National Dairy
Development Board

ANNUAL REPORT 2017-18

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MEMBERS OF THE BOARD

(As on 31st March 2018)

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Chairman

Joint Secretary (Dairy Development)
Department of Animal Husbandry, Dairying & Fisheries
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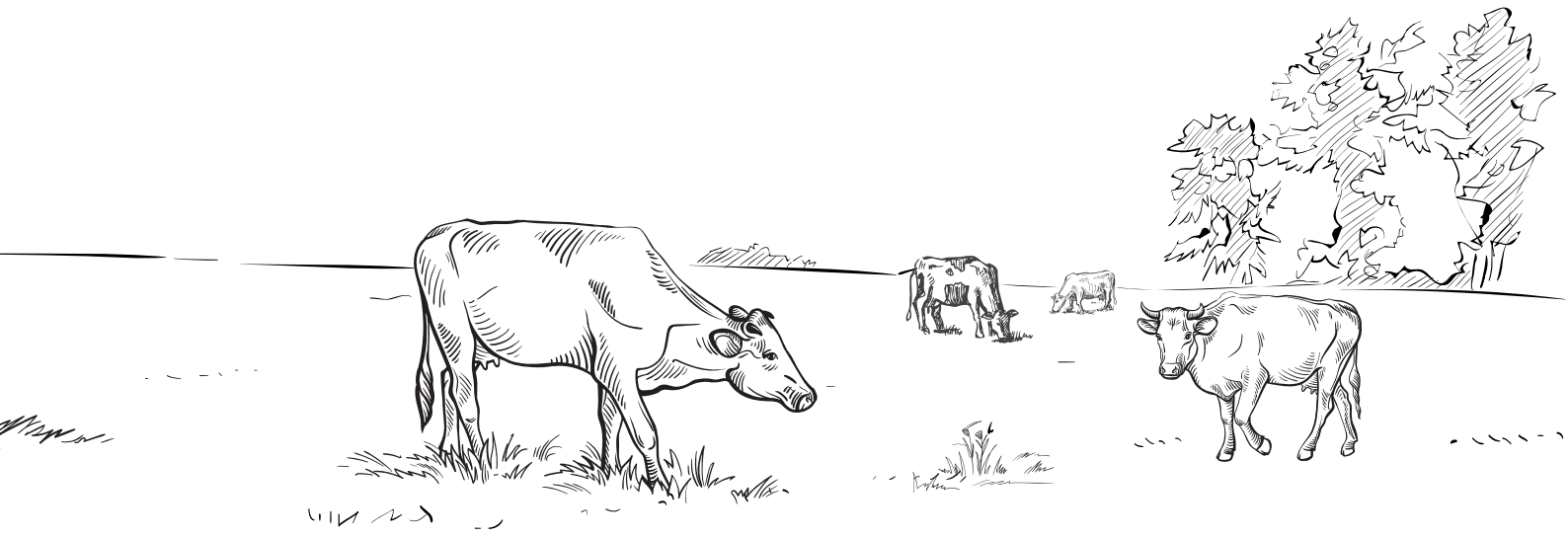
Executive Director

Shri Yuvaraj Yashvant Patil
Executive Director



THE YEAR IN RETROSPECT

Milk production in the country grew at 6.7 per cent to 176.4 million tonnes in 2017-18 as against 165.4 million tonnes in 2016-17, which was more than double the growth of world milk production. It improved the per capita availability of milk to 374 grams per day.

Chairman, NDDB receiving the Rajbhasha Kirti Puraskar from the honourable President of India

Milk production

176.4

million tonnes in 2017-18

Milk production in the country grew at 6.7 per cent to 176.4 million tonnes in 2017-18 as against 165.4 million tonnes in 2016-17, which was more than double the growth of world milk production. It improved the per capita availability of milk to 374 grams per day.

The prices of milk and milk products rallied moderately in the beginning of the year in anticipation of lower milk production in major milk exporting countries. However, by the end of May 2017, it was evident that potential supply contracts were exaggerated and milk production in major countries remained either normal or above normal. In addition, EU also had intervention stocks of previous year's milk powder. This led to weakening of world market sentiments and the prices of dairy products slumped rapidly and remained subdued until end of the year. However, due to increased demand and limited supply of butterfat, market remained bullish and prices of butter and ghee continued to touch new highs. In October 2017, it was projected that milk flow would remain upwards till mid-2018 mainly due to higher farm-gate milk prices to milk producers in Oceania and Europe. This further impacted market sentiments leading to prolonged crash in world dairy markets.

The fall in global prices rendered exports of dairy products from India unviable. Export of skimmed milk powder (SMP) declined sharply from 1,24,000 tonnes in 2013-14 to 14,892 tonnes in 2016-17 and further to 11,308 tonnes in 2017-18.

Due to much lower price realisation, many predominantly commodity focused private processors had little interest in buying milk and they either slashed their milk purchase prices to the lowest levels or reduced or closed down their operations.

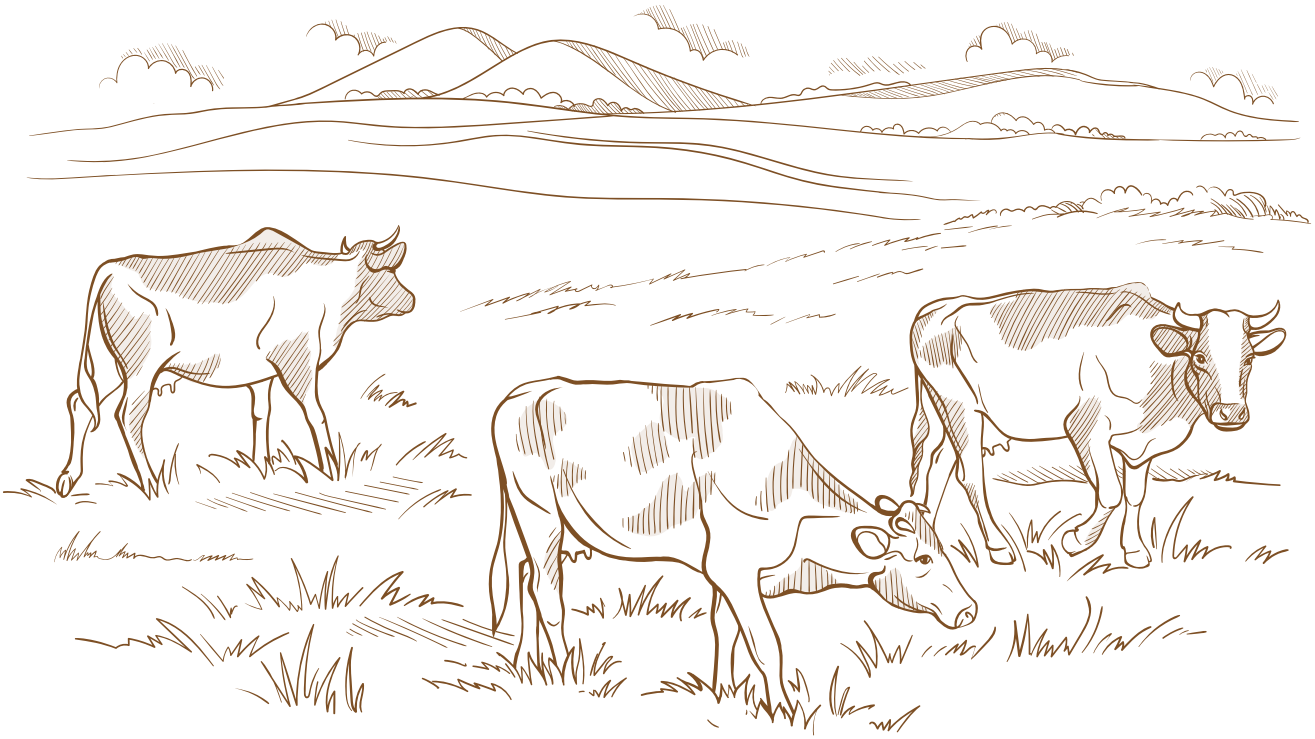
In general, weaker market sentiments prevailed throughout the year in the Indian dairy sector. Also, as flush season started, the prices came under further pressure. By January 2018, major private players reduced the procurement prices in major milk producing regions as compared to previous year. In e-auction, the SMP was traded at ₹ 151 per kg in March 2018, as compared to ₹ 250 a year ago. While butter prices remained at higher levels for most of the period, it started declining by about ₹ 45 and traded at ₹ 260 per kg after December 2017.

Despite the slump in world market, the dairy cooperatives strived hard to maintain the producer price of the previous year. Better procurement prices by the cooperatives along with decrease in procurement volume by major private players led to increase in milk collection by the cooperatives by about 11 per cent to 475.6 lakh kg per day (LKgPD) in 2017-18.

Liquid milk sale registered an increase of about 6 per cent to 349.6 lakh litres per day (LLPD). Hence, the cooperatives had to convert additional surplus of milk into conserved commodities. With no buyers in a declining powder market, there was a steady build-up in milk powder inventory with cooperatives resulting in blocking of working capital.

The market realisation of SMP during the year was even lower than the production cost leading to a situation that the cooperatives were forced to bear the losses. The year gone by was challenging for the dairy sector.

Milk collection by the dairy cooperatives – 475.6 lakh kg per day during 2017-18



STRENGTHENING COOPERATIVE BUSINESS

NDDB has been committed to improve the livelihood of dairy farmers. While NDDB remained dedicated to strengthening the operations of the cooperative milk unions and increasing income of the dairy farmers, it also sought to leverage the strength of the cooperative network to introduce new initiatives. Emphasis was given on generating additional income for dairy farmers through these new initiatives. Efforts were also made to propagate use of renewable energy in dairying.

Milk collection underway in Dairy Cooperative Society

4.9 million Women members in Dairy Cooperative Societies

During 2017-18, NDDB initiated work on a model dairy cooperative society. NDDB adopted the Mujkuva village in Anand district of Gujarat. Various new initiatives have been introduced on pilot basis in this village which include a rooftop solar plant for DCS, community fodder farm, DCS managed fodder silage making unit, coverage of all animals under ration balancing programme, use of manual chaff cutter, data logger for BMC, Thermal Storage System to operate BMC, Kalam library for village youth, clean village campaign, de-addiction camps, health camps etc.

This village will also act as field demonstration unit for trainees and visitors to Anand. Based on the positive outcome of rooftop solar plant and BMC data logger in Mujkuva village, another 125 such solar plants and data loggers, under NDP I, are being installed in various DCSs

across the country. A pilot on bovine manure management using flexi-biogas technology with the objective of increasing farmers' income from dung was also initiated during the year.

NDDB in collaboration with International Water Management Institute (IWMI) and Rajasthan Electronics and Instruments Ltd (REIL) initiated formation of a Solar Pump Irrigators Cooperative Enterprise (SPICE) at Anand, Gujarat. Eleven grid connected agriculture pumps were replaced with solar pumps and surplus energy will be sold to distribution company's (DISCOM's) grid. This will incentivise farmers to minimise use of groundwater and also provide additional income from sale of surplus electricity. A pilot project has also been initiated in collaboration with the Government of Punjab. A plan was submitted to Punjab Government to replace all agriculture connections on a single agriculture feeder with grid connected solar pumps.

NDDB continued to promote awareness about bee-keeping activities through the dairy cooperative network in collaboration with the National Bee Board (NBB). Seminars on the benefits of taking up scientific bee-keeping activity involving participants from dairy federations, milk unions, NBB and progressive bee-keeping farmers were organised.

Role of bee-keeping in providing self-employment to rural youth, production of value aided bee-hive products and cross-pollination of various agricultural and horticultural crops leading to improvement in productivity were emphasised during the seminars. Scientific training in bee-keeping for taking up bee-keeping activity was also organised for the farmers belonging to different milk unions. As a result, some milk unions have started bee-keeping activity on pilot basis using their existing dairy infrastructure.

NDDB also took up the responsibility of dairy development in areas where development in this sector has not been significant. NDDB's efforts in Assam and Jharkhand are already showing positive results. Within one year of its operation, Vidarbha- Marathwada Dairy Development project has earned the trust of farmers in the region. NDDB has submitted a state dairy development plan to Government of Anrunchal Pradesh.

During the year, the cooperative milk unions together covered about 1,86,000 village dairy cooperative societies, with a cumulative membership of 16.6 million milk producers. The cooperative milk unions collectively procured an average of 475.6 lakh kg of milk per day as compared to 428.7 lakh kg per day in the previous year, with a growth of about 11 per cent. The sales of liquid milk reached 349.6 lakh litres per day, recording a growth of about 6 per cent over previous year.

Bee-keeping activities promoted through the dairy cooperative network in collaboration with the National Bee Board (NBB)

As on March 2018, the total number of women members in dairy cooperatives across the country was 4.9 million.

NDDB's Software for Automatic Milk Collection System

NDDB has developed a robust, integrated, multi-platform, transparent, multilingual software, NDDB Automatic Milk Collection System (NDDB AMCS), for complete operations at Dairy Cooperative Society level. This solution is integrated at Union/Federation/National level to enable transparency, financial inclusion and improve efficiency of operations. The platform is based on Open Source technology stack and liberates DCS from vendor lock-in as application works on all hardware.

This solution comprises of an application at DCS Level on Windows, Linux and Android platform, coupled with Portals at multiple levels. This solution also provides android applications for farmer, DCS Secretary and Dairy Supervisor to get relevant information and alerts. The features includes Business operations, Financial Accounting, Welfare Schemes, Share transactions, Audit, Meeting Management at DCS level apart from providing seamless integration with Union Systems. The software also enables milk bill payment directly to farmers' bank accounts.

This solution will equip farmer and other stakeholders with relevant information in real time to ensure accountability at every step.

Strengthening Village Based Milk Procurement System

Village Based Milk Procurement System (VBMPS), one of the major components of the National Dairy Plan Phase I (NDP I), being implemented by NDDB, continued to achieve more than the set targets. By March, 2018, the number of sub-project plans (SPPs) approved increased to 231 in number, including ten sub-project plans of Producer Companies, with total approved grant assistance of ₹ 6,838.02 million.

By March 2018, 25,707 villages were covered by forming new Dairy Cooperative Societies and strengthening of existing Dairy Cooperative Societies with facilities for milk chilling using Bulk Milk Coolers and advanced testing facilities. Approximately 6.68 lakh new members were inducted and 7.30 lakh existing members benefited from improvements in the milk collection system. Of the incremental membership achieved till now, about 49 per cent are women members. Additional Milk procurement under the Plan has been more than 2,630 thousand Kg per day (TKgPD).

Large number of milk producers are benefitting from increased access to organised market, due to VBMPS. The focus has been on increasing women members. This has resulted in formation of 2,538 new women DCS. Installation of about 2,500 Bulk Milk Coolers (BMCs) at strategic locations along the milk collection routes have improved the quality of milk. This is evident by the high Methylene Blue Reduction Test (MBRT) results recorded at the End Implementing Agency (EIA) level.

Management of Dairy Cooperatives

West Assam Milk Producers' Cooperative Union Limited

NDDB continued to manage West Assam Milk Producers' Cooperative Union Limited (WAMUL) popularly known as Purabi Dairy. During the year, WAMUL benefited around 9,400 dairy farmers through 116 MPIs and 80 DCSs' and reported an average milk procurement of 29,590 kg per day with around 4.2 per cent Fat and 8.2 per cent SNF. The average milk procurement price paid by WAMUL to its associated dairy farmers was around ₹ 34.00 per kg during 2017-18. WAMUL also paid an additional price aggregating to ₹ 18 million to its members. The year also saw WAMUL taking a significant stride in registering its Milk Producers' Institutions (MPIs) into Dairy Cooperative Societies (DCS). As on March 2018, WAMUL managed to register 74 DCSs.

Greater degree of transparency was established in the village level milk collection process by installation of 71 solar powered Data Processor Based Milk Collection Units (DPMCU) purchased under financial assistance received from IDDP-III scheme of DAHDF, Ministry of Agriculture and Farmers Welfare, Government of India. The scheme has also helped WAMUL in setting up of a local server for synchronising information being generated in these DPMCUs for seamless monitoring of quantity and quality of milk procured.

WAMUL continued to provide various input services such as doorstep AI delivery, distribution of cattle feed and feed supplements at affordable rates besides arranging training and capacity building programmes for its dairy farmers. As on March 2018, the doorstep AI delivery project of WAMUL has reported delivery of 1,26,862 Artificial Inseminations (AIs) and birth of 47,220 calves (of which 25,396 are females) covering over 1,000 villages through a network of 110 Mobile AI Technicians (MAITs) in the districts of Morigaon and Nagaon. In the same period, WAMUL sold around 100 MT of cattle feed and around 2 MT of mineral mixture.

In October 2017, WAMUL conducted Calf Rally and celebrated Milk Day in Doboka sub-division of Hojai district. The event felicitated women dairy farmers and appreciated the services provided by MAITs.

During 2017-18, WAMUL sold around 51,000 litres of packed liquid milk every day under the brand 'Purabi' besides selling paneer, sweet curd, plain curd and ghee. This year, WAMUL launched a range of new products including 'Purabi Tea Special' and toned milk "Purabi Smart" fortified with Vitamins A&D with support from Tata Trusts under their programme - The India Nutrition Initiative (TINI). WAMUL achieved a growth of around 13 per cent over the previous year by registering a sales turnover of ₹ 930 million as against ₹ 820 million registered in the previous year. During this year, WAMUL registered its trademarks (logo and brand name) under the Trademarks Act, 1999.

WAMUL achieved a growth of around

13 per cent

registering a sales turnover of ₹ 930 million

Government of Assam identified WAMUL as an End Implementing Agency (EIA) for receiving a grant in aid under a World Bank financed project- Assam Agribusiness and Rural Transformation Project (APART) for giving strengthening the organised / formal dairy sector in thirteen selected districts of Assam. The project was launched in August 2017 and will be implemented over a period of seven years.

Jharkhand Milk Federation

NDDB continued to manage The Jharkhand State Cooperative Milk Producers Federation Limited (JMF) which registered significant growth in milk procurement as well as milk marketing during 2017-18. The Milk Federation achieved an average daily milk procurement of about 116.0 TKgPD, from more than 19,000 milk pourers in over 1,900 villages. The federation paid about ₹ 1,340 million towards milk bill payments through Direct Bank Transfer in the individual bank account of milk producers in addition about ₹ 10.3 million was paid as additional price to the pourers during the financial year. During the year the Federation marketed liquid milk and milk products averaging 97 thousand litres per day. More than 350 DPMCUs & AMCUs were made operational by the end of the financial year. Considering the potential of dairy development in the State, the Government of Jharkhand approved creation of three new Dairies at Sahebganj, Deoghar and Palamu districts.

Jharkhand Milk Federation, trained 208 local resource persons who provided advisory services to 9,071 milk producers for their 12,041 milch animals covering 216 villages. Under VBMPS, 100 new MPPs have been organised and 98 existing MPPs strengthened through installation of BMCs and DPMCUs/AMCUs. About 9,500 milk producers and village level committee members were trained during the year.

JMF supplied 330 MT Area Specific Chelated Mineral Mixture and around 114 MT bypass protein supplement to milk producers. The federation also supplied 2,618 MTs of compound cattle feed to milk producers. The Federation distributed around 70 MT of green fodder seeds during the year.

Financial Assistance to Dairy Cooperatives

NDDB continued to provide financial assistance to dairy cooperatives for enhancing their infrastructure for milk processing, milk chilling, feed manufacturing, solar thermal applications in dairy plants and other activities like skill development. Projects of cooperatives with total outlay of ₹ 3,536 million were approved under the scheme “Providing Financial Assistance for Infrastructure Activities, Skill Development and Trainings”. During the year, long term financial assistance of ₹ 2,241 million was disbursed to dairy cooperatives and working capital assistance of ₹ 2,016 million was provided.

Dairy Processing & Infrastructure Development Fund (DIDF)

Large numbers of milk processing units with Producers Owned Institutions were set up under the Operation Flood Programme which ended in 1996 and since then most of these plants have never been modernised and expanded. These plants are running on old and less energy efficient technologies in comparison to the available modern/advance energy efficient technologies. At the same time, Producers Owned Institutions operate on a thin margin (less than 5 per cent) as they pass on maximum share of sales realisation to milk producers and make available quality milk to consumers at affordable price. Due to less profit margins and lack of resource and surplus, the required financial assistance for investment in processing infrastructure is not easily available from commercial banks.

Hence, NDDB formulated a project proposal for modernisation and creation of additional processing infrastructure for Producer Owned Institutions through a concessional rate of finance. Government of India (GoI) in Budget 2017-18 announced a dedicated Dairy Processing Infrastructure Development Fund (DIDF) of ₹ 80,000 million in NABARD. Consequent to this, Department of Animal Husbandry, Dairying and Fisheries (DADF), GoI issued administrative approval and operational guidelines of the DIDF scheme.

DIDF scheme will be implemented with a total financial outlay of ₹ 1,08,810 million comprising ₹ 80,040 million as a loan from National Bank for Agriculture and Rural Development (NABARD), ₹ 20,010 million as End Borrower’s contribution ₹ 120 million will be contributed by Implementing Agencies towards Project Management and Learning, and interest subvention of ₹ 8,640 million will be provided to NABARD by Government of India through Department of Animal Husbandry, Dairying and Fisheries.

The project will focus on creation/modernisation/expansion of milk processing infrastructure and manufacturing facilities for value added products. The project will also focus on setting-up of chilling infrastructure & electronic milk testing equipment at village level.

Satisfying milk producers through fair and transparent milk procurement system at village level

NDDB as an Implementing Agency will implement the project through eligible End Borrowers such as Milk Unions, State Dairy Federations, Multi-state Milk Cooperatives, Milk Producer Companies and NDDB subsidiaries.

Assistance under DIDF scheme will be available to the End Borrowers in the form of interest bearing loan@ 6.5% per annum with 10 years repayment period including 2 years moratorium on repayment of principal.

Investment under DIDF scheme would help Producer Owned Institutions to bring efficiency in processing plants through substantial savings in processing cost and by reducing losses. It would help them to remain competitive in the market thereby giving optimum value of milk to milk producers and supply quality milk to consumers at affordable price. This scheme would help in achieving the Government of India's vision to double the farmers' income by 2022.

Dairy Development initiative in Vidarbha & Marathwada regions of Maharashtra

To make dairying a source of sustainable livelihood and poverty alleviation in drought prone regions of Vidarbha & Marathwada, MoU between Government of Maharashtra (GoM) and NDDB was executed. A Detailed Project Report (DPR) was jointly prepared by NDDB and GoM to implement region specific dairy development activities over a period of three years from 2017-18 to 2019-20 with an outlay of about ₹ 3,000 million.

GoM would provide Productivity Enhancement services like animal induction, doorstep delivery of AI services, fodder development support, ration balancing advisory services, subsidy on supply of feed resources and animal health services. Mother Dairy has initiated setting-up of village level institutions to provide access to milk producers for sale of milk.

