CHAPTER-VI

DAIRYING

Haryana has no natural resource of energy and economic minerals which are necessary for setting up of any large scale industry. It's asset lies in continuous as well as interspersed rich loamy soil and a simple and hardworking peasantry which is conservative but not insensitive to modernization ; and for whom crop raising provides as much jest in living as does raising of cattle. Agriculture and animal breeding in mixed farming have, therefore, been the principal avocation of the vast rural Haryana from time immemorial.

Haryana is known for its excellent breeds of cows and buffaloes. The famous Haryana breed of cow is a dual purpose animal. It's males provide India's best draught bullocks adept both in speed and endurance. It's females are reasonably good yeilders of milk, anytime better in performance than many millions of non-descript stock. A pure breed of Haryana cow is, undoubtedly, the most preferred indigenous foundation material for a successful programme of cross breeding with exotic germ plasm. The buffaloes of Murrah breed of Haryana are of proven milk yielding merits. Haryana vies with Punjab for the very best of Murrah stock. In the table below is presented the number of Haryana's female cows and buffaloes of above 3 years kept for milk production and for supply of working bullocks.

Description	**In hundred**			
	1961	**1966**	**1972**	**1997**
Cow : In milk	3801	3515	3942	5725
Dry	2355	2354	2806	2171
Yet to calve	376	243	421	1319
Others	48	38	92	426
Total	**6580**	**6150**	**7261**	**9641**

Total Cow Population	**22479**	**22268**	**24518**	**23998**
Buffalo : In Milk	4809	5864	8143	14991
Dry	3189	3782	4028	5281
Yet to calve	684	443	559	2774
Others	50	23	101	180
Total	**8732**	**10112**	**12831**	**23226**
Total Buffalo Population	**16539**	**19347**	**25176**	**48224**

The average daily milk yield of buffalo was estimated at 5.79 Kg. non-descript cow at 4.22 Kg. and cross breed cow at 6.70 Kg. in the year 2002-03. With this the total annual milk production in the state was 51.25 lakh tonnes. The milk production of the State for the different years is given as under :-

Year	**Estimated production of milk (lakh tonnes)**	**Per capita availability of milk per day (grams)**
1966-67	10.89	352
1977-78	17.27	412
1978-79	17.90	414
1979-80	19.50	440
1980-81	21.87	484
1981-82	22.75	475
1982-83	23.17	492
1983-84	24.27	482
1984-85	24.41	468
1985-86	25.55	478
1986-87	26.24	478

1987-88	25.58	456
1988-89	27.85	486
1989-90	31.51	539
1990-91	34.19	571
1991-92	35.65	579
1992-93	37.15	601
1993-94	38.50	602
1994-95	40.62	620
1995-96	40.56	602
1996-97	42.04	611
1997-98	43.73	621
1998-99	45.27	626
1999-00	46.79	631
2000-01	48.49	640
2001-02	49.77	646
2002-03	51.25	656
2003-04	52.21	660

This quantity constituted over 11% of the all India total production from a section of breedable female stock which is barely 2.5 % of the total or all India number for this class ; and speaks eloquently of the comparative high productivity of the milch stock in Haryana. It is no wonder, therefore, that Haryana is known as the stud farm of India from where every year cow and buffalo bulls are purchased for upgrading the milch stock of most of the other states in India. Haryana has been , and is, also the biggest cattle market of India. In thousands every year Haryana cows and Murrah buffaloes are supplied to other states, especially to big cities like Kolkata, Mumbai, Delhi, Chennai and cities in Uttar Pradesh. Numbers apart, milch animals exported from Haryana are, more often than not, the selected best. After collection from rural areas, the traditional market from which the animals are purchased and sent out by rail/road, are located mostly

in Rohtak, Jind, Hisar, Hansi, Narwana and little elsewhere. Although exact figures are not available (because of various modes of transport used in the export of animals selected), the data collected from the rail heads of dispatch reveal that about 35000 to 45000 are annually sold for export outside Haryana.

Haryana's trade in milch animals outside the state lends undoubtedly a great economic fillip to rural breeders of buffaloes and cows. But surely this trade can not and should not flourish at the loss of the state's invaluable treasure in genetic materials that go with the parting of the selected best. This issue has assumed considerable relevance, particularly in the light of the fact that these prized animals removed each year from the country's best breeding tracts to the big cities are destined to be consigned to the slaughter houses as soon the days of their current lactation come to an end. During the sojourn in the cities, these milch animal are not bred. As such, with their untimely end, the nation is also deprived of the priceless progenies that could have otherwise born and perpetuated the lines. Where however, this diabolic practice has not been resorted to, and the animals purchased are used for multiplication and /or for breeding purpose, the stock from Haryana has played a vital role in upgrading the cattle wealth of many a sister states of the Indian Union. For instance, over the period of a few decades now, Vijaywada areas of Andhra Pradesh have developed large herds of buffaloes of the like make up and performance of Murrah. In practically all of the Northern states and in a few of the South as well, bulls of Haryana breed have been used in upgrading the local non descript cattle for increased milk production.

