmazi Pathar | Bhimar Ali | Ujankuri | Balikuchi | Nitananda Panbari | Ratanpur | Parbatia Gaon | Phalengichuk |
| Area of village (in hectares) | 244 | 220 | 74.00 | 99 | 347.00 | 86.00 | 313.00 | 137 |
| No. of households | 462 | 310 | 407 | 27 | 316 | 396 | 626 | 78 |
| Population | 2,524 | 1,896 | 2,488 | 140 | 1,614 | 1,656 | 3,071 | 355 |
| SC population | 0 | 408 | 58 | 1 | 318 | 272 | 20 | 29 |
| ST population | 194 | 0 | 0 | 0 | 0 | 0 | 12 | 10 |
| Drinking water facilities | Available | Available | Available | Available | Available | Available | Available | Available |
| Approach paved roads | Available | NA | Available | Available | Available | Available | Available | Available |
| Approach mud roads | Available | Available | Available | Available | Available | Available | Available | NA |
| Distance (kms)-nearest town | 37 | 8 | 40 | 4 | 8 | 3 | 6 | 25 |
| Electricity for domestic use | Available | Available | Available | Available | Available | Available | Available | Available |
| Electricity of agricultural use | NA | Available | NA | NA | Available | Available | NA | NA |
| Irrigated area | 2.33 | 0.42 | 0 | 0 | 0 | 14.71 | 0 | 16 |
| Un-irrigated area | 212.95 | 192.99 | 1369.33 | 69 | 273.26 | 36.67 | 259.77 | 96 |
| % Irrigated Area | 1.09 | 0.21 | 0 | 0 | 0 | 28.63 | 0 | 14.28 |
| Culturable waste | 1.10 | 0.42 | 12.44 | 18.43 | 32.18 | 30.88 | 34.68 | 12.15 |
| Area not available for cultivation | 27.17 | 26.02 | 53.55 | 11.57 | 41.66 | 4.4 | 18.14 | 6.28 |

**Table 5.6: Basic Details of Selected NDCS Villages (2011 Census)**

| Particulars | Basic Details of Selected NDCS Villages | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Nagaon | | Kamrup | | Barpeta | | Jorhat | |
| | Changmazi Mikir Gaon | Dhal Pukhuri | Barchapari | Pachim Par Baghbari | Bhogpur | Turple Panbari | Bhatemara | Beganakhowa |
| Area of village (in hectares) | 89 | 181 | 203.00 | 70 | 217.00 | 163.00 | 214.00 | 121 |
| No. of households | 114 | 166 | 141 | 92 | 243 | 197 | 600 | 115 |
| Population | 611 | 946 | 688 | 586 | 1,295 | 1,139 | 2,830 | 571 |
| SC population | 0 | 458 | 212 | 0 | 0 | 86 | 39 | 0 |
| ST population | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 |
| Drinking water facilities | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Approach paved roads | NA | Yes | Yes | Yes | Yes | Yes | NA | Yes |
| Approach mud roads | Yes | Yes | Yes | Yes | Yes | NA | Yes | Yes |
| Distance (kms)-nearest town | 32 | 7 | 40 | 6 | 24 | 8 | 5 | 25 |
| Electricity for domestic use | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Electricity of agricultural use | NA | Yes | NA | NA | Yes | Yes | NA | NA |
| Irrigated area | 28.62 | 0.39 | 0 | 0 | 0 | 0 | 0 | 0 |
| Un-irrigated area | 40.54 | 171.75 | 142.32 | 47.14 | 193.08 | 120.74 | 187.38 | 61 |
| % Irrigated Area | 35.3 | 0.22 | 0 | 0 | 0 | 0 | 0 | 0 |
| Culturable waste | 6.72 | 0.3 | 27.73 | 8.3 | 10.32 | 9.25 | 3.75 | 2.62 |
| Area not available for cultivation | 19.54 | 8.36 | 32.51 | 14.54 | 12.8 | 33.33 | 22.62 | 13.15 |

**Table 5.7 :Profile of Selected PDCS & Private Dairy Units in Assam**

| District | Profile of Selected PDCS & Private Dairy Units in Assam | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Nagaon | | Kamrup | | Barpeta | | Jorhat | |
| **Selected PDCS** | Jamuna Valley DUSSL | Kapili DUSSL | Uma Mahila DUSSL | Gorakhaya DUSSL | Kamdhanu DUSSL | Himalaya DUSSL | Swarna Dhanu DUSSL | Suravi |
| Tehsil/Taluka | Bimakandi | Dol Pukhuri | Hajo | Rangia | Bajali | Gobardhana | Titabar | Dhekargora |
| Village | Changmazi Pathar | Bhimar Ali | Ujankuri | Balikuchi | Nitananda Panbari | Ratanpur | Parbatia Gaon | Phalengichuk |
| Total No. of HHs in Village | 462 | 310 | 407 | 27 | 316 | 296 | 626 | 78 |
| Total No. of Dairy Farmers hh (approx.) | 35 | 100 | 145 | 26 | 200 | 80 | 170 | 68 |
| Total milk collection (liters)/Day | 800 | 1200 | 200 | 160 | 8100 | 2000 | 920 | 880 |
| Av. Fat (%) | 4.28 | 5.1 | 5.34 | 4.8 | 5.55 | 4.3 | 4.1 | 3.8 |
| Total No. of milk producers | 32 | 85 | 100 | 25 | 147 | 43 | 102 | 60 |
| Milk sent to Milk Union (liters) | 300 | 800 | 200 | 160 | 5600 | 1200 | 0 | 0 |
| Milk sold @ dairy- Quantity (lit) | 500 | 400 | 0 | 0 | 2500 | 600 | 920 | 880 |
| Milk sold @ dairy- Rate/lit (Rs.) | 35 | 36 | 0 | 0 | 35 | 36 | 36 | 36 |
| **Selected Private Dairy Units- PDU** | | | | | | | | |
| Tehsil/Taluka | Bimakandi | Dol Pukhuri | Hajo | Rangia | Bajali | Gobardhana | Titabar | Dhekargora |
| Village | Changmazi Mikir Gaon | Dhal Pukhuri | Barchapari | Pachim Par Baghbari | Bhogpur | Turple Panbari | Bhatemara | Beganakhowa |
| Agent | Agent | Agent | Agent | Agent | Agent | Agent | Agent | Agent |
| Total No. of HHs in Village | 114 | 166 | 141 | 92 | 243 | 191 | 600 | 115 |
| Total No. of Dairy Farmers hh (approx.) | 30 | 77 | 58 | 41 | 148 | 64 | 112 | 48 |
| Total milk collection (liters)/Day | 600 | 750 | 370 | 220 | 1700 | 850 | 520 | 380 |
| Av. Fat (%) | 3.4 | 3.8 | 4.1 | 3.9 | 5.1 | 4.2 | 3.6 | 3.6 |
| Total No. of milk producers | 27 | 52 | 48 | 34 | 82 | 37 | 85 | 39 |
| Milk sent to Milk Union (liters) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Milk sold @ dairy- Quantity (lit) | 600 | 750 | 370 | 220 | 1700 | 910 | 520 | 380 |
| Milk sold @ dairy- Rate/lit (Rs.) | 40 | 41 | 41 | 40 | 41 | 40 | 40 | 41 |

*Source: Field Survey Data*

## 5.3 Selected Primary Dairy Cooperative Societies & Private Dairy Units

The details of the selected Primary Dairy Cooperative Societies & Private Dairy Units located in selected villages are presented in Table-5.7. The total milk collection at PDCS was much higher than that of private dairy units, while per litre milk rate was relatively lower in PDCS as compared to PDU.

## 5.4 Sample Households

Table-5.8 shows family profile of selected households. The average household size for DCS varied from 4.98 numbers to 5.93 numbers with an overall average of 5.28 numbers while for NDCS, the average household size ranged from 1.77 numbers to 1.87 numbers with an overall average of 5.02 numbers. Table also reflects that average percentage of family members engaged in dairy farming was 49.61 for DCS and 49.83 for NDCS.

**Table 5.8: Family Profile of Selected Households**

| Particulars | Assam | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DCS (n=120) | | | | NDCS (n=120) | | | |
| | S | M | L | T | S | M | L | T |
| Av. Household Size (Nos.) | | | | | | | | |
| Male | 2.13 | 1.90 | 2.78 | 2.27 | 1.80 | 1.60 | 1.90 | 1.77 |
| Female | 1.45 | 1.58 | 2.00 | 1.68 | 1.30 | 1.40 | 1.45 | 1.38 |
| Children(Below 15 Year) | 1.40 | 1.45 | 1.15 | 1.33 | 1.80 | 1.85 | 1.95 | 1.87 |
| Total | 4.98 | 4.93 | 5.93 | 5.28 | 4.90 | 4.85 | 5.30 | 5.02 |
| Gender of Respondent/HH (%) | | | | | | | | |
| Male | 80.00 | 82.50 | 85.00 | 82.50 | 82.50 | 100.00 | 100.00 | 94.17 |
| Female | 20.00 | 17.50 | 15.00 | 17.50 | 17.50 | 0.00 | 0.00 | 5.83 |
| Av. Age of respondent (years) | | | | | | | | |
| Male | 52.19 | 53.15 | 52.47 | 52.61 | 47.27 | 43.00 | 47.15 | 45.72 |
| Female | 41.63 | 44.00 | 51.67 | 45.29 | 43.57 | 0.00 | 0.00 | 43.57 |
| Total | 50.08 | 51.55 | 52.35 | 51.33 | 46.63 | 43.00 | 47.15 | 45.59 |
| Av. Age of family (years) | 28.23 | 29.96 | 28.66 | 28.93 | 30.23 | 29.75 | 30.37 | 30.13 |
| Av. Education of respondent/HH (years) | 6.35 | 6.85 | 6.75 | 6.65 | 6.68 | 8.10 | 5.75 | 6.84 |
| % of Family members works in dairy | 47.74 | 52.28 | 48.95 | 49.61 | 50.55 | 49.00 | 50.00 | 49.83 |

Notes: S-Small, M-Medium, L-Large, T-Total.

*Source: Field Survey Data*

Table 5.9 shows the socio-economic characteristics of selected households. In Assam, domestic decisions are taken mostly by the male members of a family and the field survey in some of the districts justified the same. In the sample households, 85 per cent male took part in decision making under DCS and the corresponding figure for NDCS stood at 94.17 per cent. About 95

per cent of the sample households were Hindus and the remaining 5 per cent were Muslim community under DCS while among the NDCS, 77.50 per cent were from Hindu and rest 22.50 per cent from Muslim community. The distribution of selected DCS households as per social

**Table 5.9: Socio-Economic Characteristics of Selected Households**

| Sr. No | Particulars | % DCS | | | | % NDCS | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | S | M | L | T | S | M | L | T |
| 1 | Gender of Decision Maker (%) | | | | | | | | |
| | Male | 85.00 | 82.50 | 87.50 | 85.00 | 82.50 | 100.00 | 100.00 | 94.17 |
| | Female | 15.00 | 17.50 | 12.50 | 15.00 | 17.50 | 0.00 | 0.00 | 5.83 |
| 2 | Religion (% to total) | | | | | | | | |
| | Hindu | 95.00 | 92.50 | 97.50 | 95.00 | 82.50 | 77.50 | 72.50 | 77.50 |
| | Muslim | 5.00 | 7.50 | 2.50 | 5.00 | 17.50 | 22.50 | 27.50 | 22.50 |
| | Christian | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sikh | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | Social Group (% to total) | | | | | | | | |
| | Scheduled Tribe | 0.00 | 0.00 | 0.00 | 0.00 | 2.50 | 0.00 | 0.00 | 0.83 |
| | Scheduled Caste | 5.00 | 2.50 | 5.00 | 4.17 | 32.50 | 15.00 | 22.50 | 23.33 |
| | Other Backward Class | 57.50 | 27.50 | 37.50 | 40.83 | 30.00 | 32.50 | 27.50 | 30.00 |
| | General/Open | 37.50 | 70.00 | 57.50 | 55.00 | 35.00 | 52.50 | 50.00 | 45.83 |
| 4 | Occupation (%) | | | | | | | | |
| | ***Principal*** | | | | | | | | |
| | Cultivator | 85.00 | 75.00 | 62.50 | 74.17 | 87.50 | 82.50 | 67.50 | 79.17 |
| | AH & Dairying | 0.00 | 20.00 | 37.50 | 19.17 | 0.00 | 17.50 | 32.50 | 16.67 |
| | Agri. Labour | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Nonfarm Labour | 15.00 | 5.00 | 0.00 | 6.67 | 12.50 | 0.00 | 0.00 | 4.17 |
| | Own Non-Farm Establishment | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Trade | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Employee in Service | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Other (Specify) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | ***Subsidiary*** | | | | | | | | |
| | Cultivator | 0.00 | 15.00 | 32.50 | 15.83 | 0.00 | 10.00 | 27.50 | 12.50 |
| | AH & Dairying | 100.00 | 80.00 | 62.50 | 80.83 | 100.00 | 82.50 | 67.50 | 83.33 |
| | Agri. Labour | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Nonfarm Labour | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Own Non-Farm Establishment | 0.00 | 0.00 | 5.00 | 1.67 | 0.00 | 7.50 | 2.50 | 3.33 |
| | Trade | 0.00 | 5.00 | 0.00 | 1.67 | 0.00 | 0.00 | 2.50 | 0.83 |
| | Employee in Service | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Other (Specify) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | Av. Operational land holding (area in ha) | | | | | | | | |
| | Irrigated | 0.28 | 0.42 | 0.53 | 0.41 | 0.22 | 0.41 | 0.36 | 0.33 |
| | Un irrigated | 0.82 | 0.78 | 0.69 | 0.76 | 0.93 | 0.89 | 0.80 | 0.87 |
| | Total | 1.10 | 1.20 | 1.22 | 1.17 | 1.15 | 1.30 | 1.16 | 1.20 |
| 6 | Av. Experience in Dairy (years) | 13.99 | 14.10 | 14.50 | 14.20 | 13.90 | 13.70 | 14.01 | 13.87 |
| 7 | Income Group (%) | | | | | | | | |
| | BPL | 15.00 | 0.00 | 0.00 | 5.00 | 17.50 | 0.00 | 0.00 | 5.83 |
| | APL | 85.00 | 100.00 | 100.00 | 95.00 | 82.50 | 100.00 | 100.00 | 94.17 |
| 8 | House Structure (%) | | | | | | | | |
| | Pucca | 30.00 | 42.50 | 75.00 | 49.17 | 25.00 | 40.00 | 72.50 | 45.83 |
| | Semi-Pucca | 55.00 | 57.50 | 25.00 | 45.83 | 57.50 | 60.00 | 27.50 | 48.33 |
| | Kuccha | 15.00 | 0.00 | 0.00 | 5.00 | 17.50 | 0.00 | 0.00 | 5.83 |

Notes: S-Small, M-Medium, L-Large, T-Total.
*Source: Field survey data.*

group indicate the dominance of general category (55.00 Per cent) followed by other backward class (40.83 Per cent) and schedule caste (4.17 Per cent). Under NDCS households, 45.83 per cent households belong to general caste, 30 per cent were other backward caste and 23.33 per cent were schedule caste. ST households constituted merely 0.83 per cent of the total NDCS samples. The principal occupation of the sample households was cultivation both under DCS and NDCS. 74.17 per cent of the total respondents under DCS were exclusively dependent on cultivation while the corresponding figure under NDCS was 79.17 per cent. Further, 19.17 per cent of the DCS households and 16.67 per cent of the NDCS households were also engaged in Animal Husbandry and Dairy activities. Only a few households, i.e, 6.67 per cent DCS sample & 4.17 per cent NDCS samples reported to be engaged themselves on non farm labour. It was observed that 80.83 per cent of the total sample households under DCS and 83.33 per cent of the NDCS households adopted animal husbandry and dairying as subsidiary occupation. The average operational holding was found at 1.17 hectares for DCS households and 1.20 hectares for NDCS households. Evidently, the un-irrigated area was much higher than the irrigated area. The DCS households were found more experienced in dairy farming as compared to NDCS households. It was noticed that 95 per cent of the total respondent families were above poverty line under DCS while 94.17 per cent households fall under above poverty line under NDCS as per income group. In case of housing structure, it was found that out of the total sample households under DCS, 49.17 per cent possessed pucca houses, 45.83 per cent possessed semi-pucca and rest 5.00 per cent possessed kuccha houses. The corresponding figures under NDCS were 45.83 per cent, 48.33 per cent and 5.83 per cent, respectively.

Cropping pattern reflects the relative dominance of individual crops to total cropped area. The cropping pattern of the sample households during the year 2015-16 is presented in Table-5.10. Here, it was tried to work out the area under different crops in the study area as a percentage of total gross cropped area. The cropping pattern of the sample households under DCS shows that out of the total gross cropped area , *kharif* crops covered maximum area (64.63 per cent) followed by *rabi* (20.81 per cent) and summer crop (14.56 per cent).

In case of NDCS sample households also, out of the total gross cropped area, *kharif* crops covered highest percentage of area (65.15 per cent) followed by *rabi* (21.19 per cent) and summer crops (13.66 per cent). It was found that paddy occupied highest percentage of area 59 per cent under both DCS and NDCS respondents. Besides, reasonable area was covered by mixed

vegetables & fodder crops as well. The cropping intensity was found highest in large farm size group under both the situation (158.20 per cent for DCS & 157.44 per cent for NDCS) households.

**Table 5.10: Cropping Pattern of Sample Household (2015-16)**

*(Percentage to the Gross Cropped Area)*

| Sr. No | Season /Crops | DCS (n=120) | | | | NDCS (n=120) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | S | M | L | T | S | M | L | T |
| A | ***Kharif*** | | | | | | | | |
| | Paddy | 61.20 | 58.93 | 57.53 | 59.12 | 61.47 | 58.91 | 57.45 | 59.22 |
| | Pulses | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Mixed Vegetables | 2.72 | 3.37 | 3.10 | 3.08 | 3.28 | 4.25 | 3.57 | 3.73 |
| | Fodder Crops | 2.26 | 2.43 | 2.59 | 2.43 | 2.02 | 2.10 | 2.49 | 2.20 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | **Total *Kharif*** | 66.18 | 64.72 | 63.21 | 64.63 | 66.76 | 65.26 | 63.52 | 65.15 |
| B | ***Rabi*** | | | | | | | | |
| | Pulses | 4.33 | 4.36 | 4.46 | 4.38 | 4.35 | 3.89 | 3.68 | 3.97 |
| | Mustard | 3.84 | 4.00 | 3.92 | 3.92 | 3.60 | 3.64 | 3.29 | 3.51 |
| | Mixed Vegetables | 8.93 | 9.26 | 10.06 | 9.45 | 8.98 | 11.45 | 12.25 | 10.95 |
| | Fodder Crops | 2.84 | 2.97 | 3.32 | 3.05 | 2.47 | 2.64 | 3.19 | 2.77 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | **Total *Rabi*** | 19.94 | 20.59 | 21.76 | 20.81 | 19.40 | 21.61 | 22.41 | 21.19 |
| C | **Summer** | | | | | | | | |
| | Summer Paddy | 11.55 | 11.83 | 11.87 | 11.76 | 11.51 | 10.67 | 11.21 | 11.11 |
| | Fodder Crops | 2.33 | 2.86 | 3.16 | 2.80 | 2.32 | 2.46 | 2.86 | 2.55 |
| | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | **Total Summer** | 13.88 | 14.68 | 15.03 | 14.56 | 13.83 | 13.13 | 14.07 | 13.66 |
| D | Net Cropped Area | 44.00 | 48.00 | 48.80 | 140.80 | 46.00 | 52.00 | 46.40 | 144.40 |
| E | Cropping Intensity (%) | 151.11 | 154.50 | 158.20 | 154.72 | 149.78 | 153.23 | 157.44 | 153.48 |

*Source: Field survey data.*

## 5.5 Chapter Summary

This chapter deals with the socio-economic features of the selected milk union, villages, dairy cooperative societies as well as the sample households.