During the month of March 2018, average procurement of milk was 2.03 lakh litres per day from 27,472 producer members in 1,365 villages. Mother Dairy has also invested in refurbishment of Nagpur dairy plant and handed over by GoM for its operations and management, along with installation of village level chilling and milk testing facilities. Milk received from farmers of Vidarbha and Marathwada regions is processed in Nagpur dairy plant and is available for consumers in Nagpur city through Mother Dairy milk parlours.

NDDB Dairy Excellence Award

NDDB Dairy Excellence Award has been instituted to recognise the efforts of producer owned and controlled organisations which demonstrate best practices in the area of management excellence, value to farmers and social &

gender inclusion. This award encourages organisations to sustain their efforts in the socio-economic development of local communities, with commitment towards principles and values of cooperatives.

Special awards were conferred for encouraging and recognizing dairy development efforts in difficult terrains, the role of women in dairying as well as to increase their participation as members and leaders in Milk Cooperatives.

Besides these awards, 19 women milk producers from different Milk Unions across the country were conferred with the 'Outstanding woman milk producer award'.

Quality Assurance

During the year, NDDB launched the 'Quality Mark' logo as an umbrella brand identity signifying safe and quality milk and milk products from the dairy cooperatives and producer institutions. The initiative aims at bringing about process improvement in the entire value chain from producer to the consumer to ensure availability of quality milk and milk products.

Since the roll out of this initiative, 79 Dairy cooperatives across the country expressed interest and voluntarily applied for Quality Mark. Of these, 26 units have successfully qualified. Quality Mark has led to a paradigm shift in the outlook of Unions; and they are now looking at their operations with greater emphasis on food safety and quality in pursuit of acquiring competitive edge.

NDDB continued to support various regulatory or scientific or advisory bodies like the Department of Animal Husbandry Dairying and Fisheries (DAHDF) Government of India, Codex Alimentarius Commission (CAC) and National Codex Committee (NCC), Food Safety and Standards Authority of India (FSSAI), Bureau of Indian Standards (BIS), Exports Inspection Council of India (EICI) etc. NDDB provided technical support to the International Dairy Federation (IDF). NDDB contributed to CAC working groups like Front-of-Pack Nutrition Labelling (FoPL), Labelling of Non–Retail containers of food, Biological Methods and general principles of Food Hygiene and HACCP.

In NDDB's continued pursuit to improve the quality of milk, right from the farm level, education and training programs are conducted regularly for farmers, procurement personnel and supervisors, newly recruited dairy staff of various federations and Boards of the cooperatives. Dairy professionals are sensitised on recent technological developments for efficient dairying through "Technews" and training sessions and workshops. Staff of Central Secretariat Services and professionals from SAARC were also given an insight through the awareness program on the dairy plant operations and Food safety.

Milk Producer Companies

NDDB Dairy Services (NDS), a wholly owned subsidiary of NDDB, facilitated the incorporation of four new Milk Producer Companies (MPCs) during the year, two in Bihar namely 'Bapudham' in Motihari and 'Kaushikee' in Saharsha and two in Madhya Pradesh namely,'Muktaa' in Sagar and 'Maalav' in Rajgarh. Out of the four MPCs, Bapudham was operationalised on 2nd October 2017. In a short span of time, Bapudham MPC has enrolled about 15,000 members in 342 villages and has reached an average milk procurement of around 22,000 Kg per day.

NDS continued to support the five large Milk Producer Companies namely,'Paayas' in Rajasthan, 'Maahi' in Gujarat, 'Shreeja' in Andhra Pradesh, 'Baani' in Punjab and 'Saahaj' in Uttar Pradesh.

Together, these five MPCs have enrolled around 4.14 lakh milk producers as members who have contributed more than ₹ 1,000 million towards share capital. Of the total membership, about 42 per cent are women and 60 per cent are small holder milk producers having up to three milch animals.

These five companies together procured more than 25 lakh Kg of milk per day during the year. These MPCs together marketed 4.39 lakh litre per day of various variants of poly pack milk and value added products like curd, ghee, butter milk etc., besides bulk supplies to institutions.

Advisory services for ration balancing & fodder development and, delivery of cattle feed and mineral mixture were undertaken in all the five MPCs, while Artificial Insemination (AI) services were provided by Paayas, Maahi and Saahaj MPCs under the NDP I. During the year, area specific mineral mixture and cattle feed were introduced in Bapudham MPC.

PCs at a glance as of March 31, 2018

Perticulars	Paayas, Rajasthan	Maahi, Gujarat	Shreeja, Andhra Pradesh	Baani, Punjab	Saahaj, Uttar Pradesh
Date of Incorporation	5/19/12	7/6/12	3/7/14	11/8/14	10/17/14
Legal status (incorporated under Company Act details)	PART IXA of the Companies Act, 1956	PART IXA of the Companies Act, 1956	Companies Act, 2013 read with PART IXA of the Companies Act, 1956	Companies Act, 2013 read with PART IXA of the Companies Act, 1956	Companies Act, 2013 read with PART IXA of the Companies Act, 1956
CIN No.	U01211R-J2012PTC038955	U01403G-J2012PTC070646	U01403A-P2014PTC094771	U01403P-B2014PTC038826	U01403UP-2014PTC066595
Date of Operationalisation	1/12/12	3/18/13	9/15/14	6/11/14	12/12/14
Number of Districts covered	8	11	2	8	10
Villages Covered	3,196	2,603	1,130	1,284	2,373
No of Members	97,816	1,16,511	72,714	43,073	62,327
Women Membership %	39	21	100	24	31
Small Holders %	36	61	93	44	68
Paid up Share Capital (₹ in Cr.)	33.89	32.45	12.39	9.57	18.65
Avg. Milk Procurement (TKgPD)	760	769	290	244	504
Avg. Poly Pack milk sales (TLPD)	78	334	11.5	10.78	5.43
Avg. Bulk milk sales (TLPD)	673	392	281.53	253.44	479
Estimated Turnover 2017-18 (₹ in Cr.)	1,196	1,374	339	363	731

Under the Ration Balancing Programme (RBP), a total of about 8.14 lakh animals were covered in about 12,645 villages through about 7,500 Local Resource Persons (LRPs) in the five MPCs. In the year 2017-18, about 6.4 lakh AIs were performed in about 11,500 villages by more than 1,300 Mobile AI Technicians (MAITs) in the three MPCs.

NDDB Foundation for Nutrition

NFN entered into an agreement with Rural Electrification Corporation (REC) to fund 10,000 students in 36 Government schools of Latehar, Jharkhand under their CSR initiative. 'Giftmilk' was launched on 21st November 2017 in presence of the Chief Minister of Jharkhand. The programme has also been initiated in Bokaro, Jharkhand, through CSR assistance of Bokaro Power Supply Corporation Ltd. (BPSCL). Jharkhand Milk Federation (JMF) has been supplying 200 ml pasteurised fortified (with vitamin A and D) flavoured milk to 17,000 school children daily in Jharkhand. Further, NFN launched the programme for about 1,600 students in 6 Government schools of Ahmedabad region of Gujarat under the CSR allocation of Oil & Natural Gas Corporation Ltd. (ONGC), Ahmedabad Asset through Kaira Milk Union.

Thus, during the year NFN expanded its programme to a total of six states covering around 36,000 students in 72 schools and served about 23 lakh units.

Awareness Generation

NDDB has always endeavoured to provide training to millions of small and marginal milk producers of our country on scientific animal husbandry practices. Taking this initiative forward, films on Progeny Testing (PT), Pedigree Selection (PS) and AI programmes were developed and circulated throughout the year. A film was also produced to familiarise farmers with the ideal village dairy cooperative society, Mujkuva. To reach out to more farmers, films were also dubbed into regional languages. NDDB developed an Android based game to raise awareness amongst children about the cow-to-consumer process.

Besides, NDDB also prepared posters, leaflets, brochures and booklets on scientific animal husbandry practices to educate farmers and field level functionaries. Keeping in view the effectiveness of digital mode of knowledge dissemination, NDDB has developed various in-house video clips, especially on Ethnoveterinary Medicine (EVM) formulations. Posters created in all major languages have been uploaded in the public domain. Scanning the QR code feature of each EVM formulation on these posters will play a video of its preparation and method of application.

NDDB's technological innovations and efforts in dairy development were showcased in various exhibitions and events. A digital campaign was planned to promote NDDB-created Quality mark logo for milk and milk products. The Board's news magazine published a special coverage of the NDDB Dairy Excellence Awards ceremony exclusively in Hindi, which was widely distributed to dairy institutions across the country.

ENHANCING PRODUCTIVITY

Raising genetic potential through scientific breeding programmes is crucial to achieve a sustained growth in the productivity of cattle and buffaloes in the country.

Tharparkar - a dual purpose breed known for both its milking and draught potential

Artificial Insemination (AI) services at the doorstep of producers using only disease free high quality semen produced from HGM bulls are being implemented under NDP I

ANIMAL BREEDING

Concerted efforts initiated under NDP I for genetic improvement of various breeds of cattle and buffaloes continued during the year. Considering the impact of climate change on livestock particularly on those maintained by small and marginal farmers, our priority of increasing productivity of indigenous breeds of cattle and buffaloes continued during the year. Vast local genetic resources are at considerable risk because of their low productivity and they need to be protected and supported as they provide livelihood to many small and marginal dairy farmers. Considerable progress was made in implementing scientific breeding programmes for increasing productivity of such breeds under NDP I.

Production of High Genetic Merit (HGM) bulls through genetic improvement programmes such as Progeny Testing (PT) and Pedigree Selection (PS), production of disease free high quality semen doses from HGM bulls produced through genetic improvement programmes, delivery of Artificial Insemination (AI) services at the doorstep of producers using only disease

free high quality semen produced from HGM bulls are being implemented under NDP I. Ensuring strict adherence to Standard Operating Procedures (SOPs) through an appropriate monitoring mechanism is another key component in implementing these projects. The Information network for Animal Productivity and Health (INAPH) application is being used for capturing data and dissemination of information across projects. This national database is a vital source of reliable data for analysis and policy making.

The activities under NDP I have reached a stage to implement latest scientific interventions like genomic selection and OPU-IVF to further accelerate genetic gains.

Progeny Testing

Genetic evaluation of dairy bulls based on performance of their daughters, referred to as progeny testing, is a practical and proven way for achieving a steady genetic improvement in any breed.

Under NDP- I, 14 sub-projects by 12 End Implementing Agencies (EIAs) with operations in nine states have been implemented having a total outlay of ₹ 2,248 million.

Progress made under PT projects during 2017-18

Breed	End Implementing Agency / State	No. of Bulls put to test	No. of HGM Bulls distributed to various Semen Stations
Murrah PT	Sabarmati Ashram Gaushala (SAG), Bidaj Gujarat, Punjab Livestock Development Board (PLDB, Punjab),Haryana Livestock Development Board (HLDB, Haryana), Animal Breeding Centre (ABC, Salon, Uttar Pradesh)	98	120
Mehsana PT	Mehsana & Banas Milk Unions (Gujarat)	19	22
Gir PT	Sabarmati Ashram Gaushala (SAG),	10	15
HF Cross PT	SAG, Bidaj Gujarat, Uttarakhand Livestock Development Board (ULDB, Uttarakhand)	105	51
Jersey Cross PT	Andhra Pradesh Livestock Development Agency (APLDA, Andhra Pradesh), Tamil Nadu Cooperative Milk Producers Federation (TCMCF, Tamil Nadu)	47	75
HF PT	Karnataka Milk Federation (KMF, Karnataka)	40	17
TOTAL		**319**	**300**

These projects have been implemented in their respective native tract following the Standard Operating Procedures laid down under NDP for PT projects. Required bio-security measures are also put in place in all these projects. All the projects together, since the launch of NDP I in 2012-13, have put 1,741 bulls under test and 1,102 young HGM bulls were supplied to different semen stations for production and supply of high quality disease free semen doses across the country.

An Expert Committee for Estimation of Breeding Value of Bulls formed by Government of India estimated and published breeding values of 887 bulls of six PT projects, namely SAG CB HF PT, SAG Murrah PT, Mehsana Milk Union (MU) Mehsana PT, Banas MU Mehsana PT, KMF HF PT and TCMPF CBJY PT projects. Apart from milk yield, breeding values for various other traits like Fat Yield, SNF Yield, daughter fertility and bull fertility were estimated and shared with various semen stations to enable them to select bulls with high accuracy.

Animal type classification forms an integral part of a PT project. Giving weightage to type traits in selection of animals adds value in evaluation and improves the longevity of animals. Measurement procedures have been developed for important type traits and an appropriate scale has been standardised for CBHF, Murrah and Mehsana breeds. The field implementation of typing has been initiated in a few PT projects.

Pedigree Selection

Building infrastructure for delivering Artificial Insemination services, performance recording of animals and selection of bulls of indigenous breeds for semen production in their native breeding tracts would contribute to genetic improvement of these breeds.

Pedigree Selection (PS) projects with a total outlay of ₹ 389.7 million were initiated for the conservation and development of five breeds of cattle - Kankrej, Rathi, Sahiwal, Hariana and Tharparkar and three breeds of buffaloes - Nili -Ravi,

Jaffarabadi and Pandharpuri in their respective native tracts. The Standard Operating Procedures (SOP) and the Minimum Standards (MS) set under NDP I are being followed for executingall these PS programmes.

Under NDP I, till date, 416 AI centres have been established, which have carried out 3,03,186 AIs. A total of 98 young HGM bulls have been produced in these projects and distributed to different semen stations across the country for production and supply of high quality disease free semen doses. During 2017-18, these projects together produced 65 HGM bulls ready for distribution to the semen stations.

Pedigree Selection Projects with a total outlay of ₹ 389.7 million were initiated

Progress made under PS projects during 2017-18

Sl No	Indigenous Breed	End Implementing Agency & States	No. of AI centres established	AI done	No. of bulls distributed to Semen Stations
1	Sahiwal	Sri Ganganagar ZilaDugdhUtpadakSahkari Sangh Ltd. (GANGMUL), Rajasthan	25	10,073	5
2	Sahiwal	Punjab Livestock Development Board (PLDB), Punjab	25	3,866	3
3	Kankrej	Banas Milk Union, Gujarat	76	14,050	6
4	Rathi	Uttari Rajasthan Cooperative Milk Union Ltd (UR-MULRural Health, Research and Development Trust), Bikaner, Rajasthan	45	13,143	9
5	Tharparkar	Rajasthan Livestock Development Board, Rajasthan	44	10,188	0
6	Nili Ravi	Punjab Livestock Development Board, Punjab	50	6,199	2
7	Jaffarabadi	SAG, Gujarat	50	14,629	3
8	Pandharpuri	Maharashtra Livestock Development Board (MLDB), Maharashtra	30	8,634	6
9	Hariana	Haryana Livestock Development Board (HLDB), Haryana	40	2,980	16
TOTAL			**385**	**83,762**	**50**

A huge database on production and reproduction characteristics of these indigenous breeds have been built using INAPH. The data is being used for understanding the production dynamics of the indigenous breeds in their native tract.

Bull Production through Transfer of Imported Embryo (BPTIE)

Four sub projects have been approved for production of bull calves from imported embryos of HF and Jersey breeds, under NDP I. The Participating Agencies (PAs) for the activity are: Haringhata, PBGSBS in West Bengal; Kalsi (Dehradun), ULDB in Uttarakhand; BAIF, Pune in Maharashtra and SAG, Bidaj in Gujarat. Till date a total 486 imported embryos have been transferred together by all four PAs and pregnancy rate of 36.6 per cent has been achieved. Total 151 calves (85 male and 66 females) have been born, out of which 47 male calves (30 HF and 17 Jersey) have been distributed to various A and B graded semen stations in the country.

Strengthening Semen Stations

For producing disease free, high quality semen for AI from high genetic merit bulls maintained at bio secure semen stations forms the basis of any genetic improvement programme through AI based breeding.

28 projects of 25 EIAs from 16 states have been approved for reinforcing the activities of A and B graded semen stations under NDP I with a total outlay of ₹ 3,022.77 million. Infrastructure, pertaining to biosecurity, semen production and processing of high quality, disease free

semen doses from genetically superior bulls, has been developed under these projects. These 28 semen stations together produced more than 80 million semen doses during 2017-18.

Semen Station Management System, for computerisation of all the aspects of semen production and sales, was deployed in 11 semen stations. Appropriate software solution will help digitise all the data regarding semen production, which in turn will help in improving the efficiency of semen production.

AI Delivery Services

During the year, about 1,330 AI centres were operational as a part of Pilot AI Delivery services. These AI centres together carried out about 6.4 lakh AIs and produced around 0.68 lakh genetically superior female calves.

The AI delivery services to the farmers remained the core activity of input delivery services rendered by all cooperative milk unions. During the year, the cooperative milk unions together performed about 16.40 million AIs through 22,330 centres covering 63,860 DCS.

Innovation and Adoption of Technologies to Enhance Productivity

Genomic Selection

Use of information from DNA of an animal along with its production records helps more accurate evaluation of genetic merit of an animal. The reference data thus created helps in accurate selection of young bulls at an early stage even if their daughter performance is not known. Recently developed Genomic Selection (GS) tools provide a new avenue for accurate determination of genomically Estimated Breeding Values (gEBV). GS is considered to be a quick and cost effective method for selection of breeding bulls and bull mothers. This method is now being used the world over in dairy cattle breeding.

NDDB's efforts to implement GS in India has now yielded results. For effective GS, NDDB has developed a micro array chip – INDUSCHIP - for genotyping indigenous cattle breeds and their crosses. The chip was developed as a result of joint project between NDDB and Aarhus University, Denmark. The genotype information generated using this chip will be helpful for estimation of genomic breeding values for different traits and selection of bulls and bull mothers based on genomic

In vitro embryo production facility

breeding values. The chip has SNPs which could also be useful in identification of breed proportions of indigenous and exotic breeds in animals. NDDB will supply this chip to interested organisations.

Using the reference data from HF Cross-bred progeny testing programme implemented by Sabarmati Ashram Gaushala, and the genotypes generated using INDUSCHIP, genomic breeding values were estimated for bulls and cows. It was found that the genomic breeding values of young bulls were 25 per cent more accurate than traditional breeding value based on pedigree relationships. It is for the first time that the feasibility to estimate genomic breeding values for cross-bred bulls and use the information for early selection of young bulls more accurately than the traditional methods of selection based on pedigree information has been demonstrated in the country. As sufficient performance records are available for other breeds, this chip will also be used for estimating genomic breeding values for other indigenous breeds and their crosses.

Ovum Pick Up and In vitro Embryo Production (OPU-IVEP)

In Vitro Fertilization (IVF) technology is gaining popularity world over to increase production of embryos and thereby increase production of progenies of an elite animal. Genetic gain per year, apart from other factors, depends on intensity of selection i.e. number of animals used for production of progenies out of the recorded animals. This means, through this technology, one can produce more number of calves from the elite animals having higher genetic potential, thereby increasing the selection intensity and speeding up the rate of genetic improvement.

Considering the above, NDDB has initiated a project to establish an R&D facility at NDDB, Anand to use IVEP technology to fully exploit the top most elite animals being identified in the PT and PS projects under NDP I.

Cooperative Milk Unions together performed about 16.40 million AIs through 22,330 centres covering 63,860 DCS

Training, capacity building and technical workshops

Continuous capacity building is essential for better implementation of projects. Under NDP I, during the year, 16 officers of PT & PS projects were trained at NDDB, Anand. Training of 34 semen station personnel was also facilitated by NDDB at three training Institutions – National Dairy Research Institute (NDRI), Karnal, Kerala Livestock Development Board (KLDB), Mattupatty and Anand Agricultural University (AAU), Anand for Semen Station Strengthening Projects. During the year, various officers attended international trainings too.

During the year, six INAPH TOT (Training of Trainers) programs were arranged at NDDB, Anand and 130 participants were trained.

Several workshops on project evaluation and INAPH implementation were held during the year. These workshops have helped participants to share their experience and best practices with others and acquire skill and knowledge to execute their projects more efficiently.

Project Monitoring and Evaluation

All AB projects are being monitored regularly by dedicated NDDB officers and the project authorities are provided with timely feedback and technical support which help in smooth implementation of these projects. During the year, 14 PT and 9 PS projects were evaluated by Evaluation Teams constituted by Mission Director, NDP I. These evaluations not only help the EIAs to examine the processes followed with respect to SOPs and understand the lacunae if any, but also help officers involved in implementation to learn different aspects of performance and take corrective actions. Evaluation teams provide constructive feedback to improve qualitative and quantitative performance of various projects through review meetings.

Annual evaluation of the projects revealed high quality implementation and strict adherence to prescribed scientific processes.

Information Network for Animal Productivity and Health (INAPH)

The use of INAPH was extended to cover 240 projects including Progeny Testing, Pedigree Selection and Ration Balancing Programmes spread across 24 states and 426 districts. 10.87 million animals, belonging to 6.61 million farmers spread across 95,915 villages, were ear-tagged for unique identification.

ANIMAL NUTRITION

Quality Mark

Currently there are no specific regulations to certify and monitor the quality of cattle feed and mineral mixtures produced in India. As a result, cattle feed and mineral mixtures that are available to the dairy farmers vary significantly with respect to their composition and nutritive value. Additionally more than 80 per cent of the cattle feed sold in India is of the BIS Type II variety, which cannot cater to the nutrient requirements of pregnant animals, buffaloes, calves and high yielding animals. Many cattle feed manufacturers also do not incorporate adequate quantities of minerals and vitamins in their feeds. This leads to sub-optimal milk production and reproduction in dairy cattle.

The quality of cattle feed and mineral mixtures is also important from the food safety point of view, since contaminants such as heavy metals and toxins can be transferred from feed to milk causing health hazards to human population.

Hence, NDDB proposed to introduce a 'Quality Mark' for cattle feed and mineral mixtures manufactured in the cooperative, government/semi-government sectors. This 'Quality Mark' is for voluntary adoption by the manufacturing units. Manufacturing units that opt for the 'Quality Mark' will have to adhere to specified nutritional standards for cattle feed and mineral mixtures. They would also be required to conform to 'Standard Operating Procedures' during the manufacturing process as well as adopt the requisite in-process 'Quality Control' procedures to ensure that the end product conforms to standard specifications.

During the year, five Cattle Feed Plants (CFPs) of Rajasthan Cooperative Dairy Federation have signed a Memorandum of Understanding (MoU) with NDDB for adoption of the 'Quality Mark'. A total of fifteen CFPs of various milk unions and federations in India are in the process of adopting the 'Quality Mark'.

This initiative is expected to contribute significantly towards improving the quality of cattle feed sold in India which in turn would assist in improved milk production and timely reproduction in dairy animals.

