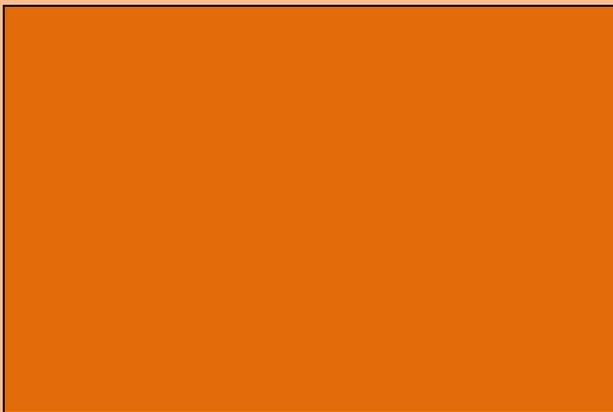


# LMIS

Report on

## Dairy Sector

Agriculture Skill Council of India



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## Introduction

In India, the dairy sector plays an important role in the country's socio-economic development, and constitutes an important segment of the rural economy. Dairy industry provides livelihood to millions of homes in villages, ensuring supply of quality milk and milk products to people in both urban and rural areas. With a view to keeping pace with the country's increasing demand for milk and milk products, the industry has been growing rapidly. India ranks first in the world in milk production, which has gone up from 53.9 million tonnes in 1990- 1991 to 127.9 million tonnes in 2012-13. Indian Dairy Industry is the largest milk producer all over the world, around 100 million MT Indian Dairy Industries value of output amounted to Rs. 1179 billion in 2004-05 which approximately equals combined output of paddy and wheat with 1/5th of the world's bovine population. The marginal producers and smallholders, who account for some 80% of all land holdings, constitute the core milk production sector; they own over 60% of all Milch animals. This sector contributes close to one fourth of India's National income and total workforce engaged in agriculture is about 60 per cent. India is emerging as a mega dairy market of 21<sup>st</sup> century. It is a crucial source of rural employment and income in the country. The growth of this sector in India during the last three decades had been impressive at more than 5% per annum.

## Self-employment

- Livestock production is considered as one of the house hold activities in rural area which is highly gender sensitive.
- Over 90% care & management of livestock are carried out by women folk.
- About 67 % of the landless, small and marginal rural workforce is engaged in agriculture either as cultivator or farm labour.
- In a normal year, crop production can generate employment for this workforce for only 90 to 120 days.
- For the remaining period, they are virtually unemployed. In this situation, dairying sets right this imbalance in employment.

According to human resource employment dairy sector can be divided into below sub-sectors of employment:

- Milk production and processing
- Milk procurement
- Research and Academics
- State department
- Financial Institutions
- Global demand

## Employment opportunities:

The Indian Dairy industry which is in the developing stage provides gainful employment to a vast majority of the rural households. It employs about 8.47 million people on yearly basis out of which 71% are women.

Jobs in Indian dairy industry are mainly in the fields of production and processing of dairy products. An individual with minimum of 60% marks who has bachelor's degree course in the dairy technology can easily be availing an opportunity to work in this industry. For the graduation course in Dairy technology one has to qualify the All India Entrance Test that is affiliated to the Indian Council of Agricultural Research. After that the person can continue with his masters in dairy technology. Jobs would be for the following positions.

**Dairy Scientists:** The main job of the dairy scientists is to deal with collection of milk and taking care of the high yielding variety of animals.

**Dairy Technologists:** The work of Dairy technology requires procurement officers who take the responsibility of collecting milk from farmers, milk booths and cattle-rearers. This particular procurement officer should well understand the latest technology that is applicable in maintaining the quality of milk of the process of transporting it to the desired location.