As per record available, there were three Milk Unions in Assam, covering most of the districts of the State, *i.e.* EAMUL, CAMUL and WAMUL. However, only WAMUL continues to remain operational these days. As such, it was taken for intensive study in consonance with the objective of this investigation. During 2015-16, WAMUL's total milk procurement was 7973271 Ltr. while numbers of DCS members and pourer members of the Union stood at 381 and 3513 respectively.

In DCS villages, no ST population was found in Kamrup and Barpeta districts except for a very small numbers in Changmazi Pathar in Nagaon district and Parbatia Gaon in Jorhat district. In case of NDCS villages no ST population was observed in Nagaon, Barpeta and Jorhat district. Only a few people under ST category were found in Barchapari village of Kamrup district. Drinking water facility was available in both the DCS and NDCS villages. Irrigation facility was very poor in the sample villages of both the situations. In case of DCS villages, highest percentage of irrigated area was reported in Ratnapur village in Barpeta district and under NDCS villages, highest irrigated area was found in Changmazi Mikir gaon of Nagaon district.

The total milk collection at PDCS was much higher than that of private dairy units, while per litre milk rate was relatively lower in PDCS as compared to PDU.

It was found that, the average household size for DCS varies from 4.98 numbers to 5.93 numbers with an overall average of 5.28 numbers while for NDCS households the average household size varies from 1.77 numbers to 1.87 numbers with an overall average of 5.02 numbers. The average percentage of family members worked in dairy farming is 49.61 for DCS and 49.83 for NDCS. In Assam, domestic decisions are taken mostly by male members of a family. In the sample households 85 per cent male took part in household decision making. The selected households in both the groups have negligible land area under irrigation. Paddy was the dominant crop for both types of households. Besides, vegetables were also grown extensively in *kharif* and *rabi* season by the DCS and NDCS households. Significant area of land was also allocated for fodder crops to fulfil the requirement of dairy animals. Cropping intensity was found 154.72 for DCS sample and 153.48 for NDCS sample.

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# Chapter-VI
# Cost of Milk Production & Awareness about the Schemes

## 6.1 Introduction

This chapter discusses in details the economics of dairy farming in the context of sample DCS and NDCS households. For this purpose, data on various parameters were gathered in order to worked out the herd strength and cattle shed, milk production, labour use pattern, expenditure on feed and animal health, cost on milk production and farmers awareness about various dairy development schemes.

## 6.2 Breedable Animals

It has been observed that the rural households maintain different categories and different breeds of animals for milk production. Details of herd strength and cattle shed of the selected DCS households and NDCS households are presented across the farm size group in Table 6.1 and Table-6.2. It is seen from the Tables that, of the total average number of herd strength, the highest share was secured by cross breed cow (8.53 nos. under DCS & 8.40 nos. under NDCS households). No other animals were reared by the sample households under both the condition. The average number of cattle shed varied between 1.05 and 1.53 with an overall average of 1.23 under DCS households. The corresponding figures were 1.03 to 1.50 with an overall

**Table 6.1: Details of Herd Strength & Cattle Shed – DCS Households**

| Particulars | Details of Herd Strength & Cattle Shed-Assam-DCS (n=120) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Animal (No) | | | | Milch Animal (No) | | | |
| | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| Local Cattle | 0.78 | 0.20 | 0.05 | 0.34 | 0.30 | 0.10 | 0.03 | 0.14 |
| Cross Breed | 3.83 | 7.73 | 14.03 | 8.53 | 1.70 | 3.65 | 6.75 | 4.03 |
| Buffalo | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | 4.60 | 7.93 | 14.08 | 8.87 | 2.00 | 3.75 | 6.78 | 4.18 |
| Av. No. of Cattle Shed | | | | Present Average value in Rs./shed | | | | |
| Pucca | 0.00 | 0.08 | 0.50 | 0.19 | 0 | 53500 | 58920 | 58213 |
| Semi-Pucca | 0.55 | 1.00 | 1.00 | 0.85 | 21432 | 24013 | 27188 | 24701 |
| Kuccha | 0.50 | 0.03 | 0.03 | 0.18 | 10010 | 11500 | 12500 | 10191 |
| Total | 1.05 | 1.10 | 1.53 | 1.23 | 15993 | 25739 | 37351 | 26333 |

*Source: Field Survey Data*

N.B.: SMP-Small Milk Producers (1-2 milch animals), MMP- Medium Milk Producers (3-5 milch animals) & LMP- Large Milk Producers (above 5 milch animals)

**Table 6.2 : Details of Herd Strength & Cattle Shed – NDCS Households**

| Particulars | Details on Herd Strength & Cattle Shed- Gujarat -NDCS (n=120) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total Animal (No) | | | | Milch Animal (No) | | | |
| | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| Local Cattle | 1.08 | 0.90 | 0.05 | 0.68 | 0.48 | 0.35 | 0.03 | 0.28 |
| Cross Bread | 3.06 | 7.34 | 14.80 | 8.40 | 1.43 | 3.35 | 6.85 | 3.88 |
| Buffalo | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total | 4.14 | 8.24 | 14.85 | 9.07 | 1.90 | 3.70 | 6.88 | 4.16 |
| Av. No. of Cattle Shed | | | | | Present Average value in Rs./shed | | | |
| Pucca | 0.00 | 0.05 | 0.40 | 0.15 | 0 | 52750 | 58775 | 58106 |
| Semi-Pucca | 0.43 | 0.90 | 1.08 | 0.80 | 21729 | 22539 | 26568 | 24124 |
| Kuccha | 0.60 | 0.13 | 0.03 | 0.25 | 12613 | 10480 | 12250 | 12245 |
| Total | 1.03 | 1.08 | 1.50 | 1.20 | 16393 | 22542 | 34959 | 25838 |

*Source: Field Survey Data*

average of 1.20 under NDCS households. The present average value per cattle shed was recorded at Rs.26, 333.00 under DCS and Rs.25, 838.00 under NDCS.

The details of animal breeds for DCS and NDCS households are presented in Table-6.3. The sample farmers under both DCS and NDCS reared local cow (*Local Desi)* as well as crossbreed cow (*Jersey Crossbred and Holstein Crossbred).*

**Table 6.3: Details of Animals Breeds for DCS & NDCS households**

| Sl. No | Particulars | Name of breeds |
|---|---|---|
| 1 | Local Cow | Local Desi |
| 2 | Crossbred Cow | Jersey Crossbred, Holstein Crossbred |
| 3 | Buffalo | - |
| 4 | Others | - |

*Source: Field Survey Data*

Details of breedable animals of the sample households under DCS and NDCS across the farm size groups are presented in Table -6.4 and Table-6.5. Tables reflect average age, length of lactation period (days), yield of present lactation for cross breed and local cows and total animals covered by insurance. It was found that under DCS, average age of both cross breed and local cow was 5-6 years. The age at first calving of local cow (26-27 months) was found higher as compared to cross breed cow (23 months). The lactation order of the milch animals was found at 3 for both categories of cows. The average lactation period was 214 days for local cows and 268 days for cross breed cows. The average level of peak yield during the present lactation was higher for both local and crossbreed cows as compared to the last lactation. The information about the animals covered under insurance was also collected and it was observed that no local cow was covered under any insurance scheme and only a few cross breed cows (72nos.)

were covered under Government insurance programme (Rs.590/animal) and premiums were paid by the farmers themselves.

**Table 6.4 : Details of Breedable Animals with DCS Households on Survey Date**

| Sl No | Particulars | Animal (DCS) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Local Cow | | | | Crossbred Cow | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Av. Age (year) | 5 | 6 | 5 | 5 | 5 | 5 | 5 | 5 |
| 2 | Av. Age at I st Calving Month | 27 | 26 | 26 | 26 | 23 | 23 | 23 | 23 |
| 3 | Lactation Order@ | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 4 | Lactation Period (Days) | 220 | 211 | 210 | 214 | 266 | 268 | 271 | 268 |
| 5 | Peak Yield- | | | | | | | | |
| | Last Lactation | 0.85 | 0.89 | 0.86 | 0.86 | 3.99 | 4.50 | 4.97 | 4.70 |
| | Present Lactation | 1.27 | 1.24 | 1.25 | 1.26 | 4.50 | 5.36 | 5.88 | 5.53 |
| 6 | Total Animals Covered under Insurance | 0 | 0 | 0 | 0 | 9 | 22 | 41 | 72 |
| | Premium paid (Rs./animal) | | | | | | | | |
| | Government | - | - | - | - | - | - | - | - |
| | Self | | | | | 575 | 600 | 600 | 590 |

*Source: Field Survey Data*

**Table 6.5: Details of Breedable Animals with NDCS Households on Survey Date**

| Sl No | Particulars | Animal (NDCS) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Local Cow | | | | Crossbred Cow | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Av. Age (year) | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 2 | Av. Age at I st Calving Month) | 29 | 28 | 28 | 28 | 24 | 24 | 24 | 24 |
| 3 | Lactation Order@ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 4 | Lactation Period (Days) | 215 | 210 | 200 | 212 | 270 | 274 | 260 | 265 |
| 5 | Peak Yield- | | | | | | | | |
| | Last Lactation | 0.83 | 0.67 | 0.85 | 0.76 | 3.50 | 3.73 | 3.99 | 3.86 |
| | Present Lactation | 1.27 | 1.25 | 1.25 | 1.26 | 3.99 | 4.43 | 4.73 | 4.55 |
| 6 | Total Animals Covered under Insurance | 0 | 0 | 0 | 0 | 6 | 15 | 33 | 54 |
| | Premium paid (Rs./animal) | | | | | | | | |
| | Government | - | - | - | - | - | - | - | - |
| | Self | - | - | - | - | 520 | 575 | 600 | 577 |

*Source: Field Survey Data*

In case of NDCS households, average age of both cross breed and local cow was 4 years. Average age of 1st calving month was 28 months for local cows and 24 months for cross breed cows. Average lactation period was estimated at 212 days for local cows and 265 days for cross breed cows. It was reported that, only 54 number of cross breed cows were covered under insurance programme with an annual average premium of Rs.577/animal to be paid by the farmers themselves.

Season wise milk yield (per day) of selected milk producers are presented across the farm size group in Table-6.6. The table shows that average yield rate of per local cow/day in rainy season for DCS milk producers varied from 1. 21 ltrs to 1.23 ltrs with an overall average of

**Table 6.6: Season wise Milk Yield (Per day) of Selected HH 2015-16**

| Sl No | Season | Season wise Milk Yield (Per day) of Selected HH 2015-16 *(Av. Yield (Lit/animal)* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Local Cow | | | | Crossbred Cow | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | DCS HH n=120 | | | | | | | | |
| 1 | Rainy | 1.23 | 1.21 | 1.22 | 1.22 | 4.47 | 5.23 | 5.75 | 5.25 |
| 2 | Winter | 1.32 | 1.27 | 1.28 | 1.33 | 4.60 | 5.56 | 5.98 | 5.89 |
| 3 | Summer | 1.26 | 1.23 | 1.24 | 1.24 | 4.44 | 5.30 | 5.90 | 5.45 |
| B | NDCS HH n=120 | | | | | | | | |
| 1 | Rainy | 1.24 | 1.21 | 1.21 | 1.22 | 3.85 | 4.19 | 4.41 | 4.17 |
| 2 | Winter | 1.32 | 1.29 | 1.30 | 1.32 | 4.23 | 4.79 | 5.04 | 4.96 |
| 3 | Summer | 1.25 | 1.25 | 1.25 | 1.24 | 3.90 | 4.32 | 4.73 | 4.51 |

*Source: Field Survey Data*

1.22 ltrs per day. During winter season average yield rate of per local cow/day is estimated at 1.33 and varied from 1.27 ltrs to 1.32 ltrs while in summer season, average yield rate of per local cow/day varied from 1.23 ltrs to 1.26 ltrs with an overall average of 1.24 ltrs.

On the other hand, in case of crossbreed cow in rainy season, average yield of milk per day varied from 4.47 ltrs to 5.75 ltrs with an overall average of 5.25 ltrs. During winter season, average yield rate of per crossbreed cow/day was estimated at 5.89 ltrs and varied from 4.60 ltrs to 5.98 ltrs while in summer season, average yield rate of per local cow/day varied from 4.44 ltrs to 5.90 ltrs with an overall average of 5.45 ltrs.

The table also depicts that the average yield of milk per local cow/day in rainy season for NDCS milk producers was 1.22 ltrs. During winter season, average yield rate of per local cow/day was estimated at 1.32 ltrs while in summer season, average yield was estimated at 1.24 ltrs local cow/day. On the other hand, average yield of milk per day in case of crossbreed cow for the NDCS in rainy season varied from 3.85 ltrs to 4.41 ltrs with an overall average of 4.17 ltrs. During winter season, average yield of milk crossbreed cow/day was estimated at 4.96 ltrs and varied from 4.23 ltrs to 5.04 ltrs while in summer season, average yield rate of per crossbreed cow/day varied from 3.90 ltrs to 4.73 ltrs with an overall average of 4.51 ltrs. It was further noticed from the Table that yield of milk against the large milk producers was higher for both DCS and NDCS households.

### 6.3 Labour Use Pattern

Labour plays important role in a dairy farm. To run the daily activities of the dairy farm, labour were engaged in fodder management activities, shed management, milking and animal health. Labour use pattern in dairy activities in DCS households is presented in Table 6.7. Table shows that, in case of DCS households total male family labour involvement was 1.10 no/ per in fodder management, 0.70 no/day in shed management, 1.0 in milking and 0.30 (no/day) in animal health 0.30. In case of female family labour (numbers/day), 0.7 engaged in fodder management, 0.7 in shed management, 0.06 in milking and 0.02 (no/day) was engaged in animal health.

The average working hour/person/day against male labour was 1.5 for fodder management, 0.3 for shed management, 0.5 for milking and 0.4 for animal health and the figures against the female labour was 0.7 on fodder management, 0.7 on shed management, 0.3 on milking and 0.2 on animal health.

The male hired labour engaged in fodder management, shed management and milking was 0.1 (numbers/day) each. No female hired labour was engaged by the sample farmers. The overall per day labour wage was found at Rs.193 for male and Rs.147 for female.

Labour use pattern across the farm size groups, in case of NDCS households is presented in Table- 6.8. It shows that number of workers/day was same for both male and female. It was found at 0.9 for fodder management, 0.7 for shed management, 0.8 in milking and 0.2 in animal health. The average number of male hired labour engaged in fodder management, shed management and milking were 0.1 (numbers of workers/day) each and no record of female hired labour could be traced among the sample farmers.

The average working hour/person/day for male labour was 1.7 on fodder management, 0.4 in shed management, 0.7 in milking and 0.4 in animal health and the figures against the female labour was 0.8 in fodder management, 0.6 in shed 0.4 in milking and 0.1 hour/person/day on animal health. On an average, per day labour wage was found at Rs.187 for male and Rs.143 for female.

**Table 6.7: Labour Use Pattern -DCS Household**

| Sl. No. | DCS | Involvement of Rural Men and Women in Dairy activities | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. of Workers / Day | | | | | | | | Total Hour Worked / Person / Day | | | | | | | |
| | | Male | | | | Female | | | | Male | | | | Female | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | Family Labours | | | | | | | | | | | | | | | | |
| 1 | Fodder Management | 1.0 | 1.1 | 1.2 | 1.1 | 0.6 | 0.7 | 0.7 | 0.7 | 1.2 | 1.5 | 1.9 | 1.5 | 0.8 | 0.7 | 0.7 | 0.7 |
| 2 | Shed Management | 0.7 | 0.7 | 0.8 | 0.7 | 0.6 | 0.7 | 0.8 | 0.7 | 0.2 | 0.3 | 0.3 | 0.3 | 0.8 | 0.7 | 0.7 | 0.7 |
| 3 | Milking | 1.0 | 0.9 | 1.0 | 1.0 | 0.5 | 0.6 | 0.6 | 0.6 | 0.4 | 0.5 | 0.6 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 |
| 4 | Animal Health | 0.2 | 0.2 | 0.4 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.4 | 0.5 | 0.4 | 0.4 | 0.2 | 0.2 | 0.3 | 0.2 |
| B | Hired Labours | | | | | | | | | | | | | | | | |
| 1 | Fodder Management | 0.0 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Shed Management | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3 | Milking | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4 | Animal Health | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| C | Labour Rate (Rs./Day)Male/Female | 200 | 190 | 190 | 193 | 150 | 145 | 145 | 147 | - | - | - | - | - | - | - | - |

*Source: Field Survey Data*

**Table 6.8: Labour Use Pattern -NDCS Household**

| Sl. No. | NDCS | Involvement of Rural Men and Women in Dairy activities | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No. of Workers / Day | | | | | | | | Total Hour Worked / Person / Day | | | | | | | |
| | | Male | | | | Female | | | | Male | | | | Female | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | Family Labours | | | | | | | | | | | | | | | | |
| 1 | Fodder Management | 0.9 | 0.9 | 1.0 | 0.9 | 0.7 | 0.9 | 1.0 | 0.9 | 1.3 | 1.6 | 2.1 | 1.7 | 0.9 | 0.8 | 0.8 | 0.8 |
| 2 | Shed Management | 0.8 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.8 | 0.7 | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 |
| 3 | Milking | 0.7 | 0.8 | 1.0 | 0.8 | 0.5 | 0.7 | 0.7 | 0.8 | 0.6 | 0.8 | 0.8 | 0.7 | 0.3 | 0.4 | 0.4 | 0.4 |
| 4 | Animal Health | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.2 | 0.1 | 0.1 | 0.1 |
| B | Hired Labours | | | | | | | | | | | | | | | | |
| 1 | Fodder Management | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | Shed Management | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3 | Milking | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4 | Animal Health | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| C | Labour Rate (Rs./Day ) Male/Female | 190 | 185 | 185 | 187 | 150 | 140 | 140 | 143 | - | - | - | - | - | - | - | - |
| *Source: Field Survey Data* | | | | | | | | | | | | | | | | | |

## 6.4 Details of Feed/Fodder and Water

Availability of nutritious feed and fodder is essential for growth and development of Livestock sector. Table-6.9 depicts the details of feed and fodder fed by the sample households to their milch animals at the time of survey. Table shows that DCS households fed on an average 3.70 kg. of dry fodder, 10.24 kg. green fodder and 1.31 kg. of concentrates per day per animal to the local cows and the corresponding figures for NDCS households were 3.68 kg,10.84 kg. and 1.30 kg. The sample households of both the category graze their local cows everyday for about 6-7 hours on their own agricultural land or common grazing land of their locality.