Calf Rearing Program

High mortality rates in new-born calves, delayed puberty, delayed age-at-first calving and long inter-calving intervals are the bane of dairy farming in India. To address the above issues, 'Scientific Nutritional Management of dairy animals has to be taken up right from the pregnancy stage of the dams and continued through calf-hood and growth stages of the calves. If executed properly 'Scientific Nutritional Management' can lead to higher birth weights of calves, lower calf mortality, earlier puberty and lower age-at-first-pregnancy and optimal inter-calving periods.

NDDB had designed the 'Calf Rearing Program' (CRP) during the previous year. Owing to impressive results the CRP was scaled up during the current year across various milk unions in Gujarat, Punjab and Karnataka. The CRP comprises - feeding specially designed 'Pregnancy feed' to the dams two months before calving, feeding specifically formulated Calf starter and Calf Growth Meal to the calves as well as scientific management of both the dam and the calf post-calving. During the year, CRP was extended to six Milk Unions in India. Banaskantha Milk Union in Gujarat had initiated the CRP with Kankrej cows, whereas four milk unions in Punjab (Ropar, Jallandhar, Patiala and Ludhiana) opted for CRP in Murrah buffaloes. Bengaluru and Mysuru Milk Unions of Karnataka, that have a high proportion of cross-bred cows in their areas opted for implementing the program in cross-bred animals.

During the year 4,372 pregnant animals were registered under the program. 2,868 calvings had taken place and 46 per cent of these calves were female. The average birth weight of Kankrej calves under CRP was 24.30 kg, which was 10 per cent higher than control group. Similar results were observed with Murrah buffaloes under CRP, where average birth weight was 35.74 kg, which was 15 per cent higher than control group. Calves fed with specially designed Calf Starter in the first six months exhibited 30 per cent higher growth than the control group. Average daily gain in first six months for calves under CRP was 418g and 439g for Kankrej calves and Murrah calves respectively. In contrast, calves under control groups were growing at less than 300g per day. Some Kankrej calves under the CRP exhibited first heat in the 11 month itself as against an average 'Age-at-first-heat' of 23 months recorded for this breed.

Feed supplement for addressing 'Heat Stress' among milking animals

Loss of productivity in dairy animals in tropical countries during summer is a common occurrence. High ambient temperatures result in increased body temperature and pulse rates among animals. Consequently, feed intake declines significantly and milk production drops. A drop in fertility and conception rate has also been recorded.

Kankrej calf being reared under the 'Calf Rearing Programme'

For alleviating the problem of 'heat stress' in dairy animals, NDDB developed a feed supplement that assists in improving water retention, lowers the pulse rates and body temperatures and also helps in improved feed intake and milk production among lactating animals. Studies have shown that on feeding the supplement, milk yield improved by 11.0 per cent and fat by 4.7 per cent. Large scale use of this supplement during summer months can greatly help in reducing the drop in milk production during the months April to August, when the average Temperature Humidity Index (THI) is more than 75.

Improving fertility among dairy animals through nutrition

Reproductive disorders in dairy animals have primarily a nutritional aetiology. Deficiency of energy and protein is commonly observed in addition to micronutrient deficiencies. During the year, NDDB formulated and tested a supplement for enhancing fertility in dairy animals.

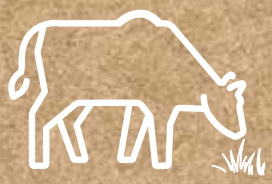
A study was undertaken in 69 cows with a history of repeat breeding (>3 inseminations) and anoestrus in six villages of Anand district. When these animals were fed the fertility supplement, mentioned above, 78 per cent of the animals in experimental group had confirmed pregnancies as compared to just 20 per cent in control group. A similar study was conducted in Cuttack district of Odisha and Amreli, district of Gujarat, wherein from among 120 animals, 86 animals (72 per cent) reported confirmed pregnancies after being fed this 'Fertility Supplement'.

Assessing 'Water footprint' for milk production

The production of milk requires large quantity of water – for production of forage crops and concentrate feed ingredients as well as to satisfy the drinking and cleaning requirements of animals. On the one hand, the pressure on our scarce water resources is increasing but on the other hand demand for milk and milk products continues to rise.

Against this backdrop NDDB initiated a study to assess the 'Water Footprint' of milk production. The 'Water Footprint' is defined as, the sum of the volume of freshwater consumed in different steps of the milk production chain, measured in units of water consumed (m^3) per unit of milk. This includes water consumed for both direct and indirect activities. Direct consumptive water use includes water used for drinking, bathing and servicing of animals, whereas indirect water usage includes water used for production of concentrate, dry fodder and green fodder. The study revealed that the average water footprint of milk from indigenous cows, cross-bred cows and buffaloes in Gujarat state was 1,970 and 1,820 m^3/tonne, respectively.

Feeding of animals in the traditional pattern led to a higher water footprint. In contrast animals fed a balanced ration, comprising a judicious mix of green fodder, dry fodder



29,621 LRPs provided balanced ration advisory services to about 2 million farmers for their 2.66 million milch animals in about 32,064 villages across 18 states

and concentrate feed ingredients, led to a lower 'Water Footprint'. The study indicated that there is a substantial scope for reducing the 'Water Footprint' of milk through balanced feeding.

Ration Balancing Advisory Services

Under the National Dairy Plan (NDP), Phase -I, 'Ration Balancing Advisory services' for milch cattle continued in 2017-18. As part of this initiative, the Local Resource Persons (LRP) visit farmers' doorsteps to formulate least cost balanced ration for the milking animals, using specifically designed computer software. Seven new Ration Balancing Program (RBP) sub-projects were initiated during the year, taking up the total projects to 114 overall.

Project coordinators for each RBP sub-project are pivotal to the successful functioning of the project. To upgrade the skills of selected project coordinators with respect to advanced technologies in dairying, 11 RBP sub-project coordinators were trained at Wageningen University in The Netherlands.

During 2017-18, 86 technical officers and trainers from 26 EIAs were also imparted one week training at NDDB, Anand. Cumulatively, 774 officers, including 75 women have been trained till March 2018. Refresher training was arranged for 26 officers of running projects to upgrade their project implementation skills. Besides these, an orientation-cum-exposure program was also conducted for LRPs of Greater Ganjam Gajpati milk union, Odisha at NDDB, Anand.

The technical officers of the EIAs in turn continued the process of imparting training on RBP to LRPs in their respective EIAs. During the year 4,348 LRPs were trained in 60 EIAs. Out of total 31,685 LRPs trained so far, 20 per cent were women, 11 per cent SC/STs and 66 per cent small holders. In 2017-18, 3.06 lakh animals of 2.22 lakh additional milk producers were brought under the ambit of RBP.

Cumulatively, 29,621 deployed LRPs provided balanced ration advisory services to about 2 million farmers for their 2.66 million milch animals in about 32,064 villages across 18 states of our country.

Data recorded in INAPH indicates that balanced feeding led to an increase in average daily milk yield of 0.26 kg and milk fat by 0.10 per cent along with reduction in feeding cost by ₹ 2.26 per kg of milk. These led to increase in average net daily income of milk producers by about ₹ 25.67 per animal.

Dairy Asia, a multi-stakeholder platform of organisations involved in dairying in 21 countries of the Asian region, announced 'Dairy Asia Sustainability Award' to recognise successful practices that make dairy systems more sustainable. It was observed that for enhanced milk production, milk producers would need to be advised on optimizing the usage of existing feed resources in a way that would meet the animals' requirements for milk production and other physiological functions. The new practice involved providing a balanced ration advisory service with locally available feed resources directly to farmers. The service was provided in local languages through village-based resource personnel, who had been given two weeks of training, through a net book/android tablet. This software could determine the feed requirements needed to meet the appropriate nutrient levels for an animal's physiological status and level of milk production

NDDB's RBP endeavour was adjudged the best intervention that has led to 'Sustainable Practice Change' in the livestock sector and was conferred the First Dairy Asia Sustainability Award during Dairy Asia meeting held at Nay Pyi taw, Myanmar on November 9, 2017.

Green Fodder Production Enhancement

Green fodder is the basic source of roughage for dairy animals. When fed in adequate quantities and in a planned manner it can reduce the overall cost of feeding on the farm. NDDB has made substantial effort to enhance green fodder productivity on farmers' fields through the dissemination of improved fodder cultivation technologies as well as techniques for fodder conservation, in addition to training of technical manpower of the dairy cooperatives. Green fodder productivity on farmers' fields can be increased by using

recommended agronomic practices in fodder cultivation after taking into account the prevailing agro-climatic conditions. Usage of quality seed of improved varieties /hybrids of fodder crops is also essential.

Enhancing the availability and usage of 'Quality Fodder Seed'

To enhance availability of quality fodder seed, technical support was provided by NDDB to Seed Processing Units of dairy cooperatives. Supply of breeder seed to cooperatives was arranged from different ICAR institutes and agricultural universities for use in the seed multiplication chain. NDDB facilitated the introduction of newly notified fodder varieties in the seed chain - such as Jawahar Berseem 5 (JB 5) in Berseem, CSV 27 in dual purpose sorghum and BAIF - 1 in Pearl millet. Certified/truthfully labelled seed of improved varieties of fodder crops were also distributed to farmers at the village level through the network of Dairy Cooperative Societies.

During the year, about 13.72 Metric Ton (MT) of breeder seed of improved varieties of fodder crops were obtained from the Indian Council of Agricultural Research/Agricultural Universities and supplied to registered seed growers for further seed multiplication and onward supply to dairy farmers.

Activities taken up by the Fodder Demonstration Unit

The Fodder Demonstration Unit (FDU), spread over 2.5 acres of land, took up the demonstration of recommended agronomic practices for the cultivation of fodder grasses, legumes, thorn-less cactus and drumstick (Moringa oleifera). Overall, 4,681 farmers as well as field staff, officers and members of the Board of Directors of Milk Unions underwent these demonstrations. Demonstration of fodder conservation in the form of silage (either made in bunkers or in re-usable polythene bags) was taken up so that farmers understand this method of fodder conservation which will ensure fodder supply during the lean season.

With the objective of economizing on the quantity of water used by the farmers for irrigation, techniques such as zero tillage, line sowing, drip irrigation and straw mulching were demonstrated.

Improved seed production technologies for various fodder crops were explained to officers of the Seed Producing Units as well as Seed Growers.

Demonstration of newly developed fodder varieties of fodder crops was taken up for visiting trainees and farmers.

To demonstrate the technique of fodder production, without additional land usage 'Food and fodder crop production sequencing' was highlighted via the inter-cropping of oats and fodder beet with autumn planted sugarcane.

Activities taken up at Mujkuva village of Anand district

In Mujkuva village, 0.52 hectare of Gochar land was developed for year-round green fodder production by planting Bajra Napier hybrid grass (BNH 10).

Green fodder production enhancement by use of quality fodder seed

Desired agronomic practices for Gochar land development - such as deep ploughing, fertility management, crop establishment, irrigation and fencing – were demonstrated to the farmers.

To increase green fodder availability in the village 800 kg fodder seed of improved varieties of multi-cut sorghum, bajra, maize and lucerne and 41,500 cuttings of Bajra Napier hybrid (BNH 10) were provided to farmers. A few progressive farmers were trained in low cost mechanised silage making technology to increase availability of fodder during the lean period. These efforts have led to an increased availability of green fodder, improvement in milk production and higher income to farmers in the village.

Popularisation of Drumstick (Moringa oleifera) as a fodder crop

Drumstick is a nutritious fodder crop for animals and is rich in crude protein, minerals and vitamins. It has many health benefits for animals. During the year 110 kg of Drumstick seed, variety PKM 1 was produced and supplied to milk unions and fodder farms for cultivation purpose. To meet the drumstick seed demand from milk unions, NDDB has developed Moringa orchard in 10 acres of land with drip irrigation system at Itola Farm near Baroda.

Activities under NDP I

Technical support was provided to 47 End Implementing Agencies (EIAs) for implementing Fodder Development Programs. Five new seed processing plants established at Kolar, Raichur, Vijayawada, Lucknow and Kota were fully functional and involved in seed production, processing and marketing activities. EIAs produced 2,543 MT of quality seed of different fodder crops through registered seed growers under buy-back arrangement and supplied about 7,816 MT of certified/truthfully labelled fodder seeds of improved genetics to farmers. In different states, 255 silage demonstrations were organised at the village level and 523 farmers adopted silage making after watching these demonstrations. Two Micro Training Centers in rural areas of Bharuch and Farrukhabad EIAs were made functional in coordination with progressive dairy farmers of those areas for creating awareness about green fodder cultivation, ensiling and adoption of modern animal husbandry practices.

Crop Residue Management

Crop residues will continue to be the basal diet for dairy cattle of our country. Cost of crop residues is increasing day-by-day due to the absence of straw management machines in our villages. Moreover, the increased use of ‘grain picking combines’ for high speed pick-up of food crops like wheat, rice, maize, oilseeds, pulses etc. is resulting in heavy loss of crop residues right in the fields. During the year the following straw management activities aimed at reduction in field wastage and economisation of feeding cost were undertaken.

Popularisation of mowers and pick-up devices

For reducing the field wastage of dry fodder a variety of mowers and pick-up devices have been introduced in different locations. These mowers (also called fodder harvesters) are high-speed machines designed for efficient

Straw picking, chopping and loading machine used in combine harvested area

7,816 MT
of improved varieties of fodder seeds were provided to farmers by dairy cooperatives

harvesting and pick up of fodder biomass from the field with or without wilting/sun-drying attachments. During the induction of these mowers special care was taken to offer options for chopping, stem-cracking, conditioning, lining, raking, trailer-loading or baling as per the characteristics of the biomass so as to recover maximum possible fodder from the fields in an energy-efficient and economical manner.

During the year, 25 mowers along with fodder biomass management attachments were introduced at various locations for village level demonstrations. With the help of these mowers over 790 demonstrations were carried out to explain the usefulness of these machines in fodder biomass management, from harvesting to storage.

Village Level Fodder Buffers

Considering the importance of having 'village level fodder buffers', biomass bunkers having capacity ranging from 50 kg to 250 MT were introduced at strategic locations. Subsequent to this many progressive farmers and village based institutions have adopted the 'fodder mowers' and 'bunker systems' for management of roughage in wet as well as dry conditions.

Straw enrichment and densification plants

Crop residues though back bone of Indian dairy farmers are extremely poor source of essential protein, energy, minerals, vitamins and trace elements apart from being bulky in nature. Their fortification and enrichment is essential before feeding productive bovine animals. To solve these problems two model straw enrichment and densification plants are being installed at Sri Ganga Nagar in Rajasthan and Kolhapur in Maharashtra having options for pellet as well as densified block-making. These plants will demonstrate the methods for improving the nutritive quality of residues, which in turn can support milk production on a stand-alone basis up to a certain level. Apart from benefits like field wastage reduction and pollution control the enriched crop residues based partial mixed ration diet will also assist in reducing the overall cost of milk production. Since the crop residue based bovine feeding system does not compete for land and water, badly needed for human food production, the investment on straw management infrastructure qualifies to be termed eco-friendly.

ANIMAL HEALTH

NDDB plays an active role in disseminating cost effective field models to control diseases of economic importance. Efforts were made to ensure that such models are eco-friendly, easy to adopt, improve work efficiency and, help in reducing the usage of drugs, especially antibiotics.

NDDB expanded the reach of brucellosis control project to 370 villages in Kaira District Milk Producers' Cooperative Ltd, Anand, Gujarat, and also continued to support the villages in Kutch district, Gujarat. All the crucial control elements like proper disposal, vaccination, disinfection, animal isolation etc., are also put in place. 60,500 cattle and buffalo calves have been vaccinated during the year. All the vaccinated calves are uniquely identified by ear tagging. For an effective field control programme, NDDB is also collaborating with Shree Krishna Hospital, Karamsad, to bring in the much needed linkage with the medical practitioners to tackle this zoonotic disease in humans. Around 420 farmers and animal health personnel have already been tested and treatment initiated for those with symptoms. The project is for a period of five years with a total outlay of ₹ 113.68 million with NDDB contributing ₹ 54.31 million.

More impetus has been given for Ethno-Veterinary Medicine (EVM) wherein the cases treated by EVM are being documented so as to create a robust database on the cure rates of various formulations. It also aims at reduction in use of antibiotics and other drugs through more and more use of EVM formulations and knowledge transfer to the farmer which will also help him in reducing treatment costs significantly.

Encouraged by the success of the pilot mastitis control project in Sabarkantha, NDDB is now implementing Mastitis Control Popularisation Project (MCPP) in 26 other milk unions across eight States (Kerala, Karnataka, Tamil Nadu, Telangana, Andhra Pradesh, Maharashtra, Gujarat and Punjab), covering around 1,500 DCS ; 1,04,500 pourers and 1,71,000 in-milk animals. More than 100

veterinarians from the participating milk unions have been trained on EVM at Trans Disciplinary University (TDU), Bengaluru followed by field trainings at several locations across the country. A web based reporting system has been deployed to capture all the data being generated from the project.

Hoof management has not been given its due importance though it is a known fact that hoof problems can significantly reduce productivity due to constant pain to the animal which results in a vicious cycle of disease conditions like mastitis, metritis, repeat breeding etc. In an effort to create awareness on the hoof management, especially in stall fed animals, NDDB arranged for a two day hands-on training programme on hoof management in field conditions for around 40 veterinarians from seven milk unions in Gujarat and Maharashtra on a pilot basis. Encouraged by the positive feedback received, NDDB is planning to extend this programme to other milk unions also.

NDDB initiated a pilot project on Infectious Bovine Rhinotracheitis (IBR) control using inactivated marker vaccine (gE detected marker vaccine) in 11 villages and in an organised dairy farm in three different states, so as to assess the efficacy of vaccination to control IBR under field conditions in both cattle and buffaloes. The main components of the project are creation of awareness on IBR, vaccination, animal identification through ear tagging, pre and post vaccinal sero-monitoring, studies on shedding of virus, differentiation of infection and vaccination antibodies etc. Initial results indicate that the vaccine is safe and no significant reduction in milk yield was recorded immediately after vaccination. Post vaccinal sero-conversion was noted in almost all the animals and they could also be differentiated from infection antibodies by companion DIVA (gE) ELISA.

The pilot is for a period of two years with a total outlay of ₹ 34.3 million of which ₹ 2.1 million is NDDB's contribution.

Biosecurity in bull production areas and semen stations

Projects in 13 Progeny Testing, 10 Pedigree Selection and 22 semen stations are being monitored on a routine basis for biosecurity and other animal health protocols so as to enable production of disease free semen. Further, the 10 km radius of each frozen semen station under NDP I is being covered under vaccination against Foot and Mouth Disease (FMD) and other significant infections to reduce the chances of disease ingress into the semen station.

INAPH Health module

The INAPH Health module has been deployed at Kolhapur milk union in Maharashtra and is now an integral part of the veterinary services delivery system of the union. As on March 2018, records of more than 2 lakh cases have being captured in the system since its deployment in April 2017. It is envisaged that the robust data generated through the analytical reports would help the union to make informed decisions in disease prophylaxis and control that would benefit the dairy farmer in the long run. INAPH Health module is being envisaged to be implemented in several other milk unions in the country in the coming year.

Success stories of NDDB supported control projects

Ethno-veterinary medicine as a cost effective alternative for mastitis therapy

Many cases of successful mastitis treatment by EVM have been recorded. Some of those have been written off by antibiotic therapy as untreatable. Parenteral antibiotic and supportive treatment for mastitis costs a farmer dearly as vouched by farmers like Shri Dadaroa Kapse & Shri Ekanath Dabhade of Aurangabad Milk Union, Maharashtra. Shri. Kapse from Mamnabad village, had consulted three different veterinary practitioners for treating his animal that had developed mastitis and spent around ₹ 24,000/-, but to no avail. While searching desperately for other options to cure his animal and salvage whatever production possible, he came across EVM and decided to give it a try. To his pleasant surprise, his animal was cured except for one quarter that had already developed fibrosis by then. He hopes that in the next lactation, that quarter would also be healed as well and he plans to regularly apply the EVM preparation before the animal is due for calving to avoid such ordeals again. The story is no different for Shri Ekanath Dabhade from Sonari village, who had spent around ₹ 16,000/- for mastitis therapy with no results until he tried EVM with good outcome.

Bhuvel : An EVM village

Bhuvel village in Sabarkantha district is one of the 100 villages under the NDDB's pilot mastitis control project being implemented in the milk union since 2014. Bhuvel had made great inroads in reducing the levels of sub-clinical mastitis (SCM) significantly over the years as detected by California Mastitis Test (CMT). Having found a sustainable solution to the problem of sub-clinical mastitis through regular CMT at DCS and individual farmer level to identify animals with SCM and oral administration of trisodium citrate (TSC), they whole-heartedly adopted EVM practices to treat mastitis cases. At

Bhuvel antibiotic usage for treatment of mastitis and some other ailments is passé. Many farmers prepare the formulation at their homestead and for those who cannot, the DCS provides the same. DCS has now extended the EVM adoption by preparing and distributing EVM formulations on a regular basis to manage other simple ailments like fever, diarrhoea etc. Farmers from the nearby villages now approach the DCS for these formulations and are ready to pay for it. Taking a cue from this the union has started preparing EVM formulations on a daily basis for simple ailments like fever and diarrhoea in order to avoid use of drugs and antibiotics as a first measure in managing such ailments.

Successful experiment in hoof management

Shri Parag Bhai, a dairy farmer with 30 cross-bred Holstein Friesian animals was identified in Ramvas village, Palanpur, Banaskantha district, Gujarat. He was sceptical initially when his farm was selected for the hands-on field training on hoof management under the NDDB's pilot project, hoof management being implemented in Banaskantha Milk Union. During the training many animals were identified with hoof issues and, four animals with overgrown hoof and corkscrew hoof were taken up for hoof management without a hoof trimming crate, using a leg rope with proper restraining.

All the four animals had completed three lactations and two were dry in advanced pregnancy. After the procedure was completed, the farmer was asked to record the milk production of the two milking animals, both of which had completed two months of lactation, after 10 days.

After 10 days, the owner called up the union and reported an increase in milk production from two litres per day to five litres per day in one animal (an increase of 3 litres per day) and, 7.5 litres to 10 litres per day (an increase of 2.5 litres per day) in the other. He also noted that the animal was walking freely and seemed more at ease. He requested that the next training programme also be arranged at his homestead since he wanted all his animals to be checked for hoof issues. It was clearly evident to him that improving animal comfort improves the milk production significantly, an aspect that is usually ignored by the farmer due to the lack of awareness.

Veterinarians who received the hands-on training appreciated the ease with which hoof management can be done in the field without a hoof trimming crate, provided the restraining is proper.

Ethno-veterinary medicine (EVM) is a very cost-effective and efficacious method to manage mastitis without the use of antibiotics

RESEARCH & DEVELOPMENT

NDDB's R&D laboratory is adopting stringent international quality standards and has been accredited with ISO/IEC 17025: 2005 (NABL) and ISO 9001:2008.