**Dairy Engineers:** Dairy engineers are usually appointed is to set up and maintain dairy plants.

**Marketing Personnel:** These individuals deal with the sale and marketing of milk together with milk products

## Areas of Employment in Dairy Sector:

Dairy technologists can look forward for a career option in:

- Dairy firm
- Fodders/Feeds
- Pharmaceutical farms
- Veterinary services
- Pollution control
- Gobar Gas plants
- Breeding firms/ Semen banks
- Consultants

- Dairy Federations
- Dairy cooperatives
- Milk/ Frozen dairy product plants
- Packaging materials
- Fabricators/ Equipment
- Plant manufacturers
- Electrical/electronic Instruments
- Refrigeration Equipments
- Transporters
- Testing equipments
- Additives/ Chemicals
- Milk production/ Processing/ Regulation of quality/Standards/ Checking/ health dealing

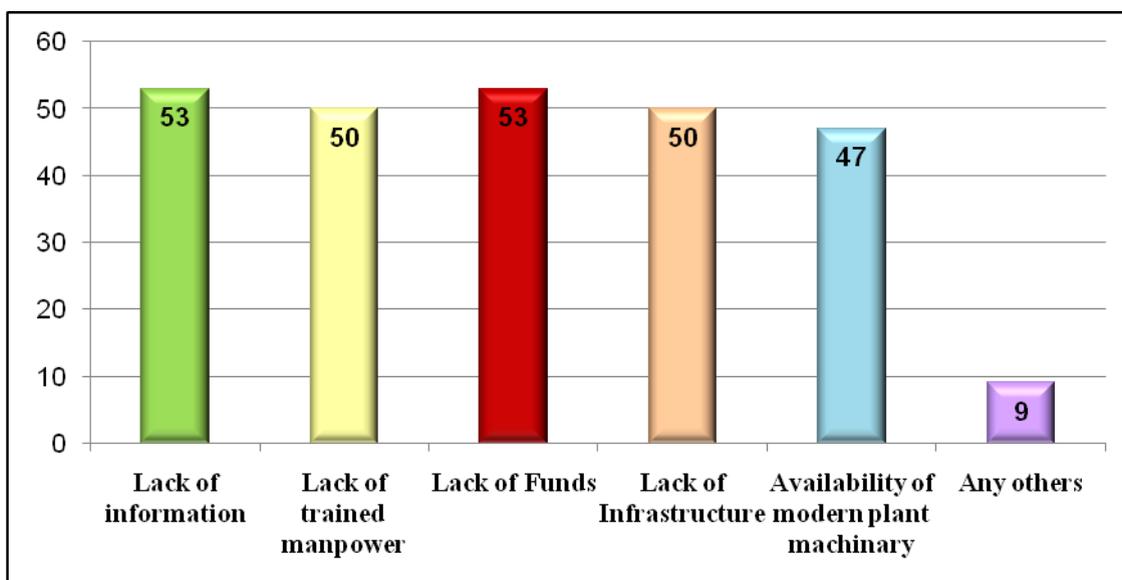
## Manpower Requirements

There are more than 800 small and big dairy plants owned by private companies and dairy federations in the country making various milk products. Different stages of production and different types of products require specialists of the specific fields. Procurement officers are needed to collect milk. Their skill set includes an updated knowledge about requisite technology to check the quality and quantity of the milk and of preservation techniques to be adopted while transporting milk from different locations to the destined common location or factory. The milk collected at the dairy is processed and converted into a variety of dairy products. Dairy technologists are required to devise suitable techniques for storing and preserving dairy products for longer time periods due to their perishable nature.

Some cooperatives and companies set up their own dairy farms. These dairy farms engage the services of Dairy Engineers who are responsible for the setting up of and for the maintenance of the dairy plants and related activities; and the marketing personnel who handle the marketing and sales of milk and milk products. There is a need for dairy scientists to develop improved methods in production, preservation and utilization of milk and milk products to improve the quantity, and more importantly, the quality of milk produced.

59% of the respondents interviewed felt that the availability of skilled manpower in the dairy industry was inadequate. Echoing the need for qualified and well-trained personnel to run the plants efficiently and profitability, both the private and the public sector companies felt that there was a gap in the demand and supply of Research Personnel for the development of new products. This was felt more by the private sector than the public sector. Though a requirement for plant operators, testing staff and marketing staff also exists there seems to be a greater need for dairy technologists with Quality Personnel occupying the third position. Providing for this manpower would go a long way in determining the prospects of a dairy industry and their non availability will become a major bottleneck in the supply side if these issues are not addressed post haste. The skilled manpower planning needs to be done to meet the growing demand of processed milk and value added products, In view of above, it is proposed that a comprehensive strategy be prepared involving the concerned stakeholders to develop the