**Table 6.9: Details of Feed and Fodder (at the Time of Survey)**

| Sl. No. | Stall-Feeding | Details of Feed and Fodder (at the Time of Survey) (Kg. /day/Animal) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Animal type (Quantity Fed ( Kg)) | | | | | | | |
| | | Local Cows | | | | Cross Breed | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | DCS | | | | | | | | |
| 1 | Dry Fodder | 3.50 | 3.62 | 3.99 | 3.70 | 4.05 | 5.09 | 5.32 | 4.82 |
| 2 | Green Fodder | 10.33 | 10.27 | 10.13 | 10.24 | 18.02 | 20.03 | 20.66 | 19.57 |
| 3 | Concentrates | 1.35 | 1.29 | 1.28 | 1.31 | 3.65 | 3.90 | 4.00 | 3.85 |
| 4 | Supplements (Gram) | 25.00 | 30.00 | 30.00 | 28.33 | 70.00 | 80.00 | 85.00 | 78.33 |
| 5 | Out feeding Grazing (No of Hrs./day) | 6.50 | 6.20 | 6.40 | 6.37 | 0.00 | 0.00 | 0.00 | 0.00 |
| B | NDCS | | | | | | | | |
| 1 | Dry Fodder | 3.67 | 3.70 | 3.68 | 3.68 | 4.00 | 5.03 | 5.16 | 5.31 |
| 2 | Green Fodder | 10.80 | 10.73 | 11.00 | 10.84 | 17.27 | 19.34 | 20.82 | 19.72 |
| 3 | Concentrates | 1.35 | 1.34 | 1.22 | 1.30 | 3.64 | 3.90 | 3.99 | 3.84 |
| 4 | Supplements (Gram) | 25.00 | 29.00 | 29.50 | 27.83 | 68.00 | 75.00 | 85.00 | 76.00 |
| 5 | Out feeding Grazing (No of hrs./day) | 6.25 | 6.50 | 7.00 | 6.58 | 0.00 | 0.00 | 0.00 | 0.00 |

*Source: Field Survey Data*

As cross breed cow needs more amount of fodder and supplements (for better productivity), the sample farmers of both the categories invested more on those items as compared to the local cows. According to the Table, the DCS sample households fed on an average 4.82 kg. of dry fodder, 19.57 kg. of green fodder, 3.85 kg. concentrates and 78.33 gram of supplements per day/ per animal. The respective figures for NDCS sample households were 5.31 kg., 19.72 kg., 3.84 kg. and 76 gram. There was no report of out feeding grazing in case of cross breed cows under both the category of households. Along with feed and fodder, water is yet another important element for the livestock. It is needed for numerous processes such as, regulation of body temperature, growth, digestion, reproduction metabolism and eyesight *etc.*

**Table 6.10: Availability of Water for Dairy activities- DCS households**

| Sl No | Particulars | Availability of Water for Dairy -DCS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rainy | | | | Winter | | | | Summer | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | Sources of Water Available for Dairy Purpose (multiple) | | | | | | | | | | | | |
| 1 | Open Well | 20.0 | 12.5 | 5.0 | 12.5 | 20.0 | 12.5 | 5.0 | 12.5 | 17.5 | 10.0 | 5.0 | 10.8 |
| 2 | Tubewell | 82.5 | 92.5 | 100.0 | 91.7 | 82.5 | 92.5 | 100.0 | 91.7 | 82.5 | 92.5 | 100.0 | 91.7 |
| 3 | River | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | Canal | - | - | - | - | - | - | - | - | - | - | - | - |
| 5 | Village Talawadi | - | - | - | - | - | - | - | - | - | - | - | - |
| 6 | Farm Pond | - | - | - | - | - | - | - | - | - | - | - | - |
| 7 | Tanker | - | - | - | - | - | - | - | - | - | - | - | - |
| Av. Distance (Meters) | | 93.0 | 87.0 | 80.0 | 86.7 | 93.0 | 87.0 | 80.0 | 86.7 | 93.0 | 87.0 | 80.0 | 86.7 |
| B | Supply of Water is adequate | | | | | | | | | | | | |
| 1 | Yes | 97.5 | 92.5 | 90.0 | 93.3 | 100.0 | 92.5 | 92.5 | 95.0 | 90.0 | 92.5 | 92.5 | 91.7 |
| 2 | No | 2.5 | 7.5 | 10.0 | 6.7 | 0.0 | 7.5 | 7.5 | 5.0 | 10.0 | 7.5 | 7.5 | 8.3 |
| C | Water Quality (Village talawadi/Tanker) | | | | | | | | | | | | |
| 1 | Normal | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 87.5 | 90.0 | 90.0 | 89.2 |
| 2 | Poor | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.5 | 10.0 | 10.0 | 10.8 |
| 3 | Very Poor | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| D | Alternative source of Water supply in shortage | | | | | | | | | | | | |
| 1 | Open Well | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | TubeWell | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3 | River | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4 | Canal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | Village Talawadi | 15.0 | 7.5 | 7.5 | 10.0 | 12.5 | 7.5 | 5.0 | 8.3 | 22.5 | 15.0 | 10.0 | 15.8 |
| 6 | Farm Pond | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | Tanker | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Av. Distance (Meters) | | 150.0 | 142.0 | 130.0 | 140.7 | 150.0 | 142.0 | 130.0 | 140.7 | 150.0 | 142.0 | 130.0 | 140.7 |
| E | Payment Made for Water, If any (Rs) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

*Source: Field Survey Data*

**Table 6.11: Availability of Water for Dairy activities- NDCS households**

| Sl No | Particulars | Availability of Water for Dairy -NDCS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rainy | | | | Winter | | | | Summer | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | Sources of Water Available for Dairy Purpose (multiple) | | | | | | | | | | | | |
| 1 | Open Well | 22.5 | 17.5 | 10.0 | 16.7 | 22.5 | 17.5 | 10.0 | 16.7 | 20.0 | 12.5 | 7.5 | 13.3 |
| 2 | Tubewell | 82.5 | 90.0 | 100.0 | 90.8 | 82.5 | 90.0 | 100.0 | 90.8 | 82.5 | 90.0 | 100.0 | 90.8 |
| 3 | River | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | Canal | - | - | - | - | - | - | - | - | - | - | - | - |
| 5 | Village Talawadi | - | - | - | - | - | - | - | - | - | - | - | - |
| 6 | Farm Pond | - | - | - | - | - | - | - | - | - | - | - | - |
| 7 | Tanker | - | - | - | - | - | - | - | - | - | - | - | - |
| Av. Distance (Meters) | | 102.0 | 98.0 | 90.0 | 96.7 | 102.0 | 98.0 | 90.0 | 96.7 | 102.0 | 98.0 | 90.0 | 96.7 |
| B | Supply of Water is adequate | | | | | | | | | | | | |
| 1 | Yes | 92.5 | 95.0 | 95.0 | 94.2 | 100.0 | 97.5 | 95.0 | 97.5 | 87.5 | 90.0 | 92.5 | 90.0 |
| 2 | No | 7.5 | 5.0 | 5.0 | 5.8 | 0.0 | 2.5 | 5.0 | 2.5 | 12.5 | 10.0 | 7.5 | 10.0 |
| C | Water Quality (Village talawadi/Tanker) | | | | | | | | | | | | |
| 1 | Normal | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 82.5 | 85.0 | 90.0 | 85.8 |
| 2 | Poor | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 17.5 | 15.0 | 10.0 | 14.2 |
| 3 | Very Poor | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| D | Alternative source of Water supply in shortage | | | | | | | | | | | | |
| 1 | Open Well | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2 | TubeWell | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3 | River | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4 | Canal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5 | Village Talawadi | 17.5 | 10.0 | 5.0 | 10.8 | 15.0 | 10.0 | 5.0 | 10.0 | 25.0 | 17.5 | 12.5 | 18.3 |
| 6 | Farm Pond | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7 | Tanker | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Av. Distance (Meters) | | 170.0 | 165.0 | 151.5 | 162.2 | 170.0 | 165.0 | 151.5 | 162.2 | 170.0 | 165.0 | 151.5 | 162.2 |
| E | Payment Made for Water, If any (Rs) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

*Source: Field Survey Data*

Besides, clean and fresh water is important to keep the cattle healthy and also for producing better quality milk. It has been reported that for every litre of milk produced by a cow, consumption of at least three litres of water is a must.

The sources and availability of water for dairy activities under DCS and NDCS households were taken in to account and are presented in Table 6.10 and Table-6.11. It was seen from the Tables that in both the categories, ground water was the main source of water in the form of tube well and open well. Though the supply of water was almost adequate, few households suffered from water shortage and in such cases, they collected water from *village public tanks* which were about 117-150 meters away from their dairy farm. Water quality was reported to be normal during rainy and winter season and comparatively poor during summer season.

**6.5 Details of Veterinary and Breeding Services and Expenditures**

During the field survey, information were collected from the sample households on veterinary and breeding services along with expenditure incurred and are presented in

**Table 6.12: Details of Veterinary and Breeding Expenditure during last one year DCS Households**

| Sl No | Particulars | DCS - Veterinary and Breeding Expenditure during Last year (2015-16) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | LC | | | | CB | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | Vaccination | | | | | | | | |
| | HS | 2 | 2 | 0 | 4 | 11 | 78 | 259 | 348 |
| | BQ | 3 | 4 | 0 | 7 | 16 | 84 | 257 | 357 |
| | FMD | 5 | 4 | 1 | 10 | 56 | 131 | 266 | 453 |
| B | Medicines + Doctor( Rs ) | 326 | 420 | 375 | 374 | 576 | 665 | 840 | 689 |
| C | Av. No. of Visit By Vet./Year | 1.67 | 2.00 | 1.50 | 1.72 | 2.38 | 2.49 | 3.00 | 2.62 |
| D | Service | | | | | | | | |
| | Artificial Insemination | 1.00 | 1.00 | 0.00 | 2.00 | 62.00 | 144.00 | 267.00 | 473.00 |
| | Natural service | 11.00 | 3.00 | 1.00 | 15.00 | 6.00 | 2.00 | 3.00 | 11.00 |
| | Amount | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| E | No. of AI Per conception | 1.00 | 2.00 | 0.00 | 1.50 | 1.74 | 1.75 | 1.64 | 1.68 |
| F | Per visit rate paid to vet. Doctor (Rs/visit) | 165 | 175 | 190 | 177 | 200 | 215 | 230 | 215 |

*Source: Field Survey Data*

**Table 6.13: Details of Veterinary and Breeding Expenditure during last one year**
**NDCS Households**

| Sl No | Particulars | DCS - Veterinary and Breeding Expenditure during Last year (2015-16) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | LC | | | | CB | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | Vaccination | | | | | | | | |
| | HS | 4 | 4 | 0 | 8 | 14 | 72 | 269 | 355 |
| | BQ | 5 | 4 | 0 | 9 | 22 | 81 | 245 | 348 |
| | FMD | 9 | 8 | 1 | 18 | 44 | 122 | 249 | 415 |
| B | Medicines + Doctor( Rs ) | 305 | 358 | 393 | 350 | 504 | 637 | 838 | 653 |
| C | Av. No. of Visit By Vet./Year | 1.5 | 1.7 | 1.75 | 1.65 | 2.02 | 2.35 | 2.89 | 2.42 |
| D | Service | | | | | | | | |
| | Artificial Insemination | 2.00 | 1.00 | 0.00 | 4.00 | 53.00 | 131.00 | 271.00 | 455.00 |
| | Natural service | 17.00 | 13.00 | 1.00 | 31.00 | 4.00 | 3.00 | 3.00 | 10.00 |
| | Amount | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| E | No. of AI Per conception | 1.15 | 1.5 | 0 | 1.33 | 1.8 | 1.69 | 1.7 | 1.73 |
| F | Per visit rate paid to vet. Doctor (Rs/visit) | 170 | 175 | 190 | 178 | 205 | 220 | 245 | 223 |

*Source: Field Survey Data*

Table- 6.12 and Table-6.13. It is seen from the Tables that only a few local cows were vaccinated by the sample households of both the category. But in case of cross breed cattle, the rate was satisfactory as almost all the cattle were given vaccination. Some of the sample households reported to have incurred expenditure on medicines and doctor when animals fell sick. On an average, DCS households spent Rs. 374 against per local cows and Rs.689 on cross breed cows towards medicine and doctor fees in a year. The corresponding figure were Rs.350 and Rs.653 against the NDCS households.

## 6.6 Awareness about the Schemes

There are quite a good number of schemes introduced by the Central and State Government for the development of dairy farmers in the State. But lake of awareness about those schemes is one of the major problems encountered by the dairy sector. During the course of study, it was tried to examine the status of awareness about various dairy development schemes among the sample respondents under DCS and NDCS and the results are presented in Table-6.14. It is seen from the table that on an average, only 72.50 per cent of the DCS households were aware of different vaccinations schemes/ programmes, while in case of NDCS households, the percentage was very poor (46.67%). About 72.50 per cent of the DCS respondents were aware of the AI programme and corresponding figure for NDCS was 57.50 per cent only. About 68.33 per cent DCS households were had the information about other dairy development

programmes while only 12.50 per cent of the NDCS households knew about those programmes. The main source of information about the schemes for DCS households was dairy co-operative/milk unions while NDCS households got the same from fellow member/dairy owner/neighbour. It was found that very few DCS sample farmers got benefitted from dairy development scheme (23.33%) and no one was benefitted under NDCS category. Most of the DCS households opined that the quality of materials received was good and they were satisfied with the benefits received under dairy development schemes (89.17%).

**6.14 : Details of Awareness about various schemes**

| Sl No. | Particulars | DCS % of response | | | | NDCS % of response | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Awareness about different Vaccinations schemes/programmes (%) | | | | | | | | |
| | Yes | 65.0 | 72.5 | 80.0 | 72.5 | 35.0 | 42.5 | 62.5 | 46.67 |
| | No | 35.0 | 27.5 | 20.0 | 27.5 | 65.0 | 57.5 | 37.5 | 53.33 |
| 2 | Awareness about Artificial Insemination (AI) programmes (%) | | | | | | | | |
| | Yes | 65.00 | 72.50 | 80.00 | 72.50 | 32.50 | 5.00 | 75.00 | 57.50 |
| | No | 35.00 | 27.50 | 20.00 | 27.50 | 67.50 | 35.00 | 25.00 | 42.50 |
| 3 | Awareness about any dairy development scheme/programmes (%) | | | | | | | | |
| | Yes | 70.00 | 67.50 | 67.50 | 68.33 | 5.00 | 10.00 | 22.50 | 12.50 |
| | No | 30.00 | 32.50 | 32.50 | 31.67 | 95.00 | 90.00 | 77.50 | 87.50 |
| 4 | Sources of information about schemes (%) | | | | | | | | |
| | a) Govt. Animal Husbandry Department | 22.50 | 20.00 | 25.00 | 22.50 | 40.00 | 35.00 | 40.00 | 38.33 |
| | b) Dairy Cooperative/ Milk Union | 57.50 | 65.00 | 62.50 | 61.67 | 0.00 | 0.00 | 0.00 | 0.00 |
| | c) Media (Press/TV) | 2.50 | 0.00 | 0.00 | 0.83 | 10.00 | 12.50 | 12.50 | 11.67 |
| | d) Fellow farmer/dairy owner/neighbour | 17.50 | 15.00 | 12.50 | 15.00 | 50.00 | 52.50 | 47.50 | 50.00 |
| 5 | Have you benefited with any dairy scheme (%) | | | | | | | | |
| | Yes | 22.5 | 27.5 | 20.0 | 23.33 | 0.00 | 0.00 | 0.00 | 0.00 |
| | No | 77.5 | 72.5 | 80.0 | 76.67 | 100 | 100 | 100 | 100 |
| | a) If benefited, please provide following | | | | | | | | |
| | i) Av. No. of visits to concern office | - | - | - | - | - | - | - | - |
| | ii) Wage days lost, if any (Days) | - | - | - | - | - | - | - | - |
| | iii) Total Expenditure to avail scheme (doc/travel/etc) | - | - | - | - | - | - | - | - |
| | iv) Bribe paid to any one | - | - | - | - | - | - | - | - |
| | Good | 87.50 | 90.00 | 90.00 | 89.17 | - | - | - | - |
| | Bad | 12.50 | 10.00 | 10.00 | 10.83 | - | - | - | - |
| | v)Satisfied with benefit received (%) | | | | | | | | |
| | Yes | 87.50 | 90.00 | 90.00 | 89.17 | - | - | - | - |
| | No | 12.50 | 10.00 | 10.00 | 10.83 | - | - | - | - |
| | If no, give reason | Poor quality | Poor quality | Poor quality | Poor quality | - | - | - | - |

*Source: Field Survey Data*

From the above analysis, it becomes clear that DCS households were more aware about the various dairy development schemes/programmes and availed more benefits under those schemes. Thus, Government should come forward to take fresh initiatives to focus on various on-going dairy development schemes/programmes for upliftment of the dairy farmers as well as dairy sector in Assam.

## 6.7 Cost of Milk Production

The species-wise cost of milk production for DCS and NDCS households are

**Table 6.15 Cost of Cow Milk Production and Net Returns- DCS households**

| Sl. Nl. | Particulars | DCS- Cost of Milk Production –Cow | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | LC | | | | CB | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Total Dry Fodder (Rs./Animal/Day) | 4.73 (9.78) | 4.53 (9.73) | 4.79 (10.18) | 4.70 (9.95) | 6.08 (4.62) | 6.36 (4.34) | 6.38 (4.03) | 6.36 (4.36) |
| 2 | Total Green Fodder (Rs./Animal/Day) | 16.53 (34.22) | 15.41 (33.14) | 15.20 (32.31) | 15.67 (33.13) | 32.44 (24.65) | 30.05 (20.49) | 30.99 (19.54) | 31.31 (21.48) |
| 3 | Total Concentrates (Rs./Animal/Day) | 13.50 (27.95) | 13.55 (29.14) | 13.44 (28.58) | 13.53 (28.62) | 38.33 (29.12) | 42.90 (29.26) | 44.00 (27.74) | 41.66 (28.58) |
| 4 | Total Supplements (Rs./Animal/Day) | 1.25 (2.59) | 1.50 (3.23) | 1.50 (3.19) | 1.42 (3.00) | 4.20 (3.19) | 4.80 (3.27) | 5.10 (3.22) | 4.70 (3.22) |
| 5 | Total feed & fodder (Rs./Animal/Day) | 36.00 (74.54) | 34.98 (75.24) | 34.92 (74.27) | 35.32 (74.69) | 81.04 (61.58) | 84.11 (57.36) | 86.47 (54.53) | 84.03 (57.65) |
| 6 | Total Labour (Rs./Day) | | | | | | | | |
| | Male (Rs./Day) | 9.50 (19.67) | 8.90 (19.15) | 9.60 (20.42) | 9.33 (19.74) | 34.60 (26.29) | 47.50 (32.40) | 59.98 (37.82) | 47.36 (32.49) |
| | Female (Rs./Day) | 1.90 (3.93) | 1.61 (3.46) | 1.45 (3.08) | 1.65 (3.50) | 14.35 (10.90) | 12.78 (8.72) | 9.81 (6.19) | 12.31 (8.45) |
| | Total | 11.40 (23.60) | 10.51 (22.61) | 11.05 (23.50) | 10.99 (23.23) | 48.95 (37.20) | 60.28 (41.11) | 69.79 (44.01) | 59.67 (40.94) |
| 7 | Veterinary Cost (Rs./Animal/Day) | 0.90 (1.86) | 1.00 (2.15) | 1.05 (2.23) | 0.98 (2.08) | 1.61 (1.22) | 2.24 (1.53) | 2.33 (1.47) | 2.06 (1.41) |
| 8 | Total Cost (Rs./Animal/Day) | 48.30 (100.00) | 46.49 (100.00) | 47.02 (100.00) | 47.29 (100.00) | 131.60 (100.00) | 146.63 (100.00) | 158.59 (100.00) | 145.77 (100.00) |
| 9 | Milk Production (Litre/Animal) | 1.27 | 1.24 | 1.25 | 1.26 | 4.50 | 5.36 | 5.88 | 5.53 |
| 10 | Price (Rs. /litre) | 41.00 | 40.00 | 40.50 | 40.50 | 35.30 | 34.50 | 36.18 | 35.33 |
| 11 | Returns from Milk Production (Production*Avg Price) | 52.07 | 49.60 | 50.63 | 51.03 | 158.85 | 184.92 | 212.74 | 195.36 |
| 12 | Income from Dung (Rs./Animal/Day) | 2.90 | 3.00 | 2.68 | 2.92 | 3.00 | 3.25 | 3.50 | 3.25 |
| 13 | Total Income (Rs./Animal/Day) | 54.97 | 52.60 | 53.31 | 53.95 | 161.85 | 188.17 | 216.24 | 198.61 |
| 14 | Net Return/Profit (RS./Animal/Day) | 6.67 | 6.12 | 6.28 | 6.35 | 30.25 | 41.54 | 57.64 | 43.15 |