High throughput and error free sample processing at NDDB R&D Laboratory for animal disease diagnosis and research

R&D Laboratory continued its support to various disease control initiatives of NDDB by adopting cutting edge technologies.

The R&D laboratory has participated in an international proficiency testing programme and proved its proficiency in animal disease diagnosis. The laboratory focused on providing disease diagnostic service and advisory role to various semen stations, bull mother farms and PT/PS areas covered under NDP I, located across India. The laboratory processed more than one lakh samples for the second year in a row. This unit continued its support to various disease control initiatives of NDDB by adopting cutting edge technologies. In addition to the above activities, the laboratory also undertook various research and development activities concentrating on finding a solution to real-time difficulties faced in animal disease diagnosis in the Indian scenario.

Disease diagnosis

This laboratory has been entrusted with the mandate to screen sexually transmitted diseases of cattle and buffaloes and to suggest appropriate disease prevention and control measures for achieving disease free status. The diseases listed in the compendium of minimum standard protocol for bovine breeding issued by Department of Animal Husbandry, Dairying and Fisheries (DADF), Government of India, forms the core of the diagnostic activity. This type of diagnostic service is mostly availed by agencies involved in bull production activities (semen stations, bull mother farms, villages covered under PT/PS programmes) and includes other agencies affiliated to NDDB and end implementing agencies covered under National Dairy Plan-1. The diseases for which diagnostic services are provided includes infectious bovine rhinotracheitis (IBR), bovine brucellosis (BB), bovine

viral diarrhoea (BVD), Johne's disease (JD), bovine genital campylobacterosis (BGC) and bovine trichomonosis. The laboratory processed a total of 1,00,864 samples originating from 682 consignments received from 74 stakeholders of 14 states. The lab also screens samples originating from various disease control projects initiated by NDDB.

The laboratory screened 24,792 and 23,013 serum samples from cattle and buffaloes for diagnosis of brucellosis and IBR respectively, of which 2.03 per cent were positive for brucellosis and 16.05 per cent were positive for IBR. The prevalence rate varies greatly between organised and unorganised herds. The prevalence in unorganised sector (at village level) was 8.47 and 35.50 per cent for Brucella and IBR respectively, whereas in organised sector (semen station, bull mother farms and dairy farms) it was 1.10 per cent for brucellosis and 30.76 per cent for IBR. The prevalence of Brucella and IBR where scientific management practices and strict biosecurity measures are implemented (semen stations), were 0.52 per cent and 28.25 per cent respectively.

Serological screening of 16,671 samples for detection of BVD antigen revealed 30 positive cases (0.18 per cent). Out of these 30 animals, seven animals were found to be persistently infected (PI) on further testing at one month interval. Identification and removal of PI animals was recommended as they are lifelong carriers and act as source of infection for other animals in the farm. Screening of 1,919 serum samples for detection of antibodies to *Mycobacterium avium* subspecies *paratuberculosis* (MAP), causative agent of Johne's disease revealed 1.36 per cent positivity in ELISA. The laboratory also processed 590 preputial washings from bulls and 27 vaginal wash of cows for detection of BGC and trichomonosis by cultural isolation method and none were found positive.

Quality control of frozen semen batches

Frozen semen doses (FSDs) produced from IBR sero-positive bulls could be a source of infection of BHV-1 for naive cows during artificial insemination. Therefore, MSP guideline issued by DADF mandates screening of all the batches of FSDs produced from IBR sero-positive bulls for presence of BHV-1 virus either by real time PCR or cell culture. The laboratory received and processed a total of 35,461 FSDs from semen stations located at different parts of the country and declared 1.47% FSDs to be positive for BHV-1 DNA. The bacterial load in the FSDs is another important quality control parameter for clean and appropriate handling of semen batches. The laboratory processed 349 FSDs for determination of bacterial load and 90.5 per cent of FSDs passed the parameter as per the cut-off set in the MSP.

Lyophilisation of reference strains

The laboratory maintains a well characterised repository of reference materials constituting positive and negative panel of sera, plasma, reference and field strains of the causative agents of each disease being diagnosed in this laboratory. These materials/strains are used for development and/or evaluation of new diagnostic techniques for diagnosis of diseases. Lyophilisation is the best method for long term preservation of these materials. Therefore, the laboratory has initiated freeze-drying of reference samples by using most contemporary lyophilisation system.

Isolation, confirmation and antibiogram of mastitis causing agents

The laboratory initiated processing milk samples collected from cases of clinical and sub-clinical mastitis for isolation of causative agents. Common mastitis causing agents viz. *E. coli, Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus agalactiae and Klebsiella spp*. could be isolated. These isolated organisms were further confirmed by specific PCR reactions. *Staph. aureus* was found to be the most predominant isolate followed by *E. coli*. Among the *Staph. aureus* isolates, 37.8 per cent were confirmed to be coagulase positive. Antibiogram studies revealed, 71 per cent of *E. coli* isolates and 46 per cent of *Staphylococcus* isolates to be resistant to β-lactam group of antibiotics. Further, 18.2 per cent of *Staph. aureus* isolates were also found to be resistant to methicillin. Further work on isolation and confirmation of agents from more number of mastitis cases and studies of the presence of antimicrobial resistance (AMR) genes in the isolates are also being undertaken through whole genome sequencing and PCR techniques. The metagenomics protocol using Ion-torrent PGM reporter was optimised. Processing of mastitis milk samples identified 6-18 different species of organisms in the milk samples. A number of pathogenic organisms' viz. *Staph. aureus, Corynebacterium bovis, Streptococcus uberis* and *Staph. dysagalactiae* could be identified. Further studies on more number of milk samples are under progress.

Duplex real time PCR for Brucella and BHV-1

IBR and brucellosis are the major agents of infectious abortions in India. The laboratory developed a duplex real-time PCR for simultaneous detection of Brucella and BHV-1 in clinical specimen of cattle and buffaloes. This duplex real-time PCR utilises primers and probes targeting *bcsp31*

and *gB* gene of BHV-1 and Brucella respectively and the limit of defection was found similar to the individual real time PCR. The test was found to be highly repeatable in intra and inter-assay study (CV within 10 per cent). This duplex real-time PCR was validated with individual real-time PCR by comparing the result of 443 clinical specimens (nasal and vaginal secretions and placental tissues). The diagnostic sensitivity (dsn) and diagnostic specificity (dsp) for both the pathogen was found to be above 95 per cent and 99 per cent respectively (very good degree of agreement, kappa value 0.974).

Investigation of abortion cases in an organised herd

A study was conducted to investigate the causes of infectious abortion in an organised dairy herd experiencing high rate of abortion. Occurrence of major abortifacient viz. *Brucella*, BHV-1, BVDV, *Neospra caninum, Coxiella burnetii* and *Leptospira hardjo* was studied by employing serological test (ELISA). The prevalence of Brucella, BHV-1, BVDV and *Leptospira* was very high (> 50 per cent) whereas the prevalence of *Neospora* and *Coxiella* were low (<10 per cent).

Further, 59 abortion cases were investigated for involvement of abortion causing agents by employing serological (ELISA) and molecular techniques (real-time PCR). Serologically, antibodies to *Brucella*, BHV-1, BVDV, *Neospora, Coxiella* and *Leptospira* were detected in 94.9 per cent, 86.4per cent, 89.35 per cent, 8.4 per cent, 6.8 per cent and 5.6 per cent of aborting dams. In real-time PCR, BHV-1 DNA was detected in 22.4 per cent cases whereas, Brucella DNA could be detected in 55.77 per cent cases. Dual infection was recorded in 17.24 per cent cases. BVDV RNA could not be detected in any of the cases. Further study on the involvement of other infectious agents is under progress.

Evaluation of commercial ELISA kit for bovine brucellosis

Commercially available ELISA kits from seven established manufacturers were compared for fitness of purpose in the Indian context. A total of 675 serum samples originating from Brucella free herds (n=200), infected herds (n=182), vaccinated herds (n=86) and from villages of different states unknown status (n= 207) were randomly selected. The dsn and dsp of the kits were determined by three approaches (Rose Bengal plate test as gold standard test, known confirmed status of the animals and by Bayesian latent class analysis). The dsn among the kits varied from 65.8 per cent to 100 per cent whereas the dsp varied from 67.5per cent to 95.2 per cent. On the basis of our findings necessary

Immunization in progress under NDDB's pilot projects on control of diseases in dairy animals

recommendations have been made to use the ELISA kit with high sensitivity and specificity for routine diagnosis in the laboratory. Further evaluation of kits with larger number of samples to reach a confirmatory conclusion is under progress.

Differentiation of cow milk from buffalo milk by real-time PCR

Fraudulent practices of mixing buffalo milk with cow milk to obtain the premium price of pure cow milk has been reported. The laboratory developed a molecular technique for detection of this adulteration of buffalo milk with cow milk. The SYBR green based real-time PCR targeted *16S RNA* and *cytB* mitochondrial gene of cow and buffalo respectively. The specificity of the test was validated with 10 breeds of cattle and 7 breeds of buffaloes. The test could detect 1:10 v/v adulteration of buffalo milk in cow milk and can be used in routine screening.

Evaluation of Nobuto filter paper strips for transportation of bovine blood

Nobuto filter paper strips has been reported as an alternative method for transport of blood/ serum samples for diagnosis of diseases. The laboratory evaluated the utility of these filter papers by spotting blood samples of cattle and buffaloes for detection of antibodies to Brucella in ELISA. A method for elution of antibodies from the dried blood spots was optimised. Screening of 180 blood spots revealed a dsn and dsp of 95.28 per cent and 90.57 per cent respectively in comparison to the direct serum samples transported in cold chain. The degree of agreement between the two methods was very good (Kappa value = 0.854). These findings suggest, Nobuto filter paper can be considered as an alternative for transportation of samples from remote areas for disease surveillance studies.

The laboratory's participation in international proficiency testing programme ensures its competency in disease testing.

Results of NDDB R&D Laboratory's test methods matched 100% with that of the International Proficiency testing provider

The laboratory ensures valid test results by adopting quality control measures and continuously evaluates its competence by periodic re-testing of representative samples and by participating in internationally recognised proficiency testing (PT) programmes. The PT programme determines the performance of the individual laboratory in specific tests. The laboratory enrolled with VetQAS, APHA, UK, the leading PT provider for veterinary diagnostics, for evaluation of serological tests adopted for diagnosis of IBR, brucellosis, BVD and JD. The laboratory received coded serum samples from the PT provider as per schedule, tested it and uploaded the result within specified time frame. The laboratory results matched 100% with the anticipated result for all the batches of samples received for all the five tests undertaken. The laboratory's participation in international proficiency testing programme ensures its competency in disease testing.

PRODUCT AND PROCESS DEVELOPMENT

NDDB is engaged in research and development activities to support dairy cooperatives by providing new products and processes, and facilitating diversification of product portfolio and value addition to existing products.

During the year, recipe and process were standardised for two new products – milk protein soft candy and dairy-based smoothie. Milk protein soft candy is developed for kids and aimed to serve as a carrier for protein. This product contains substantially higher amount of milk protein derived from whey as compared to the similar products available in the market. Whey proteins have higher biological value as compared to other proteins. They are a tremendous source of dietary nitrogen and essential amino acids, and help to promote muscle growth. Further, the product is a good vehicle for fortification of micronutrients.

Dairy-based smoothie

Dairy-based smoothie is a refreshing beverage containing nutrients and phytochemicals from milk and fruits. The product has good digestibility as fermented milk and whey solids have been used in its preparation. Dairy plants which are manufacturing *lassi* and/or *chhachh* can easily manufacture this product using the existing process line.

NDDB has developed a low cost nutrition meal based on cereals and milk components, fortified with vitamins and minerals for improving the nutritional status of school going kids. The meal has been formulated on the basis of nutritional guidelines given by National Institute of Nutrition and Food and Agriculture Organisation for kids between age 4-6 years. The product has been found highly acceptable by school going children.

In continuation of the Dairy Board's efforts to provide *ready-to-use* cultures (RUC) of indigenous origin to cooperative dairies, the technology for one such culture to be used for *dahi* production was developed in this year. Improvisations in previously developed RUC technology for production of *mishti dahi* were also made by enhancing acidification activity. Both of the RUC formulations were tested by carrying out successful industrial trials at WAMUL, Assam; DIMUL, Nagaland; and Jharkhand Milk Federation, Jharkhand.

In an effort to enrich NDDB's starter culture depository, eight potential lactic acid bacteria comprising two thermophilic streptococci and six lactobacilli were isolated from traditional fermented milk products. These isolates are being screened for suitability of conversion to RUC.

Non-RUC propagative type lyophilised starter cultures for production of *dahi*, *mishti dahi* and *lassi* were supplied to Dimapur Milk Union, Nagaland, during the year.

Milk protein soft candy

BUILDING AN INFORMATION NETWORK

NDDB collects information through its Internet based Dairy Information System (iDIS) and from need based studies and various secondary sources to augment the dairy database for planning, policy decisions and supporting the interests of cooperative dairying.

Dairying a source of livelihood

In Bundelkhand region of Uttar Pradesh, a large scale sample survey was conducted in 416 sample villages covering 1.62 lakh households to gather information on milk production, marketable surplus and procurement by various agencies at the sub-district level

Information Building

During the year, NDDB continued to implement the modified "Internet based Dairy Information System" (iDIS), a-web enabled system with an objective to provide a common platform for the dairy cooperatives for their mutual benefits. MIS personnel from over 250 milk unions, marketing dairies, cattle feed plants and milk federations were reoriented and trained in the new modified web-based system. The new system has been made simpler and more user-friendly.

Assessing the potential for dairy development in Bundelkhand region of Uttar Pradesh

An assessment of potential for dairy development in Bundelkhand region of Uttar Pradesh covering seven districts viz., Banda, Chitrakoot, Hamirpur, Jalaun, Jhansi, Lalitpur and Mahoba was carried out during the year. In this regard, a large scale sample survey was conducted in 416 sample villages covering 1.62 lakh households to gather information on milk production, marketable surplus and procurement by various agencies at the sub-district level (i.e. tehsil /block).

It was found that almost every second household owned milch animal(s) in the study area, with higher proportion of ownership in Jhansi, Chitrakoot and Jalaun districts. The proportion of milk sold by the milch animal owning households (MAH) was estimated at 53 per cent, while the net milk surplus available in the villages was estimated at 44 per cent of production. This profile varied from district to district. The organised sector for milk procurement in the villages was virtually non-existent and hence most of the milk (94 per cent) was sold to unorganised channel – dudhias locally in the villages or outside the villages. The total milk production in these seven districts together was estimated at 4.3 lakh litres per day, milk producers' surplus at 2.3 lakh litres per day and net surplus at 1.9 lakh litres per day.

Estimation of milk production and surplus in 11 districts of Marathwada-Vidarbha regions

A comprehensive survey was carried in October 2014 in eight districts of Marathwada & Vidarbha regions to assess the potential for dairy development. Based on the findings of the survey, milk potential pockets were identified and milk procurement operations were initiated by the MDFVL. During the year, the remaining 11 districts of these regions were surveyed with the support of the Department of Animal Husbandry and Dairying, Government of Maharashtra. Based on the findings of the survey, the district-wise strategies for dairy development have been prepared.

Baseline Surveys for National Programme for Dairy Development

To avail the assistance under National Programme for Dairy Development (NPDD) – a Central Sector Scheme of Government of India, the cooperative milk unions are required to submit a project proposal along with baseline report consisting of details on milk production, productivity of animals, procurement, processing infrastructure and marketing based on primary sample survey. In this regard, surveys were conducted to create baseline indicators on the above parameters for monitoring and evaluation at the request of milk Unions of Ballabhgarh in Haryana and Ashti, Aurangabad, Walva & Jalgaon in Maharashtra.

Statistical dairy profiles for

12 major dairying states have been published till date

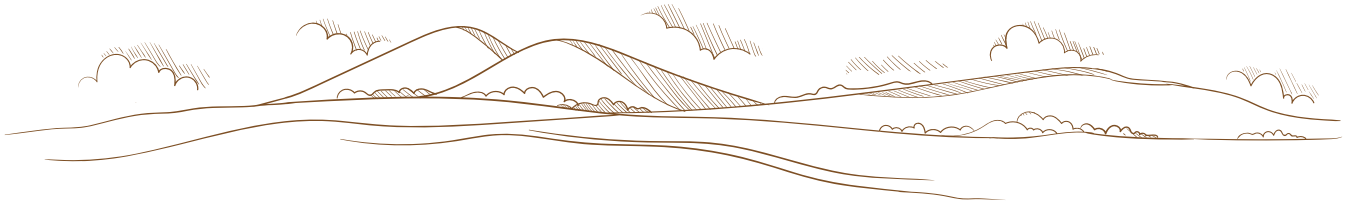
Study to ascertain the prevailing levels of Fat and SNF content in raw milk at producer level- Phase II

NDDB undertook a scientific study to understand the prevailing Fat & SNF level of milk at the udder level in six states. The samples at different stages were collected following proper stratification of the districts by type of animal reared and density of milk production. The first phase of the survey was carried out during November 2016 and the second phase in July 2017. In phase- II, it was found that the issue of low Fat & SNF in cross-bred cows was higher in summer season, as compared to winter season. Further, more than 50 per cent of total cross-bred animals' samples reported lower SNF content and 17 per cent of total samples reported lower Fat content than FSSAI standards.

Model DCS

On the lines of Mujkuva Model DCS set up in Gujarat, a baseline enumeration covering all households in Gandava Kalan village in Fatehgarh Sahib district of Punjab and Belari village in Ujjain district of Madhya Pradesh was conducted to benchmark socio-economic profile of the villagers, dairy animal ownership, productivity, milk production, consumption and sale.

It was found that only 1-2 per cent of the total households reported dairying as primary source of occupation in both the villages. In Gandava Kalan (F.G. Sahib), 35 per cent of households indicated that dairy animal rearing was supplementary source of income, whereas the same was



52 per cent in Belari (Ujjain). While Gandava Kalan village in Punjab had predominantly cross-bred cows (56 per cent) followed by buffaloes (42 per cent), Belari village reported higher proportion of buffaloes (51 per cent), followed by cross-bred cattle (38 per cent). In both these villages, more than three-fourths of total milk produced was sold by the producers and dairy cooperative society was the only credible institution for milk sale.

Exploring opportunities for dairy development in Arunachal Pradesh

A Memorandum of Understanding (MoU) was executed between the Government of Arunachal Pradesh (GoAP) and the National Dairy Development Board (NDDB) for dairy development in the state. A comprehensive survey was conducted in 5 districts- Lohit, Namsai, Lower Dibang Valley, Papum pare and West Kameng. Based on the findings of the survey, a 5-year dairy development plan was prepared and submitted to GoAP.

External Monitoring & Evaluation for NDP I

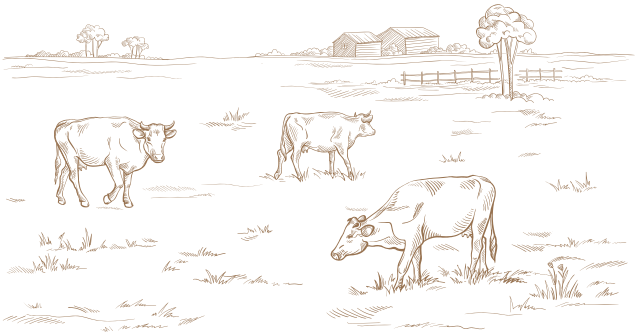
The field work for the 4th annual round for monitoring Project Development Objectives (PDO) level indicators of NDP I with a specific theme on "Entrepreneurial Behaviour of Dairy Farmers" by the external agency has been completed.

Geographical Information System for Milk Unions

Geographical Information System (GIS) for milk unions has been conceived, designed and developed exclusively for the use of cooperative milk unions. During the year, workshops to initiate the use of GIS at milk union level were held in three states (Haryana, Punjab and Kerala) and officers of nine milk unions were trained in utilising open-source GIS application (QGIS).

Statistical profile on dairying

Statistical dairy profiles for 12 major dairying states have been published till date. These reports were widely circulated across all functionaries of the government, administrators, research institutions, academic and policy making bodies and were received well by various stakeholders.



DEVELOPING HUMAN RESOURCES

The focus, during the year, was on grooming young professionals to make a difference in the farmer owned cooperative Institutions.

Capacity building through training

12,268 people were trained during the year

Throughout the year, training and capacity building programmes under various modules were conducted for producer members, officers and board of directors of milk unions. Dairy cooperatives organised village awareness programmes on National Milk Day wherein 1.2 Lakh farmers participated. Importance of dairying, cooperative principles and importance of women participation, fairness and transparency in milk collection system, scientific animal management practices, better quality fodder, clean milk production practices and democratic governance system of the cooperatives were covered in these programmes.

Newly inducted personnel from Uttar Pradesh and Madhya Pradesh State Dairy Cooperative Federations were trained in Dairy Cooperative Management. Orientation on Dairy Cooperative business was also provided to newly joined officials from the Vidarbha and Marathwada Dairy Development Project. In addition to this, around 50 Veterinarians working in the Animal Health Department were also imparted Training of Trainers (TOT).

Under NDP I, newly inducted personnel of milk unions from Gujarat, Jharkhand, Karnataka, Haryana, Punjab and Tamil Nadu got the opportunity to be trained on various aspects of Dairy Cooperative management.

Training was imparted on Milk Marketing, in association with specialists from other Institutions. Trainings have also been conducted in other core areas like Milk Procurement, Animal Nutrition, and Animal Breeding. For ensuring efficient and transparent milk procurement and Clean Milk Production Processes, training of trainers for Bulk Milk Cooler operation & maintenance was also organised during the year. Progressive dairy farmers were provided training on Dairy Entrepreneurship at the Regional training Centres on scientific animal management. A Leadership Development

training programme for Board of Directors of milk unions was conducted.

At the request of milk unions, NDDB conducted training programmes on Ice-cream manufacturing.

During the year, 12,268 people were trained under different categories, at NDDB, Anand and its regional training centres. The participation of women personnel was encouraging, about 26 per cent of the personnel trained this year were women.

At the request of VAMNICOM, Pune, an International Training Programme was conducted for SAARC nations, in which 21 participants from Bangladesh, India, Nepal and Sri Lanka were trained.

749 Training nomination during the year

Human Resource Development

Learning and development, employee engagement and organisational capacity building was the focus of HRD initiatives during the year. Need based functional as well as managerial/behavioural training was facilitated for NDDB employees through in-house customised programmes as well as through sponsorship to training programmes in premier institutions within and outside the country. Training programmes like Project Management, Total Quality Management, Basics in Management, Leadership Development, Becoming Future Ready, Achievement Motivation, Quality Control and Quality Assurance in Concrete Structure, Dairy for Non-Dairy were organised in collaboration with well-known institutions/experts. Training programme on “Total Quality Individual” focused on personal effectiveness was organised for the staff and workers. In all, 749 training nominations were processed during the year.