With the advent of Five Year Plans for nation building, modernization of dairying through centralized milk procurement, processing and marketing is being considered a potent instrument which can serve usefully both the producers and the consumers. In this context the question appears ; Should Haryana continue to be the primary trader of milk producing animals, remain economically retarded and suffer the hazard of loosing the best breeding materials which through generations have been so assiduously gained ? Or, is not the time ripe that Haryana, instead of frittering away its invaluable treasure, retain it within its own precincts ? Instead of dealing in milch animals, why not the farmers of Haryana deal in milk itself ? That way, the return both in short and in long term, is

distinctly more advantageous to Haryana's rural folks who constitute the bulk of its population.

The establishment of an organized dairy industry, which will permit the farmers to keep their milch stock and produce milk for supply to the deficit market, has been found to hold far greater economic benefit than trading by export of the milch animals. As pointed out earlier, even on their present day productivity (which can be significantly improved by modern technical inputs in breeding, feeding, management and health care) the milch stock of Haryana is able to produce daily about 140 lakh Kg. of milk and 40% of it or about 56 lakh Kg. of this milk is surplus and is provided to dairy industry of a turnover valued annually at about Rs. 450 crore. Two thirds of this turnover or Rs. 300 crore goes to the producers' share. If daily supply per producer is reckoned at 10 Kg., and 30% of the producers' share of the turnover is available as net earning, the dairy industry of the magnitude has been able to provide for 2,00,000 rural families of milk producers with a supplementary annual income of Rs. 7000-8000/- each. Besides , such an industry has opened up scores of direct and indirect employment to persons at various levels.

In consideration of the tremendous scope for development of the dairy industry, of imminent need for preventing yearly denudation of a large number of milking animals and not in the least, of future assurance against wanton depletion of invaluable seed material which the state's trade in milch stock to major cities engender, the government, immediately after the formation of Haryana State, decided to form an autonomous body ; Haryana Dairy Development Corporation Federation (HDDCF). The objective laid for this corporation was to provide a remunerative, regular and organized market for milk produced in rural Haryana and to usher in a socio-economic climate for the innumerable straitened farmer-producer of milk which will prevent the time old trade practice of parting away with the prized stock.

Within few years of its creation, the corporation was able to build the most important marketing infrastructure by putting up three milk plants with capacity to handle a total of 85,000 litres of milk. This public sector effort was reinforced by a private sector enterprise with plant capacity of 50,000 litres.

Before the establishment of milk plants, collection and sale of rurally produced milk were totally dominated by the hierarchy of dudhias and thikedars. Their motivation in business was how to make maximum of profit at the cost of both producers and consumers. In the absence of an alternative outlet, the rural producers were compelled to sell their surplus milk to these middle-men operators. The latter dug so deep into the milk business, that even an organized sector like Delhi Milk Scheme had to strike a deal with them to receive its dairy's raw milk supply. Enough has been said of the exploits of these unscrupulous operators whose dominance in the dairy scheme of India continue to be as much a bane as other anti-dairying institutions such as the running of city stables for urban supply of milk. Perhaps the most grievous effort the greed of the hierarchy of dudhias & thikedars caused, was widespread disincentive among the farmer producers ; to took no interest in scientific breeding and management to augment productivity in their animals.

In order to wean the producers, who were mostly small and marginal farmers and landless labour from the clutches of middle-men, and thereby to enable rurally produced milk to be directly procured, the Government decided to organize the farmer producers of milk by the institution of Milk Producers Cooperative Societies.

HARYANA DAIRY DEVELOPMENT COOPERATIVE FEDERATION LIMITED

Haryana Dairy Development Corporation Federation started functioning from 01.01.1970 and continued actively functioning upto 31.03.1997. During the period the corporation set up all the milk plants, except Milk Plant, Sirsa which was set up by Milk Union Sirsa in the year 1996-97. The Haryana Dairy Development Cooperative Federation started functioning w.e.f. 01.04.1977 after taking over the fixed assets of the corporation on lease. The main objective of taking over business by the Federation from corporation was to establishment a three-tier cooperative structure on Anand Pattern.

In this system societies function at village level, union at district level and Federation at state level. Village level societies collect milk twice a day, morning and evening. The union & collects milk and bring it either to the chilling centers or plants run by them. The collection of milk is done through a net work of transport vehicles. The vehicles which bring milk from societies to chilling centers or directly to plants are engaged by the unions on hire basis. The milk from chilling centers is transferred to plants in tankers. Vehicles engaged for bringing milk from villages are hired by unions and tenders are also finalized by them. Payment of milk is given by the unions to societies who in turn make the payment to pourer members. The payment is made after every ten days. Societies apart from collection of milk from the members also sell cattle feed, quality fodder seed, ghee, powder etc. to the members. The unions organize and supervise the societies, make arrangement of cattle feed, powder, ghee, and quality seeds etc. and visit of Fodder experts to villages. The Federation provides technical guidance to the unions and organize marketing of milk and milk products.