Note:1. Figures in parentheses indicate the percentage to total cost. 2. * indicates multiplication sign.
*Source: Field Survey Data*

presented in Table 6.15 and Table-6.16. Table-6.15 shows that, of the total feed and fodder cost per animal per day, maximum cost was incurred on green fodder (33.13 %), followed by concentrates (28.62%), dry fodder (9.95 %) and total supplements (3.00 %) against the

**Table 6.16 Cost of Cow Milk Production and Net Returns- NDCS households**

| Sl. No. | Particulars | NDCS- Cost of Milk Production –Cow | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | LC | | | | CB | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Total Dry Fodder (Rs./Animal/Day) | 4.99 (10.13) | 4.74 (9.83) | 4.53 (9.54) | 4.75 (9.83) | 6.00 (4.89) | 6.44 (5.00) | 6.35 (4.45) | 7.12 (5.34) |
| 2 | Total Green Fodder (Rs./Animal/Day) | 17.82 (36.20) | 16.20 (33.62) | 16.50 (34.76) | 16.84 (34.87) | 31.43 (25.61) | 29.01 (22.55) | 31.23 (21.87) | 31.75 (23.81) |
| 3 | Total Concentrates (Rs./Animal/Day) | 13.64 (27.70) | 14.07 (29.19) | 12.93 (27.25) | 13.55 (28.06) | 38.22 (31.14) | 42.90 (33.34) | 43.89 (30.74) | 41.59 (31.18) |
| 4 | Total Supplements (Rs./Animal/Day) | 1.25 (2.54) | 1.45 (3.01) | 1.48 (3.11) | 1.39 (2.88) | 4.08 (3.32) | 4.50 (3.50) | 5.10 (3.57) | 4.56 (3.42) |
| 5 | Total feed & fodder (Rs./Animal/Day) | 37.69 (76.58) | 36.46 (75.64) | 35.43 (74.65) | 36.53 (75.64) | 79.73 (64.96) | 82.85 (64.39) | 86.57 (60.62) | 85.01 (63.75) |
| 6 | Total Labour (Rs./Day) | | | | | | | | |
| | Male (Rs./Day) | 8.73 (17.74) | 9.05 (18.78) | 9.31 19.62 | 9.03 18.70 | 30.50 24.85 | 34.22 26.60 | 46.52 32.58 | 37.08 27.80 |
| | Female (Rs./Day) | 1.80 (3.66) | 1.59 (3.30) | 1.52 (3.20) | 1.64 (3.39) | 11.00 (8.96) | 9.86 (7.66) | 7.91 (5.54) | 9.59 (7.19) |
| | Total | 10.53 (21.39) | 10.64 (22.08) | 10.83 (22.82) | 10.67 (22.09) | 41.50 (33.81) | 44.08 (34.26) | 54.43 (38.12) | 46.67 (35.00) |
| 7 | Veterinary Cost (Rs./Animal/Day) | 1.00 (2.03) | 1.10 (2.28) | 1.20 (2.53) | 1.10 (2.28) | 1.50 (1.22) | 1.74 (1.35) | 1.80 (1.26) | 1.68 (1.26) |
| 8 | Total Cost (Rs./Animal/Day) | 49.22 (100.00) | 48.20 (100.00) | 47.46 (100.00) | 48.30 (100.00) | 122.73 (100.00) | 128.67 (100.00) | 142.80 (100.00) | 133.36 (100.00) |
| 9 | Milk Production (Litre/Animal) | 1.27 | 1.25 | 1.25 | 1.26 | 3.99 | 4.43 | 4.73 | 4.55 |
| 10 | Price (Rs. /litre) | 39.86 | 39.50 | 39.00 | 39.45 | 33.50 | 32.12 | 33.90 | 33.17 |
| 11 | Returns from Milk Production (Production*Avg Price) | 50.62 | 49.38 | 48.75 | 49.71 | 133.67 | 142.29 | 160.35 | 150.94 |
| 12 | Income from Dung (Rs./Animal/Day) | 2.80 | 2.50 | 2.60 | 2.63 | 2.51 | 2.70 | 3.20 | 2.80 |
| 13 | Total Income (Rs./Animal/Day) | 53.42 | 51.88 | 51.35 | 52.34 | 136.18 | 144.99 | 163.55 | 153.74 |
| 14 | Net Return/Profit (RS./Animal/Day) | 4.20 | 3.68 | 3.89 | 3.92 | 13.44 | 16.32 | 20.75 | 16.84 |

Note:1. Figures in parentheses indicate the percentage to total cost. 2.* indicates multiplication sign.
*Source: Field Survey Data*

local cow. In case of cross bred cows, highest expenditure was incurred on total concentrates (28.58%) followed by green fodder (21.48%), dry fodder (4.36%) and total supplements (3.22 %). Table also shows that, on an average, total cost on labour was estimated at Rs.10.99/day for local cows and Rs.59.67 for cross bred cows. The Veterinary cost per day/cow

was worked out at Rs.0.98 for local cow and Rs.2.06 on cross bred cows. Total cost per day/cow was estimated at Rs.47.29 for local and Rs.145.77 for cross bred cows.

Milk production per day/cow was found very low for local cows (1.26 ltr.) against 5.53 ltr. for cross bred cows. Total average income and net return/ cow/day were found at Rs.53.95 and Rs.6.35 for local and Rs.198.61 and Rs.43.15 for cross bred cows, respectively.

Table-6.16 shows that, of the total cost on local cows, 75.64 per cent was incurred on feed and fodder, 22.09 per cent on labour and 2.28 per cent on veterinary charge. In case of cross bred cows, 63.75 per cent was incurred on feed and fodder, 35.00 per cent on labour and 1.26 per cent on veterinary charge. The average total cost per animal/day was estimated at Rs.48.30 for local cow and Rs.133.36 for cross bred cow.

Milk production per day/cow for local cow was found 1.26 ltr. which was same as that of DCS households. But in case of cross bred cow, it was worked out at 4.55 ltr. (5.53 litre in case of DCS). Total average income and net return/ animal/day was found at Rs.52.34 and Rs.3.92 for local cows and Rs.153.74 and Rs.16.84 for cross bred cows, respectively.

**6.8 Chapter Summary**

This chapter attempts to have an insight in to the economics of milk production & awareness of different dairy development schemes in the State for DCS and NDCS households. It was found that under DCS, average age of both cross bred and local cow was 5-6 years while it was 4 years for NDCS households. It has been observed that the economics of cross bred cow in terms of milk production was found to be at higher side than that of local cow.

Season wise milk yield (per day) of selected milk producers shows that average yield rate of per local cow/day in rainy season for DCS milk producers varied from 1. 21 ltrs to 1.23 ltrs with an overall average of 1.22 ltrs. During winter season, average yield rate of per local cow/day was estimated at 1.33 and varied from 1.27 ltrs to 1.32 ltrs while in summer season average yield rate of per local cow/day varied from 1.23 ltrs to 1.26 ltrs with an overall average of 1.24 ltrs.

On the other hand, in case of per cross bred cow in rainy season, the average yield rate of milk per day varied from 4.47 ltrs to 5.75 ltrs with an overall average of 5.25 ltrs. During winter season, the average yield rate of per cross bred cow/day was estimated at 5.89 ltrs and varied from 4.60 ltrs to 5.98 ltrs while in summer season, average yield rate of per cross-bred cow/day varied from 4.44 ltrs to 5.90 ltrs with an overall average of 5.45 ltrs.

Average yield rate of per local cow/day in rainy season for NDCS milk producers was found to be 1.22 ltrs. During winter season, average yield rate of per local cow/day was estimated at 1.32 ltrs while in summer season, average yield rate of per local cow/day is estimated 1.24 ltrs. On the other hand, average yield of milk per day, in case of per cross bred cow for the NDCS in rainy season varied from 3.85 ltrs to 4.41 ltrs with an overall average of 4.17 ltrs. During winter season, average yield rate of per cross bred cow/day was estimated at 4.96 ltrs and varied from 4.23 ltrs to 5.04 ltrs while in summer season, the average yield rate of per cross bred cow/day varied from 3.90 ltrs to 4.73 ltrs with an overall average of 4.51 ltrs. It was also noticed that yield of milk against the large milk producers was higher for both DCS and NDCS households.

The DCS households were more aware about the various dairy development schemes/programmes and availed more benefits from those schemes. Thus, Government should come forward to take some initiatives to focus on various on-going dairy development schemes/programmes for the upliftment of the dairy farmers as well as dairy sector in Assam.

From the above analysis, it was found that milk production and net return was not up to the desired level in case of NDCS households. It may be due to low milk productivity of cows with poor health, low feeding, un-scientific husbandry practices and low price offered by private agents/buyers. There is an urgent need to enhance milk producer's income by increasing milk productivity, adopting scientific rearing practices and ensuring remunerative price for their produce. Forming dairy cooperative society may aid and assist the poor dairy farmers to go ahead with the stated objectives.

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## 7.1Introduction

Dairy sector plays an important and vital role in providing nutritive food, rich animal protein to the general public and in supplementing family income and generating gainful employment in the rural sector, particularly among the landless, marginal and small farmers. Emerging trends indicate that the demand for milk is growing faster than its production. The demand of milk was worked out at 114.93 million tonnes in 2011 and will increase to 181.95 million tonnes in 2030 at a growth rate of 7%.Considering its perishability milk production can be profitable only when there is proper marketing facility, so that it can be quickly disposed to a particular place where it can be processed and marketed. In India more than 80% of milk is still marketed through traditional milk marketing channels (Staal *et.al* 2006 and Kumar *et.al* 2010). Majority of milk producers are smallholders and contribute more than 70% of the total milk production in India. This chapter incorporates milk production and its use, sale of milk, cost of milk marketing and constraints faced in milk marketing.

## 7.2Use of Milk at Home and Processing

During the field survey, it was tried to collect information on production and uses of milk on the earlier day of visit by the sample households of DCS and NDCS and the results are presented in Table-7.1 and Table-7.2. It is seen from the Tables that under both the situations, in case of local cows, large milk producers consumed 100 per cent of their milk at home followed by medium milk producers and small milk producers. On the other hand, in case of cross breed cows, all three categories of milk producers used to retain a small volume, ranging from 3.50 per cent to 4.34 per cent for home consumption.

Of the total milk of local cows used at home, on an average, 77.32 per cent was used for direct consumption and 22.68 per cent was used as processed items by the DCS sample. As against this, 86.48 per cent of cross breed cow milk was used for direct consumption and rest 13.52 per cent was used as processed items. The NDCS sample households used 74.75 per cent of local cow milk for direct consumption and 25.25 per cent was kept for processing. Therefore, 72.68 per cent of cross breed cow milk was consumed directly and rest part

**Table-7.1: Production and Use of Milk by selected DCS Households (day of visit)**

| Sr. No | Particulars | Local Cow | | | | Crossbred Cow | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Milk Drawn Lit/animal/day | 1.27 | 1.24 | 1.25 | 1.26 | 4.50 | 5.36 | 5.88 | 5.53 |
| 2 | Use of Milk at Home (lit) | 3.14 | 1.96 | 1.25 | 6.35 | 12.24 | 31.30 | 55.57 | 99.11 |
| | % Milk used at Home | 20.60 | 39.52 | 100.00 | 29.60 | 4.00 | 4.00 | 3.50 | 3.70 |
| | For Direct Consumption (%) | 76.75 | 76.53 | 80.00 | 77.32 | 86.36 | 82.77 | 88.60 | 86.48 |
| | For Processing (%) | 23.25 | 23.47 | 20.00 | 22.68 | 13.64 | 17.23 | 11.40 | 13.52 |
| 3 | Raw/Liquid Milk sold (Lit) | 12.10 | 3.00 | 0.00 | 15.10 | 293.76 | 751.26 | 1532.03 | 2577.05 |
| % to total production | | 79.40 | 60.48 | 0.00 | 70.40 | 96.00 | 96.00 | 96.50 | 96.30 |

*Source: Field Survey Data*

**Table 7.2: Production and Use of Milk by selected NDCS Households (day of visit)**

| Sr. No | Particulars | Local Cow | | | | Crossbred Cow | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Milk Drawn Lit/animal/day | 1.27 | 1.25 | 1.25 | 1.26 | 3.99 | 4.43 | 4.73 | 4.55 |
| 2 | Use of Milk at Home (lit) | 8.43 | 7.15 | 1.25 | 16.83 | 8.10 | 25.74 | 51.84 | 85.68 |
| | % Milk used at Home | 34.94 | 40.86 | 100.00 | 39.25 | 3.56 | 4.34 | 4.00 | 4.05 |
| | For Direct Consumption (%) | 76.28 | 72.03 | 80.00 | 74.75 | 78.64 | 72.33 | 71.93 | 72.68 |
| | For Processing (%) | 23.72 | 27.97 | 20.00 | 25.25 | 21.36 | 27.67 | 28.07 | 27.32 |
| 3 | Raw/Liquid Milk sold (Lit) | 15.70 | 10.35 | 0.00 | 26.05 | 219.33 | 567.88 | 1244.18 | 2031.39 |
| % to total production | | 65.06 | 59.14 | 0.00 | 60.75 | 96.44 | 95.66 | 96.00 | 95.95 |

*Source: Field Survey Data.*

*i.e*, 27.32 per cent was kept for processing. Tables show that, large milk producers under both the conditions used entire milk from local cows for home consumption. On an average, the DCS households sold 70.40 per cent of local cow milk and 96.30 per cent of cross-breed cow milk while NDCS households sold 60.75 per cent of local cow milk and 95.95 per cent cross -breed cow milk in raw form.

## 7.3 Sale of Milk and Cost of Milk Marketing

Sale and marketing of milk is one of the important aspects of dairy farming while ultimately determine the profit of the milk producer. During the field survey, it was tried to find out the cost of sale and marketing of milk for DCS and NDCS sample households and the results are presented in Table- 7.3 and Table-7.4.

**Table 7.3: Sale of Milk and Cost of Milk Marketing- DCS Households**

| Sl No | Particulars | DCS HH- Sale of Milk and Cost of Milk Marketing | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Local Cow | | | | Crossbred Cow | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Milk Sold (% to total prod) | 79.40 | 60.48 | 0.00 | 70.40 | 96.00 | 96.00 | 96.50 | 96.30 |
| 2 | Agencies | | | | | | | | |
| **A** | **DCS** | | | | | | | | |
| a | Milk Sold (% to total sale) | 0.00 | 0.00 | - | 0.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| b | Price (Rs./Lit | 0.00 | 0.00 | - | 0.00 | 35.30 | 34.50 | 36.18 | 35.33 |
| c | Payment (%) | | | | | | | | |
| | Daily | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Weekly | 0.00 | 0.00 | - | 0.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| | Monthly | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Half Monthly | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| d | Distance (Kms) | 0.00 | 0.00 | - | 0.00 | 0.40 | 0.50 | 0.50 | 0.47 |
| e | Transport Cost (Rs.) | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **B** | **Consumer** | | | | | | | | |
| a | Milk Sold (% to total sale) | 100.00 | 100.00 | - | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| b | Price Rs./Lit | 41.00 | 40.00 | - | 40.50 | - | - | - | - |
| c | Payment (%) | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | - | - | - | - |
| | Monthly | 100.00 | 100.00 | - | 100.00 | - | - | - | - |
| d | Distance (Kms) | 0.20 | 0.20 | - | 0.20 | - | - | - | - |
| e | Transport Cost (Rs.) | 0.00 | 0.00 | - | 0.00 | - | - | - | - |
| **C** | **Private vendor /Middlemen** | | | | | | | | |
| a | Milk Sold (% to total sale) | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| b | Price Rs./Lit | - | - | - | - | - | - | - | - |
| c | Payment (%) | | | | | | | | |
| | Daily | - | - | - | 0.00 | - | - | - | - |
| | Weekly | - | - | - | 0.00 | - | - | - | - |
| | Monthly | - | - | - | 0.00 | - | - | - | - |
| d | Distance (Kms) | - | - | - | 0.00 | - | - | - | - |
| e | Transport Cost (Rs.) | - | - | - | 0.00 | - | - | - | - |
| **D** | **Sweet Shop/ / Catering Services/etc** | | | | | | | | |
| a | Milk Sold (% to total sale) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| b | Price Rs./Lit | - | - | - | - | - | - | - | - |
| c | Payment | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | - | - | - | - |
| | Monthly | - | - | - | - | - | - | - | - |
| | Half Monthly | | | | | | | | |
| d | Distance (Kms) | - | - | - | - | - | - | - | - |
| e | Transport Cost (Rs.) | - | - | - | - | - | - | - | - |
| **E** | **Private Milk Plants** | | | | | | | | |
| a | Milk Sold (% to total sale) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| b | Price Rs./Lit | - | - | - | - | - | - | - | - |
| c | Payment | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | - | - | - | - |
| | Monthly | - | - | - | - | - | - | - | - |
| | Half Monthly | | | | | | | | |
| d | Distance (Kms) | - | - | - | - | - | - | - | - |
| e | Transport Cost (Rs.) | | | | | | | | |
| **F** | Catering Services | | | | | | | | |
| a | Milk Sold (% to total sale) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| b | Price Rs./Lit | - | - | - | - | - | - | - | - |
| c | Payment | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | - | - | - | - |
| | Monthly | - | - | - | - | - | - | - | - |
| d | Distance kms | - | - | - | - | - | - | - | - |
| e | Transport Cost (Rs.) | - | - | - | - | - | - | - | - |
| **G** | members did not sale milk to dairy | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Reasons | - | - | - | - | - | - | - | - |

*Source: Field survey Data*

**Table 7.4: Sale of Milk and Cost of Milk Marketing- NDCS Households**

| Sl No | Particulars | NDCS HH- Sale of Milk and Cost of Milk Marketing | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Local Cow | | | | Crossbred Cow | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Milk Sold (% to total prod) | 65.06 | 59.14 | 0.00 | 60.75 | 96.44 | 95.66 | 96.00 | 95.95 |
| 2 | Agencies | | | | | | | | |
| **A** | **DCS** | | | | | | | | |
| a | Milk Sold (% to total sale) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| b | Price (Rs./Lit | - | - | - | - | - | - | - | - |
| c | Payment (%) | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | - | - | - | - |
| | Monthly | - | - | - | - | - | - | - | - |
| d | Distance (Kms) | - | - | - | - | - | - | - | - |
| e | Transport Cost (Rs.) | - | - | - | - | - | - | - | - |
| **B** | **Consumer** | | | | | | | | |
| a | Milk Sold (% to total sale) | 100.00 | 100.00 | - | 100.00 | 9.95 | 8.03 | 6.00 | 6.99 |
| b | Price Rs./Lit | 39.86 | 39.50 | - | 39.45 | 39.86 | 39.50 | 39.00 | 39.45 |
| c | Payment (%) | | | | | | | | |
| | Daily | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Weekly | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Monthly | 100.00 | 100.00 | - | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| | Half Monthly | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| d | Distance (Kms) | 0.30 | 0.20 | - | 0.25 | 0.20 | 0.20 | 0.50 | 0.30 |
| e | Transport Cost (Rs.) | 0.00 | 0.00 | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **C** | **Private Vendor /Middlemen** | - | - | - | - | - | - | - | - |
| a | Milk Sold (% to total sale) | - | - | - | - | 40.27 | 41.80 | 44.00 | 42.98 |
| b | Price Rs./Lit | - | - | - | - | 33.50 | 32.12 | 33.90 | 33.17 |
| c | Payment (%) | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | 100.00 | 100.00 | 100.00 | 100.00 |
| | Monthly | - | - | - | - | - | - | - | - |
| d | Distance (Kms) | - | - | - | - | 2.00 | 2.00 | 2.50 | 2.17 |
| e | Transport Cost (Rs.) | - | - | - | - | 0.00 | 10.00 | 15.00 | 12.50 |
| **D** | **Sweet Shop/ / Catering Services/etc** | | | | | | | | |
| a | Milk Sold (% to total sale) | - | - | - | - | 49.77 | 50.18 | 50.00 | 50.02 |
| b | Price Rs./Lit | - | - | - | - | 33.50 | 32.12 | 33.90 | 33.17 |
| c | Payment | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | 100.00 | 100.00 | 100.00 | 100.00 |
| | Monthly | - | - | - | - | - | - | - | - |
| | Half Monthly | - | - | - | - | - | - | - | - |
| d | Distance (Kms) | - | - | - | - | 1.80 | 2.00 | 3.00 | 2.27 |
| e | Transport Cost (Rs.) | - | - | - | - | 0.00 | 10.00 | 12.00 | 11.00 |
| **E** | **Private Milk Plants** | | | | | | | | |
| a | Milk Sold (% to total sale) | - | - | - | - | - | - | - | - |
| b | Price Rs./Lit | - | - | - | - | - | - | - | - |
| c | Payment | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | - | - | - | - |
| | Monthly | - | - | - | - | - | - | - | - |
| | Half Monthly | - | - | - | - | - | - | - | - |
| d | Distance (Kms) | - | - | - | - | - | - | - | - |
| e | Transport Cost (Rs.) | - | - | - | - | - | - | - | - |
| **F** | **Catering Services** | | | | | | | | |
| a | Milk Sold (% to total sale) | - | - | - | - | - | - | - | - |
| b | Price Rs./Lit | - | - | - | - | - | - | - | - |
| c | Payment | | | | | | | | |
| | Daily | - | - | - | - | - | - | - | - |
| | Weekly | - | - | - | - | - | - | - | - |
| | Monthly | - | - | - | - | - | - | - | - |
| d | Distance kms | - | - | - | - | - | - | - | - |
| e | Transport Cost (Rs.) | - | - | - | - | - | - | - | - |
| **G** | members did not sale milk to dairy | - | - | - | - | - | - | - | - |
| | Reasons | - | - | - | - | - | - | - | - |

*Source: Field survey Data*

Table-7.3 shows that DCS sample households sold the entire milk produced by the local cows to the consumers at an average price of Rs.40.50/ltr. and the payment was received on monthly basis. Further, they supplied the entire amount of cross-bred cow milk (marketable surplus) to the dairy cooperative societies against weekly payment @ Rs.35.33/ltr.