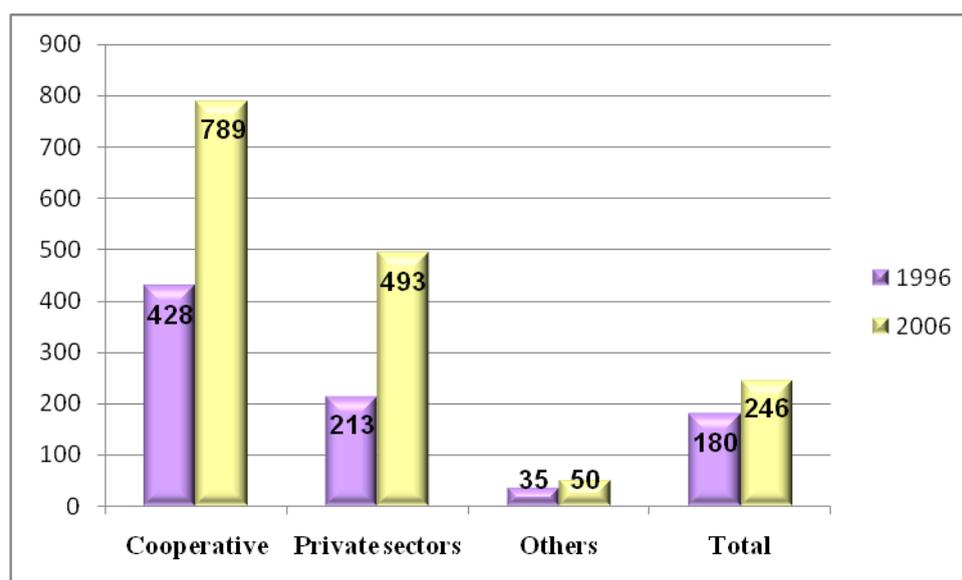
required skilled manpower as well as review & upgrade the present course curriculum for animal husbandry and dairying.



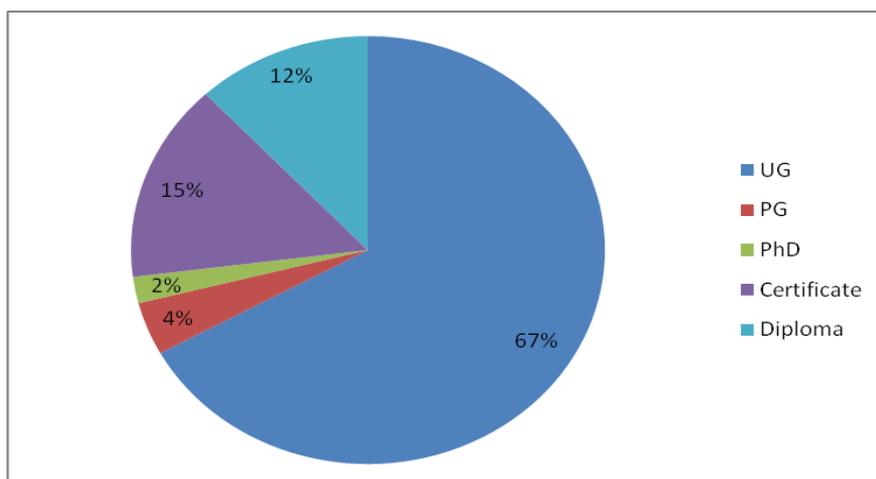
**Source:** Survey Report by FICCI (*Competitiveness through Quality for Food Processing Industries in India*)

### Skill Gaps

Projecting the total number of dairy personnel is based on number of personnel required per dairy plant. Projection of number of dairy plants is based on future milk production, processing content, average capacity of dairy plants and capacity utilization.