At the village level the milk producers form the society. The management of the society is run by a committee elected by these members amongst themselves. The management committee of the societies is responsible for looking after day to day working of the societies. Thus the producers look after their interest themselves. Apart from its wonderful democratic system of functioning, the Dairy Cooperative hold one more advantage for its members i.e. the net profit of the society is carried to various funds and balance, if any, is distributed as under :-

a) 75% as bonus to members in accordance with the milk supplied by them to their society.

b) 10% to be set aside for cattle development.

c) 15% as bonus to staff to be decided by the managing committee but the amount should not exceed more than one month pay in each case.

Further the working of the societies is closely watched by the representatives of the union. At union level the progress of the societies is reviewed in the meeting of Board of Directors which comprises of the elected representatives of the societies, representative of the Federation and National Dairy Development Board (NDDB). The management of Federation is run by the Board of Directors which comprises of the following :-

i) Chairman of the Milk Unions.

ii) Nominees of the Government.

iii) Registrar, Cooperative Societies.

iv) Representative of NDDB.

v) Managing Director of the Federation.

For its activities the Federation/Corporation initially and till 1991 received finance from government in the shape of share capital, loan, subsidy and grant etc. These organizations have also received finance from NDDB under operation floods-I, II and III. These finances have mostly come as 70% loan and 30% grant. The milk unions receive share capital from societies and society collect share capital from members.

As a sequel to Operation Flood-I programme which was taken up only in two districts i.e. Rohtak and Gurgaon, Federation took up implementation of Operation Flood-II in the entire state of Haryana in 1982. The programme envisages establishment of Anand Pattern Cooperatives, providing of technical input services and augmentation of processing facilities. Later in 1987 Operation

Flood-II programme was undertaken to strengthen infrastructure created under Operation Flood-I and Operation Flood-II.

INFRASTRUCTURE

There are five milk plants at Jind, Ambala, Rohtak, Ballabgrarh and Sirsa having handling capacity of 4.70 lakh liters per day :-

Sr. No.	Milk Plants	Year of establishment	Products	Handling capacity (TLPD)
1	Jind	1970-71	Liquid Milk, Powder, Ghee, Paneer, Jaljeera, Mango Drink, Dahi	100.00
2	Ambala	1973-74	Liquid Milk, Paneer, Dahi, Lassi, Milk Cake, SFM	70.00
3	Rohtak	1976-77	Powder, Ghee, Table Butter, Liquid Milk, Dahi	100.00
4	Ballabgrarh	1979-80	Liquid Milk, Dahi, Ghee, Paneer	100.00
5	Sirsa	1996-97	Powder, Ghee, Liquid Milk, Milk Cake, Paneer	100.00

Capacity utilization of milk plants is as under :-

Year	Capacity Utilization (% age)
1999-2000	101.76
2000-2001	117.00
2001-2002	128.30
2002-2003	130.00
2003-2004	146.36

In addition to 5 mlk pants, there are 25 mlk cilling cnters in the sate. Besides these, about 32 mlk pants are functioning in the private sector :-

WORKING DETAILS

FUNCTIONAL SOCIETIES

Year	Average No. of Societies/day
1999-2000	2607
2000-2001	2710
2001-2002	2855
2002-2003	3166
2003-2004	3350
2004-2005 (Upto September, 04)	3644

About 50% of the villages in the state have been covered by milk cooperative societies :-

MILK PROCUREMENT

Year	Total Milk Procurement (Lacs Liters)	% age increase
1999-2000	918.28	15.56
2000-2001	1009.35	9.92
2001-2002	1237.09	22.55
2002-2003	1355.62	9.58
2003-2004	1209.15	-10.80

During 2003-04 there has been downfall in milk production in almost all the states in the North :-

MILK PRICE TO MILK PRODUCERS

Year	Average Price paid	% age increase	Total Milk price paid
	(Rs. Per litre)		(in Rs. lakh)
1999-2000	10.70	5.94	9825.33
2000-2001	10.96	2.43	11057.65
2001-2002	10.55	---	13053.36
2002-2003	11.09	5.12	15028.46
2003-2004	13.05	17.67	15783.63
2004-2005	13.01	6.03*	6221.48
(Upto September,04)			

*% age increase over corresponding period.

WOMEN DAIRY COOPERATIVES

438 women dairy cooperative societies have been formed in the state. Women themselves are managing these societies.

SALE OF CATTLE FEED.

Milk Unions sell cattle feed under the brand name of VITA. The cattle feed is being got manufactured from Hafed and HAIC.

CUSTOM WORK FOR MOTHER DAIRY

In 1991 we started business of customer packing of milk for Mother Dairy at Milk Plant Ballabgrarh. This business has since then grown tremendously and now we are packing milk for Mother Dairy at Ballabgrarh, Rohtak as well as at Jind also. At present we are packing 3.50 lakh litres of milk per day. The business will further grow after expansion of capacity at milk plants Ballabgarh, Rohtak & Jind.

HIGHEST SALES TURNOVER

During 2003-04 Federation and its constituent milk unions have achieved the highest sales turnover since inception.