With the focus on organisational capacity building, 17 NDDB officers underwent mentoring programme and 10 officers underwent sectoral exposure programme at Milk Unions across the country. A Future Leadership Development Programme with the objective of grooming young officers has also been initiated. NDDB organised an 11 day orientation programme for Management Trainees from Jharkhand Milk Federation wherein 11 trainees participated. Two training programmes for 50 executives of Maahi Milk Producer Company on “Self Development” were also facilitated during the year. NDDB also provided support to Milk Unions for recruitment of human resources during the year. Other important employee engagement initiatives like talks on contemporary themes, book review, Unnati (group learning forum for workers) and inspirational videos were organised throughout the year.

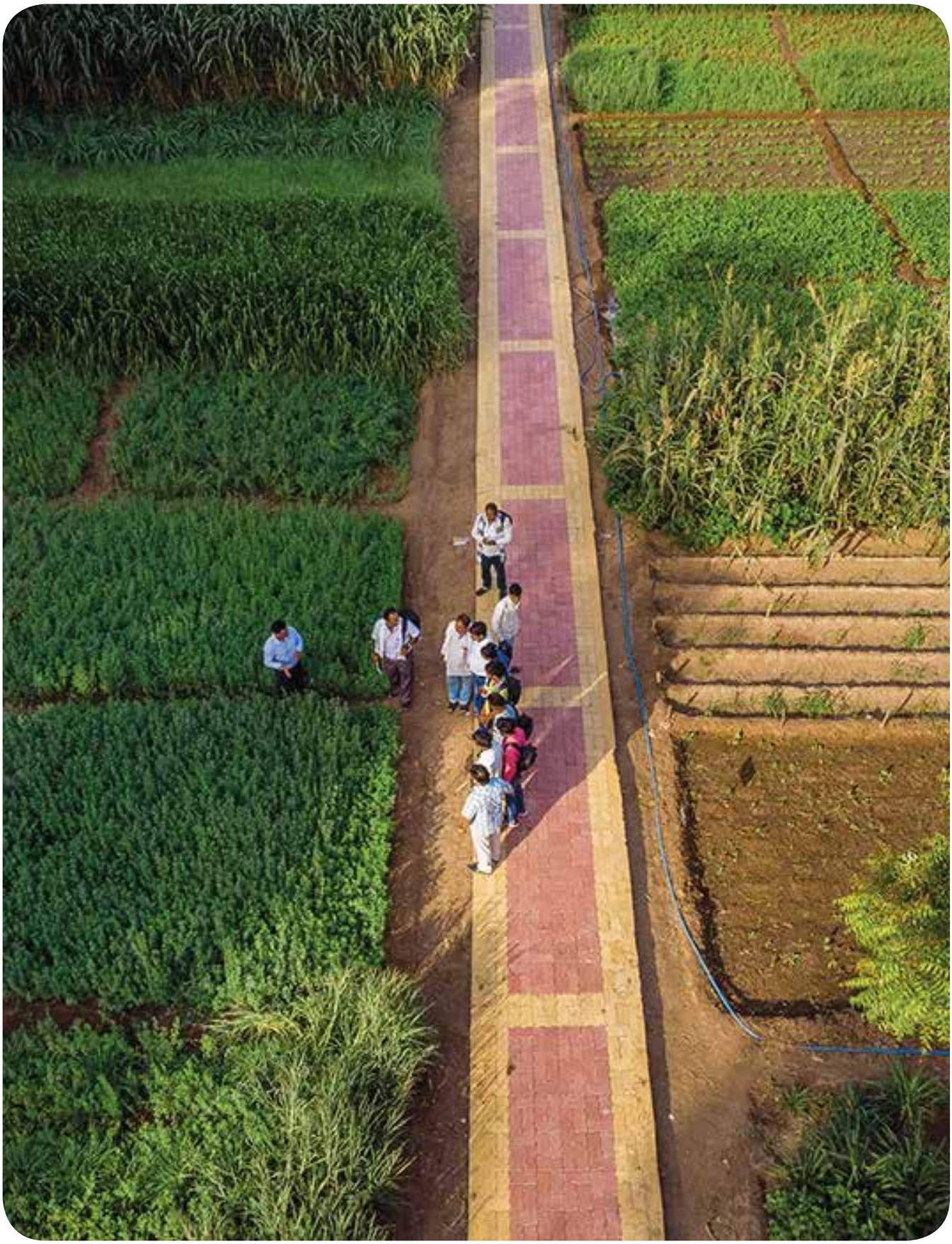
Training Programmes at a Glance

Name of the Programme	No. of Programmes	No. of Participants
A. Cooperative Services		
Farmer Induction Programme	89	2,605
Farmer Orientation Programme	111	3,602
Dairy Entrepreneurship Programme	6	82
Board of Directors Orientation Programme	21	288
Management committee members training	8	158
Training for P&I executives	16	263
Lady extension officers training	1	14
New supervisors training on Producer Relationship Management (PRM)	3	50
New recruits induction programme on Dairy Cooperative Management	6	119
Training of Trainers on Business and Producer Relationship Management (PRM)	1	17
Total	**262**	**7,198**
B. Productivity Enhancement		
Training on INAPH	10	207
Training on AHOs	2	53
Customised programme for Veterinary Officers	5	100
Technical officers & trainers training on Rational Balancing Programme	8	111
Orientation on Progeny Testing (PT) & Pedigree Selection (PS)	1	16
Training on Ethno-Veterinary Medicine (EVM) mastitis control and field testing using antibiotic residue kits. (4 days each)	5	116
Field training on EVM (3 days each for the same vets trained at TDU)	6	116
Field training on Hoof Management (2 days each)	2	42
Orientation to field personnel and board members of Kutch Navnirman Abhiyan on brucella control. (1 day)	1	14
Training on Laboratory techniques (7 days)	1	3
Training of animal type classifiers in Progeny Testing projects	6	86
Artificial Insemination (Basic)	17	389
Artificial Insemination (Refresher)	11	213
Resource Person Training	26	632
Dairy Animal Management	27	675
Training on Calf rearing	2	52
Total	**123**	**2,825**
C. Quality Assurance		
Clean milk production, Operation & Maintenance of dairy equipment's	27	699
Quality & Food safety measures	6	99
Processing & Product manufacturing	9	135
Utilities Operation & Maintenance	7	112
Training on vitamin analysis	1	1
Training on analysis of cattle feed	1	1
Training on "Analysis of Veterinary Drug Residues including Antibiotics"	1	10
Training on "Good Food Laboratory Practices"	1	35
International Training Programme on Laboratory Quality Management Systems (LQMS for developing countries)	1	8
Total	**54**	**1,100**

Name of the Programme	No. of Programmes	No. of Participants
D. Sectoral Analysis and Studies		
Internet based Dairy Information System (i-DIS)	27	505
GIS training	9	119
Total	**36**	**624**
E. Information & Communication Technologies		
AMCS Training & Demonstration	3	45
SSMS Deployment - End user Training	14	140
Total	**17**	**185**
F. NDP Trainings		
Orientation on World Bank procurement procedure	1	28
Training on environmental & social aspects under NDP I	2	18
Total	**3**	**46**
G. Other Trainings for Milk Union Personnel		
Achievement Motivation	4	70
Milk Marketing	6	109
Training on Managerial Excellence	2	35
Training on Management & Leadership	1	21
Training on GST	2	55
Total	**15**	**290**
Grand Total	**510**	**12,268**

Training of NDDB employees

Name of the Programme	No. of Programmes	Nominations	
		Total	SC/ST
Basics in Management	2	40	7
Goods and Service Tax	2	141	16
Total Quality Management	2	54	8
Internal Auditor Training programme on ISO 9001-2005	1	15	1
Becoming Future Ready	1	18	-
Quality Control and Quality Assurance in Concrete Structure	1	24	5
Project Management	1	18	2
Mentoring	1	13	1
Dairy for Non-Dairy Personnel	1	24	4
MS Excel	1	14	2
Achievement Motivation	3	75	12
Developing Leadership	1	20	2
FSSC/ISO 22000 Lead Auditor Course	1	15	4
Total Quality Individual	5	134	23
Other programmes (employees sponsored for training at premier training institutions)		144	12
Total		**749**	**99**



ENGINEERING PROJECTS

NDDB provides consultancy services for execution of projects to dairy cooperatives across the country, creating new processing infrastructure and expanding existing facilities for dairy and cattle feed plants. Services are also being extended to execute bio security labs, animal vaccine production units and semen stations. NDDB also undertakes study of existing plants for refurbishing and upgrading infrastructure to improve efficiency, ensuring food safety and reducing product handling losses.

Nandini Hitech Product Plant, Channarayapatna

6 New Projects worth ₹ 5,381.9 millions were initiated during 2017-18, while work for 19 projects continued during the year

Six projects were completed during the year. These include fully automated 30 MTPD Powder Plant along with 4-7 LLPD liquid milk plant at Channarayapatna (Karnataka), Expansion of dairy plant from 7 LLPD to 12 LLPD (phase-I) at Kolhapur (Maharashtra), International Centre for Foot and Mouth Disease at Bhubhaneswar (Odisha), Cattle Feed Plant of 50 MTPD at Hotwar (Jharkhand) and Cattle Feed Plant at Erode (Tamil Nadu) – Utilities (PH II) & Silo System (PH III). In addition to these 15 Concentrated Solar Thermal projects and Design Consultancy for 2 ETP Projects were also completed during the year.

Apart from the above, NDDB also completed validation of three reports on quality assurance & quality control of civil projects and six appraisals for strengthening of semen stations under NDP I, during the year. Six new projects worth ₹ 5,381.9 millions were initiated during 2017-18, while work for 19 projects continued during the year.


SFB

NDDB emphasised on providing energy-efficient and state-of-the-art technologies for setting up dairy and cattle feed plants for milk unions and federations. In order to improve the efficiencies of the existing plants, studies on infrastructure of dairy plants were carried out and recommendations submitted to respective milk unions for upgradation of the facilities along with estimates of the required capital investment and payback period.

The study for feasibility of expansion and energy efficiency improvement of dairy plants covered during the year include five dairy plants at Salem & Trichy (Tamil Nadu), Bhilwara (Rajasthan), Sagar (Madhya Pradesh) and Guwahati (Assam). Similarly, study for feasibility of CFP expansion was taken up for plants at Sirsa and Rohtak in Haryana.

Following are the highlights of major projects

30 MTPD Powder Plant & Expansion of Liquid Milk Plant at Channarayapatna from 4 LLPD to 7 LLPD

NDDB commissioned an automated 30 MTPD powder plant with a liquid milk plant expansion from 4 LLPD to 7 LLPD in June 2017. The powder plant is equipped with three-stage dryer along with multi effect MVR (Mechanical Vapour Recompressor) evaporation plant.

The plant produces agglomerated Skim Milk Powder, Whole Milk Powder and Dairy Whitener. The plant has facility for bulk packaging in 25 Kg bags and retail consumer packs.

Gokul Dairy Expansion Project from 7 LLPD to 12 LLPD at Kolhapur

The fully automated liquid milk plant along with packaging facility was completed within stipulated time and commissioned in November 2017.

Silo System at CFP Erode

NDDB commissioned 2 x 500 MT DORB Silo System at Cattle Feed Plant Erode in December 2017.

Environment Friendly activities (Green Energy Initiations)

Implementation of Concentrated Solar Thermal: As an initiative to promote solar energy in the dairy industry to provide long term sustainable clean, renewable and viable source of energy, in line with the policy of the Government of India and reduce dependence on fossil fuel and carbon emission, NDDB has implemented 15 CST (Concentrated Solar Thermal) in dairies & chilling centres in Karnataka, Maharashtra, Gujarat and Punjab. The CST is being used to generate hot water for thermal applications in dairies like boiler feed water, can/crate washing, and CIP system.

Solar Bulk Milk Cooler (BMC): Thermal storage system with solar PV modules has been installed at Milk Society at Mujkuva in Anand for pilot study. This would ensure use of green power for chilling of milk at Milk society and would reduce dependency on fossil fuels for power.

Ozonised treatment for Waste Water: A package type skid mounted system using ozone for treatment of waste water generated by Bulk Milk Cooler at Milk Society at Mujkuva in Anand has been installed for pilot study.

Bio-safe laboratories

NDDB provides technical Services for construction of Bio-safety Laboratories (BSL2 & BSL3), Clean room Labs, Animal testing facilities, QA-QC Labs, Bio-Pharma units like Vaccine manufacturing facilities for the Government organisations like ICAR, Department of Animal Husbandry etc.

NDDB has capabilities for design and execution of highly complex Bio-safety containment facilities. World over there are limited bio-containment facilities with BSL3+ and higher level laboratories.

The major Bio-safety projects undertaken by NDDB during 2017-18 are

1. International Centre for Foot & Mouth Disease (ICFMD), a BSL3+ facility, at Bhubaneswar - A prestigious state of the art R&D facility of ICAR with BSL3+ Laboratory for conducting biomedical research in Foot and Mouth Disease (FMD) which is a highly infectious disease in animals. This facility will also serve as a regional resource laboratory for SAARC countries for conducting Bio-medical research on FMD.
2. Setting up a new BSL3 laboratory with Small Animal testing facility (LATU) at Tamil Nadu Veterinary & Animal Sciences University (TANUVAS), Chennai.
3. Planning, designing and execution of facilities for Department of Animal Husbandry & Veterinary Sciences
    a. Anthrax Spore Vaccine production, blending and filling facility (GMP standard), setting up QA/QC lab (GLP standard) and small animal testing facility at IVPM Ranipet, Tamil Nadu.
    b. Poultry diagnostics & feed water analysis laboratory (GLP standard) at Palladam, Tamil Nadu.

4. In-Vitro Fertilization Laboratory facility at NDDB Anand. This facility has been commissioned.

5. Dairy Laboratories -

   a. Establishment of Quality Control (QC) Laboratories for 15 dairies across Uttar Pradesh & Central Dairy at Lucknow. Execution is in progress.

   b. Establishment of Quality Control (QC) Laboratory for Hotwar Dairy of JMF at Ranchi. Execution is in progress.

On-going Projects

Project	Capacity	Location
Northern Region		
Fermented Milk Products Plant	370 TLPD	Verka Dairy, Mohali
Dairy Plant	1,000 TLPD	Jaipur, Rajasthan
Western Region		
Baby Food Plant with milk processing facility	120 TPD PP & 1,200 TLPD LMP	Sabar Dairy, Himmatnagar, Gujarat
Dairy & Product Plant along with Powder Plant	30 TPD PP & 800 - 1,000 TLPD LMP	Ajmer, Rajasthan
Dairy Plant Expansion PH II	(Butter Deep Freeze, Effluent Treatment Plant, etc)	Kolhapur, Maharashtra
New Dairy Plant	500 TLPD	Jalgaon, Maharashtra
New Product Plant	(Sterilised flavoured milk, paneer, dahi, lassi, butter milk)	Jalgaon, Maharashtra
Cattle Feed Plant Expansion	300 - 450 TPD	Kolhapur, Maharashtra
Central Region		
Dairy Plant	40 TLPD	Sendhwa, Madhya Pradesh
Southern Region		
Dairy Plant	250 TLPD	Uppoor, Karnataka
Aseptic Milk Packing Station	100 TLPD	Shollinganallur, Tamil Nadu
Ice Cream Plant	10 - 30 TLPD	Madurai, Tamil Nadu
Ultra Heat Treatment Plant (Aseptic packing)	25 TLPD	Madurai, Tamil Nadu
Bio-Security Laboratory with small animal testing facility	BSL3 facility	TANUVAS, Chennai, Tamil Nadu
Anthrax Spore Vaccine Production Facility	GMP – 70 lakh doses/annum	IVPM, Ranipet, Tamil Nadu
QA & QC Lab and small animal testing facility (BSL 3)		IVPM, Ranipet, Tamil Nadu
Poultry Disease Diagnostic Facility	Feed & Water Testing	Palladam, Tamil Nadu
Procurement Projects		
Quality Assurance Laboratory Equipment for setting of QC Lab for 15 anchor unit of PCDF	-	15 Dairies in Uttar Pradesh
Setting of QC lab	-	Hotwar Dairy, Ranchi, Jharkhand
New Projects (Service Agreement recently executed)		
Aseptic Milk Packing Station	200 TLPD	Bassi Pathana, Punjab
Dairy Plant along with Butter Plant	500 TLPD LMP & 10 TPD Butter	Ludhiana, Punjab
Dairy Plant	50 TLPD	Deogarh, Jharkhand
Dairy Plant	50 TLPD	Sahebgunj, Jharkhand
Dairy Plant	50 TLPD	Palamu, Jharkhand

Glossary

TLPD – Thousand Litres Per Day
TPD – Tonnes Per Day
PP – Powder Plant
LPD – Litres Per Day

THE NATIONAL DAIRY PLAN

National Dairy Plan Phase I (NDP I), a Central Sector Scheme of Government of India, is being implemented by National Dairy Development Board (NDDB) in 18 States with the network of 169 End Implementing Agencies (EIAs) for the period 2011-12 to 2018-19.

Transforming lives through dairying

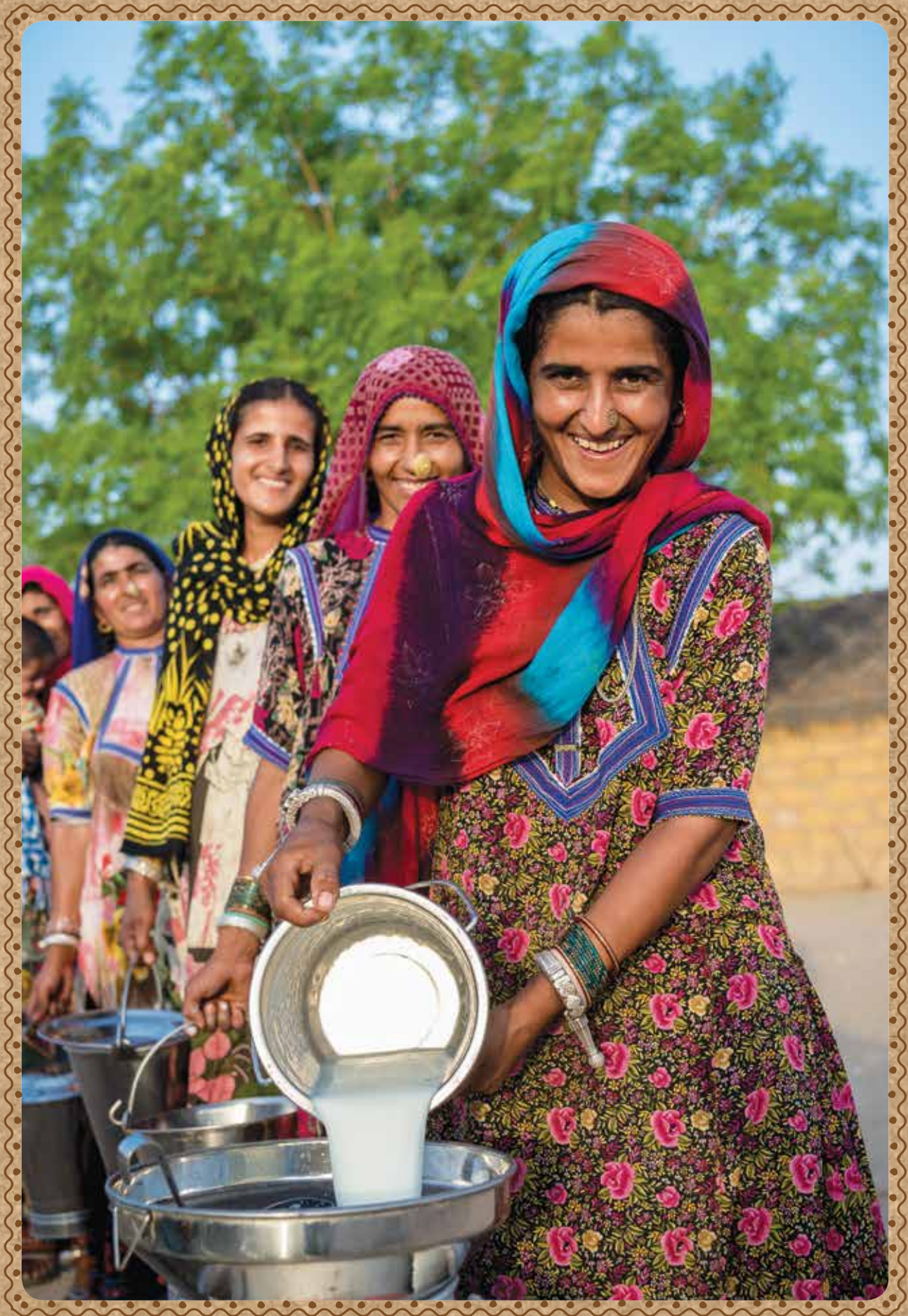
NDP I is being implemented in 18 major milk producing States, viz. Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal. These States account for more than 90 per cent of the country's milk production

Project Development Objectives:

- Increase productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk.
- Provide rural milk producers with greater access to the organised milk processing sector.

These objectives are being pursued through adoption of focused scientific and systematic processes in the provision of technical inputs supported by appropriate policy and regulatory measures.

NDP I is an externally aided project with the total outlay of ₹ 22,420 million comprising ₹ 15,840 million as International Development Association (World Bank) assistance, ₹ 1,760 million as GoI share, ₹ 2,820 million as share of EIAs that will carry out the projects in participating States. Additional support of ₹ 2,000 million will be provided by National Dairy Development Board and its subsidiaries for providing technical and implementation support to the project.



NDP I is being implemented in 18 major milk producing States, viz. Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal. These States account for more than 90 per cent of the country's milk production, over 87 per cent of the breedable cattle and buffalo population and 98 per cent of the country's fodder resources. However, the benefits from the project are accruing across the country.