**Growth of registered dairy Plants under MMPO act**

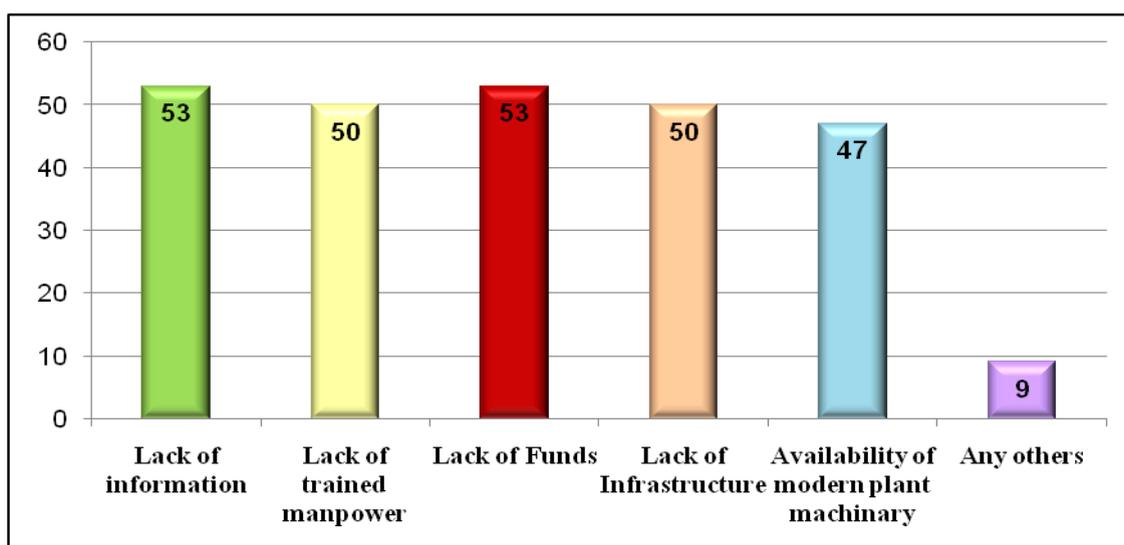


Source: Establishment survey by IAMR

### Distribution of Dairy Science personnel in Dairy plants

### Adoption of Best Practices

The dairy industry is now poised to spread across frontiers with well laid out organizational structures, state-of-art technologies, world class packaging, informative labeling and meeting with international standards of quality. Yet the country is not able to adopt best practices developed by the country. This was the refrain of 63% of respondents interviewed during this study, a thought agreed upon by both the private sector and the public sector companies. Only 37 % of the respondents stated that they were able to adopt best practices developed by the country (Source: Survey report by FICCI). As mentioned earlier in the context of factors affecting product quality vis-a-vis prescribed standards, here also lack of information was a prime factor responsible for this state. Another issue that was considered equally important was lack of funds, followed by lack of infrastructure and trained manpower occupying the third position.



Source: Survey Report by FICCI (Competitiveness through Quality for Food Processing Industries in India)

### Factors affecting adoption of Best Practices in Indian Dairy Plants

## Management of Dairy Development Programmes in India

Management of human resources is felt very much important in any organization and it is fundamental aspect in the dairy development programmes. The dairy development is achieved through new knowledge and technology produced by people which is implemented through people and adopted by people. Therefore, one of the most important tasks of achieving excellence in our dairy development programmes is to develop a well trained personnel of the proper size, mix and educational level with adequate training to motivate them for an outstanding job performance. A common expectation among the dairy development workers is to update their performance through acquisition of new knowledge & skill. Therefore, a careful planning & implementation of human resources development in the dairy development programmes to suggest suitable ways and means for its improvement for achieving an outstanding performance in our dairy development programmes.

### Planning Human Resource Needs

Often the organizations involved in dairy development plea for more & more staff ignoring the issues like proper mix of disciplines, levels of training & experience. As a result many of the R&D organizations are facing the problem of either over-staffing or under staffing and unequal distribution of the experts. Therefore, careful planning for an optimum level of human resources in the fundamental challenge faced by our dairy development programmes.

Many of the organizations involved in dairy development have too many people rather than too few, at least for the financial resources available. As a consequence most of the budget is spent for personnel cost with the resultant shortage of operational funds. The shortage of funds for improvement in the quality of manpower employed, their travel & work facilities resulted in low levels of productivity.

The cause of unplanned staffing can be attributed to factors like lack of initial planning for staff requirements corresponding to the size of operation, inclusion or dropping up of programmes based on lack of programme prioritization and non-implementation of the project based budgeting in the dairy development programmes. These weaknesses have resulted in an uneven distribution of personnel & poor prioritization in the use of limited resources. The presence of unskilled professionals with inadequate knowledge in dairying is one of the serious constraints with respect to dair development.