Year	Sales Turnover	% age increase
	(Rs. In Crore)	
1999-2000	215.92	12.30
2000-2001	238.44	10.43
2001-2002	277.40	16.34
2002-2003	320.23	15.44
2003-2004	351.45	9.75

IMPORTANT PRODUCTS SOLD BY HARYANA DAIRY CO-OPERATIVE FAMILY

VITA GHEE

Haryana famous for its Murrah breed of buffaloes is also known as **'Land of Milk'**. In this land one would perhaps think twice before setting up an organization, which would purchase milk from the doorsteps of the milk producers and then convert the same into products and venture to sell to those who are the masters of the trade. HDDCF have ventured to enter into this kind of business and are now fully established with their brand name **'VITA'** which has now become a choice of common man. The common man now recommends usage of Vita ghee instead of home made ghee which is still the hall mark of the purity and the quality. A common man of Haryana has accepted Vita ghee across the state. The neighboring areas of the state particularly Delhi, Chandigarh, Punjab, U.P., J&K, Himachal Pradesh & Rajasthan find Vita ghee to their choice and liking. Vita ghee has made a niche in market for quality. Recently Vita has added different type of new ghee packing to increase its market share.

MOTHER DIARY SUPPLY IN DELHI

Many of Delhities may not be aware that Mother Dairy Milk which they consume daily, is in fact from the milk land of Haryana and is processed and packed at HDDCF's plants. Mother Dairy gets 40% of their packed milk processed and packed from HDDCF's milk plants.

VITA LIQUID MILK SALE

A turn round has been made in the sale of liquid milk by obtaining an increase of 50% over the corresponding period of last year. This is despite availability of more fresh milk in this year. Vita pasteurized milk is now available daily in at least at all districts and sub division level cities in Haryana, Chandigarh U.T. and selected cities of HP, Rajasthan, Punjab and Uttranchal. Small towns like Narwana, Naraingarh, Murthal, Safidon etc. are getting Vita pasteurized milk daily. Vita has recently launched its pasteurized milk in Dehradun, Gurgaon and Bhantida where it is becoming first choice in consumer preference. Vita is catching up fast in Delhi also where the sale per day has reached 25000 litres.

Earlier there were 10-15 milk booths throughout the state of Haryana for distribution of milk and milk products but now more than 30-35 milk booths are operating in Haryana and in the near future this number is going to be increased up to 50. Recently such milk booths have also been opened in the office complexes of HUDA, Shakti Bhawan and General Hospitals. The staff and public visiting these institutions are enjoying the taste of Vita milk and milk products and the response is encouraging.

VITA BUTTER

Vita butter is number two in preference of consumer. Vita butter has made a dent in Delhi and Chandigarh market. New product like white butter in 500 gm packing has been added to cater to the needs of consumer. Very recently Vita butter will be available in 10 gms button type packing to cater to the needs of institutional demand like hostels, railway etc.

VITA PANEER

While for the last many years Vita paneer was quite famous in Delhi which was being sold through mother dairy booths but in recent past it has become first preference in Haryana for any social function. Daily sale of Vita paneer is touching 1.5 MT. Paneer manufacturing has been decentralized at all the plants so that the fresh paneer reaches consumers.

VITA SFM

Other famous product of Vita is sweetened flavoured milk (SFM) which is available in many flavours in 200 ml returnable glass bottles, 200 ml throw away glass bottles and 200 ml plastic throw away bottles.

VITA DAHI

Dahi launched recently is available in 100 gms. 200 gms and 400 gms packing and is catching fast as a consumer preference. In most of government offices Vita dahi is becoming daily item of lunch.

OTHER VITA PRODUCTS

Vita has added three new products in its family namely Vita Jal Jeera, Vita salted lassi & Vita sweet lassi and because of their good taste and quality they are being sold like hot cake. Efforts are being made to increase the shelf life of these products. Besides packing is being made more attractive and consumer friendly. On festivals like Diwali Vita milk cake has become very famous. Vita has a plan to enter into the field of "Kulfi", Ice cream, and 50% fat cream & "Peda".

TURN OVER

The turn over of Vita has crossed a land mark of Rs. 350 crores last year and hope to cross Rs. 400 crores this year.

OTHER LAND MARKS

The year 2003-04 was the historic year for Haryana Dairy Cooperatives as all the wings that is (a) Societies (4000 in number), (b) Milk Unions (6 in number) and (c) Federation earned profits, this was despite paying 17.67% higher milk procurement prices to producers in comparison to last year. Raw material cost forms 77% of the total cost of production. As a cooperative organization the objective to pay better price to members is foremost objective which is being achieved consistently. Emphasis has been laid to equip dairy cooperative societies with electronic equipments to measure quantity and quality of milk being brought by members for sale. This has brought in lot of confidence in their attitude towards the dairy cooperative societies.

Haryana being dominated buffalo rearing, therefore it is affected by adverse lean/flush ratio in milk production and consequently milk procurement. To arrest the trend a conscious decision to pay higher procurement price during

lean season and the lowest milk procurement this year touched 206000 kgs of milk per day in the month of June as compared to 138000 kgs same month last year.