Table-7.4 shows that NDCS households also sold entire amount of marketable surplus obtained from local cows directly to the consumers at an average price of Rs.39.45/ltr. on monthly payment mode. On the other hand, they opted to sell cross bred cow milk to sweet shop/catering services (50.02%) and private vendor/middle man (42.98%), both with an weekly payment mode and to the consumer (6.99 %) on monthly payment basis. On an average, they received Rs. 33.17/ltr. The distance from dairy farm to the sale point ranged between 0.20 km to 3.00 kms.

From the above analysis, it becomes clear that, DCS households preferred to sell their marketable surplus of cross-bred cow milk to the dairy cooperative societies from which they got assured and reasonable price. But NDCS households had to sell their produce through different informal channels with relatively lower price as compared to the DCS sample.

**Handling of Income from Dairying**

During the course of study, information were collected on handling of the income generated from dairy farming and are presented in Table- 7.5. It is seen from the Table that the income was mainly earned from sale of milk and dung and major part of income was handled by male members of the family belonging to both the DCS and NDCS households. In some cases, both male & female together used to handle the income. It was found that, under DCS, of the total income received from sale of milk, 57.67 per cent was handled by male members, 26.67 per cent was by female members and the rest 15.67 per cent was handled by both of them. And of the total income earned from sale of dung/FYM, 48.40 per cent was kept by male members, 32.43 per cent was kept by female members and the remaining 19.17 per cent was handled by both of them. In case of NDCS, households, 66.37 per cent of the income earned from sale of milk was handled by males, 19.50 per cent was by females and 14.13 per cent was kept by both male and female members of the households. Of the total income received from disposing of dung/ FYM, 50.40 per cent was handled by males, 23.67 per cent by females and rest 25.93 per cent was handled by both of them.

**Table 7.5: Details about Income received from Dairying and its use**

| Sl No | Particulars | Who receives the income | | | | Income spent on (share in approx.) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Family Expenditure | | | | Animal Feed & Health | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| **I** | **DCS** | | | | | | | | | | | | |
| **A** | ***Income from dairy (sale of milk )*** | | | | | | | | | | | | |
| 1 | Male | 55.00 | 50.00 | 68.00 | 57.67 | | | | | | | | |
| 2 | Female | 25.00 | 40.00 | 15.00 | 26.67 | 61.50 | 55.25 | 53.00 | 56.58 | 38.50 | 44.75 | 47.00 | 43.42 |
| 3 | Both | 20.00 | 10.00 | 17.00 | 15.67 | | | | | | | | |
| **B** | ***Income from sale of products*** | | | | | | | | | | | | |
| 1 | Male | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | |
| 2 | Female | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | Both | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | |
| **C** | **Income sale of dung /FYM** | | | | | | | | | | | | |
| 1 | Male | 45.50 | 49.70 | 50.00 | 48.40 | | | | | | | | |
| 2 | Female | 36.00 | 31.30 | 30.00 | 32.43 | 70.50 | 65.00 | 60.30 | 65.27 | 29.50 | 35.00 | 39.70 | 34.73 |
| 3 | Both | 18.50 | 19.00 | 20.00 | 19.17 | | | | | | | | |
| **II** | **NDCS** | | | | | | | | | | | | |
| **A** | ***Income from dairy (sale of milk )*** | | | | | | | | | | | | |
| 1 | Male | 60.40 | 66.50 | 72.20 | 66.37 | | | | | | | | |
| 2 | Female | 20.00 | 22.50 | 16.00 | 19.50 | 70.50 | 65.00 | 60.30 | 65.27 | 29.50 | 35.00 | 39.70 | 34.73 |
| 3 | Both | 19.60 | 11.00 | 11.80 | 14.13 | | | | | | | | |
| **B** | **Income from sale of products** | | | | | | | | | | | | |
| 1 | Male | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | |
| 2 | Female | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 | Both | 0.00 | 0.00 | 0.00 | 0.00 | | | | | | | | |
| **C** | **Income sale of dung /FYM** | | | | | | | | | | | | |
| 1 | Male | 49.50 | 50.00 | 51.70 | 50.40 | | | | | | | | |
| 2 | Female | 21.00 | 22.50 | 27.50 | 23.67 | 70.50 | 65.00 | 60.30 | 65.27 | 29.50 | 35.00 | 39.70 | 34.73 |
| 3 | Both | 29.50 | 27.50 | 20.80 | 25.93 | | | | | | | | |

*Source: Field Survey Data*

While spending the income received from sale of milk and dung/ FYM, priority was given to family expenditure and then to animal feed and health under both the categories of DCS and NDCS households.

## 7.4 Problems in milk marketing

Owing to perishability and bulkiness nature of milk, producers' bargaining power is limited. In spite of a good number of development schemes launched by the Govt. milk marketing in Assam remains unorganized. Lack of alternative market options forces them to sell their produce in the traditional market. The dominant players in milk marketing in the study area were the raw milk traders and the traditional milk processors. A very few market agents were involved in raw milk marketing and milk processing. Another major hindrance to efficient marketing system was the presence of numerous intermediaries, which usually took advantage of producers' weakness. In addition to these, milk marketing was reported to be very difficult due to lack of proper infrastructure, *viz.* transportation, distribution network & storage support. As such, the study area in particular and Assam in general is highly deficient in milk production. It

is factually true that the agro climatic condition of Assam's conducive enough for raising the milk production to a great extent. Under the changed scenario, importance of milk in our food basket has also gone enormously. As such, a well strategy to make dairy as a commercial enterprise can go a long way in gaining wellness to the peoples of Assam.

**7.5 Chapter Summary**

The chapter deals with the details of milk consumption and marketable surplus of the sample households under DCS and NDCS situations. Large milk producers under both the conditions utilised the entire milk produced from local cows for home consumption. On an average, DCS households sold 70.40 per cent of local cow milk and 96.30 per cent of cross-breed cow milk while NDCS households sold 60.75 per cent of local cow milk and 95.95 per cent cross -bred cow milk.

The DCS sample households sold the entire milk produced by the local cows to the consumers at an average price of Rs.40.50/ltr. on monthly payment basis. They used to dispose entire amount of cross -bred cow milk to the dairy cooperative societies with weekly payment basis at an average price of Rs.35.33/ltr. The NDCS households sold entire marketable surplus obtained from local cows directly to the consumers at an average price of Rs.39.45/ltr. with monthly payment mode. On the other hand, they opted to sell the cross-bred cow milk to sweet shop/catering services (50.02%), private vendor/middle man (42.98%) both, with weekly payment mode and to the consumers (6.99 %) with monthly payment basis. On an average, the price realized by the NDCS households stood at Rs. 33.17/ltr.

The DCS households used to sell their marketable surplus of cross-bred cow milk to the dairy cooperative societies and they realized assured and reasonable price. But NDCS sample households used to sell their produce through different informal channels with relatively lower price as compared to the DCS sample.

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# Chapter VIII
# Constraints faced in Production and Marketing of Milk and Suggestions

## 8.1 Introduction

Dairy is one of the most important activities/enterprises to generate sustainable income for the farmers of Assam. During the planning period, the Central and State Governments have introduced and implemented various schemes and programmes for the development of dairy sector and economic upliftment of the dairy farmers. But, lots of problems and difficulties continue to haunt the farmers, particularly in production and marketing sector. During the course of the study, it was tried to find out different constraints *i.e.* infrastructural, economic, marketing, technical, socio - psychological and some other constraints faced by the sample households of both DCS & NDCS categories. This chapter discusses the details of various constraints confronted by the dairy farmers of the study area and remedies thereof.

## 8.2 Service Delivery System

The details of input and output service delivery experienced by DCS and NDCS households are presented in Table-8.1 and Table 8.2. It can be seen from the Table-8.1 that DCS households received adequate supply of cattle feed both from cooperative society and private agent with credit facilities. But most of the respondents opined that the cost of cattle feed and mineral mixture was quite high. They also viewed that Emergency Veterinary Services (EVS) were precisely adequate particularly in co-operative societies and the charges of EVS was also high enough. Fifty nine per cent sample respondents reported that vaccines were adequate to meet their requirements. Availability of Semen at the AI Centre was not satisfactory. Provision of loan facilities from the society or from the Government were inadequate and no technical guidance was made available to them. The charges for insurance was high reported to be high & very high as perceived by 49 & 34 per cent of the sample household.

In case of output delivery system, all the sample households opined that the price of milk they received was low and they got it on fortnightly basis. Ninety eight percent respondents mentioned that they got no incentives or bonus for supplying milk. Majority of the sample households (82.50 per cent) reported that the cross breed cow milk was acceptable to the family.

**Table 8.1: Details of Input and Output Service Delivery experienced by DCS households**

| Sl No | Particulars | Service Provider (% of response) - DCS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PDCS | | | | Agent | | | | Private agent | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | Input Delivery (%) | | | | | | | | | | | | |
| 1 | Supply of Cattle Feed | | | | | | | | | | | | |
| | Adequate | 75.00 | 82.50 | 95.00 | 84.17 | - | - | - | - | 65.00 | 72.50 | 80.00 | 72.50 |
| | Inadequate | 25.00 | 17.50 | 5.00 | 15.83 | - | - | - | - | 35.00 | 27.50 | 20.00 | 27.50 |
| | Not Available | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Cattle feed & fodder seed on Credit | | | | | | | | | | | | |
| | Available | 70.00 | 75.00 | 82.50 | 75.83 | - | - | - | - | 62.50 | 77.50 | 80.00 | 73.33 |
| | Not Available | 30.00 | 25.00 | 17.50 | 24.17 | - | - | - | - | 37.50 | 22.50 | 20.00 | 26.67 |
| 3 | Cost of cattle feed & mineral mixture | | | | | | | | | | | | |
| | High | 90.00 | 85.00 | 80.00 | 85.00 | - | - | - | - | 100.00 | 100.00 | 70.00 | 90.00 |
| | Ok | 10.00 | 15.00 | 20.00 | 15.00 | - | - | - | - | 0.00 | 0.00 | 30.00 | 10.00 |
| | Not Available | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | Emergency Veterinary Services (EVS) | | | | | | | | | | | | |
| | Available | 5.00 | 12.50 | 25.00 | 14.17 | - | - | - | - | 40.00 | 50.00 | 55.00 | 48.33 |
| | Not Available | 95.00 | 87.50 | 75.00 | 85.83 | - | - | - | - | 60.00 | 50.00 | 45.00 | 51.67 |
| | *Charges for EVS* | | | | | | | | | | | | |
| | High | 100.00 | 82.50 | 55.00 | 79.17 | - | - | - | - | 87.50 | 82.50 | 80.00 | 83.33 |
| | Medium | 0.00 | 17.50 | 45.00 | 20.83 | - | - | - | - | 12.50 | 17.50 | 20.00 | 16.67 |
| | Low | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| | Rs/Visit | | | | | | | | | | | | |
| 5 | Vaccines | | | | | | | | | | | | |
| | Adequate | 55.00 | 60.00 | 62.50 | 59.17 | - | - | - | - | - | - | - | - |
| | Inadequate | 35.00 | 32.50 | 35.00 | 34.17 | - | - | - | - | - | - | - | - |
| | Not Available | 10.00 | 7.50 | 2.50 | 6.67 | - | - | - | - | - | - | - | - |
| 6 | Delivery & applications of quality & requisite quantity of vaccines | | | | | | | | | | | | |
| | Yes | 65.00 | 72.50 | 80.00 | 72.50 | - | - | - | - | - | - | - | - |
| | No | 35.00 | 27.50 | 20.00 | 27.50 | - | - | - | - | - | - | - | - |
| 7 | Semen at the AI centre | | | | | | | | | | | | |
| | Adequate | 20.00 | 37.50 | 65.00 | 40.83 | - | - | - | - | - | - | - | - |
| | Inadequate | 35.00 | 20.00 | 10.00 | 21.67 | - | - | - | - | - | - | - | - |
| | Not Available | 45.00 | 42.50 | 25.00 | 37.50 | - | - | - | - | - | - | - | - |
| 8 | Provision of loan in society or govt. for Purchasing cattle | | | | | | | | | | | | |
| | Adequate | 20.00 | 32.50 | 32.50 | 28.33 | - | - | - | - | - | - | - | - |
| | Inadequate | 30.00 | 37.50 | 35.00 | 34.17 | - | - | - | - | - | - | - | - |
| | Not Available | 50.00 | 30.00 | 32.50 | 37.50 | - | - | - | - | - | - | - | - |
| 9 | Charges for insurance | | | | | | | | | | | | |
| | Very high | 37.50 | 35.00 | 30.00 | 34.17 | - | - | - | - | - | - | - | - |
| | High | 47.50 | 47.50 | 52.50 | 49.17 | - | - | - | - | - | - | - | - |
| | Medium | 15.00 | 17.50 | 17.50 | 16.67 | - | - | - | - | - | - | - | - |
| 10 | Technical Guidance | | | | | | | | | | | | |
| | Available | 20.00 | 32.50 | 37.50 | 30.00 | - | - | - | - | - | - | - | - |
| | Not available | 80.00 | 67.50 | 62.50 | 70.00 | - | - | - | - | - | - | - | - |
| B | Output Delivery (%) | | | | | | | | | | | | |
| 1 | Milk Price( Rs./lit ) | | | | | | | | | | | | |
| | Adequate | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | - | - | | - |
| | Low | 100.00 | 100.00 | 100.00 | 100.00 | - | - | - | - | - | - | | - |
| 2 | Payment of Milk | | | | | | | | | | | | |
| | Immediate | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | - | - | - | - |
| | Within 2 days | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | - | - | - | - |
| | Within 15 days | 100.00 | 100.00 | 100.00 | 100.00 | - | - | - | - | - | - | - | - |
| | More than 15 days | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | - | - | - | - |
| 3 | incentives or bonus for supplying milk | | | | | | | | | | | | |
| | Adequate | 0.00 | 2.50 | 2.50 | 1.67 | - | - | - | - | - | - | - | - |
| | Low | 100.00 | 97.50 | 97.50 | 98.33 | - | - | - | - | - | - | - | - |
| | Not Available | 0.00 | 0.00 | 0.00 | 0.00 | - | - | - | - | - | - | - | - |
| 4 | Acceptability cross-bred cow milk in family | | | | | | | | | | | | |
| | Poor | 12.50 | 5.00 | 2.50 | 6.67 | - | - | - | - | - | - | - | - |
| | Acceptable | 75.00 | 85.00 | 87.50 | 82.50 | - | - | - | - | - | - | - | - |
| | Not acceptable | 12.50 | 10.00 | 10.00 | 10.83 | - | - | - | - | - | - | - | - |
| 5 | Advance payment for milk by society/ vendors | | | | | | | | | | | | |
| | Available | 65.00 | 72.50 | 80.00 | 72.50 | - | - | - | - | - | - | - | - |
| | Not available | 35.00 | 27.50 | 20.00 | 27.50 | - | - | - | - | - | - | - | - |