NDP I consists of a multi-pronged series of initiatives and the key envisaged outputs under the programme are mentioned in the table below:

530 sub projects of 169 EIAs from 18 States have been approved with the grant assistance of ₹ 17,541.38 million

Activity	Key Outputs
Breed Improvement	
Production of High Genetic Merit (HGM) cattle and buffalo bulls	• Production of 2,500 HGM bulls
Strengthening of "A" and "B" graded Semen Stations	• Production of 100 million semen doses annually in the terminal year
Pilot Model for Viable Doorstep AI delivery Services	• 3,000 MAITs carrying out annual 4 million doorstep AIs by the terminal year
Animal Nutrition	
Ration Balancing Programme	• Coverage of 2.7 million milch animals in 40,000 villages
Fodder Development Programme	• Production of 7,500 tonnes of certified/ truthfully labelled fodder seed • 1,350 silage making/ fodder conservation demonstrations
Village Based Milk Procurement System	
Reinforcing and Expanding Milk Procurement System at Village level	• 23,800 additional villages to be covered • 1.2 million additional milk producers
Project Management and Learning	
Project Management & Learning	• Monitoring, Learning and Evaluation system for collection of data, its analysis and interpretation

Sub project approvals

During the financial year 2017-18, 144 sub projects were approved with the grant assistance of ₹ 3,370.05 million. Cumulatively till March 2018, 530 sub projects of 169 EIAs from 18 States have been approved with the grant assistance of ₹ 17,541.38 million. The approved sub projects include 70 sub projects for Project Management and Learning Activities. Activity wise approved sub projects during 2017-18 and cumulative till March 2018 is provided in the table below:

Activity	No. of Approved Sub Projects		Amount in ₹ Million	
			Grant Assistance in the Sub Projects Approved during	
	2017-18	Cumulative till Mar 2018	2017-18	Cumulative till Mar 2018
Animal Breeding	**5**	**62**	**581.60**	**6,821.05**
Bull Production Programme	1	30	34.51	2,940.92
Strengthening of Semen Stations	4	28	547.09	3,022.77
Pilot AI Delivery Services	0	4	0.00	857.37
Animal Nutrition	**0**	**167**	**0.00**	**3,113.52**
Ration Balancing Programme	0	117	0.00	2,450.44
Fodder Development	0	50	0.00	663.08
Village Based Milk Procurement System	**106**	**231**	**2,430.56**	**6,838.02**
Sub Total	**111**	**460**	**3,012.16**	**16,772.59**
Project Management & Learning	33	70	357.89	768.79
Total	**144**	**530**	**3,370.05**	**17,541.38**

State-wise approved sub projects during 2017-18 and cumulative till Mar 2018 is mentioned in the table below:

Activity	No. of Approved Sub Projects		Amount in ₹ Million	
			Grant Assistance in the Sub Projects Approved during	
	2017-18	Cumulative till March 2018	2017-18	Cumulative till March 2018
Andhra Pradesh	3	18	90.68	770.35
Bihar	5	30	271.53	638.15
Chhattisgarh	2	4	96.06	125.56
Gujarat	11	57	307.08	3,350.10
Haryana	6	24	37.85	673.00
Jharkhand	0	2	0.00	49.15
Karnataka	14	48	448.99	1,801.48
Kerala	5	16	62.16	434.99
Madhya Pradesh	3	16	33.51	221.90
Maharashtra	10	47	281.76	1,180.68
Odisha	3	22	24.69	279.06
Punjab	10	32	335.64	1,230.97
Rajasthan	10	41	354.73	2,232.52
Tamil Nadu	9	29	346.79	1,128.07
Telangana	3	10	19.02	209.39
Uttar Pradesh	5	29	88.65	1,617.11
Uttarakhand	0	7	0.00	233.85
West Bengal	11	26	178.51	432.49
Centralised	1	2	34.51	163.77
Sub Total	**111**	**460**	**3,012.16**	**16,772.59**
Project Management & Learning	33	70	357.89	768.79
Total	**144**	**530**	**3,370.05**	**17,541.38**

During the financial year 2017-18, some innovative activities have also been approved for testing proof-of-concept for new and promising technologies toward greater dairy productivity and competitiveness. The approved new/ innovative activities include:

- Developing Genomic Selection Methodology for various cattle breeds with priority on indigenous breeds by Sabarmati Ashram Gaushala
- Developing and validating genotyping microarray chip for buffaloes for genomic selection by Animal Breeding Research Organisation (ABRO)
- Popularisation of Infectious Bovine Rhinotracheitis (IBR) control using inactivated marker vaccine by
    - Andhra Pradesh Livestock Development Board (APLDA)
    - Banaskantha District Cooperative Milk Producers Union Ltd.
    - Sabarmati Ashram Gaushala, Bidaj
- Creating awareness of IBR in PT/ PS and Ring Vaccination areas of Semen Station projects under NDP I.
- Production of Video film on IBR
- Extension material on IBR to the End Implementing Agencies implementing Progeny Testing/ Pedigree Selection/ Strengthening of Semen Stations sub projects.
- Organizing workshop on IBR
- Data Loggers for the Bulk Milk Coolers installed at village dairy co-operative societies
- Rooftop Solar PV System at new/ strengthened village dairy cooperative societies/ Milk Pooling Points

Production of high genetic merit cattle and buffalo bulls

To meet the demand for disease free high genetic merit (HGM) bulls of different breeds for production of high quality disease free semen doses, the animal breeding interventions undertaken under NDP I are: Progeny Testing Programme, Pedigree Selection Programme, Import of Bulls/ Embryos and bull production through imported embryos. These interventions aim to produce and supply replacement requirement of HGM bulls for frozen semen stations across the country by end of the project period.

Progeny Testing Programme

To make available high genetic merit bulls of major dairy breeds of cattle and buffalo to semen stations for production of high quality disease free semen doses semen production, 14 sub projects of 12 EIAs are under implementation in nine States. The cattle breeds covered under Progeny Testing Programme are: Pure Holstein Friesian, Cross-bred Holstein Friesian, Cross-bred Jersey and Gir while in buffaloes the breeds covered are Mehsana and Murrah.

Till March 2018, 1,443 HGM bulls have been made available for distribution to semen stations from various PT sub projects, of which 1,102 have been distributed to different semen stations.

Key Benefits of Progeny Testing Programme implemented under NDP I:

- Performance recording has facilitated comparison of bulls/breeds across regions. It has also helped in selection of bull mothers for production of future bulls.
- Availability of performance records of large number animals has provided valuable reference population to initiate Genomic selection.
- AI follow up data has facilitated comparison of parameters related to reproduction efficiency of breeds/animals. This has also provided information for comparison of performance of AI technicians across various sub projects.
- HGM bulls produced under these sub projects are expected to increase productivity of animals of future generations.

Pedigree Selection Programme:

To conserve and promote indigenous breeds of cattle and buffalo in their native tracts by making available high genetic merit bulls for semen production, 9 sub projects of 8 EIAs from 5 States are under implementation through Pedigree Selection Programme. The various breeds covered under Pedigree Selection Programme are Kankrej, Hariana, Rathi, Tharparkar, Sahiwal in cattle and Jaffarabadi, Pandharpuri and Nili Ravi in buffaloes.

Till March 2018, 157 HGM bulls have been made available from various Pedigree Selection sub projects, of which 119 have been distributed.

Key Benefits of Pedigree Selection Programme implemented under NDP I:

- Performance recording under PS sub projects has facilitated selection of Bulls mothers for HGM bull production.

486

imported embryos have been transferred from which 151 calves (85 male and 66 females) have been born

- Extension efforts have popularised AI acceptance among farmers in native tract of Indigenous breeds
- Performance recording has highlighted potential of Indigenous breeds

Additionally, to meet the requirement of pure Jersey and Holstein Frisian bulls for production of high quality disease free semen doses, 171 bulls have been imported for semen production. Additionally, till March 2018, 486 imported embryos have been transferred from which 151 calves (85 male and 66 females) have been born from these embryo transfers and 47 male calves (30 HF &17 Jersey) have been distributed.

Strengthening semen stations

Under NDP I, existing semen stations with a rating of either “A” or “B” grade are being supported to expand and upgrade the facilities to meet the increasing demand of frozen semen doses for Artificial Insemination. Till March 2018, 28 projects have been approved for strengthening of ‘A’ and ‘B’ graded semen stations under NDP I of 25 EIAs from 16 States. During 2017-18, the Semen Station strengthened under NDP I produced more than 80 million disease free high quality semen doses.

Under NDP I, a Semen Station Management System (SSMS) has been developed to link all the activities of semen station ranging from bull management, semen production, fodder production, stock management, asset management to finally sale of semen doses to customers. This network will create a ‘National Link’ for all the semen stations in India to create an information pool on the semen production and its use in the field. SSMS is live at 12 semen stations comprising 5 State Livestock boards, 3 Co-operative Semen Stations, 3 Trusts and 1 NGO as provided in the table below:

Murrah buffalo calf

"Improvement in parentage mismatch of HGM male calves produced through nominated mating at Rohtak under SAG Murrah PT Sub Project (NDP I)"

Under NDP I, sub project plan for "Production of High Genetic Merit Murrah Buffalo bulls through Progeny Testing" commenced from Oct 2012 by Sabarmati Ashram Gaushala, where test mating of bulls is carried out in the three Milk Unions (Surat, Sabar and Panchmahal Milk union) in Gujarat andBull production through nominated mating is carried out in Rohtak, Haryana.

Male Parentage testing in the sub project: Under field Progeny Testing (PT) program, among the various quality parameters, parentage verification is considered to be the most critical one. The lengthy and complex PT program, being implemented with an aim to select genetically superior bulls based on the performance of their progenies, requires considerable amount of time and fund for creation of infrastructure for Artificial Insemination (AI) delivery, performance recording etc. But all these efforts go in vain if high percentage of parentage error is observed in any PT sub project, because failure to record correct parentage can cause bias in sire evaluation and introduce errors in estimation of breeding values. During initial two years of the sub project, the parentage error for HGM male calves born out of Nominated mating in Rohtak area was 30%, which was considerably high and appeared as a major obstacle in achieving the HGM bull production target under this sub project.

Main reasons for high Parentage Error during initial stage were:

- Prevalence of breeding bulls for natural service in the villages
- Preference of farmers for Natural service over AI for better conception in buffaloes
- Practice of checking the bull number (printed on the straw) by the AI technicians immediately after AI was not being adopted. Thus chances of recording wrong bull number increased.
- Use of frozen semen of different bulls for consecutive insemination within same oestrus cycle.

Measures taken to minimise parentage error:

- Massive extension work has been done in sub project area to change farmer belief towards AI. As a result, now the Farmers prefer AI over Natural service.
- The inseminators and farmers were educated on the importance of use of genetically superior sire for producing HGM breeding bulls in the next generation and overall genetic improvement of Murrah buffaloes.
- Mechanism to ensure entry of same bull ID in INAPH that has been used for AI was established. AITs were given a transparent pouch for temporary storage of used semen straws which was checked by the supervisors fortnightly.

Project officials and Supervisors started verification of live AI to ensure SOPs are being followed during AI by the AITs. This was also done to inculcate the habit of reading bull ID immediately after thawing and recording bull ID after AI.

With the adoption of innovative strategies, the project team was able to bring down parentage error to 15.68% in the year 2016-17. Year wise parentage error of HGM male calves reported under this project is as follows:

Activity	2013-14 & 2014-15	2015-16	2016-17
Parentage tested	84	158	185
Correct parentage	59	129	156
Wrong parentage	25	29	29
Percent wrong parentage	30%	18.35%	15.68%

The Project officials are continuously making efforts to bring it down further.

- Amul Research and Development Association, ARDA, Ode
- Central Semen Bank, Bhadbhada, Bhopal
- Bull Station, Dhoni Farm
- Dama Semen Production Unit, Dama
- Frozen Semen Bank, Bassi
- Deep Frozen Semen Production Unit, Rishikesh
- Indo Swiss Project, Mattupatty
- Frozen Semen Bank, Hissar
- BAIF Central Research Station, Urulikanchan
- Animal Breeding Centre, Saloon
- Alamadhi Semen Station, Chennai
- Sabarmati Ashram Gaushala, Bidaj

For effective coordination, monitoring and reporting of animal health activities, Coordination Committees have been formed under the respective sub projects sanctioned under NDP I, encompassing all the tehsils for bull production areas and all villages in 10 Km radius of the semen stations taken up for strengthening.

To assist the EIAs for effective implementation of animal health measures, Animal Health Officers have been put in place for all the Progeny Testing, Pedigree Selection and Strengthening of Semen Stations sub projects.

Pilot doorstep AI delivery services

Under NDP I, three sub projects are being implemented to set up a pilot model for doorstep AI delivery services operating in a financially self-sustainable manner using Standard Operating Procedures including animal tagging and performance record.

These pilot sub projects have covered 11,335 villages through 1,330 Mobile AI technicians and have carried out 6.44 Lakh artificial inseminations during 2017-18. Extension activities were intensified during the year. Tin paintings, posters, wall paintings, etc. were placed in strategic locations around villages. Two awareness movie namely “PRAGATI” and “A FILM ON AI NETWORK” were produced in regional languages aimed at creating awareness on AI, importance of SOP and addresses various misconception about AI and ear tagging. Mass Media were also used in spreading the word about benefits of AI. A campaign on FM radio was also undertaken in operational area Saahaj MPC.

AI at farmers doorstep

Shift from Natural Insemination to Artificial Insemination

Shri Jeshabhai Mangabhai Tharesa is a dairy farmer of Karsangadh village, Surendrangar district in Gujarat. He used to cross his two buffaloes with local buffalo bull as he did not believe in Artificial Insemination. The calf born through the local bull was not healthy and body weight was poor.

The farmer met Dr. Ramesh Bhai Kavar (Veterinary Officer) and Mr. Ramesh Bhai Rathod (MAIT) working in Maahi Milk Producer Company and came to know about AI programme being run by Maahi under NDP I. Dr.Kavar informed him regarding this programme and its benefits. After understanding the AI benefits, he crossed one of his buffalo through AI by MAIT. After ear tagging, the MAIT registered the animal in the INAPH.

His buffalo delivered a female buffalo calf. At the time of calving, both the calf's and dam's health was good and calf weight was more than the bull calf obtained through natural service.

The farmer confidently enumerated the benefits:

- No searching of Bull
- AI cost is less than Natural services
- Choice of Bull selection,
- Services at the door step
- I can check the record any time
- Geta good genetic potential calf.

Nowadays he is advising other milk producer of his village to take benefit of Pilot Artificial Insemination delivery services. Farmers are grateful to "NDP I AI sub Project" which has contributed in getting good progenies.

Ration balancing programme

Under Ration Balancing Programme (RBP), Local Resource Person (LRP) formulates a least cost balanced ration for milch animals from locally available feed resources using the software "Information Network for Animal Productivity and Health (INAPH)". Balanced ration to milch animals helps in ensuring that the milch animals produce milk commensurate with their genetic potential. Feeding the balanced ration to milk animals not only reduces the cost of feeding per Kg of milk but also significantly reduces the methane emissions.

Under this programme, 117 sub projects of 105 EIAs from 18 States have been approved. Under these sub projects, till March 2018, advice on balanced ration has been provided for 2.66 million milch animals in 32,064 villages. These interventions has resulted in reducing the cost of feeding per Kg of milk by more than 10 per cent on an average. Also methane emission has reduced by more than 12 per cent in lactating cows and buffaloes.

Fodder development programme

Under the Fodder Development Programme, certified fodder seeds are being promoted to increase fodder production. Field demonstrations of mowers, silage making and biomass storage silos are also being carried out to popularise these technologies among farmers. 50 fodder development sub projects from 13 states are under implementation.

Under these sub projects till March 2018, support has been provided for production of 10,762 MT of fodder seeds and sale of 26,380 MT of certified fodder seeds. 2,225 silage demonstrations have been organised, 659 mowers have been procured and 118 biomass storage silos have been constructed.

20 Micro Training Centres (MTC) have been set up with 10 EIA and farmers have been exposed to improved fodder production and conservation technologies at these Micro-training Centres (MTC).

Silage making is getting popular among farmers. About 3,500 farmers have started silage making at their own after participating in silage demonstrations organised by EIAs under NDP I.

Village based milk procurement system

Village Based Milk Procurement System under NDP I aims to provide rural milk producers with greater access to the organised milk-processing sector by forming and enhancing Dairy Cooperative and Producer Companies. Under this

Success is self-confidence

LRPs profile:

Name : Smt. Deepa Devi

Village: Jaipur Khima,
Tal.- Lalkuan, Dist- Nainital

Education: 8th standard
Social category: General

Smt Deepa had never handled a smartphone, let alone a computer or software. But when the milk union wanted to start RBP implementation in her village she volunteered to work as a LRP with an intention to help the farmers. During the training, she tried her level best to learn the intricacies of ration balancing but struggled a lot with the software. She took it as a challenge. She requested the trainers to devote some extra time with her and even took an initiative to develop her public speaking skills. Her enthusiasm and self-belief worked as an inspiration for other participants.

Her level of confidence was evident when she desired to address the farmers herself during the village awareness programme. After the village awareness programme, she started implementing the programme and covered the target number of animals within first 20 days. She is now providing RBP services to 50 milk producers in her village. She regularly visits them and would discuss and analyse the nutrient status of the covered animals. Impact data of around 69 animals indicate that there is increase in milk yield by 240g, fat content by 0.02 per cent and reduction in feeding cost by ₹ 2.10 per day per animal.

Her efforts are visible; farmers in her village have started feeding their animals only twice a day with prescribed quantity of feeds and fodders along with mineral mixture. There is reduction in digestive disorders in the animals along with an increase in productivity and reproductive efficiency.

activity new societies/pooling points are being formed and existing societies/pooling points are being made stronger by providing village level capital items like Bulk Milk Coolers, Automated Milk Collection Units (AMCU), Data Processor based Milk Collection Units (DPMCU), Milk Cans, etc. While installation of DPMCUs and AMCUs has resulted in increased transparency and fairness in milk procurement operations, installation of BMCs has given farmers more flexibility in pouring milk as well as improvement in quality of milk.

Under this activity, 231 sub projects from 18 States are being implemented by 121 EIAs. Till March 2018, these sub projects have covered 37,586 villages and have enrolled 12.78 Lakh additional milk producers. Out of the total members enrolled 5.55 Lakh (43% of total) are women members and 8.57 Lakh (67% of total) are small holders.

A Village Awareness Programme (VAP) module was approved by PSC in its 23rd meeting to disseminate information to milk producers on the scientific animal husbandry and dairying practices and also to publicize the benefits of NDP I activities to milk producers. 4 VAPs per EIA has been approved to be organised for the year 2017-18. Till March 2018, 390 VAPs (VBMPS & RBP) have been organised with participation of about 1.5 Lakh milk producers.

Linking villages to markets

"The Kambassi Mahila Dairy Cooperative Society, Ambala Milk Union"

The Kambassi Dairy Cooperative Society (DCS) started its operations under the aegis of the Ambala Milk Union of Haryana on 19 August 2015.

Before starting the DCS, there was no regular and transparent market for milk producers to sell their milk, as a result they had no option but to sell the surplus milk to private vendors. A few of them were pouring milk in the DCS of the adjoining villages. Through Kambassi DCS, Milk Producers of this village got regular and proper market access and now they are able to get best price for their milk. The Union organised multiple meetings in the village to make the villagers aware on the benefits of the cooperatives, cattle feed, mineral mixture and deworming practices.

This DCS started functioning with 21 members. On the first day, about 35 litres of milk was collected and only 15 members poured milk. With the passage of time producers faith in the cooperative system grew stronger. As a result the membership increased to 84 women milk producers and the collection has reached more than 278 litres per day. At present there are 84 women members and 15 SC members of the DCS. Milk Producers are coming forward and demanding for installation of advanced milk testing machines such as DPMCU.

Project management and learning

Project Management and Learning (PM&L) activities are being undertaken with an objective to put in place ICT based Management Information System for integration, monitoring, analysis and reporting. This would lead to effective coordination of project activities among various EIAs and to facilitate learning and evaluation. For monitoring and evaluation of NDP I both internal and external monitoring and evaluation systems have been put in place.

Project Management & Learning is of critical importance for tracking progress in the implementation of various project components, identifying problems as they arise, guiding remedial actions to help ensure that the project achieves its intended objectives and assessing the impact of the project. External Monitoring & Evaluation (M&E) is being carried out by external agencies/consultants.

Till date, six external Monitoring and Evaluation Studies have been undertaken i.e. Overall External Monitoring & Evaluation of NDP I by Development & Research Services (P) Ltd., New Delhi; Methane Emission Measurement Study for Northern India by National Dairy Research Institute (NDRI), Karnal; Encouraging Women Empowerment through Dairying, Study by Institute of Rural Management, Anand (IRMA); RBP Impact Study for Northern and Western India by NDRI, Karnal; RBP Impact Study for Southern India by IRMA and Methane Emission Measurement Study for Western India by Anand Agricultural University (AAU).

External Monitoring and Evaluation of NDP I is being undertaken by Development Research and Services (P) Ltd., New Delhi since 2012 for the entire duration of NDP I. Major findings of this Study project indicate :

- The average milk yield of cattle and buffaloes in the project area increased from 5.03 litres during the baseline year 2012-13 to about 6.0 litres during the Annual Round III evaluation year 2016-17.
- The proportion of 'in milk' female animals to adult female animals in the project area increased from 63% during the baseline year 2012-13 and to about 68% during the Annual Round III evaluation year 2016-17.
- The proportion of milk sold to total production in the project area increased from 65% during the baseline year 2012-13 to about 67% during the Annual Round III evaluation year 2016-17 after taking into account all the increases in milk production and the sale of milk simultaneously.
- The share of milk sold to the organised sector (as share of production) in the project area increased from 45% during the baseline year 2012-13 to 72% during the Annual Round III evaluation year 2016-17.

During 2017-18, four International exposure visits/ trainings were organised under NDP I which included:

- "Training on Animal Nutrition" at Wageningen University, The Netherlands, in which 15 officers (11 from 11 EIAs of 8 states and 4 officers of NDDB) participated.

- "Training on Genetic Improvement of Animal" at Wageningen University, The Netherlands.15 officers (10 from 7 EIAs of 8 states and 5 officers of NDDB) participated.
- "Monitoring and Evaluation of Development Projects and Programmes" at International Training Centre of International Labour Organisation (ITC-ILO) at Turin, Italy. 12 participants attended the training (8 from NDDB and 4 From DADF, GoI).
- "Overseas Training cum exposure visit to GOTAFE, Australia under VBMPS". Two batches of 25 participants each were sent to GOTAFE Australia during the year.

NDP I Regional Review Meetings continued to be organised regularly to review the progress made, identify bottlenecks/shortcomings, highlight the success and work out future action plans etc. These regional review meetings were attended by Secretary, DADF; Chairman, NDDB; Joint Secretary, DADF, Executive Director, NDDB, World Bank officials, GM-CMC, NDDB; Secretaries and Directors of State AH Department, MDs of Federations, CEOs and Project Coordinators of concerned EIAs; DADF and NDDB officers. Each Sub Project has been assigned to a monitoring officer of NDDB for concurrent monitoring and providing implementation support to EIAs.

Training and capacity building

Development of human resources for timely and efficient implementation of activities under National Dairy Plan Phase I (NDP I) is essential to manage the continuous metamorphosis taking place in the dairy sector. Under NDPI, the training and capacity building programmes are being organised by both NDDB and End Implementing Agencies for milk producers, executives of the union, village resource persons and Board members of the union. The key objectives of the training programme have been:

- Knowledge and skill up-gradation of human resources
- Increase productivity and efficiency of human resources
- Enhance quality of outcome/results

During the year 2017-18, a good number of participants, 4.41lakh participants have been trained/oriented in programmes organised by NDDB and EIAs. Cumulatively, 19.43lakh participants have been trained/ oriented under NDP I.