EXPANSION

The capacity of the existing milk plants is being expanded to handle more milk to cater to ever growing demand.

QUALITY IMPROVEMENT

Vita is foremost in quality marks and has obtained ISO & HACCP certifications for its milk plants at Rohtak, Ballabgarh and Ambala and are in the process of obtaining these certificates for remaining plants. A cold chain in the shape of bulk coolers is also being developed in the procurement system to attain the highest quality standards of milk procurement & raw milk to be used for manufacture of milk products so as to bring down the bacterial load in raw milk. This is being done to catch the export market.

MAJOR IMPORTANT EVENTS

During 2000-2001 a new Milk Chilling Centre at Kurukshetra was established. During the same year a bonus of Rs. 55.00 lakh was distributed to producer members.

During 2002-2003 Milk Chilling Centre, Matanhail was established. During the same year a bonus of Rs. 130.00 lakh was distributed to producer members.

Further during 2003-2004 : The construction of Milk Chilling Centre at Khanpur Ghati (Pinangwan), Gurgaon and Milk Chilling Centre at village Ujjana was started.

VISION

The days are not far away when HDDCF holder of Vita trademark will become number one Federation in the Northern Zone.

NATIONAL DAIRY RESEARCH INSTITUTE, KARNAL

National Dairy Research Institute (NDRI) had its origin as Imperial Dairy Research Institute, which was established at Bangalore in 1923. After independence, the Indian Government established centres for research and education to cover the area specific needs of different regions. It was in 1955 that its headquarters were shifted to Karnal and the Institute was rechristened as National Dairy Research Institute. The infrastructure at Bangalore was retained as Southern Regional Station of the Institute. In 1962 and 1964, two regional stations were established in Mumbai and Kalyani, respectively, to serve as the Western and Eastern regional stations of the Institute. However, the Western Regional Station at Mumbai was closed down in 1984. The Southern and the Eastern Regional Stations continue to provide region specific Research and Development (R&D) support for dairy development in relation to the agro-climatic conditions that exist in those areas. In 1970, the Institute's management was weaned away from the Ministry of Agriculture and brought under the wings of the Indian Council of Agricultural Research (ICAR) with a view to provide greater operational autonomy in research management functions. In 1989, status of Deemed University was conferred to the Institute for further strengthening of the academic programmes for human resource development. The Institute provides high quality education in the field of dairying, which has no parallel in Asia. It is noteworthy that NDRI is not only an important contributor to dairying manpower required in State Agricultural Universities but also to the dairy industry for operation and management of milk plants all over the country. This is evidenced by recognition, by the ICAR, of the Institute as Centre of Advanced Studies at NDRI in Dairy Cattle Breeding and Dairy Technology disciplines to further strengthen the research and training components.

Dairying has played a prominent role in providing employment ; income and above all the much needed household food and nutritional security as well as

strengthening of rural economy. It has been recognized as an instrument of socio-economic transformation in the rural India. The value of output from animal husbandry & dairying to agriculture over the years is increasing.

Seven mandates have been identified for the smooth functioning of the Institute :

- To undertake basic and applied research in the area of dairying covering production, processing, economics and management.
- To develop dairy farming systems for different agro-climatic conditions and demonstrate models for transfer of technology.
- To organize and conduct programmes at under-graduate and post-graduate levels in various branches of dairy science.
- To organize short-term specialized training programmes and vocational courses.
- To collaborate with National and International agencies for dairy research and development.
- To provide consultancy to dairy industry, dairy farmers and other dairy development agencies. To act as a Referral Centre on dairy research.

The organizational structure of NDRI follows the Deemed University pattern of the ICAR. The policy-making functions are managed through Board of Management, Research Advisory Committee, Academic Council, Staff Research Council, Extension Council and Executive Council.

The Institute's mandate is to conduct research in dairy production, processing and management to develop manpower and to integrate dairy research, education and extension, with the sole aim of providing basis for dairy development in the country.

R&D activities of the Institute are being carried out in all the three major aspects of Dairy Profession viz. I) Dairy Production ii) Dairy Processing iii) Dairy

Extension/Management through twelve research divisions/Sections and tow regional stations.

Many of the research programmes have Inter-institutional linkages with NDDB, DBT/DST, SAUs State Department and Milk Federations at the National level. The research efforts and infrastructural facilities of the Institute have been greatly strengthened by active collaboration with International Agencies like IAEA, SIDA, ATI, Indo-Duch, Indo-UK Indo-German, World Bank etc. Under NATP programme funded by the World Bank, as many as 14 projects have been initiated.