*Source: Field Survey Data*

Table 8.2: Details of Input and Output Service Delivery experienced by NDCS households

| Sl No | Particulars | Service Provider (% of response) – NDCS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PDCS | | | | Agent | | | | Private agent | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| A | Input Delivery (%) | | | | | | | | | | | | |
| 1 | Supply of Cattle Feed | | | | | | | | | | | | |
| | Adequate | - | - | - | - | - | - | - | - | 77.50 | 72.50 | 80.00 | 76.67 |
| | Inadequate | - | - | - | - | - | - | - | - | 22.50 | 27.50 | 20.00 | 23.33 |
| | Not Available | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Cattle feed & fodder seed on Credit | | | | | | | | | | | | |
| | Available | - | - | - | - | - | - | - | - | 25.00 | 95.00 | 97.50 | 72.50 |
| | Not Available | - | - | - | - | - | - | - | - | 75.00 | 5.00 | 2.50 | 27.50 |
| 3 | Cost of cattle feed & mineral mixture | | | | | | | | | | | | |
| | High | - | - | - | - | - | - | - | - | 92.50 | 85.00 | 82.50 | 86.67 |
| | ok | - | - | - | - | - | - | - | - | 7.50 | 15.00 | 17.50 | 13.33 |
| | Not Available | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | Emergency Veterinary Services (EVS) | | | | | | | | | | | | |
| | Available | - | - | - | - | - | - | - | - | 5.00 | 10.00 | 22.50 | 12.50 |
| | Not Available | - | - | - | - | - | - | - | - | 95.00 | 90.00 | 77.50 | 87.50 |
| | *Charges for EVS* | | | | | | | | | | | | |
| | High | - | - | - | - | - | - | - | - | 100.00 | 85.00 | 55.00 | 80.00 |
| | Medium | - | - | - | - | - | - | - | - | 0.00 | 15.00 | 45.00 | 20.00 |
| | Low | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| | Rs/Visit | - | - | - | - | - | - | - | - | - | - | - | - |
| 5 | Vaccines | | | | | | | | | | | | |
| | Adequate | - | - | - | - | - | - | - | - | 50.00 | 57.50 | 62.50 | 56.67 |
| | Inadequate | - | - | - | - | - | - | - | - | 35.00 | 30.00 | 30.00 | 31.67 |
| | Not Available | - | - | - | - | - | - | - | - | 15.00 | 12.50 | 7.50 | 11.67 |
| 6 | Delivery & applications of quality & requisite quantity of vaccines | | | | | | | | | | | | |
| | Yes | - | - | - | - | - | - | - | - | 62.50 | 77.50 | 80.00 | 73.33 |
| | No | - | - | - | - | - | - | - | - | 37.50 | 22.50 | 20.00 | 26.67 |
| 7 | Semen at the AI centre | | | | | | | | | | | | |
| | Adequate | - | - | - | - | - | - | - | - | 10.00 | 30.00 | 60.00 | 33.33 |
| | Inadequate | - | - | - | - | - | - | - | - | 35.00 | 12.50 | 10.00 | 19.17 |
| | Not Available | - | - | - | - | - | - | - | - | 55.00 | 57.50 | 30.00 | 47.50 |
| 8 | Provision of loan in society or govt. for Purchasing cattle | | | | | | | | | | | | |
| | Adequate | - | - | - | - | - | - | - | - | 0.00 | 5.00 | 5.00 | 3.33 |
| | Inadequate | - | - | - | - | - | - | - | - | 5.00 | 7.50 | 10.00 | 7.50 |
| | Not Available | - | - | - | - | - | - | - | - | 95.00 | 87.50 | 85.00 | 89.17 |
| 9 | Charges for insurance | | | | | | | | | | | | |
| | Very high | - | - | - | - | - | - | - | - | 52.50 | 37.50 | 32.50 | 40.83 |
| | High | - | - | - | - | - | - | - | - | 37.50 | 40.00 | 40.00 | 39.17 |
| | Medium | - | - | - | - | - | - | - | - | 10.00 | 22.50 | 27.50 | 20.00 |
| 10 | Technical Guidance | | | | | | | | | | | | |
| | Available | - | - | - | - | - | - | - | - | 22.50 | 27.50 | 20.00 | 23.33 |
| | Not available | - | - | - | - | - | - | - | - | 77.50 | 72.50 | 80.00 | 76.67 |
| B | Output Delivery (%) | | | | | | | | | | | | |
| 1 | Milk Price( Rs./lit ) | - | - | - | - | - | - | - | - | - | - | - | - |
| | Adequate | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| | Low | - | - | - | - | - | - | - | - | 100.00 | 100.00 | 100.00 | 100.00 |
| 2 | Payment of Milk | | | | | | | | | | | | |
| | Immediate | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| | Within 2 days | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| | Within 15 days | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| | More than 15 days | | | | | | | | | 100.00 | 100.00 | 100.00 | 100.00 |
| 3 | incentives or bonus for supplying milk | | | | | | | | | | | | |
| | Adequate | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| | Low | - | - | - | - | - | - | - | - | 0.00 | 0.00 | 0.00 | 0.00 |
| | Not Available | | | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 |
| 4 | Acceptability cross-bred cow milk in family | | | | | | | | | | | | |
| | Poor | - | - | - | - | - | - | - | - | 12.50 | 10.00 | 10.00 | 10.83 |
| | Acceptable | - | - | - | - | - | - | - | - | 67.50 | 75.00 | 82.50 | 75.00 |
| | Not acceptable | - | - | - | - | - | - | - | - | 20.00 | 15.00 | 7.50 | 14.17 |
| 5 | Advance payment for milk by society/ vendors | | | | | | | | | | | | |
| | Available | - | - | - | - | - | - | - | - | 60.00 | 80.00 | 95.00 | 78.33 |
| | Not available | - | - | - | - | - | - | - | - | 40.00 | 20.00 | 5.00 | 21.67 |

*Source: Field Survey Data*

It is also observed that there was the provision of giving advance payments for milk by the dairy cooperatives.

In case of NDCS households (Table-8.2) the sample farmers did not receive any support or facility from dairy cooperative societies existing in their locality and they were fully dependent on private agencies for input and output services. Although, the supply of cattle feed were available with private agencies, nearly 23.33 per cent of the respondents felt that its supply was inadequate. Most of the sample farmers (87.50 per cent) opined that EVS was not readily available and whenever it was available, the rate was very high. Although the requisite quantity of vaccines were available in the surveyed area, availability of semen was not available reported by the NDCS sample. Almost 40 per cent of the sample households reported that the insurance charges were very high and no technical guidance was made available to them. All the sample farmers reported that the milk price was very low and all the households received their return after a break of 15 days. Most of the sample farmers mentioned about acceptability of cross bred cow milk for home consumption. About 78.33 per cent of the farmers reported that advance payment by the private agent was very much available in the study areas.

**8.3 Infrastructural Constraints**

The details of infrastructural constraints faced by the selected households are presented in Table-8.3. Table shows that the major constraints in case of DCS households were, lack of improved equipment, unavailability of emergency vaccine services, veterinary staff, improper time of delivery of milk in winter due to transportational bottlenecks and unavailability of cattle feed and fodder on credit *etc*. Along with these problems, the NDCS sample farmers also had to face with the constraints like lack of training facility on improved farm technology.

**8.4 Economic Constraints**

Details of economic constraints faced by the DCS and NDCS households are presented in Table-8.4. It is seen from the Table that DCS households experienced the economic constraints like high cost of fodder seed, low price of milk, high cost of cross bred cow, high cost of medicine, high cost of cattle feed and mixture, low incentive for supplying milk, high charges of emergency veterinary services *etc*. The major economic constraints faced by the NDCS households were same as that of DCS, but additionally had to face with the problems like lack of provision of loan from the society or Government for purchase of cattle.

**Table 8.3: Details on Infrastructural Constraints faced by Selected Households**

| Sl No | Particulars | Infrastructural Constraints (IC) (% to total responses ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | DCS households | | | | NDCS households | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | **Lack of improved equipments** | | | | | | | | |
| | Never | 5.00 | 17.50 | 47.50 | 23.33 | 0.00 | 15.00 | 50.00 | 21.67 |
| | Sometime | 65.00 | 72.50 | 45.00 | 60.83 | 67.50 | 82.50 | 50.00 | 66.67 |
| | Always | 30.00 | 10.00 | 7.50 | 15.83 | 32.50 | 2.50 | 0.00 | 11.67 |
| 2 | **Irregular & inadequate supply of cattle feed** | | | | | | | | |
| | Never | 50.00 | 55.00 | 62.50 | 55.83 | 47.50 | 50.00 | 60.00 | 52.50 |
| | **Sometime** | 35.00 | 27.50 | 20.00 | 27.50 | 27.50 | 27.50 | 20.00 | 25.00 |
| | Always | 15.00 | 17.50 | 17.50 | 16.67 | 25.00 | 22.50 | 20.00 | 22.50 |
| 3 | **Unavailability of emergency veterinary services** | | | | | | | | |
| | Never | 5.00 | 12.50 | 25.00 | 14.17 | 5.00 | 10.00 | 22.50 | 12.50 |
| | Sometime | 20.00 | 17.50 | 17.50 | 18.33 | 25.00 | 22.50 | 20.00 | 22.50 |
| | Always | 75.00 | 70.00 | 57.50 | 67.50 | 70.00 | 67.50 | 57.50 | 65.00 |
| 4 | **Infrequent visit of veterinary staff** | | | | | | | | |
| | Never | 15.00 | 20.00 | 25.00 | 20.00 | 12.50 | 20.00 | 27.50 | 20.00 |
| | Sometime | 22.50 | 30.00 | 20.00 | 24.17 | 25.00 | 32.50 | 17.50 | 25.00 |
| | Always | 62.50 | 50.00 | 55.00 | 55.83 | 62.50 | 47.50 | 55.00 | 55.00 |
| 5 | **Unavailability of vaccines** | | | | | | | | |
| | Never | 55.00 | 60.00 | 62.50 | 59.17 | 50.00 | 57.50 | 62.50 | 56.67 |
| | Sometime | 35.00 | 32.50 | 35.00 | 34.17 | 35.00 | 30.00 | 30.00 | 31.67 |
| | Always | 10.00 | 7.50 | 2.50 | 6.67 | 15.00 | 12.50 | 7.50 | 11.67 |
| 6 | **Occasional Availability of semen at the AI centre** | | | | | | | | |
| | Never | 20.00 | 37.50 | 65.00 | 40.83 | 10.00 | 30.00 | 60.00 | 33.33 |
| | Sometime | 35.00 | 20.00 | 10.00 | 21.67 | 35.00 | 12.50 | 10.00 | 19.17 |
| | Always | 45.00 | 42.50 | 25.00 | 37.50 | 55.00 | 57.50 | 30.00 | 47.50 |
| 7 | **Lack of training facilities** | | | | | | | | |
| | Never | 17.50 | 35.00 | 37.50 | 30.00 | 2.50 | 5.00 | 5.00 | 4.17 |
| | Sometime | 47.50 | 42.50 | 47.50 | 45.83 | 10.00 | 12.50 | 15.00 | 12.50 |
| | Always | 35.00 | 22.50 | 15.00 | 24.17 | 87.50 | 82.50 | 80.00 | 83.33 |
| 8 | **Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day** | | | | | | | | |
| | Never | 35.00 | 32.50 | 30.00 | 32.50 | 42.50 | 35.00 | 32.50 | 36.67 |
| | Sometime | 55.00 | 60.00 | 62.50 | 59.17 | 47.50 | 52.50 | 60.00 | 53.33 |
| | Always | 10.00 | 7.50 | 7.50 | 8.33 | 10.00 | 12.50 | 7.50 | 10.00 |
| 9 | **Unavailability of green/dry fodder throughout the year** | | | | | | | | |
| | Never | 17.50 | 32.50 | 37.50 | 29.17 | 25.00 | 32.50 | 40.00 | 32.50 |
| | Sometime | 52.50 | 47.50 | 42.50 | 47.50 | 35.00 | 45.00 | 42.50 | 40.83 |
| | Always | 30.00 | 20.00 | 20.00 | 23.33 | 40.00 | 22.50 | 17.50 | 26.67 |
| 10 | **Unavailability of cattle feed and fodder seed on credit** | | | | | | | | |
| | Never | 20.00 | 22.50 | 25.00 | 22.50 | 22.50 | 25.00 | 27.50 | 25.00 |
| | Sometime | 50.00 | 52.50 | 57.50 | 53.33 | 42.50 | 45.00 | 55.00 | 47.50 |
| | Always | 30.00 | 25.00 | 17.50 | 24.17 | 35.00 | 30.00 | 17.50 | 27.50 |
| 11 | **Low average milk yield of the milk animals** | | | | | | | | |
| | Never | 17.50 | 25.00 | 35.00 | 25.83 | 7.50 | 12.50 | 22.50 | 14.17 |
| | Sometime | 32.50 | 50.00 | 37.50 | 40.00 | 42.50 | 50.00 | 42.50 | 45.00 |
| | Always | 50.00 | 25.00 | 27.50 | 34.17 | 50.00 | 37.50 | 35.00 | 40.83 |

*Source: Field Survey Data*

## Table 8.4: Details on Economic Constraints faced by Selected Households

| Sl No | Particulars | Economic Constraints (EC) (% to total responses ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | DCS households | | | | NDCS households | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | **High cost of fodder seed** | | | | | | | | |
| | Never | 12.50 | 15.00 | 20.00 | 15.83 | 7.50 | 12.50 | 25.00 | 15.00 |
| | Sometime | 20.00 | 22.50 | 25.00 | 22.50 | 7.50 | 20.00 | 42.50 | 23.33 |
| | Always | 67.50 | 62.50 | 55.00 | 61.67 | 85.00 | 67.50 | 32.50 | 61.67 |
| 2 | **Delay in payment of milk** | | | | | | | | |
| | Never | 65.00 | 55.00 | 50.00 | 56.67 | 52.50 | 45.00 | 40.00 | 45.83 |
| | Sometime | 17.50 | 35.00 | 40.00 | 30.83 | 25.00 | 42.50 | 52.50 | 40.00 |
| | Always | 17.50 | 10.00 | 10.00 | 12.50 | 22.50 | 12.50 | 7.50 | 14.17 |
| 3 | **Low price of milk offered** | | | | | | | | |
| | Never | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sometime | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Always | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 4 | **High cost of cross bred cow** | | | | | | | | |
| | Never | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sometime | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Always | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 5 | **High cost of veterinary medicines** | | | | | | | | |
| | Never | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sometime | 0.00 | 17.50 | 25.00 | 14.17 | 0.00 | 15.00 | 32.50 | 15.83 |
| | Always | 100.00 | 82.50 | 75.00 | 85.83 | 100.00 | 85.00 | 67.50 | 84.17 |
| 6 | **High cost of cattle feed and mineral mixture** | | | | | | | | |
| | Never | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sometime | 0.00 | 20.00 | 27.50 | 15.83 | 0.00 | 20.00 | 30.00 | 16.67 |
| | Always | 100.00 | 80.00 | 72.50 | 84.17 | 100.00 | 80.00 | 70.00 | 83.33 |
| 7 | **Low provision of loan in society or govt. for purchasing cattle** | | | | | | | | |
| | Never | 20.00 | 32.50 | 32.50 | 28.33 | 0.00 | 5.00 | 5.00 | 3.33 |
| | Sometime | 30.00 | 37.50 | 35.00 | 34.17 | 5.00 | 7.50 | 10.00 | 7.50 |
| | Always | 50.00 | 30.00 | 32.50 | 37.50 | 95.00 | 87.50 | 85.00 | 89.17 |
| 8 | **Low incentives or bonus for supplying milk** | | | | | | | | |
| | Never | 0.00 | 2.50 | 2.50 | 1.67 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sometime | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Always | 100.00 | 97.50 | 97.50 | 98.33 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9 | **High charges of emergency veterinary services** | | | | | | | | |
| | Never | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sometime | 0.00 | 17.50 | 45.00 | 20.83 | 0.00 | 15.00 | 45.00 | 20.00 |
| | Always | 100.00 | 82.50 | 55.00 | 79.17 | 100.00 | 85.00 | 55.00 | 80.00 |
| 10 | **High charges for insurance** | | | | | | | | |
| | Never | 15.00 | 17.50 | 17.50 | 16.67 | 10.00 | 22.50 | 27.50 | 20.00 |
| | Sometime | 37.50 | 35.00 | 30.00 | 34.17 | 37.50 | 40.00 | 40.00 | 39.17 |
| | Always | 47.50 | 47.50 | 52.50 | 49.17 | 52.50 | 37.50 | 32.50 | 40.83 |

*Source: Field Survey Data*

## 8.5 Marketing Constraints

Marketing constraints faced by the DCS and NDCS households are presented in Table-8.5. It is seen from the Table that the severity of constraints faced by the DCS respondents was low as compared to NDCS sample. They experienced the major problems like lower level of knowledge about marketing strategies, lower risk taking behaviour and inability to market the value-added products.

**Table 8.5 Details on Marketing Constraints faced by the Selected Households**

| Sl No | Constraints | Marketing Constraints (MC) (% to total responses ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | DCS households | | | | NDCS households | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | **Irregular sell of milk** | | | | | | | | |
| | Never | 72.50 | 77.50 | 87.50 | 79.17 | 77.50 | 65.00 | 35.00 | 59.17 |
| | Sometime | 25.00 | 17.50 | 7.50 | 16.67 | 12.50 | 15.00 | 25.00 | 17.50 |
| | Always | 2.50 | 5.00 | 5.00 | 4.17 | 10.00 | 20.00 | 40.00 | 23.33 |
| 2 | **Lack of time for marketing** | | | | | | | | |
| | Never | 45.00 | 42.50 | 42.50 | 43.33 | 35.00 | 27.50 | 25.00 | 29.17 |
| | Sometime | 20.00 | 20.00 | 47.50 | 29.17 | 20.00 | 20.00 | 25.00 | 21.67 |
| | Always | 35.00 | 37.50 | 10.00 | 27.50 | 45.00 | 52.50 | 50.00 | 49.17 |
| 3 | **Less knowledge about marketing strategies** | | | | | | | | |
| | Never | 15.00 | 30.00 | 35.00 | 26.67 | 10.00 | 27.50 | 27.50 | 21.67 |
| | Sometime | 30.00 | 22.50 | 22.50 | 25.00 | 25.00 | 27.50 | 27.50 | 26.67 |
| | Always | 55.00 | 47.50 | 42.50 | 48.33 | 65.00 | 45.00 | 45.00 | 51.67 |
| 4 | **Low risk taking behaviour** | | | | | | | | |
| | Never | 27.50 | 35.00 | 50.00 | 37.50 | 32.50 | 30.00 | 37.50 | 33.33 |
| | Sometime | 32.50 | 27.50 | 17.50 | 25.83 | 25.00 | 32.50 | 27.50 | 28.33 |
| | Always | 40.00 | 37.50 | 32.50 | 36.67 | 42.50 | 37.50 | 35.00 | 38.33 |
| 5 | **No or less advance payment for milk by society/vender** | | | | | | | | |
| | Never | 55.00 | 57.50 | 62.50 | 58.33 | 15.00 | 22.50 | 35.00 | 24.17 |
| | Sometime | 35.00 | 27.50 | 20.00 | 27.50 | 22.50 | 10.00 | 7.50 | 13.33 |
| | Always | 10.00 | 15.00 | 17.50 | 14.17 | 62.50 | 67.50 | 57.50 | 62.50 |
| 6 | **Inability to market for value added products** | | | | | | | | |
| | Never | 15.00 | 30.00 | 35.00 | 26.67 | 10.00 | 27.50 | 27.50 | 21.67 |
| | Sometime | 55.00 | 47.50 | 42.50 | 48.33 | 65.00 | 45.00 | 45.00 | 51.67 |
| | Always | 30.00 | 22.50 | 22.50 | 25.00 | 25.00 | 27.50 | 27.50 | 26.67 |

*Source: Field Survey Data*

## 8.6 Technical Constraints

The details of technical constraints faced by the selected households are presented in Table-8.6.

**Table 8.6 Details on Technical Constraints faced by Selected Households**

| Sl No | Constraints | Technical Constraints (TC) (% to total responses ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | DCS households | | | | NDCS households | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | **Lack of technical guidance** | | | | | | | | |
| | Never | 15.00 | 17.50 | 25.00 | 19.17 | 7.50 | 10.00 | 17.50 | 11.67 |
| | Sometime | 25.00 | 27.50 | 25.00 | 25.83 | 15.00 | 22.50 | 235.00 | 20.83 |
| | Always | 60.00 | 55.00 | 50.00 | 55.00 | 77.50 | 67.50 | 57.50 | 67.50 |
| 2 | **Unavailability of high genetic merit bull** | | | | | | | | |
| | Never | 15.00 | 30.00 | 35.00 | 26.67 | 10.00 | 27.50 | 27.50 | 21.67 |
| | Sometime | 55.00 | 47.50 | 42.50 | 48.33 | 65.00 | 45.00 | 45.00 | 51.67 |
| | Always | 30.00 | 22.50 | 22.50 | 25.00 | 25.00 | 27.50 | 27.50 | 26.67 |
| 3 | **Poor conception rate through artificial insemination** | | | | | | | | |
| | Never | 22.50 | 12.50 | 7.50 | 14.17 | 17.50 | 10.00 | 10.00 | 12.50 |
| | Sometime | 25.00 | 42.50 | 52.50 | 40.00 | 17.50 | 40.00 | 35.00 | 30.83 |
| | Always | 52.50 | 45.00 | 40.00 | 45.83 | 65.00 | 55.00 | 50.00 | 56.67 |
| 4 | **Poor knowledge about Feeding and health care** | | | | | | | | |
| | Never | 22.50 | 22.50 | 30.00 | 25.00 | 5.00 | 22.50 | 27.50 | 18.33 |
| | Sometime | 15.00 | 30.00 | 35.00 | 26.67 | 25.00 | 27.50 | 27.50 | 26.67 |
| | Always | 55.00 | 47.50 | 42.50 | 48.33 | 70.00 | 50.00 | 45.00 | 55.00 |
| 5 | **Lack of knowledge about cheap & scientific housing of animal** | | | | | | | | |
| | Never | 17.50 | 25.00 | 35.00 | 25.83 | 7.50 | 12.50 | 22.50 | 14.17 |
| | Sometime | 50.00 | 25.00 | 27.50 | 34.17 | 50.00 | 37.50 | 35.00 | 40.83 |
| | Always | 32.50 | 50.00 | 37.50 | 40.00 | 42.50 | 50.00 | 42.50 | 45.00 |

*Source: Field Survey Data*

## 8.7 Socio-Psychological Constraints

The details of socio-psychological constraints as reported by the sample households are incorporated in Table-8.7. Table shows that, the main socio-psychological constraint as reported by DCS and NDCS households was lack of purchasing power, closely followed by poor socio-economic condition, lack of time due to pre-occupation with other domestic/ agriculture work was yet another constraint perceived by them.