In addition, there are instances that the graduates without any fundamental degree in any one of the disciplines concerned with dairying have been admitted into various post-graduate courses by just giving one year pre requisite courses in respective disciplines. This has been practiced to overcome the shortage existed with respect to availability of manpower specialization in various disciplines of dairying. It is continuing even after the situation that surplus of adequately skilled manpower specialized in the disciplines of dairying holding M. Sc. & PhD degrees are available. The above practices of producing quacks in the name of meeting the shortages of manpower is to be curtailed immediately.

The undue importance given to the managerial positions have resulted in the preference of such positions by the skilled professionals by acquiring additional management degrees or getting away elsewhere for such posts. This has resulted in poor skilled staff at the lower level. The problems of ill trained and non-professional technical staff, therefore, needs an immediate attention in the planning of human resource development in the dairy development programs.

## **Employment Generation in the Indian Dairy Sector**

Dairy enterprises are very important in terms of improving the socio-economic status of the rural poor by reducing the longstanding problems of unemployment and underemployment. Since distribution of livestock is more equitable than is land, growth in the livestock sector is deemed to be antipoverty and equity-oriented. In 1999/2000 dairying, including processing and selling of products, engaged about 18 million people in India, 5.5% of total workers. Of the total workforce engaged in dairying activities, 92% are concentrated in rural areas. The distribution of workers among rural and urban areas differs considerably across states; the share of urban workers in dairying is very high in Assam (43%) and West Bengal (24%). The share of persons engaged in urban areas in dairying is also higher than the national average in Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa and Rajasthan. Dairying seems to promote gender and social equity: 58% of the total workers engaged in the dairying sub-sector are women, although in urban areas it is only 37%. The participation of women in other activities, including agriculture, is low compared to that in animal husbandry, particularly dairying. Further, the majority of dairy workers belong to socially and economically disadvantaged communities: Scheduled Tribes (STs), Scheduled Castes (SCs) and Other Backward Castes (OBCs) together constitute about 69% of the persons employed in dairy sector. Further, about 92% of workers in the dairy industry are engaged in farming and allied activities pertaining to primary production, including cattle rearing, goat rearing for milk production, breeding, ranching and grazing. Processing, including manufacturing of different dairy products, such as butter, ghee, milk powder, ice-cream, kulfi, khoya and cheese, engages only 1.2% of dairy workers in both the formal and traditional informal sectors. A little over 6% of workers in the dairy sub-sector are engaged in selling of milk and milk products, including both wholesaling as well as retailing. As expected, a higher proportion of workers in the dairy sector in rural areas are engaged in production-related activities (95 %) and less than 1% in processing. But in urban areas about 31% of the dairy workers are engaged in selling of milk and milk products. (PPLPI Working Paper No. 44-3)

STATE	RURAL	URBAN	ALL	RURAL (%)	URBAN (%)
Andhra Pradesh	1986	158	2143	92.6	7.4
Assam	35	27	62	57.0	43.0
Bihar	664	64	727	91.3	8.7
Gujarat	1709	142	1851	92.3	7.7
Haryana	783	65	848	92.3	7.7
Himachal Pradesh	234	3	237	98.9	1.1
Jammu & Kashmir	28	5	34	83.7	16.3
Karnataka	470	76	546	86.1	13.9
Kerala	459	71	530	86.6	13.4
Madhya Pradesh	305	57	362	84.4	15.6
Maharashtra	842	169	1011	83.3	16.7
Orissa	178	30	208	85.6	14.4
Punjab	1559	84	1643	94.9	5.1
Rajasthan	2585	92	2677	96.6	3.4
Tamilnadu	844	135	979	86.3	13.7
Uttar Pradesh	3350	241	3592	93.3	6.7
West Bengal	182	58	240	75.8	24.2
<b>India</b>	<b>16,267</b>	<b>1,520</b>	<b>17,787</b>	<b>91.5</b>	<b>8.5</b>

Source: NSSO database (55th round)