NDRI as a premier Research Institute in dairying is committed to bring the useful technologies to the doorsteps of the farming community. The Institute has a well-planned approach for the transfusion of Science and Technology for milk production enhancement programmes. For the better results, the Dairy Extension Division, Krishi Vigyan Kendra/Dairy Training Centre, Institution Village Linkage Project and Regional Stations are providing trainings and demonstrations on dairying for the farming community. The key feature of the training programmes is the 'hands-on experience' provided to the trainees through viable demonstration units in bee keeping, fishery, crop production and dairying. Council has recognized the Krishi Vigyan Kendra (KVK) of the Institute by awarding Ist prize for the year 1993-95. During the period from July, 1976 to December, 2003. KVK has been conducting 2601 training (on-campus and off-campus) programmes participated by 51950 trainees on different aspects of Animal Husbandry & Dairying, Agriculture, Horticulture, Bee-keeping, Fisheries and Home Science and Dairy Training Centre of the Institute also organized 501 training programmes participated by 51529 trainees on all aspects of Dairy Production, Dairy Processing and Dairy Management for the KVK trainers, Staff of the State Dairy Development Departments, Entrepreneurs, Bank Officers and Dairy Plant Personnel from time to time. For the rural unemployed/employed farmwomen and farmers, special training programmes are also arranged to renew their knowledge and skills and to acquaint them with the latest findings in the agriculture field through a year wise action plan. Therefore, channels of information, credit inputs and access to markets have to be aimed at farmers as they play a vital and crucial role in agriculture field including livestock

production. Extension assistance regarding livestock rearing has been directed towards farmwomen to enhance their productive use and economic value of the labour and time. This can be achieved only by proper planning through a transition from unskilled to skilled work. Suitable and appropriate programmes for the skill development of rural farmers and farm women on animal keeping are organized for increasing their earning potential and improving the efficiency of the farmers.

Agriculture is the backbone and important sector of the Indian economy as it provides us food security generates employment and helps to cope up with poverty. Agriculture contributes remarkably to the exports of the nation. It has occupied a top seat in context to the current trends of global negotiations on fetching the farming sector into the multilateral trading system. Around 65% of the labour class of the country belongs to the agricultural sector. In spite of this, it has been observed that there is a decline in the share of agriculture in the GDP from 52% in 1950's to 26% at present ; agriculture is still one of the largest contributors to the GDP. NDRI as a leading research institute of the country in the field of dairying is fully committed to develop result oriented technologies by addressing them through an effective agricultural extension system for the welfare of farming community to up lift the GDP of Indian economy. In the emerging architecture of new global system of agricultural research, NDRI is effectively implementing its dairy development programmes by establishing Rural Dairy Centers-A New Concept Under Dairy Vikas Yojana for the benefit of rural farming community. NDRI provides basic dairy extension facilities such as veterinary health cover, artificial insemination band, cooperative infrastructure and training aids at the doorsteps of farming community in its adopted villages of in Haryana. The Extension Division of NDRI, has been conducting all India Dairy Husbandry Officers' Workshop every year. The Institute stressed upon the mobilized of HRD resources towards financial self-sufficiency through consultancy, patenting and other contractual services, in the context, NDRI's commercially oriented wing known as consultancy service cell handles all such matters and generates funds for the Institute.

Post-harvest technologies, agro-based products, clean milk production, market survey and intelligence, enhancement of available technologies,

empowerment of farming community and well planned marketing strategies are essential priority areas to change agriculture sector into industrial sector which is highly depend on agriculture. In this context, NDRI is running a Institute Village Linkage Programme under NATP project scheme for implementing technologies developed by NDRI as a "Lab to Land" programme on regional bases for the direct benefit of farming community of Haryana State. A team of subject matter specials is providing guidance and sharing his experiences among the farmers in the villages of Haryana for increasing their income and living standards.

Dairying and animal husbandry sector present excellent potential for the orchestrating future growth of the GDP of our nation. The research and development work of NDRI is based on timely focused theme for developing appropriate resources for sustained milk production from cattle and buffaloes. Technologies developed at NDRI are not only helping Haryana State but also the nation to develop strategies for breeding, feeding and management aspect of milk production enhancement. Restructuring of the hitherto unorganized sector of the dairy industry received critical support through the R&D work done at NDRI on the processing aspects of milk from indigenous breeds of buffalo and cattle.

India has large bovine population consisting of 205 million cattle and 90 million buffaloes, accounting for about 51 percent of Asia and 19 percent of world bovine population. Indian cattle and buffalo breeds are well adapted to harsh climatic conditions and low inputs and have been imported by a number of countries for improving their native breeds. Buffalo is an important dairy animal in India and contributes around 55 percent of the total milk production. The best-known buffalo breeds produce between 1500-2500 kg of milk in a lactation. India's milk production has increased from 17 million tonnes in 1950-51 to a remarkable level of 88 million tonnes in 2002-03, the highest in the world. The present per capita availability of milk is 226 gm per day. Phenomenal progress in the field of dairying after independence is due to the concerted efforts of large number of milk producing farmers, scientists, planners, NGO's, dairy cooperatives and the industry. The unique feature of our dairy production is that it involves around 70 million rural families with 2-4 cattle holding.