Activity/ Training Programme	Component	Category of Participants	Achievement	
			Annual April17-March 18	Cumulative April 12-March 18
Farmers Induction	VBMPS-Coops	Milk Producers	6,625	24,920
Farmers Orientation			2,970	15,776
Board Orientation		Board of Directors	117	1,128
Business Appreciation		Executives	131	1,862
Training of Trainers			17	257
New Supervisors Training			50	594
Management committee members training		MCMs	159	159
Basic/Refresher DCS secretary		Village Resource Persons	251	251
Training of Trainers on AMCU & BMC		Executives	98	98
Sub-total			**10,418**	**45,045**
Refresher training on P&I supervisors	VBMPS-PC	Executives	17	17
Sub-total			**17**	**17**
Training of Technical Officers on RBP	Ration Balancing Programme-Coops	Executives	24	354
Refresher training on training of trainers			18	70
Training of Information Technology on RBP			26	76
Sub-total			**68**	**517**
Training of Technical Officers on RBP	Ration Balancing Programme-PC	Executives	10	114
Sub-total			**10**	**114**
Fodder production & conservation practices	Fodder Development-Coops	Executives	257	558
Sub-total			**257**	**558**

Activity/ Training Programme	Component	Category of Participants	Achievement	
			Annual April17-March 18	Cumulative April 12-March 18
Fodder production & conservation practices	Fodder Develop-ment-PCs	Executives	48	48
Sub-total			**48**	**48**
Orientation/refresher to AIOs	Progeny Testing	Executives	06	45
Orientation/refresher toProject Coordinators			01	22
Orientation/refresher to District Coordinators			06	71
Orientation/refresher to Calf Rearing In-charges			04	22
Sub-total			**17**	**160**
Orientation/refresher to Project Coordinators	Pedigree Selection	Executives	03	21
Orientation/refresher to Area Coordinators			03	17
Refresher training on AI		Village Resource persons	14	14
Sub-total			**20**	**52**
Basic AI training for MAIT	Pilot AI Delivery	Village Resource Person	173	173
Sub total			**173**	**173**
Total			**11,011**	**46,650**

Other NDP I trainings conducted at NDDB:

Activity/ Training Programme	Category of Participants	Achievement	
		Annual April17-March 18	Cumulative April 12-March 18
Training on Environment and Social aspects		18	231
Orientation on NDP procurement guidelines		28	853
Lady Extension officers-BAP		14	58
Total		**60**	**1,142**

Environment and social management

While implementing the activities under NDP I, social inclusion and environment mitigation measures are being undertaken with emphasis on increasing participation of women, small holders and scheduled caste and scheduled tribes across the activities. Key projects undertaken include:

- E&S Orientation Session in NDP I trainings at NDDB: In 2017-18, 26 sessions were facilitated on both Environmental and Social management in 13 trainings of EIAs implementing sub projects under NDP I at NDDB Anand.
- E&S Training for E&S Officers of EIAs: Two training on E&S for designated E&S officers of EIAs were to be conducted in FY 2017-18.
- Renewable Energy Technology: Biogas plants have been funded to 18 semen stations under NDP I to demonstrate the effective use of renewable energy from animal waste. Biogas is produced using animal dung and spent slurry and leftover dung is used for making vermi-compost and manure or direct application in the fodder fields by mixing it with irrigation water. Till March 2018, 15 Biogas plants have been commissioned. Biogas produced is being used for generating electricity to supplement the electricity for lighting the paths, bull sheds, fans and running water pump sets etc.
- Solar Energy: Producer Company, Paayas MPC (Rajasthan), has installed solar energy systems in all the MPPs formed under NDP I. Solar energy is being utilised for operating the milk measurement equipment like DPMCUs, fan and lighting etc. This has helped in reducing the dependency on erratic supply of electricity for running milk collection operations at societies located in remote locations.
- Project Steering Committee in its 24th meeting approved proposal to install Rooftop Solar PV system

combined with a battery backup and inverter to all the 125 Milk Unions/ PCs covered under NDP I which will enable the DCS/MPI/MPP function without any hindrance in case of electricity drop. Procurement of these has been initiated by the EIAs.

- Bio-medical Waste Management at Semen Stations: All semen stations under NDP I have bio-medical waste management systems in place (either through self or with help of external agencies) and they are also conducting training of their staff and workers on proper management of bio-medical waste generated. Out of these about 14 Semen Stations have complied with Bio-medical Waste Management Rules 2016 and signed a contract with Common Bio-medical Waste Management Facilities (CBMWTFs) for collection and safe disposal of segregated waste generated. Relevant documents in this regard have already been submitted by these EIAs.
- Compendium of Success stories: A compendium of success stories is being prepared for documenting the best practices at field level. A consultant has been hired after getting PSC approval.
- Equity Action Plan: An Equity Action Plan (EAP) has been prepared as per the World Bank guideline in order to increase social integration and ensure social equity in sub projects being implemented under NDP I. EAP is supervising a document prepared in line with Environmental and Social Management Framework (ESMF) of NDP I.

Financial management

During the financial year 2017-18, ₹ 3,899.80 million has been received from DADF and ₹ 2,665.59 million has been disbursed. Cumulatively till March 2018, ₹ 14,350.94 million has been received by NDDB from DADF for implementation of NDP I and ₹ 12,727.72 million has been disbursed to EIAs as advance and for expenditure on centralised activities.

Total fund utilisation till March 2018 is ₹ 13,467.85 million out of which ₹ 11,280.03 million is NDP I grant and ₹ 2,187.83 million is contribution of EIAs implementing VBMPS sub projects. During the financial year 2017-18, the fund utilisation has been ₹ 2,091.96 million, out of which ₹ 1,833.64 million is NDP I grant and ₹ 258.32 million is contribution of EIAs.

The National Steering Committee at its13th meeting approved the annual action plan of ₹ 3,249.1 million for the financial year 2018-19. Union Budget 2018-19 has also allocated ₹ 3,249.1 million as Budget Estimates for 2018-19.

Audit of NDP I accounts for the financial year 2016-17 has been completed and shared with the World Bank.

Improving quality of life

Contribution of NDP I in increasing farmers' income

Interventions under NDP I have put in place a scientific approach and systematic processes which would help taking the country on the path to improve the genetics of milk producing animals in a consistent and continuous manner. Further, NDP I has immensely contributed in improving the livelihoods of small holder milk producers who are the bedrock of India's milk production system. Some of the benefits to milk producers are listed below:

- Disease free high quality semen doses produced by High Genetic Merit bulls produced under NDP I through Progeny Testing and Pedigree Selection Programmes are being used for artificial insemination which is improving the genetic potential of milch animals of milk producers by increasing productivity.
- Feeding balanced ration to milch animals through Ration Balancing Programme has been benefiting milk producers by way of increasing the milk production per animal per day and also by reducing the average cost of feeding. As a result of this, farmers have realised increase in net daily income of ₹ 26.36 per animal, substantially contributing to increasing farmers' earnings. Other major benefits of this intervention have been increase in lactation length as well as reduction in methane emissions.
- Fodder development interventions under NDP I has demonstrated use of fodder conservation technologies and is making available certified/ truthfully labelled fodder seeds which increases the low cost availability of fodder resources to milk producers.
- Under Village Based Milk Procurement System interventions of NDP I, by formation of Dairy Cooperative Societies/ Milk Pooling Points, milk producers have been provided access to organised milk processing sector which provides a better returns to milk producers. To further supplement this, Automated/ Data Processor based Milk Collection Units have been provided at the village level to ensure that the milk producers are paid based on the quality of milk poured by them. All these activities have direct relation in increasing farmers' income by providing them a fair and transparent milk procurement system and improved raw milk quality.

CENTRE FOR ANALYSIS AND LEARNING IN LIVESTOCK AND FOOD

Centre for Analysis and Learning in Livestock and Food (CALF) is accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) covering chemical, microbiological and genetics under scope of testing. CALF is also a notified referral laboratory for Food Safety and Standards Authority of India (FSSAI) for milk and milk products.

A view of wet chemistry laboratory

In 2017-18, the laboratory registered 30 per cent growth over the last year by conducting about 1,30,000 tests.

CALF is one of the most advanced, multi-disciplinary analytical laboratories in the country which is helping dairy cooperatives, food and feed industry to reach highest standards of quality. With state-of-the-art equipment and qualified technical manpower, CALF offers a range of reliable and accurate analytical services in the field of dairy products, food, fruit and vegetables, water, feed and animal genetics at an affordable cost to dairy cooperatives across the country.

CALF is also committed to build the competency of laboratory personnel and has joined hands with FSSAI and BIS for organizing national and international training programs at CALF, NDDB Anand. These programs were attended by 47 participants from various laboratories of the country and 8 participants from other countries.

The Laboratory also organised two in-house training programs.

In 2017-18, the laboratory registered 30 per cent growth over the last year by conducting about 1,30,000 tests. Various new initiatives like setting up of testing facility for fats and oils, contaminants and residues for dairy products, fruit and vegetables, sample collection arrangement and accreditations and recognitions have contributed to this growth. Significant growth has been observed in the tests pertaining to dairy and food products. The distribution of laboratory services comprises 50 per cent food, 26 per cent feed and feed ingredients and 24 per cent genetics analysis.

Accreditations and recognitions

The laboratory has significantly increased its scope of accreditation from 195 parameters to 718 parameters in NABL assessment, by inclusion of pesticides, veterinary drugs, antibiotics, compositional, physical-chemical tests in various products like milk, milk products, fruit and vegetables, infant foods, water, fats and oils etc.

Progress and New initiatives

CALF has started collection of samples as a part of the ICAR's Monitoring of Pesticide Residues at National Level project for testing of vegetables in the states of Gujarat, Madhya Pradesh and Rajasthan.

CALF has been continuously supporting dairy industry by developing standards/new technologies to overcome challenges such as milk fat adulteration, maltodextrin, mix milk, dioxin etc. CALF has standardised PCR based qualitative test for mix milk analysis suitable to detect the adulteration of buffalo milk in cow milk and vice versa at 1 per cent detection limit.

CALF has participated in dairy exhibitions and organised customer meets to update the dairy industry on the latest developments in the field of analysis of food, dairy and feed products.

The laboratory has a valuable resource of genotype of about 2,100 bulls of various breeds of cattle and buffalo from various semen stations across the country. This data is used for parentage verification of newly selected high genetic merit calves.

The laboratory has implemented a rigorous quality control programme to ensure accuracy of the analytical results. Quality control data is continuously monitored during various steps of analysis. In 2017, the laboratory participated in 18 PT / ILC programs for about 281 tests and satisfactorily qualified in 280 tests, indicating implementation of effective quality control program and competency of laboratory personnel.

A view of the Genetic Laboratory

OTHER ACTIVITIES

Celebrating Ambedkar Jayanti

₹ 1,35,000

was given as cash incentives to employees

Progressive use of Hindi

With a view to promote the use of Hindi language in the official work, earnest efforts were made during year 2017-18. NDDB's Annual Report, NDP I progress report, background note on Parliamentary Standing Committee (PSC) on Agriculture, PSC Questions & Answers and other reports, website contents, training material, manuals and Power Point Presentations were prepared in Hindi. Besides, effective steps were taken to implement the Official Language Policy.

To accelerate the pace of its progressive use, a Hindi Fortnight was organised in all NDDB offices during September 2017. Apart from a lecture by a prominent Hindi scholar, competitions like on-the-spot Hindi Essay Writing, Speech, Translation, General Knowledge and Poetry recitation were organised during the year. A large number of employees participated in these competitions. Prize money for all these competitions was enhanced and about ₹ 83,000 was distributed as cash prize to employees.

Recognizing the commendable efforts in the implementation of the Official Language, NDDB was awarded the Rajbhasha Kirti Puraskar – First prize for the year 2016-17 in the category of B region organisation. Chairman, NDDB received this prestigious award from Hon'ble President of India on 14th September 2017 at Vigyan Bhawan, New Delhi during Hindi Diwas Samaroh organised by Department of Official Language, Ministry of Home Affairs, Government of India.

NDDB has introduced various incentive schemes for promotion of Hindi in office work. One such scheme is Hindi Noting and Drafting Incentive Scheme. 43 employees participated in this scheme and cash incentive for Noting and Drafting Scheme was enhanced as per the guidelines. An amount of ₹ 1,35,000 was given as cash incentives to employees. Five employees whose children scored 75 per cent and more marks in Hindi in Class 10th and 12th examination, were given a cash prize of ₹ 1,000 each.

Demonstration on use of voice typing tool in Hindi was organised for enhancing use of Hindi in computer. In order to encourage employees, various Hindi workshops i.e. Workshop for C region employees, noting & drafting workshop for

Employees proficient in Hindi, workshop on Hindi Language Training were organised. For regular monitoring of progress of Hindi usage in office work, inspection of NDDB office, Mumbai was done during the year.

As a new initiative, a dedicated email Id was created for tracking the records of Hindi correspondence at NDDB, Anand. With a view to provide information readily available on concurrent official activities/programmes and to provide an effective platform to showcase creative writing by the employees, a Hindi E-magazine named "Srijan" was published.

NDDB library has a large number of books in Hindi. During the year, books in Hindi, amounting to about ₹ 1,20,771 were added to the library.

All national programmes viz. Republic Day, Independence Day, Gandhi Jayanti, Shastri Jayanti and Dr. Ambedkar Jayanti were organised in Hindi.

Welfare of SC/ST Employees

During the year, SC/ST employees were nominated to functional as well as behavioural training programmes focused on their competency and self-development. In all, 99 training nominations for SC/ST employees were processed.

Welfare measures for SC/ST employees also continued during the year. Meritorious children of SC/ST employees were recognised with cash prize and certificates for their academic achievements. To encourage academic orientation, SC/ST employees were reimbursed expenses incurred on education as well as books for their children.

As a mark of respect to Dr. B.R. Ambedkar and cherishing his yeoman contribution to the nation, Ambedkar Jayanti was celebrated in all offices of NDDB. At this event, distinguished speakers shared their thoughts on the life and achievements of Dr Ambedkar.

To encourage academic orientation, SC/ST employees were reimbursed expenses incurred on education as well as books for their children.

Hindi Diwas Samaroh

SUBSIDIARIES

PHE assembly facility

IDMC Limited

IDMC was incorporated as a wholly owned subsidiary company of National Dairy Development Board in 1992. The Company offers processing and packaging solutions to its customers across dairy, cattle feed, pharmaceutical, beverage and thermal segments.

IDMC completed the design, supply, installation, testing and commissioning of two dairy projects with capacity of five lakh litres per day to process market milk and products such as paneer and fermented milk products. An expansion project for processing 10 lakh litres of milk per day was also commissioned during the year. A large ice-cream plant of 50 KLPD and a 5 TPH automated continuous butter making plant were also put into commercial operation during the year. Ten turnkey dairy projects with products, are progressing towards completion. Two of these projects include setting up of milk powder plants.

IDMC manufactured and supplied a range of processing equipment such as pasteurizers, ice-cream freezers, continuous butter making machines and products such as milking machines, bulk milk coolers (BMCs), pumps, valves and fittings. IDMC has also developed fully indigenous and affordable milking machines which have been validated and can be used for dairy farms with 5-30 cows.

Under the refrigeration business line, several ammonia refrigeration projects with capacities ranging from 388 TR to 1,385 TR were completed. Apart from this, other greenfield and expansion projects at various locations were in progress. The company commissioned three indigenously manufactured ice silos with capacities ranging from 3,000 to 4,100 MCAL. Orders for similar ice silos were under execution.

IDMC successfully designed, supplied, installed, tested and commissioned a silo storage system of 1,000 MT for grains and other raw materials for a cattle feed plant in the south.

In the pharmaceutical segment, an automated effluent decontamination system for a BSL3+ affiliated laboratory and a bio-reactor system for manufacturing of vaccines was commissioned during the year. Work was in progress for a large fermentation project for manufacturing multiple products like enzymes, probiotics and recombinant therapeutics and also for a large bacterial fermentation system to produce culture for use in bio bulk drug manufacturing.

IDMC commissioned a sugar dissolving system and continued to supply components for food and beverage industry during the year.

The research and development department of IDMC continued to develop new equipment and focused on making its offerings of products and processes more structured and competitive.

Under the plastic segment, IDMC expanded its blown film capacity by adding a three layer plant. It also complemented its range of packaging films by installing a seven layer blown film plant. This has enhanced the Unit's capability to cater to customers in segments such as UHT milk, edible oil, cheese etc. and contribute to the growth.

For FY 2017-18, IDMC reported a total revenue of ₹ 8,034.64 million.

INDIAN IMMUNOLOGICALS LIMITED

Indian Immunologicals was setup by The National Dairy Development Board (NDDB) in 1982, as its unit, with the objective of making vaccines available to farmers at an affordable price. The unit was corporatised as Indian Immunologicals Limited in the year 1999.

In the year 2017-18, Indian Immunologicals Limited (IIL) recorded turnover of ₹ 5,039 million. IIL's achieved a Profit After Tax (PAT) of ₹ 526 million, a significant improvement to 2016-17. IIL's significant growth came from its retail businesses. Animal Health retail business posted 22 per cent growth while human health retail business recorded 24 per cent growth. IIL delivered about 200 million doses of FMD vaccine in 2017-18, consistent with its last year's figure. In addition IIL also established itself as the largest supplier of anti-rabies vaccine to the various state governments. IIL achieved a breakthrough in its Institutions business by winning the Pentavalent vaccine tender of Ministry of Health's Universal Immunization Programme (UIP). IIL's exports recorded turnover of ₹ 640 million. The company has divested its Animal Nutrition (cattle feed) business.

IIL launched VAXTAR 5 (Pentavalent vaccine for children) containing DPT, Hepatitis B (rDNA) and Haemophilus Influenzae Type B Conjugate vaccine. It launched Zuspray, its first herbal product in the Animal Health Segment. IIL introduced several hormones in the human health segment to address the needs of infertility clinics. The Inceptova range of products has been well received. IIL initiated India's first nasal Parvo vaccine for use in companion animals, besides introducing a combination vaccine for enterotoxaemia and Tetanus for use in small ruminants.

IIL obtained license and has started manufacturing its human anti-rabies vaccine, Abhayrab from its state-of-the-art manufacturing facility in Karakapatla. The hallmark of IIL's products is its quality, which is well recognised by the Industry, customers and Government.

IIL's DSIR approved Research and Development Centre has many exciting candidate vaccines in its pipe line. A gene deleted marker vaccine for IBR has been developed and a large scale field safety study has been completed successfully. Field trials for IIL's Classical Swine Fever have been successfully completed and currently awaiting license. Phase 1 clinical trial for Hepatitis A vaccine is in progress. Pre Clinical Toxicology (PCT) studies for Typhoid Conjugate vaccine has been completed and batches for clinical trials are being made. PCT for Measles Rubella combination vaccination is nearing completion. IIL has signed an exclusive agreement for the procurement of Sabin Injectable Polio Vaccine and will use it for developing hexavalent vaccine which includes DPT, Hepatitis B, HiB and Inactivated Polio antigens.

IIL is in the forefront of farmer's education and awareness programmes. The company has actively participated in various Krishi Melas in several parts of the country to create awareness among the farmers. As a part of its Corporate Social Responsibility (CSR) initiative, IIL continues to provide health coverage to more than a lakh cattle in Goushalas. IIL has adopted a Government school (Laxmapur village, Medak district, Telangana state) and has created infrastructure for the well-being of students and also provided them with uniforms, school bags and notebooks. Being a sponsor of the "Gift Milk for Nutrition", IIL provides students with flavoured milk daily at the school.

Mother Dairy Fruit & Vegetable Private Limited

Mother Dairy Fruit and Vegetable Private Limited as it is now called was initially set up in 1974 as Mother Dairy, Delhi on behalf of Government of India to meet the liquid milk requirement of Delhi. Mother Dairy, Delhi was corporatised in the year 2000 as a Private Limited company viz., Mother Dairy Fruit and Vegetable Private Limited (MDFVL) and is a wholly owned subsidiary of NDDB.

Mother Dairy's establishment is linked to the intrinsic efforts led by NDDB towards increasing the milk production of the country. Today, the NDDB subsidiary is amongst the leading players in the packaged food industry and is committed to offer remunerative prices to farmers into dairying and F&V cultivation.

In the year 2017-18, the Company has strengthened its initiatives in the Eastern & Western parts of the country. The initiatives undertaken were focussed towards creating infrastructure and avenues for farmers to market their produce. Efforts were put in to strengthen the Company's

own procurement network and create a sustained market access for the farmers of the region.

Mother Dairy entered the draught affected regions of Marathwada and Vidharbha in Maharashtra to setup a milk procurement network in FY16-17. Mother Dairy is currently associated with 27,000 farmers from 1,300 villages in 9 districts, thereby augmenting the livelihood of milk producers by providing them with right remuneration for their produce. Within a span of just one year, the NDDB subsidiary crossed the milestone of collecting 1 lakh litres of milk per day from the milk pourers of the region. Procurement operations started in October 2016 with a humble beginning of 170 litres on the first day, which now has crossed to 2 lakh litres/day. The benefit of these initiatives has accrued to farmers in the tune of more than ₹ 1,250 million.

With an aim to provide these farmers with a direct access to the market, Mother Dairy also started sales of poly pack milk in the city of Nagpur. The milk pooled from these regions of Marathwada and Vidharbha is processed at a state-of-the-art plant in Nagpur, which was refurbished by MDFVPL and later inaugurated in June 2017. The upgradation of this plant was done in record time of 4 months with an initial capacity of 50,000 litres/day expandable up to 2 lakh litres/day. The Company is also enhancing its reach to the consumers of Nagpur and is in the process of expanding its retail network by opening up more booths in the city. With currently 17 milk booths, Mother Dairy plans to take the count to 100 booths in the near future.

On the other hand, procurement regions have been extended towards the eastern part of the country. Mother Dairy initiated setting-up procurement centres in parts of Bihar in the last fiscal from where it is presently procuring around 35,000 litres of milk. The Company will continue procuring raw milk sourced locally from milk producers, who have now been organised into 'Bapudham Milk Producers Company'.

In order to process and create a market for the milk procured, the NDDB subsidiary is coming up with a state-of-the-art milk processing facility in the city of Motihari, Bihar. The foundation stone of the proposed plant was recently laid in February 2018. The upcoming plant, spread over an area of 4.5 acres and with a processing capacity of 1 lakh litre of milk/day, aims to begin operations within a year's time.

In its efforts to create a national footprint, the Company's milk division has further expanded its reach by launching its polypack milk in the cities of Kolkata, Nagpur, Varanasi, etc. With growing reach, the division is also focusing on high salience by executing national campaigns and driving Cow Milk as the lead brand for communication. These initiatives have already given an advantage to the brand. Cow Milk was launched in June 2016 and has already touched 6 lakh litres/

Shri. Dilip Rath, Chairman, National Dairy Development Board at the launch of 'Gift Milk' program in Noida

day, translating close to ₹ 10,000 million consumer brand value.