**Employment in dairying in major states of India (in 1,000s) and its distribution in rural and urban areas.**

### Employment Generation in Milk Production

Several farm-level studies have highlighted the importance and potential of dairy farming in generating regular employment and income (Shiyani and Singh 1995; Sharma & Singh 1995; Singh, 1997; Dixit 1999). These studies found that the estimated employment generation by a dairy bovine was in the range of 60-100 man days per annum, depending upon the region, categories of farm households and type of livestock species: on a per household basis, the employment generated varied from 150-300 man days per year. It is widely accepted by various studies that the livestock sector provides much higher employment and more regular income than any other agricultural or allied activity. Aggregate figures suggest that productivity of labour in dairying is about 2.5-times higher than in agriculture generally, based on aggregate output per worker in each sector. Annual return per unit of labour is about INR 45,000 (USD 1020) in dairying and about INR 17,000 (USD 390) in the agriculture sector as a whole. This is because of its labour intensive nature, ability to generate employment from small land areas throughout the year and its role in redistribution of rural income. In addition, the livestock sector

has the potential to generate employment in industries such as feed manufacturing, dairy equipment, animal skin and leather industries and service sectors in the form of veterinary hospitals and dispensaries, institutional and non institutional finance, insurance and trade. In the case of rural production units, direct employment included self, family and hired labour while indirect employment referred to labour involved in providing services to the milk producing farms. Analysis revealed that the proportion of family labour to total labour used was highest in the large farms and the lowest in commercial units. The rural farms used mainly family labour, which varied from 53% to 77% of total, while the commercial units hired 60% of their total labour requirements (PPLPI Working Paper No. 44-3).

### Future Milk production

Milk production in the country is estimated 127.9 million tonnes in 2011-12 according to annual report by department of animal husbandry, dairying & fisheries, ministry of agriculture. The 12<sup>th</sup> plan assumes a growth of 5% per annum in the milk production, which will lead to annual production level of 148 million tonnes in 2015 and if this growth is sustained till 2020, the production will be around 189 million tonnes.

YEAR	Expected levels of milk production (in million MT) with an assumed growth rate of 12 <sup>th</sup> year plan i.e. 5 percent
2011-2012	127.9
2014-2015	148.0
2019-2020	189.0

According to vision 2015 of the food processing Industry aims to increase the processing content of milk from 13% in 2003-04 to 25% in 2009-10 and 30% in 2014-15. The annual rate of growth will be 7.4% according to above target to achieve and it will take the processing content to 39% by 2019-20.

It is assumed that the average capacity of the dairy plants will be about 150 thousand litres per day by 2020 from around 117 thousand litres per day in 2007 .This assumption is taken from discussions about ‘white revolution’.

### Employment Generation in the Milk Market

Employment in milk marketing and processing was also estimated. The data were collected from rural milk producers and commercial farms and also informal milk processing and marketing units. Data related to both direct and indirect job opportunities created in the production, processing and marketing of milk were collected. The data on labour used in various operations and wage rates were collected. The data collection focused on the informal and locally processed channels, but includes retailers of

packaged pasteurized milk. The key channels for milk and dairy product flows, which reflect both traditional and formal markets, are listed below although not all are described in the employment data:

Producer – Consumer

Producer – Vendor - Consumer

Producer – Creamery / *Halwai* - Consumer

Producer – Vendor- Creamery / *Halwai* – Consumer

Producer – Vendor- Retailer - Consumer

Producer – Milk plants – Consumer

Producer – Ice Creamery – Consumer

Producer - Vendor – Milk Plants - Consumer

Producer – MPCC – Milk plant – Distributor – Retailer- Consumer

Among these, the direct Producer-Consumer channel, without any intermediaries, is still the predominant one in terms of market share, not only in the study sites but also in India as a whole (Dairy India 1997). The informal and small-scale dairy industry generates significant labour at each stage, from production through procurement, transport, processing and marketing of milk, much of which is available to low-skilled individuals who may have few other employment opportunities. Compared to processed markets, which employ many fewer workers per unit milk, the traditional market is seen to be comprised of labour-intensive enterprises with an enormous potential for employment generation in the rural sector. The significance of dairying in providing regular employment and income is indispensable, particularly to landless labourers and marginal and small-scale farmers who still form the majority among milk producers in India. The fact that the rural farms create more employment opportunities than the commercial units should be considered in the formulation of policies for rural employment. Besides the employment generated at the production level in rural setting, dairy creates ample opportunities in the processing and marketing activities, with multiplier effects of dairying in creating jobs in other firms providing services.