**Table 8.7 Details on Socio-Psychological Constraints faced by Selected households**

| Sl No | Constraints | Socio-Psychological Constraints (SC) (% to total responses ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | DCS households | | | | NDCS households | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | **Lower socio- economic conditions** | | | | | | | | |
| | Never | 15.00 | 22.50 | 35.00 | 24.17 | 15.00 | 22.50 | 27.50 | 21.67 |
| | Sometime | 35.00 | 42.50 | 37.50 | 38.33 | 37.50 | 27.50 | 22.50 | 29.17 |
| | Always | 50.00 | 35.00 | 27.50 | 37.50 | 47.50 | 50.00 | 50.00 | 49.17 |
| 2 | **Lack of purchasing power** | | | | | | | | |
| | Never | 12.50 | 22.50 | 32.50 | 22.50 | 7.50 | 20.00 | 25.00 | 17.50 |
| | Sometime | 45.00 | 30.00 | 20.00 | 31.67 | 42.50 | 25.00 | 17.50 | 28.33 |
| | Always | 42.50 | 47.50 | 47.50 | 45.83 | 50.00 | 55.00 | 57.50 | 54.17 |
| 3 | **Lack of time due to pre-occupation with other domestic/ agricultural work** | | | | | | | | |
| | Never | 10.00 | 27.50 | 30.00 | 22.50 | 12.50 | 25.00 | 32.00 | 23.33 |
| | Sometime | 65.00 | 35.00 | 30.00 | 43.33 | 57.50 | 40.00 | 20.00 | 39.17 |
| | Always | 25.00 | 37.50 | 40.00 | 34.17 | 10.00 | 35.00 | 47.50 | 37.50 |
| 4 | **Lack of cooperation and coordination among members** | | | | | | | | |
| | Never | 55.00 | 60.00 | 67.50 | 60.83 | 50.00 | 52.50 | 60.00 | 54.17 |
| | Sometime | 30.00 | 30.00 | 22.50 | 27.50 | 22.50 | 27.50 | 25.00 | 25.00 |
| | Always | 15.00 | 10.00 | 10.00 | 11.67 | 27.50 | 20.00 | 15.00 | 20.83 |
| 5 | **Milk producers are meant for influential people** | | | | | | | | |
| | Never | 60.00 | 62.50 | 72.50 | 65.00 | 55.00 | 57.50 | 60.00 | 57.50 |
| | Sometime | 30.00 | 30.00 | 22.50 | 27.50 | 27.50 | 22.50 | 25.00 | 25.00 |
| | Always | 10.00 | 7.50 | 5.00 | 7.50 | 17.50 | 20.00 | 15.00 | 17.50 |
| 6 | **Milk of cross-bred cow has poor acceptability (family members )** | | | | | | | | |
| | Never | 60.00 | 62.50 | 70.00 | 64.17 | 55.00 | 55.00 | 57.50 | 55.83 |
| | Sometime | 25.00 | 30.00 | 25.00 | 26.67 | 30.00 | 25.00 | 25.00 | 26.67 |
| | Always | 15.00 | 7.50 | 5.00 | 9.17 | 15.00 | 20.00 | 17.50 | 17.50 |

*Source: Field Survey Data*

## 8.8 Other Constraints

Along with the constraints discussed above, some other constraints were also identified in the study area and are presented in Table-8.8. The common problems faced by both DCS and NDCS households were, poor irrigation facility to grow fodder crop, poor livestock extension services, poor knowledge about scientific animal husbandry practices, lack of awareness about quality milk production, lack of milk testing and animal screening facilities, lack of veterinary services and lack of finance to invest on dairy farming and business. Besides these problems, NDCS households reported some other constraints like unavailability of chilling facilities at village level for milk preservation, degraded or encroached grazing lands, lack of animal feed for better milk production, lack of marketing facility *etc.*

**Table 8.8 Details on Other Constraints faced by Selected Households**

| Sl No | Constraints | Other Constraints (OC) (% to total responses ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | DCS households | | | | NDCS households | | | |
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Unavailability of chilling facilities at village level for milk preservation | 37.50 | 30.00 | 35.00 | 34.17 | 65.00 | 62.50 | 70.00 | 65.83 |
| 2 | Diversion of feed and fodder ingredients for industrial use | 25.00 | 15.00 | 17.50 | 19.17 | 22.50 | 12.50 | 15.00 | 16.67 |
| 3 | Majority of grazing lands are either degraded or encroached | 47.50 | 37.50 | 50.00 | 45.00 | 52.50 | 50.00 | 57.50 | 53.33 |
| 4 | Poor access to organized markets deprive farmers in getting proper milk price | 40.00 | 37.50 | 42.50 | 40.00 | 45.00 | 47.50 | 52.50 | 48.33 |
| 5 | Irregular quality electricity supply | 25.00 | 30.00 | 22.50 | 25.83 | 25.00 | 27.50 | 27.50 | 26.67 |
| 6 | Poor irrigation facility to grow fodder crops | 50.00 | 55.00 | 57.50 | 54.17 | 45.00 | 55.00 | 60.00 | 53.33 |
| 7 | Non availability of improved fodder seed | 37.50 | 40.00 | 35.00 | 37.50 | 30.00 | 35.00 | 30.00 | 31.67 |
| 8 | Poor livestock extension services | 57.50 | 52.50 | 52.50 | 54.17 | 60.00 | 65.00 | 70.00 | 65.00 |
| 9 | Poor knowledge about scientific animal husbandry practices and dairy farming | 72.50 | 55.00 | 47.50 | 58.33 | 80.00 | 67.50 | 55.00 | 67.50 |
| 10 | Poor knowledge of mastitis (mastitis in dairy animal ) in dairy animals | 52.50 | 42.50 | 20.00 | 38.33 | 55.00 | 45.00 | 22.50 | 40.83 |
| 11 | Lack of awareness about quality milk production | 52.50 | 55.00 | 60.00 | 55.83 | 70.00 | 72.50 | 57.50 | 66.67 |
| 12 | Poor housing to milch animals | 55.00 | 40.00 | 32.50 | 42.50 | 57.50 | 45.00 | 37.50 | 46.67 |
| 13 | Unavailability of medicine and equipment required for quality milk production | 50.00 | 42.50 | 47.50 | 46.67 | 52.50 | 55.00 | 50.00 | 52.50 |
| 14 | Lack of milk testing and animal screening facilities | 75.00 | 55.00 | 45.00 | 58.33 | 87.50 | 67.50 | 57.50 | 70.83 |
| 15 | Lack of veterinary services in village for quality milk production | 52.50 | 55.00 | 50.00 | 52.50 | 57.50 | 60.00 | 57.50 | 58.33 |
| 16 | Lack of nutrition's feed for quality milk production | 50.00 | 45.00 | 42.50 | 45.83 | 52.50 | 57.50 | 52.50 | 54.17 |
| 17 | Lack of ecto parasites control programmes | 50.00 | 35.00 | 30.00 | 38.33 | 57.50 | 47.50 | 42.50 | 49.17 |
| 18 | Lack of finance to invest in dairy business for quality milk production/ Inadequate finance | 75.00 | 52.50 | 40.00 | 55.83 | 82.50 | 65.00 | 42.50 | 63.33 |
| 19 | Lack of necessary space required for tying the milking animals | 15.00 | 30.00 | 37.50 | 27.50 | 17.50 | 37.50 | 47.50 | 34.17 |
| 20 | Lack of marketing facility for dairy business | 37.50 | 42.50 | 52.50 | 44.17 | 45.00 | 65.00 | 70.00 | 60.00 |
| 21 | Uneconomical capital investment on quality milk production | 40.00 | 40.00 | 35.00 | 38.33 | 40.00 | 42.50 | 42.50 | 41.67 |
| 22 | Lack of water supply | 45.00 | 30.00 | 22.50 | 32.50 | 35.00 | 42.50 | 37.50 | 38.33 |
| 23 | Inadequate labour supply | 30.00 | 40.00 | 37.50 | 35.83 | 32.50 | 42.50 | 37.50 | 37.50 |
| 24 | Ecological factors- High heat/temperature, High cold, etc | 42.50 | 37.50 | 30.00 | 36.67 | 35.00 | 32.50 | 37.50 | 35.00 |
| 25 | Competition from established and large units | 22.50 | 20.00 | 25.00 | 22.50 | 30.00 | 32.50 | 40.00 | 34.17 |
| 26 | Difficulty to store milk in summer | 27.50 | 40.00 | 50.00 | 39.17 | 32.50 | 55.00 | 62.50 | 50.00 |
| 27 | low acceptability of AI in buffalo | - | - | - | - | - | - | - | - |
| 28 | Disease outbreak: mortality and morbidity | 25.00 | 15.00 | 10.00 | 16.67 | 25.00 | 12.50 | 10.00 | 15.83 |
| 29 | Politics in Cooperative is not good | 55.00 | 50.00 | 52.50 | 52.50 | 50.00 | 45.00 | 40.00 | 45.00 |

*Source: Field Survey Data*

All these problems continued to affect the performance of dairy sector in Assam for years together, and as such, adequate & time measures must be initiated to bring about a transition towards the desired direction.

## 8.9 Suggestions by Milk Producers

In order to make the dairy farming a more profitable venture, the sample DCS and NDCS households offered some suggestions which are furnished in tabular format (Table-8.9). It is seen from the Table that, a maximum of 70.83 per cent DCS households suggested that milk price

**Table 8.9 Suggestions for improvement in adoption of dairy schemes**

| Sl No | Suggestions | % of response to DCS | | | | % of response to NDCS | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | SMP | MMP | LMP | TMP | SMP | MMP | LMP | TMP |
| 1 | Marketing facilities be provided at village level for the outlet of milk and milk products | 40.00 | 57.50 | 60.00 | 52.50 | 20.00 | 37.50 | 65.00 | 40.83 |
| 2 | Providing technical knowledge to manage the dairy Enterprise | 30.00 | 52.50 | 42.50 | 41.67 | 35.00 | 40.00 | 22.50 | 32.50 |
| 3 | There should be regular and planned supply of vaccines (100%) | 32.50 | 32.50 | 30.00 | 31.67 | 12.50 | 27.50 | 37.50 | 25.83 |
| 4 | Subsidies should be given on certain inputs like veterinary medicines, fodder seeds, etc. | 55.00 | 47.50 | 42.50 | 48.33 | 65.00 | 45.00 | 45.00 | 51.67 |
| 5 | Enhanced milk price for the producers | 82.50 | 67.50 | 62.50 | 70.83 | 80.00 | 67.50 | 50.00 | 65.83 |
| 6 | Loan sanction procedure should be made easy | 62.50 | 67.50 | 57.50 | 62.50 | 55.00 | 57.50 | 62.50 | 58.33 |
| 7 | The loan amount for the purchase dairy animals need to be increased | 25.00 | 42.50 | 45.00 | 37.50 | 15.00 | 30.00 | 35.00 | 26.67 |
| 8 | Concentrates should be made available at cheaper rate and in time | 25.00 | 17.50 | 10.00 | 17.50 | 15.00 | 35.00 | 22.50 | 24.17 |
| 9 | Providing proper A.I. facility at village level /door step | 42.50 | 55.00 | 47.50 | 48.33 | 45.00 | 45.00 | 65.00 | 51.67 |
| 10 | Cost of veterinary services need to be reduced | 75.00 | 60.00 | 45.00 | 60.00 | 72.50 | 60.00 | 35.00 | 55.83 |
| 11 | Provide veterinary literature in village | 72.50 | 65.00 | 60.00 | 65.83 | 60.00 | 57.50 | 55.00 | 57.50 |
| 12 | Small scale dairy industries be encouraged at village level | 30.00 | 30.00 | 22.50 | 27.50 | 27.50 | 27.50 | 25.00 | 26.67 |
| 13 | Need to improve service delivery | 47.50 | 50.00 | 50.00 | 49.17 | 42.50 | 47.50 | 47.50 | 45.83 |

*Source: Field Survey Data.*

should be increased across the size classes. Another 65.83 per cent opined that veterinary literature should be provided to the farmers to educate them in scientific dairy farming. 62.50 per cent of the DCS sample opined that loan sanction procedure should be made easy while 60.00 per cent of the households suggested for reducing the cost of veterinary services. They also suggested to provide technical knowledge to the dairy farmers, to ensure regular and planned supply of vaccines, to grant subsidies on veterinary medicines, fodder seeds, *etc*., and also to provide for loan facility, supply of concentrates at cheaper rate, providing proper A.I. facility at village level /door step and for improvement of service delivery system. Like DCS households,

majority of the NDCS households also concurred with enhancement of milk prices for the producers. Other major suggestions made by them were, easy loan facility, granting subsidy on veterinary medicines, fodder seeds, providing proper A.I. facility at village level; reducing the cost on veterinary services and providing veterinary literature in village areas *etc.*

**Future Challenges**

Changes in the food market structure during the new millennium are expected to be significant. With an increase in life expectancy, the proportion of aged people in the population will increase, and this could emphasis a demand for special nutritional products. Appropriate R&D interventions and newer developments in dairy processing area will focus on novel aspects of emerging technologies, which could be utilized for upgrading processes for the production of traditional milk products. Transformation of the unorganized sector of dairy industry engaged in processing more than 54 per cent of the milk produced in the country provides a formidable challenge. Intensive R&D efforts are needed to develop suitable technologies for large scale manufacture and packaging of traditional milk products. The growth is to be achieved through integration with newly emerging, energy efficient unit operations developed in advanced countries.

A pre-requisite to this developmental activity would be scientific documentation of the desirable physico-chemical and shelf-life characteristics of region- specific traditional milk products. Dairying during the new millennium is optimistic about repeating the experience gained thus far to achieve phenomenal expansion of technological development. Considerable input of financial resources will be necessary to further growth of dairy industry in the liberalized global economies. Under the changed scenario, India has to face the challenges on several fronts. These include the production of good quality milk; adoption of cost effective, energy efficient eco-friendly technologies for collection and processing of milk and milk products, diversification of the product range, up gradating and improvement in the shelf-life of Indian dairy products, development of appropriate systems for packaging, infrastructure for storage, transportation and marketing of dairy products, quality systems, certification, food safety, Government legislation, effective management of resources and energy, proper disposal of industrial waste and customer services.

## 8.10 Constraints faced by PDCS/Private Dairy Units

During the field survey, various constraints faced by the selected Primary Dairy Cooperative Societies (PDCS) and Private Dairy Units (PDU) were gathered and presented in Tables 8.10 to 8.12.

Table 8.10 shows the milk supply related constraints faced by the PDCS and PDUs. Table shows that the major constraint faced by PDCS pertaining to milk supply was unavailability of green/ dry fodder throughout the year. Other problems faced by them were, no or less provision for advance payment for milk by the society or vendors; poor quality, irregular & inadequate supply of milk, infrequent visit of veterinary staff, late delivery, unavailability of emergency veterinary services, unavailability of vaccines and low average milk yield of the milch animals.

The major constraint faced by PDU was inability to provide cattle feed and fodder seed on credit. Most of them also faced problems like, poor quality, irregular & inadequate supply of milk, unavailability of green/ dry fodder throughout the year and low average milk yield.

Infrastructure related constraints cited by the sample PDCS and PDU were recorded and presented in Table 8.11. Lack of training facility was major constraint for both PDCS and PDU.

Other constraints of both PDCS and PDU included un-availability of chilling facilities at village level for milk preservation, lack of improved equipment and lack of necessary space required for dairy operation *etc*.

Table 8.12 depicts the market related constraints faced by the DCS and PDUs. The major constraint as reported by the sample PDCS and PDU was the competition from imported dairy products while, competition from private dairy, unstable prices of milk, inability to market for value-added products and poor road infrastructure were the other marketing constraints faced by the both groups, with varying severity in different districts.