During the last 80 years, the Institute has made valuable contributions in the fields of Dairy Education and Research related to production, processing and

management and to develop necessary manpower required for the diary sector. For innovative teaching, modern audio, visual and video equipments facilities have been provided to the various divisions. Sufficient number of personal computers are provided for use in research and teaching. Software packages have been developed for various dairy and farm operations, their management and analysis. Special computer courses have been developed for dairying students. Scientists have prepared books, monographs and bulletins to supplement their teaching efforts. To promote scientific interactions and healthy environment for work, group meeting and seminars by faculty and post graduate students are being held as per standing fixed time schedule on all Saturdays.

The Institute works in close liaison with various National and International developmental agencies to assist the country in its dairy development plans. Scientific achievements, development of human resource at multi-tier level and infusion of science in various sectors of the dairy industry have been the hallmarks of the Institute. The Institute catalyses close interaction among scientists, students, farmers and dairy industry for orchestrating dairy development process in a harmonious manner.

The programmes of NDRI University are constantly reviewed and updated to impart requisite knowledge to the graduates so that they are academically proficient in meeting the newly emerging global changes. The outstanding feature of the B. Tech (Dairy Technology) degree of this Institute is the in-plant training to supplement classroom teaching. By having one year of in-plant training as a part of four-year curriculum during third year of degree programme the students are given full opportunity to manage plant operation in the commercial environment. Thus, they acquire necessary skill and self-confidence in managing real the problems encountered in commercial dairy plants. In this manner, NDRI University imparts a very well balanced degree programme both in academic context and practical experience. A placement Cell is in operation at NDRI with the objective of providing career guidance, training and placement services for the students of NDRI well-organized campus interviews.

Educational and training opportunities are provided to visiting scholars from various countries. In the past, trainees from Nepal, Sri Lanka, Vietnam,

Ethiopia, Holland, Egypt etc. have been benefited. In-plant training facilities are also imparted to the students from sister Institutions and SAUs.

This Institute has a well-structured approach for the transfusion of science and technology for milk production enhancement programmes. NDRI has been working in unison for establishing programmes to enable two-way communication between scientists and end users so that meaningful R&D programmes could be undertaken. Further attempt is being made to identify villages in different agro-climatic zones where appropriate models consistent with the crop-livestock production systems and technologies for enhancing milk production have been developed by bringing about integrated development of the rural community. Through these programmes, efforts are made to bring financial and marketing institutions at the doorsteps of the farmer to encourage modern practices of milk production. Dairy Meals, Field Days, Calf Rallies and Women in Agriculture Days, Farmer Days, Women Days and World Food Days are organized for the benefit of farming community. NDRI organized may exhibitions depicting the recent advancement relating to Dairy Production and Dairy Processing aspects particularly for the benefit of regional farming community.

The Computer Centre is engaged in multifarious academic and service providing activities such as offering computer courses to under-graduate and post-graduate students in dairying, monitoring management information, maintenance of databases, software development and imparting training to staff. Besides, the Centre is also providing services for data analysis, Internet surfing, e-mail, DTP and graphic applications to staff and students.

The Agricultural Research Information System (ARIS) was established at the Institute in 1997. The computer center provides E-mail and Internet service to the scientists, research scholars and other staff members through the establishment of Local Area Network (LAN).

The Institute possesses an elite herd of over 1000 dairy animals, which include cattle, buffaloes and goats. The two indigenous dairy breeds ‘Sahiwal’ and ‘Tharparkar’, also form part of the Institute’s herd strength. A herd of Murrah buffaloes, the breed that is known to be the best in the world, and a small herd of indigenous and crossbred goats, are also maintained for conducting research.

Systematic records on all aspects of dairy production and management are maintained. These data are computerized and used by students, researchers and the farm managers.

Fresh initiatives have been taken for modernizing the infrastructure for maintenance of elite herds of Sahiwal cows, Crossbred cows and Murrah buffaloes. It is proposed to set up a state-of-the-art- Milk Production System that could serve as a demonstration model for the progressive farmers.

The commercial dairy plant with state-of-the-art equipment and process automation and processing capacity of 60,000 litres of milk per day has been established at NDRI in 1997 with the financial support by National Dairy Development Board. Plant is being used for in-plant training of our students as well as for the research work of the scientists. The Plant recently acquired ISO : 9002 and HACCP Certifications.

The Consultancy Unit undertakes consultancy services in terms of intellectual services, pilot project implementation, evaluation of materials and analytical services in the areas of Dairy Production, Dairy Processing and Dairy Management on professional basis. Scientists of this Institute are invited as dairy experts by various dairy organizations.

Two high milk producing strains of cattle, named 'Karan Fries' and 'Karan Swiss' have been developed by crossbreeding followed by appropriate selection programme through inter-se-mating and progeny testing. Highest peak yields of 44 and 46.5 kg have been recorded in Karan Swiss and Karan Fries, respectively. Through consistent selection, the indigenous breeds i.e. Sahiwal and Tharparkar have been improved to produce 23 kg and 19.5 kg milk per day, respectively. Murrah buffalo produced a record milk yield of 22.5 kg in a day. In case of crossbred goats under stall fed condition in a record yield of 5.4 kg per day was achieved.