The processing industry can grow only if milk production and procurement grows as planned or even better. At present only about 30 percent of marketable surplus flows to the organized processing sector (co-operative and private sector plants). This needs to be increased. The need for dairy personnel arises in procuring milk of appropriate quality and handling it till it reaches the processing plant. There is a new trend emerging to use bulk chilling equipment at the stage of milk procurement at village and local level. Similarly, quality testing of milk procured is a crucial element in the chain. And quality control is possible only through well equipped laboratories and well trained personnel to handle this.

Assumptions taken to project dairy science human capital demand for milk procurement:

- There are more than 6 lakh villages in the country. And it is assumed that bulk chilling plants and quality testing laboratories will be extended to half of the villages i.e. approximately 3 lakhs.

- Each village level chilling plant will require services of a diploma/ certificate holder with knowledge of chilling equipment and testing facilities will require another personnel.
- Elaborate quality testing facilities may be set up at 100 important locations in the country by 2020. Each having 2 graduates in dairy science technology and 4 certificate/ diploma holders.

YEAR	No of villages with bulk chilling plants and testing equipment	No of diploma/ certificate holders needed of chilling/ testing	No of quality testing labs	Personnel required in the labs.	Over all requirement
2010-11	10000	20000	10	60	20060
2011-12	50000	100000	20	120	100120
2012-13	100000	200000	30	180	200180
2013-14	125000	250000	40	240	250240
2014-15	150000	300000	50	300	300300
2019-20	300000	600000	100	6000	600600

#### Required stock of dairy personnel for milk procurement

### Projection of Human capital in dairy processing sector

It is assumed that an average plant of 100000 litres per day capacity would have five sections operate at three shifts and require a total 25 dairy science personnel. This norm has been verified by data thrown up by establishment survey conducted by IAMR as a part of this study. Out of over 3500 establishments from which 152 are milk processing plants. Together they had an employment of about 28000 personnel of which 4500 are from dairy science. Taking above numbers it can be concluded that each processing plant needs 30 dairy science personnel.

The stock of dairy personnel required in dairy plants calculated on the basis of this norms for growth scenario considering 12<sup>th</sup> year plan i.e. 5 %.

YEAR	Required stock of dairy Science personnel at 5% growth
2009-10	23750
2010-11	24881
2011-12	26027
2012-13	27194
2013-14	28385
2014-15	29604
2019-20	37041

#### Projected stock of Dairy personnel required for processing sector up to 2020

## Growth of dairy plants

Year	No. of dairy plants in co-operative sector	No. of dairy plants in private sector	No. of dairy plants in other sector	No. of dairy plants total	Average processing capacity of plants(thousand litres per day)
2004	232	468	48	748	109
2005	232	472	47	751	112
2006	246	493	50	789	124
2007	254	532	46	832	117

Source: Dairy statistics under MMPO act 1992

## Projections of plants till 2020

On the basis of above assumptions the required number of dairy plants in the organized sector has been projected till 2020 on the basis of projected levels of milk production( assumed 5% growth in 12<sup>th</sup> year plan), percentage of milk production processed, average processing capacity of plants, and capacity utilization.

Year	Milk production in MT	% processed	Quantity of milk processed in MT	Quantity in '000 litres per day	Avg. Processing capacity (thousand litres per day)	% Capacity utilisation	No of Plants
2009-10	116	23.19	26.79	73399	124.62	0.64	926
2010-11	121	24.75	26.79	82255	127.15	0.67	963
2011-12	127	26.31	30.02	91814	129.69	0.71	1000
2012-13	134	27.87	33.51	102123	132.23	0.74	1038
2013-14	140	29.43	37.27	113233	134.77	0.78	1077
2014-15	147	30.99	41.33	125199	137.31	0.82	1117
2019-20	188	38.79	73.01	200020	150.00	0.90	1482

This above projection is done according to 12<sup>th</sup> year plan assumed growth percentage and taking the linear trend of it.