**Table -8.10 Milk Supply related Constraints faced by the PDCS & Private Dairy Units**

| Sl No. | Constraints | Milk Supply related Constraints faced by (% to total responses) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PDCS (% to total responses) | | | | PDU (% to total responses) | | | |
| | | Nagaon | Barpeta | Kamrup(R ) | Jorhat | Nagaon | Barpeta | Kamrup ( R ) | Jorhat |
| 1 | **Huge number of small producers** | | | | | | | | |
| | Never | 0 | 0 | 0 | 50 | 12.5 | 27.5 | 0 | 0 |
| | Sometime | 50 | 0 | 100 | 0 | 27.5 | 48.5 | 0 | 62.5 |
| | Always | 50 | 100 | 0 | 50 | 60 | 24 | 100 | 37.5 |
| 2 | **No or less provision for advance payment for milk by society or vendors** | | | | | | | | |
| | Never | 0 | 0 | 0 | 25 | 0 | 0 | 12.5 | 87.5 |
| | Sometime | 50 | 0 | 0 | 25 | 25 | 100 | 62.5 | 12.5 |
| | Always | 50 | 100 | 100 | 50 | 75 | 0 | 25 | 0 |
| 3 | **Unable to provide cattle feed and fodder seed on credit to members** | | | | | | | | |
| | Never | 0 | 100 | 0 | 50 | 0 | 0 | 0 | 0 |
| | Sometime | 50 | 0 | 50 | 50 | 0 | 0 | 0 | 0 |
| | Always | 50 | 0 | 50 | 0 | 100 | 100 | 100 | 100 |
| 4 | **Poor Quality milk** | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 0 | 25.5 | 50 | 0 |
| | Sometime | 50 | 50 | 100 | 100 | 12.5 | 45.5 | 12.5 | 12.5 |
| | Always | 50 | 50 | 0 | 0 | 87.5 | 29 | 37.5 | 87.5 |
| 5 | **Irregular & inadequate supply of milk** | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 |
| | Sometime | 0 | 100 | 100 | 50 | 0 | 0 | 25 | 25 |
| | Always | 100 | 0 | 0 | 50 | 25 | 25 | 25 | 75 |
| 6 | **Late delivery** | | | | | | | | |
| | Never | 50 | 0 | 0 | 0 | 45.5 | 62.5 | 50 | 25 |
| | Sometime | 50 | 100 | 100 | 100 | 37.5 | 25 | 12.5 | 37.5 |
| | Always | 0 | 0 | 0 | 0 | 17 | 12.5 | 37.5 | 37.5 |
| 7 | **Unavailability of emergency veterinary services** | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Sometime | 50 | 100 | 0 | 50 | 0 | 25 | 0 | 50 |
| | Always | 50 | 0 | 100 | 50 | 25 | 0 | 25 | 50 |
| 8 | **Infrequent visit of veterinary staff** | | | | | | | | |
| | Never | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Sometime | 50 | 50 | 100 | 100 | 0 | 25 | 0 | 50 |
| | Always | 0 | 50 | 0 | 0 | 25 | 0 | 25 | 50 |
| 9 | **Unavailability of vaccines** | | | | | | | | |
| | Never | 50 | 50 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Sometime | 50 | 50 | 100 | 100 | 0 | 25 | 12.5 | 62.5 |
| | Always | 0 | 0 | 0 | 0 | 25 | 0 | 12.5 | 37.5 |
| 10 | **Occasional availability of semen at the AI centre** | | | | | | | | |
| | Never | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| | Sometime | 100 | 50 | 100 | 50 | 0 | 25 | 12.5 | 62.5 |
| | Always | 0 | 50 | 0 | 0 | 25 | 12.5 | 0 | 37.5 |
| 11 | **Unsuitability of the time of delivery of milk during winters due to bitter cold in early hours of the day** | | | | | | | | |
| | Never | 100 | 100 | 100 | 100 | 25 | 25 | 12.5 | 87.5 |
| | Sometime | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.5 |
| | Always | 0 | 0 | 0 | 0 | 0 | 0 | 12.5 | 0 |
| 12 | **Unavailability of green/ dry fodder throughout the year** | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Sometime | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Always | 100 | 100 | 100 | 100 | 25 | 25 | 25 | 100 |
| 13 | **Low average milk yield of the milk animals in area** | | | | | | | | |
| | Never | 50 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| | Sometime | 0 | 50 | 0 | 50 | 0 | 0 | 12.5 | 25 |
| | Always | 50 | 50 | 100 | 0 | 25 | 25 | 12.5 | 75 |
| 14 | **Lack of cooperation and coordination among members** | | | | | | | | |
| | Never | 100 | 100 | 100 | 100 | 25 | 25 | 12.5 | 37.5 |
| | Sometime | 0 | 0 | 0 | 0 | 0 | 0 | 12.5 | 37.5 |
| | Always | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |

*Source: Field Survey Data*

**Table 8.11: Infrastructure related Constraints faced by the PDCS & Private Dairy Units**

| Sl No. | Constraints | Infrastructure related Constraints faced by (% to total responses) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PDCS (% to total responses) | | | | PDU (% to total responses) | | | |
| | | Nagaon | Barpeta | Kamrup | Jorhat | Nagaon | Barpeta | Kamrup | Jorhat |
| 1 | Unavailability of chilling facilities at village level for milk preservation | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 50 | 12.5 | 0 | 0 |
| | Sometime | 50 | 0 | 50 | 0 | 25 | 25.5 | 0 | 0 |
| | Always | 50 | 100 | 50 | 100 | 25 | 62 | 100 | 100 |
| 2 | Lack of improved equipment | | | | | | | | |
| | Never | 0 | 0 | 0 | 50 | 0 | 40.5 | 0 | 0 |
| | Sometime | 50 | 0 | 100 | 0 | 100 | 35 | 50 | 0 |
| | Always | 50 | 100 | 0 | 50 | 0 | 22.5 | 50 | 100 |
| 3 | Lack of necessary space required for dairy operation | | | | | | | | |
| | Never | 100 | 50 | 52 | 0 | 50 | 0 | 25 | 62.5 |
| | Sometime | 0 | 50 | 50 | 0 | 0 | 0 | 25 | 12.5 |
| | Always | 0 | 0 | 0 | 100 | 50 | 100 | 50 | 25 |
| 4 | Lack of training facilities | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Sometime | 50 | 0 | 0 | 0 | 0 | 50 | 0 | 0 |
| | Always | 50 | 100 | 100 | 100 | 100 | 50 | 100 | 100 |

*Source: Field Survey Data*

**Table 8.12: Market related Constraints faced by the PDCS & Private Dairy Units**

| Sl No. | Constraints | Market related Constraints faced by (% to total responses) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PDCS (% to total responses) | | | | PDU (% to total responses) | | | |
| | | Nagaon | Barpeta | Kamrup | Jorhat | Nagaon | Barpeta | Kamrup | Jorhat |
| 1 | Inability to market for value-added products | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 50 | 25 | 24.5 | 0 |
| | Sometime | 50 | 0 | 100 | 50 | 50 | 25 | 25 | 50 |
| | Always | 50 | 100 | 0 | 50 | 0 | 50 | 50.5 | 50 |
| 2 | Competition from private dairy | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 |
| | Sometime | 50 | 0 | 0 | 50 | 0 | 100 | 0 | 0 |
| | Always | 50 | 100 | 100 | 50 | 100 | 0 | 0 | 0 |
| 3 | Poor Road infrastructure | | | | | | | | |
| | Never | 50 | 0 | 12.5 | 0 | 25 | 12.5 | 12.5 | 0 |
| | Sometime | 0 | 50 | 0 | 50 | 50 | 75 | 12.5 | 0 |
| | Always | 50 | 50 | 87.5 | 50 | 25 | 12.5 | 75 | 100 |
| 4 | Unstable prices of milk | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 50 | 12.5 | 25 | 12.5 |
| | Sometime | 50 | 0 | 100 | 50 | 25 | 62.5 | 50 | 50 |
| | Always | 50 | 100 | 0 | 50 | 25 | 25 | 25 | 37.5 |
| 5 | Competition from imported dairy product | | | | | | | | |
| | Never | 0 | 0 | 0 | 0 | 12.5 | 0 | 0 | 0 |
| | Sometime | 50 | 0 | 0 | 50 | 50.5 | 0 | 50 | 0 |
| | Always | 50 | 100 | 100 | 50 | 37 | 100 | 50 | 100 |

*Source: Field Survey Data*

### 8.11 Constraints faced by Milk Union

In Assam, only WAMUL is functioning at present, which covers three out four of the sample districts *i.e.* Kamrup, Barpeta and Nagaon. During the field survey, it was

**Table 8.13: Constraints faced by the Milk Union in Assam**

| | |
|---|---|
| **1.** | **Manpower Constraints (*e.g.* Problems in recruiting staff etc.)**<br>a) Identification of skilled manpower and hiring them with salaries commensurating with the industry standards.<br>b) Absence of dairy science college, food technology institute in the North Eastern Region. |
| **2.** | **Technical Constraints (*e.g.* Problems in availability of inputs, shortfall in technical assistance provided, etc.)**<br>a) Manual intervention of product making at processing plant that impedes efficiency in meeting the market demand of liquid milk and various milk products.<br>b) Lack of availability of raw materials for manufacturing of cattle feed locally in a viable manner.<br>c) Lesser number of crossbred animals in the State. |
| **3.** | **Governance issues: *(e.g. autonomy in deciding producer and consumer price, autonomy in recruitment & transfers, extent of political interference, if any, facilitating and hindering State policies etc.)***<br>a) The village level dairy cooperative societies (DCS) that are registered under Assam State Cooperative Societies Act are not bound to pour any specific portion of milk collection to a forwarding agency in the form a cooperative milk union thereby deviating from the principles of *Anand* pattern cooperatives/ three tier structure. |
| **4.** | **Financial Constraints**<br>a) No financial constraint was arising, as NDDB is providing term loan at reasonable interest rates. |
| **5.** | **Potential for future**<br>a) The Union is going to get financial assistance under new World Bank aided project, Assam Project on Agribusiness and Rural Transformation (APART), through Government of Assam.<br>b) The Union will be expanding its operations in various other parts of Assam through two other milk unions, East Assam Milk Producers' Cooperative Union Ltd. (EAMUL) in Jorhat and Cachar and Karimganj Milk Producers' Cooperative Union Ltd. (CAMUL) in Silchar. |

*Source: WAMUL, 2016, Assam*

noticed that milk union had also faced some constraints which are presented in Table- 8.13. From the Table, it is evident that the major problems faced by the lone milk union were lack of skilled manpower, absence of dairy science college or food technology institute in the North Eastern Region for better training and innovation, lack of availability of raw materials for manufacturing of cattle feed in a viable manner, lesser number of crossbred animals in the State and non-adherence to the principles of *Anand* pattern cooperatives/ three tier structure by the village level Dairy Cooperative Societies (DCS). However, the milk unions have high potential for the future in the sense that the Unions are going to get handsome amount of financial assistance under new World Bank aided project, Assam Project on Agribusiness and Rural Transformation (APART), through Government of Assam. As per report, it will expand its operations in other parts of Assam in co-ordination with two other now defunct milk unions *viz.*

East Assam Milk Producers' Cooperative Union Ltd. (EAMUL) and Cachar and Karimganj Milk Producers' Cooperative Union Ltd. (CAMUL).

Thus, it can be inferred that there exists huge potential for the milk Unions in Assam, which can bring about marked changes in the dairy sector in this part of the country.

**8.12 Chapter summary**

This chapter deals with different constraints i.e. infrastructural, economic, marketing, technical, socio-psychological and some other constraints faced by the sample households of both the situations. The DCS households received adequate supply of cattle feed both from cooperative society and private agent with credit facilities. But most of the respondents opined that the cost of cattle feed and mineral mixture was high. In case of NDCS households, the sample farmers did not get any support or benefits from the dairy cooperative societies existing in their locality and they were fully dependent on private agency for input and output services.

Major infrastructural constraints in case of DCS households were lack of improved equipments, unavailability of emergency vaccine services, inadequate visit of veterinary staff, unavailability of cattle feed and fodder on credit *etc*. Together with these problems, the NDCS sample farmers also faced with the problem of lack of training facility on improved farm technology.

The DCS households experienced the economic constraints like high cost of fodder seed, low price of milk, high cost of cross bred cow, high cost of medicine, high cost of cattle feed and mixture, low incentive for supplying milk, high charges of emergency veterinary services etc. The major economic constraints faced by the NDCS households were same as that of the DCS households. Additionally, they did not have any scope of availing loan from the society or Government for purchasing cattle.

The DCS respondents encountered with very few marketing constraints as compared to NDCS sample.

Technical problem faced by the sample DCS households was lack of technical guidance on advanced dairy farming. Apart from this, some of the respondents felt that problems like unavailability of high genetic merit bull, poor conception rate through artificial insemination, lack of knowledge about feeding and health care *etc*. also hindered the development process. While majority of the NDCS households, faced with the problem of lack of technical guidance,

poor conception rate through artificial insemination and poor knowledge about feeding and health care.

The common problems faced by both DCS and NDCS households were, poor irrigation facility to grow fodder crop, poor livestock extension services, poor knowledge about scientific animal husbandry practices, lack of awareness about quality milk production, lack of milk testing and animal screening facilities, lack of veterinary services and lack of finance to invest in dairy business for quality milk production.

The major constraint as reported by the sample PDCS and PDU was the competition from imported dairy products. Competition from private dairy, unstable prices of milk, inability to market for value-added products and poor road infrastructure were the other marketing constraints faced by the both groups.

The problems faced by the lone Milk Union in Assam were lack of skilled manpower, absence of suitable institutes in the North Eastern Region for better training and innovation, lack of availability of raw materials for manufacturing of cattle feed locally in a viable manner, lesser number of crossbred animals in the State and non-adherence to the principles of *Anand* pattern cooperatives/ three tier structure by the village level DCS. These problems and difficulties encountered by all the stakeholders, once addressed, can gear up new vista for dairy development in the State of Assam.

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# Chapter IX
# Conclusions and Recommendations

On the basis of the field survey, careful observations and discussions held with the milk producers and other stakeholders associated with dairy, the following suggestions are offered for improvement of the dairy sector in Assam.

- The State Government should prioritize the strategies for dairy development in the State Plan to make a real breakthrough in the dairy sector.
- Productivity-led growth is essential for accelerated and sustainable growth of this sector. Composition of dairy cattle should be modified with introduction of adequate number of cross -bred cows.
- There is need to evolve a comprehensive dairy development policy in the State through genetic improvement of indigenous milch animals. Process should be initiated for production of good quality semen from high genetic sources. To achieve that, the existing semen stations should be strengthened and upgraded. Larger focus should be on field progeny testing for quality bull production.
- Revival of non functional Milk Unions *viz*. EAMUL located at Jorhat and CAMUL at Silchar can give a new lease of life to the dairy sector.
- In order to overcome the fodder deficit, the Animal Husbandry and Veterinary Department of the State, being the key player, can take up elaborate programmes for enhanced fodder production throughout the State.
- Establishment of organized network of market can benefit the livestock farmers in getting due share for their products. Networking of village level dairy co-operatives can benefit all the stakeholders on several fronts. Strengthening of market linkages through expansion of cooperatives and facilitating new models of dairy farming would go a long in further improving milk yield in the State.
- Proper monitoring and implementation of dairy schemes/ programmes in the State with specific milestones set for which convergence of some of the existing schemes may bring in more efficiency in to the system. The ongoing schemes and new initiatives should be placed under three mega schemes with wider freedom and flexibility for the State to choose the appropriate components.

- There is need to assist and train the milk producers in the field of breeding, feeding, animal management technique and marketing of milk and milk products in a cost effective manner.
- Some infrastructural development like road communication and transport is needed for transportation of fodder, feed concentrates, veterinary medicines and also transportation of milk to the consuming centres round the year.
- Livestock insurance coverage should be expanded to all types of production systems and species with appropriate incentive framework.
- Well-equipped laboratories for testing of adulterants, antibiotics residues, and food borne pathogens should be established to enhance safety and quality of animal feeds.
- Improving the farmers' access to institutional credit through simplification of procedures, reduction in interest rates, *etc.*

The status of dairying in Assam is far from satisfactory in terms of production and coverage despite the fact that there lies enormous potential which remains unrealized till date. Development of dairy farming on sustainable basis through optimum utilization of natural resources, adequate health-care facilities for livestock, improvement of breeding programmes through Artificial Insemination, improvement of present milk marketing system and timely vaccination can go a long way in bringing marked changes in the lives of the milk producers of this part of the country.

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## References


Alvares, Claud (1983), "Operation Flood –The White Lie," *The Illustrated Weekly of India*, pp. 8-13, October.

Bansil P.C. (2002), "Agricultural Statistics in India", CBS Publications, New Delhi.

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

Chand, Romesh (1995), "Livestock in Himachal Pradesh: Factors Affecting Growth Composition and Intensity", *Indian Journal of Agricultural Economics*, Vol. 50, No.3, pp. 299-310, July-Sept.

Dhaka, J.P., D.K. Jain, V.K. Kesavan & Lotan Singh (1998), "A Study of Production and Marketing of Surplus Functions for Milk in India" National Dairy Research Institute, (ICAR), Haryana.

Gandhi, V. P and Z. Zhou (2010), "Rising Demand for Livestock Production in India: Nature, Patterns and Implications, *Australian Agribusiness Review*, Vol. 18, No.1, pp. 103-35.

Government of Assam (2011-12 to 2016-17),"Economic Survey", Directorate of Economics and Statistics, Guwahati, Assam.

Government of Assam (2017), "Statistical Handbook 2016", Directorate of Economics and Statistics, Guwahati, Assam.

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

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

Government of India (2016), "Basic Animal Husbandry & Fisheries Statistics-2016", Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture and Farmers Welfare.

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

Grewal, S.S. and P.S. Rangi (1983),"Economics and Employment of Dairying in Punjab", *Indian Journal of Agricultural Economics,* Vol. 35, No.4, pp.120-125.

Huria, V.K and K.T.Acharya (1980), "Dairy Development in India-Some Critical Issues", *Economic and Political Weekly,* Vol.15, No.45 & 46, pp.1931-1942, November.

Jain, D.K., A.K. Sharma & V.K. Kesavan (1998), "Demand Analysis of Milk and Milk Products in India," National Dairy Research Institute (ICAR) Karnal, Haryana.

Kahlon, A.S. (2002),"Dairy Financing in Kurukshetra and Kaithal Districts of Haryana- An Ex-post Evaluation Study", NABARD, Regional Office, Chandigarh.

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

Kumar, P. (1998), "Food Demand Supply Projections in India", Mimeo, Indian Agricultural Research Institute, New Delhi.

Kumar, Ayush and Jignesh Shah (2016),"Dairying as an Instrument for Ensuring Socio-Economic and Nutritional Security in Rural India", *Indian Journal of Agricultural Economics*, Vol. 71 ,No.1,pp. 78-89, January- March.

Kuwar, P.M (1975), "Economics of Cross-breed Cows", *Indian Journal of Agricultural Economics*, Vol.15, No.3, pp.151-152.

National Livestock Policy Perspective (1996), Report of the Steering Group (National Livestock Policy, Department Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Government of India

NDDB(2014), "Annual Report 2013-14", National Dairy Development Board, Anand.

NDDB(2015), "Annual Report 2014-15", National Dairy Development Board, Anand.

NDDB(2016),"Annual Report 2015-16", National Dairy Development Board, Anand.

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

Patel, R.K. (1993),"Present Status and Promise of Dairying in India", *Indian Journal of Agricultural Economics*, Vol. 48, No.1, pp.1-33, Jan-March.

Radhakrishna, R. and C. Ravi.( 1990), "Food demand projections for India" Hyderabad, India: Center for Economic and Social Studies. Mimeo.

Ramaswamy, N.S. (2000), "Livestock and Sustainable Development." Paper presented at the International Conference on *Smallholder Livestock Production Systems in Developing Countries: Opportunities and Challenges* held during 24-27$^{th}$November, Kerala Agricultural University.

Rao, V.M. (2005),"Cooperatives and Dairy Development –Changing Destiny of Rural Women", Mittal Publications, New Delhi.

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

Sharma, Usha & S.K. Sharma (2005), "Discovery of North- East India, Mizoram," Vol.8, Mittal Publications, New Delhi.

Sharma, Vijay Paul (2004), "Livestock Economy of India: Current Status, Emerging Issues and Long –Term Prospect", *Indian Journal of Agricultural Economics*, Vol.59, No.3, pp.512-554, July-Sept.

Sharma, V.P. and Ashok Gulati (2003),"Trade Liberalization, Market Reforms and Competitiveness of the Indian Dairy Sector," MTID Discussion Paper, No.61, Washington, D.C., U.S.A., April.

Singh, Surendar (1986), "Agro-Economics of Dairy Development in India", Criterion Publications, New Delhi.

Saikia, T.N and G. Kakaty (2007),"Evaluation of Integrated Dairy Development Project (IDDP) in non –operation flood, hilly and backward areas in North Eastern Region" Agro-Economic Research Centre for N.E. India, Jorhat, Assam.

Tripathi, R.S. (1995),"Cow Milk Production in H.P. Hills –An Economic Approach," *Indian Journal of Dairy Science*, Vol. 48, No.2, pp. 98-102.

**Websites visited:**

http:// agricoop.nic.in

http://www.amul.com/m/gcmmf

http:// animalhubandry.assam.gov.in

http://dahd.nic.in

http://www.fao.org

http://www.nddb.org

# Appendix 1

## Coordinator's Comments on the Draft Report and Action Taken

| | | |
|---|---|---|
| 1. | Title of report : | Assessment of the status of Dairying and Potential to improve Socio-Economic Status of the Milk Producers in Assam |
| 2. | Date of receipt of the Draft report | 15/12/2017 |
| 3. | Date of dispatch of the comments | 11/01/2018 |
| 4. | Comments on the Objectives of the study | Objectives of the study have been satisfied. |
| 5. | Comments on the methodology | As suggested, proper sampling and methodology have been used. |
| 6. | Comments on analysis, organization, presentation etc. | Detailed analysis is undertaken and organized as suggested. |
| 7. | References: | Write reference in APA or IJAE style. |
| | Action: | It has been done as suggested |
| 8. | General remarks: | The study is a comprehensive study on dairy sector in Assam. |

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