Multiplication of dairy animals with high productivity constitutes the core of research effort in the area of biotechnology at the Institute which encompasses multiple ovulation, embryo transfer, cryo-preservation and embryo splitting. The Institute now possesses several cows which have produced 5-10

calves just in one year. This technology has also been extended to buffaloes. In November 1990, the successful birth of the first ever test tube buffalo calf of the world was produced through in vitro maturation and in vitro fertilization. Protocol has been developed for inducing lactation in infertile dairy animals. It has been shown that the use of bovine somatotropin (BST) increases the milk yield and efficiency of milk production in crossbred cows and buffaloes. Extensive studies have been conducted on the work efficiency of crossbred bullocks.

Using chemical and biological methods, significant improvement has been achieved in the nutritive value of poor quality wheat and paddy straws. Notable progress has been made in the utilization of agro-industrial by-products as animal feed. Genetic manipulation of rumen microorganisms is in progress to increase the efficiency of utilization of available nutrients from fibrous crop residues. The protein, energy and mineral requirements of different animals have been determined. In the filed of mineral nutrition, some outstanding research has been carried out with special reference to selenium toxicity and zinc deficiency. Chelated minerals and by-pass nutrient technologies have been developed for optimizing animals productivity. Urea molasses mineral block lick and straw blocks have been developed through research in feed technology.

Currently, the production group has taken up biotechnological approaches to solve the problems of livestock management and production. Attempts are being made to detoxify toxins in non-conventional feeds and agro-industrial by products. Attention is being given to the problem of aflatoxin in feeds. Molecular genetics are being identified which are linked to economic traits and disease resistance so as to be able to select bulls with superior attributes.

The Institute has also developed many processing technologies for large scale manufacture of indigenous dairy products, microbial rennet for the manufacture of vegetarian cheese, and whey for making an acceptable whey drink. Methods have been standardized for manufacture of a bifidus containing infant formula from buffalo milk simulating human milk. In addition, infant formula for dietary management of lactase deficient and premature infants, and a large number of low-cost weaning foods have been developed. Many equipments like the continuous ghee and khoa making machines to handle large volumes of butter and milk have been designed and developed. The Institute maintains a

National Collection of Dairy Cultures and supplies them to industry and institutions.

The Institute has developed process for manufacturing of instant and ready to use milk products including Ice-cream mix powder, malted milk powder, khoa powder Kulfi mix powder, gulab jamun mix, shrikhand powder and gajarpak powder. The Indian Dairy Industry is using these innovations extensively. Attempts are also being made in the application of modern technologies like membrane processing and microwave techniques in the manufacture of new dairy products. Techniques have been developed for magnetic treatment of milk to reduce fouling of dairy equipment surfaces, especially during buffalo milk processing. It helps to run the evaporation plants continuously for several hours.

The quality of research output of the scientists and scholars can be gauged by the number of national and Inter-national awards such as Moudgil Award, Rafi Ahamad Kidwai Award, Hari Om Ashram Trust Award, Jawahar Lal Nehru Award, Gardner's Awards etc. received by them.

The Institute had the honour to host international and national seminars. Scientists of the Institute are also invited to present their research papers at national and international seminars. The Regional Stations at Kalyani and Bangalore are also carrying out similar extension activities. The Institute shares the privilege of substantially increasing the employment potential, assets and income in the villages. It is to be noted that over 70% of these benefits have gone to the weaker sections of the society.

The Dairy Science College was established at NDRI and a three-year under-graduate degree programme in dairying was launched in 1957. This programme was bifurcated in 1961 into two specializations, viz. B. Sc. Dairying in Dairy Husbandry (which was discontinued in 1973) and B. Sc. Dairying in Dairy Technology. In the same year, M. Sc. Programmes were started in four disciplines. The degrees for all the three programmes were awarded by the Punjab University till 1976 and thereafter by the Kurukshetra University. The M. Sc. Programme was entended to 13 disciplines in 1972. NDRI was accorded the Deemed University status in 1989. In 1989, a new M. Sc. Course in Animal Biotechnology was also started. The Institute has so far produced

1027 B. Sc./B. Tech. (DT) 1580 M. Sc. And 678 Ph. D. scholars. Excellence is our motto, both in research and education. We admit fewer students and the entire faculty joins in giving them theoretical and practical training with the stat-of-the art facilities. It is, therefore, no wonder that the entire graduation class (B. Sc./ B. Tech. DT) gets top class jobs in dairy industry. Students passing out of this Institute had provided the core faculty for the newly established Agricultural Universities in dairy discipline. Most of our students who appear in Agricultural Research Service get selected. Alumni of this Institute are in top positions in dairy industry and in Research and Education organizations both in India and abroad.

NDRI today enjoys a good reputation within the country and abroad. The NDRI University has planned to start a few selected postgraduate programmes to meet the specific requirements of the growing dairy feed and food industries. The Institute is fully geared to take-up the challenges and tasks ahead by conducting meaningful user oriented research to boost milk production, and to help the dairy industry in producing high quality dairy and food products.