## Research and Academics

Research in dairy sciences is undertaken primarily in the ICAR institutions, State Agricultural Universities in the dairy sector.

Sanctioned and Vacant positions in Dairy science Research and education in March 2010:

	Sanctioned	In position	Vacant	% Vacant
ICAR institute (NDRI)	200	149	51	34.2
SAUs	726	361	365	50.5
Total	926	510	416	42.4

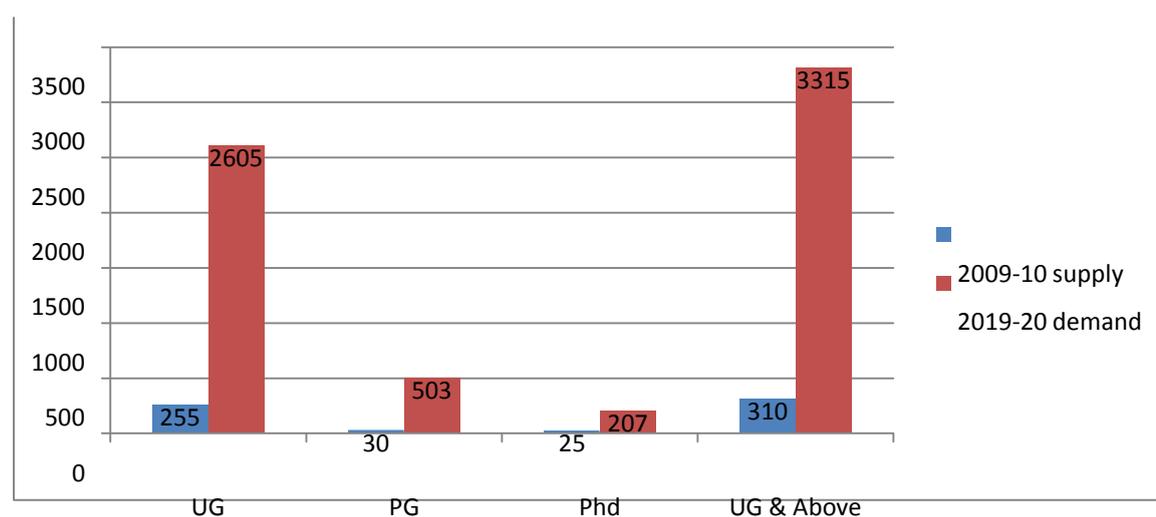
## State Departments:

In state governments, dairy development is handled as part of Animal Husbandry departments, which are mainly dominated by veterinary services and animal husbandry including cattle breeding programme. Total stock of personnel in dairy science in animal husbandry departments of all states has been taken 500 in 2010.

## Financial Institution

Including all other sectors, like insurance, public administration, defense etc., and the stock demand is taken as 1000 in 2010 which is expected to grow to 1500 by 2020 on the basis of the pattern observed in the establishment survey of IAMR.

## Current (2010) and Projected Outrun required (2020) in Dairy sciences



The above estimate includes human resource from state and central department of animal husbandry department, financial institutions (by IAMR establishment survey), Research and academics (from ICAR and SAUs) in addition to previous estimation from different sub sectors of Dairy sector. The

above flow estimate is year-to-year additional requirement.

There are 800 dairy plants in the country, but only 18% milk is handled at organized sector. Whereas, the unorganized sector, there is a dearth of trained human capital with adequate qualifications.

### **Conclusion:**

The demand for dairy sector have been projected keeping various factors in focus which include the growth of the sector, expansion plans, employment pattern, demands from industries etc. Professionals are needed in this sector with various levels of education including certificate/ diploma course to highly qualified persons with PhDs and masters. At present only big companies are employing professionals. Other industries especially unorganized sector is hiring people without seeing qualification. If India wants to achieve specified target and match the international standard in quality control and food safety, professionals of dairy science have to be appointed.

High proportion of posts in universities, institutes and government departments are lying vacant which is jeopardizing the quality of education. The requirement of diploma holders is highest in this sector. There is a potential requirement to train large number of dairy professionals so as to meet the large requirements in the area of Dairy production and management in rural sector.