The Dairy Products business has been consistently growing at a healthy rate in recent years and is likely to continue this momentum. While fresh dairy has been the key driver for growth, Mother Dairy has gradually started building distribution for the long shelf life range. The fiscal 17-18 witnessed initiatives aimed to create prominent key categories in the value added dairy products portfolio.

Dhara, the edible oil brand of Mother Dairy, has been registering a healthy cumulative growth over the last few years. The brand has grown by 18% over the last three years of which Eastern India has shown a growth of 23%. In addition, the brand has outpaced the industry growth rates in both refined and filtered oils categories. Dhara, is also embarking on the journey to enhance it reach and engagement with consumers. In the fiscal 17-18, the brand also engaged mass mediums for varied products like Refined Vegetable Oil, Refined Soyabean Oil and Ghee in order to build brand salience in focused markets.

The Company's Horticulture division, Safal, has ventured into Bhubaneswar and Sambalpur in Odisha. Safal has embarked upon a dual objective of making fresh, quality and safe fruit and vegetables available to consumers and at the same time provide a direct market linkage to the F&V growers, giving them a fair and remunerative price for their produce. This division of Mother Dairy is currently operating 11 outlets in Bhubaneswar and 6 outlets in Sambalpur, and further plans to take the total count to 30 outlets across the state.

The Horticulture division has also recently begun operations at its Ranchi plant with processing of peas and jackfruit, being procured locally, into quick frozen formats. Mother Dairy will soon begin processing of tomatoes and mangoes with its pulps and concentrates processing line, slated to commence operations this year.

Brand Mother Dairy has always spearheaded innovations in the Dairy, Oils and F&V category, and current emphasis is directed on nutrition focused innovations. During the financial year, many new products have been introduced – MishtiDoiLite, Dietz Milk, Dhara Canola Oil Plus, Frozen Jackfruit, etc. – which are aimed at offering delightful and healthy alternatives to modern-day customers.

Mother Dairy is associated with NDDB's Foundation for Nutrition for its 'Gift Milk' initiative. Under the initiative, Mother Dairy is supporting the cause by supplying daily dose of milk nutrition to around 14,000 students across 10 Government schools in Delhi & NCR. In addition, Mother Dairy has also undertaken infrastructure development including civil work, upgradation of toilets, benches for students, etc in close to 25 schools in the vicinity of its plant and procurement operations. From time to time, Mother Dairy organises medical health camps in its areas of village level operations.

As an organisation, Mother Dairy has consistently maintained sustainable use of natural and non-renewal resources to manage its operations in an environment-friendly approach. With several energy initiatives undertaken last year, the organisation has witnessed a reduction of 810 tonnes in CO^2 emissions. The overall energy conservation measures have reduced power consumption per KL of milk processed by 4.50% in FY17-18 over FY16-17. MDFVPL's Patparganj unit was felicitated with 'National Energy Conservation Award' for the year 2017 from the Hon'ble President of India in recognition of its achievements in energy efficiency and conservation.

In the area of water conservation, the Company has added STP and water recycling projects at its Patparganj and Pilkhuwa Units. Likewise, initiatives like rain water harvesting, condensate recovery have resulted in 11.00 % reduction in water consumed per KL milk handled this year over FY16-17.

In FY 2017-18, Mother Dairy Fruit & Vegetable Pvt. Ltd. achieved a turnover of ₹ 87,100 million, registering an overall growth of 10 per cent.

NDDB Dairy Services

NDDB Dairy Services (NDS) was incorporated in 2009 as a not-for-profit company under Section 8 of the Companies Act to function as a delivery arm of NDDB for field operations relating to promoting producer companies and productivity enhancement services.

NDS manages the two largest semen stations in the country, Sabarmati Ashram Gaushala in Bidaj (Gujarat) and Animal Breeding Centre in Salon (Uttar Pradesh). It owns two new mega semen stations in Alamadhi (Tamil Nadu) and Rahuri (Maharashtra). During the year, the four semen stations together sold about 331 lakh doses.

In order to produce bulls of high genetic merit for semen stations, NDS initiated application of Embryo Transfer

Technology (ETT). ETT has been majorly done in indigenous cattle, producing more than 240 viable embryos. During the year, In-Vitro Fertilisation (IVF) technology has been standardised and embryo production has started at Sabarmati Ashram Gaushala, Bidaj.

NDS continued to provide technical assistance to five Milk Producer Companies namely, Paayas in Rajasthan, Maahi in Gujarat, Shreeja in Andhra Pradesh, Baani in Punjab and Saahaj in Uttar Pradesh for taking up various activities under NDP I.

NDS supported the MPCs in the capacity building of various stakeholders. During the year, Orientation Program on Finance Module for the Board of Directors, Workshop on Core Design Principles of the MPCs for Board of Directors, Senior Officers and field teams, Trainers' Training Programme and field demonstrations for outsourced agencies for taking up awareness programmes for the MPCs were organised.

NDS assisted the four MPCs, namely, Sakhi in Alwar and Asha in Pali, in Rajasthan, Shwetdhara in Pratapgarh, Uttar Pradesh and Ruhaanii in Mansa, Punjab in carrying out orientation and refresher training programmes for the field teams. Field demonstrations for awareness programs were also taken up. These MPCs were set up under collaborative agreement with the Tata Trusts during last Year.

NDS also facilitated incorporation and operationalisation of Bapudham MPC in Motihari, Bihar and incorporation of three MPCs under National Rural Livelihoods Mission (NRLM) support, one in Bihar namely Kaushikee in Saharsha and two in Madhya Pradesh namely Muktaa in Sagar and Maalav in Rajgarh. NDS held orientation programmes for the field teams on the concept of MPCs and facilitated field demonstrations to them in taking membership drive.

NDS along with the State Rural Livelihood Missions (SRLMs) of Madhya Pradesh prepared proposal for setting up two more MPCs covering Shivpuri and Chattarpur districts and it has been approved by the Empowered Committee of Ministry of Rural Development, Government of India.

Member Enrollment Drive at Asha Mahila Milk Producer Company, Pali, Rajasthan

DAIRY COOPERATIVES AT A GLANCE

Dairy Cooperative Societies

(in numbers)@

Region/State	80-81	90-91	00-01	16-17	17-18*
NORTH					
Haryana	505	3,229	3,318	7,318	7,271
Himachal Pradesh		210	288	918	959
Jammu & Kashmir		105	**	366	366
Punjab	490	5,726	6,823	7,954	8,018
Rajasthan	1,433	4,976	5,900	15,159	14,496
Uttar Pradesh	248	7,880	15,648	26,149	31,133
Uttarakhand				4,133	4,112
Regional Total	**2,676**	**22,126**	**31,977**	**61,997**	**66,355**
EAST					
Assam		117	125	355	374
Bihar	118	2,060	3,525	19,837	21,945
Jharkhand				540	614
Meghalaya				97	97
Mizoram				37	39
Nagaland		21	74	52	52
Odisha		736	1,412	5,579	5,852
Sikkim		134	174	451	497
Tripura		73	84	100	101
West Bengal	584	1,223	1,719	3,830	4,024
Regional Total	**702**	**4,364**	**7,113**	**30,878**	**33,595**
WEST					
Chhattisgarh				924	1,082
Goa		124	166	182	182
Gujarat	4,798	10,056	10,679	18,595	19,044
Madhya Pradesh	441	3,865	4,877	9,247	9,263
Maharashtra	718	4,535	16,724	20,267	20,647
Regional Total	**5,957**	**18,580**	**32,446**	**49,215**	**50,218**
SOUTH					
Andhra Pradesh	298	4,766	4,912	3,537	3,274
Karnataka	1,267	5,621	8,516	15,185	15,817
Kerala		1,016	2,781	3,266	3,293
Tamil Nadu	2,384	6,871	8,369	11,283	10,806
Telangana				1,849	2,441
Puducherry		71	92	104	104
Regional Total	**3,949**	**18,345**	**24,670**	**35,224**	**35,735**
Grand Total	**13,284**	**63,415**	**96,206**	**1,77,314**	**1,85,903**

@ Organised (cumulative), includes conventional societies and Taluka unions formed earlier.
* Provisional
** Not reported
Data for Mehgalaya, Mizoram, Telangana & Uttarakhand included from 2014-15.

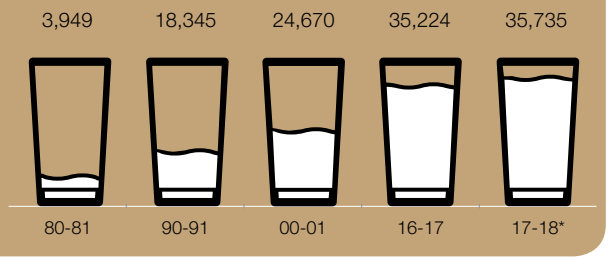
TOTAL

NORTH

EAST

WEST

SOUTH



Producer Members

(in thousands)

Region/State	80-81	90-91	00-01	16-17	17-18*
NORTH					
Haryana	39	184	185	305	313
Himachal Pradesh		17	20	38	49
Jammu & Kashmir		2	**	7	7
Punjab	26	304	370	405	410
Rajasthan	80	340	436	783	806
Uttar Pradesh	18	392	649	1,086	1,219
Uttarakhand				159	161
Regional Total	**163**	**1,239**	**1,660**	**2,782**	**2,966**
EAST					
Assam		2	1	17	20
Bihar	3	100	184	1,054	1,139
Jharkhand				17	37
Meghalaya				4	4
Mizoram				1	1
Nagaland		1	3	2	2
Odisha		46	111	291	261
Sikkim		4	5	13	14
Tripura		4	4	6	6
West Bengal	20	66	114	259	258
Regional Total	**23**	**223**	**422**	**1,663**	**1,742**
WEST					
Chhattisgarh				37	42
Goa		12	18	19	19
Gujarat	741	1,612	2,147	3,456	3,507
Madhya Pradesh	24	150	242	440	336
Maharashtra	87	840	1,398	1,719	1,787
Regional Total	**852**	**2,614**	**3,805**	**5,671**	**5,691**
SOUTH					
Andhra Pradesh	33	561	702	651	566
Karnataka	195	1,013	1,528	2,463	2,539
Kerala		225	637	962	978
Tamil Nadu	481	1,590	1,957	1,909	1,884
Telangana				148	169
Puducherry		17	27	38	41
Regional Total	**709**	**3,406**	**4,851**	**6,172**	**6,176**
Grand Total	**1,747**	**7,482**	**10,738**	**16,287**	**16,574**

* Provisional
** Not reported
Data for Meghalaya, Mizoram, Telangana & Uttarakhand included from 2014-15.

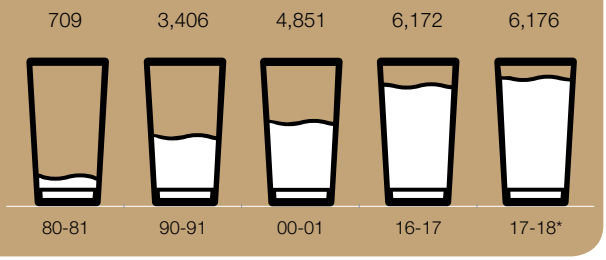
TOTAL

NORTH

EAST

WEST

SOUTH



Milk Procurement

(in thousand kilograms per day)#

Region/State	80-81	90-91	00-01	16-17	17-18*
NORTH					
Haryana	33	94	276	449	562
Himachal Pradesh		14	24	64	60
Jammu & Kashmir		11	**	18	35
Punjab	75	394	912	1,482	1,758
Rajasthan	138	364	887	2,569	2,845
Uttar Pradesh	64	382	791	351	361
Uttarakhand				182	194
Regional Total	**310**	**1,259**	**2,890**	**5,114**	**5,814**
EAST					
Assam		4	3	26	30
Bihar	3	95	330	1,565	1,603
Jharkhand				87	121
Meghalaya				12	12
Mizoram				5	6
Nagaland		1	3	3	3
Odisha		41	94	501	508
Sikkim		4	7	33	36
Tripura		3	1	5	6
West Bengal	31	52	204	160	188
Regional Total	**34**	**200**	**642**	**2,398**	**2,512**
WEST					
Chhattisgarh				77	79
Goa		16	32	66	64
Gujarat	1,344	3,102	4,567	18,226	21,135
Madhya Pradesh	68	256	319	887	1,105
Maharashtra	165	1,872	2,979	3,404	3,568
Regional Total	**1,577**	**5,246**	**7,897**	**22,660**	**25,950**
SOUTH					
Andhra Pradesh	79	763	879	1,352	1,199
Karnataka	261	917	1,887	6,549	7,077
Kerala		185	646	1,068	1,260
Tamil Nadu	301	1,106	1,618	2,998	3,039
Telangana				677	657
Puducherry		26	45	52	54
Regional Total	**641**	**2,997**	**5,075**	**12,696**	**13,287**
Grand Total	**2,562**	**9,702**	**16,504**	**42,868**	**47,563**

Includes outside State operations.
* Provisional
** Not reported
Gujarat's total milk procurement in 2017-18 includes 3,519 TKGPD from outside the State.
In 2016-17, the corresponding figure was 2,453 TKGPD.
Data for Meghalaya, Mizoram, Telangana & Uttarakhand included from 2014-15.

TOTAL

NORTH

EAST

WEST

SOUTH

Liquid Milk Marketing

(in thousand litres per day)#

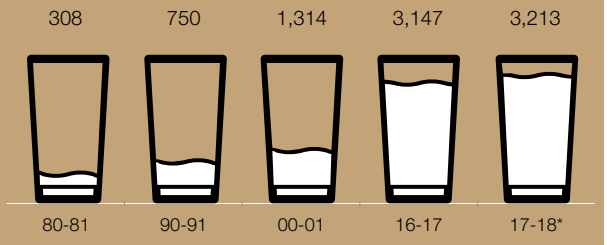
Region/State	80-81	90-91	00-01	16-17	17-18*
NORTH					
Haryana	2	80	108	323	329
Himachal Pradesh		15	20	27	25
Jammu & Kashmir		9	**	19	27
Punjab	7	139	420	956	991
Rajasthan	12	136	540	2,132	2,242
Uttar Pradesh	1	326	436	814	886
Uttarakhand				150	160
DELHI	697	1,051	1,524	6,165	6,380
Regional Total	**719**	**1,756**	**3,048**	**10,587**	**11,040**
EAST					
Assam		10	7	47	51
Bihar	8	111	324	1,008	1,126
Jharkhand				360	386
Meghalaya				12	12
Mizoram				5	5
Nagaland		1	4	3	5
Odisha		65	98	413	409
Sikkim		5	7	35	35
Tripura		6	7	11	12
West Bengal	17	26	27	33	32
KOLKATA	283	526	840	1,219	1,141
Regional Total	**308**	**750**	**1,314**	**3,147**	**3,213**
WEST					
Chhattisgarh				157	149
Goa		36	83	81	71
Gujarat	210	1,052	1,905	4,917	5,256
Madhya Pradesh	39	279	244	832	876
Maharashtra	18	363	1,178	2,826	2,783
MUMBAI	950	1,057	1,390	1,815	1,952
Regional Total	**1,217**	**2,787**	**4,800**	**10,629**	**11,088**
SOUTH					
Andhra Pradesh	19	552	733	1,196	1,337
Karnataka	166	889	1,501	3,257	3,886
Kerala		223	640	1,308	1,286
Tamil Nadu	109	405	559	980	1,038
Telangana				801	803
Puducherry		22	43	100	98
CHENNAI	245	662	725	1,076	1,168
Regional Total	**539**	**2,753**	**4,201**	**8,718**	**9,616**
Grand Total	**2,783**	**8,046**	**13,363**	**33,082**	**34,957**

Includes Metro Dairies and outside State operations.
* Provisional
** Not reported
Gujarat's total milk marketing in 2017-18 including outside the State stands at 12,059 TLPD.
In 2016-17, the corresponding figure was 11,319 TLPD.
Data for Meghalaya, Mizoram, Telangana & Uttarakhand included from 2014-15.

TOTAL

NORTH

EAST



WEST

SOUTH

Dairy cooperatives' cold chain infrastructure *

(March 2018)

Region/State	BMC (TL)	Chilling Centre (TLPD)	Dairy Plant (TLPD)
North			
Delhi			1,500
Haryana	342	330	6,775
Himachal Pradesh	165	82	65
Jammu & Kashmir	100		100
Punjab	1,529	657	2,185
Rajasthan	3,573	610	2,125
Uttar Pradesh	915	1,633	3,703
Uttarakhand	71	65	245
Regional Total	**6,695**	**3,377**	**16,698**
East			
Assam	15		60
Bihar	1,721	274	2,655
Jharkhand	144	10	695
Meghalaya			26
Mizoram	11		20
Nagaland	2		22
Odisha	744	80	655
Sikkim	9		60
Tripura	2		19
West Bengal	279	117	1,257
Regional Total	**2,926**	**481**	**5,469**
West			
Chhattisgarh	96	69	141
Goa	47		110
Gujarat	17,530	6,435	24,175
Madhya Pradesh	620	599	1,460
Maharashtra	1,805	1,665	9,325
Regional Total	**20,098**	**8,768**	**35,211**
South			
Andhra Pradesh	1,401	585	2,125
Karnataka	3,397	2,895	6,115
Kerala	1,330	100	1,810
Puducherry	50		120
Tamil Nadu	1,519	1,435	4,121
Telangana	247	404	1,250
Regional Total	**7,943**	**5,419**	**15,541**
Grand Total	**37,659**	**18,044**	**72,919**

* Provisional

BMC (TL)

CHILLING CENTRE (TLPD)

DAIRY PLANT (TLPD)

VISITORS

During 2017-18, NDDB received 579 visitors from India and abroad.

Overseas visitors came from Africa, Ethiopia, Germany, Japan, Nepal, The Netherlands, Mongolia, Oman, Sri Lanka and The United States of America.

IAS trainee officers

Prof. Ramesh Chand Member Niti Aayog

Mr. Munkhjargal B, Executive Director and National Coordinator for MNDDB from Global Communities, Mongolia

Sh/Musallam Said Ali Qatan, Chairman, Al Morooj Dairy, Sultanate of Oman

Parliamentarians from Africa

Dr. Keshav Prasad Premy, Joint Secretary and Dr. Barun Kumar Sharma, Under Secretary, Ministry of Livestock Development, Government of Nepal

ACCOUNTS

Borkar & Muzumdar
Chartered Accountants

INDEPENDENT AUDITOR'S REPORT
TO THE BOARD OF DIRECTORS OF NATIONAL DAIRY DEVELOPMENT BOARD

Report on the Financial Statements

We have audited the accompanying financial statements of **National Dairy Development Board** ("the Board"), which comprise the balance sheet as at March 31, 2018, the Income and Expenditure Account and the Cash Flow Statement for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation of these financial statements in accordance with the financial reporting provisions of National Dairy Development Board Act, 1987 ("the Act"). This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation of the financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Board's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Board's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion and to the best of our information and according to the explanations given to us, the financial statements of the Board for the year ended 31st March, 2018 are prepared, in all material respects, in accordance with the provisions of the Act.

For **Borkar & Muzumdar**
Chartered Accountnts
FRN: 101569W

Devang Vaghani
Partner
M. NO. 109386

Date: 18 June, 2018
Place: Anand

Tel: 022 6689 9999 / Fax: 022 6689 9990 / Email: contact@bnmca.com / Website: www.bnmca.com
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National Dairy Development Board ("NDDB" or "the Board")

(A Body corporate constituted under the National Dairy Development Board Act, 1987)

BALANCE SHEET as at 31st March, 2018

₹ in Million

PARTICULARS	Annexure	31.03.2018	31.03.2017
LIABILITIES			
NDDB Funds	I	29,854.14	28,774.71
Secured Loans	II	611.92	50.11
Current Liabilities and Provisions	III	6,704.88	6,542.03
Deferred Tax Liability	XVI (Note 8)	290.90	239.23
Total		**37,461.84**	**35,606.08**
ASSETS			
Cash and Bank Balances	IV	6,410.89	9,487.01
Inventories	V	0.37	0.51
Sundry Debtors		189.69	62.21
Loans, Advances and Other Current Assets	VI	15,972.02	15,274.58
Investments	VII	13,026.63	8,890.74
Fixed Assets	VIII	1,862.24	1,891.03
Total		**37,461.84**	**35,606.08**
Significant Accounting Policies	XV		
Notes to Accounts forming part of Financial Statements	XVI		

In terms of our report of even date attached.

For Borkar & Muzumdar
Chartered Accountants
Firm's Reg No. 101569W

Devang Vaghani
Partner
Membership No. 109386

For and on behalf of the Board,

Dilip Rath
Chairman

Y Y Patil
Executive Director

S Regupathi
General Manager
(Accounts)

Anand, 18th June, 2018

National Dairy Development Board ("NDDB" or "the Board")

(A Body corporate constituted under the National Dairy Development Board Act, 1987)

INCOME AND EXPENDITURE ACCOUNT for the year ended 31st March, 2018

₹ in Million

PARTICULARS	Annexure	2017-2018	2016-2017
INCOME			
Interest		2,216.46	1,962.88
Service Charges	IX	258.11	170.03
Rent		199.82	188.68
Dividend		227.22	268.22
Other Income	X and XVI (Note 11)	465.64	499.81
Total (A)		**3,367.25**	**3,089.62**
EXPENDITURE			
Interest and Financial Charges		172.16	138.02
Remuneration and Benefits to Employees	XI	814.04	951.79
Administrative Expenses	XII	147.02	139.41
Grants		20.28	7.48
Research and Development		155.11	126.00
Maintenance of Assets	XIII	231.86	184.88
Other Expenses	XIV	94.66	82.19
Bad Debts Written off	XVI (Note 9)	339.05	152.01
Depreciation	VIII	152.32	131.06
Total (B)		**2,126.50**	**1,912.84**
Surplus during the year before tax (C) = (A - B)		**1,240.75**	**1,176.78**
Less: Provision for Taxation			
Current Tax		146.70	75.20
Deferred Tax	XVI (Note 8)	51.66	35.80
Surplus during the year after tax		**1,042.39**	**1,065.78**
Less: Appropriations to -			
Special Reserve		148.59	140.52
Balance carried to General Funds		893.80	925.26
Total (D) = (B + C)		**3,367.25**	**3,089.62**
Significant Accounting Policies	XV		
Notes to Accounts forming part of Financial Statements	XVI		

In terms of our report of even date attached.

For Borkar & Muzumdar
Chartered Accountants
Firm's Reg No. 101569W

Devang Vaghani
Partner
Membership No. 109386

For and on behalf of the Board,

Dilip Rath
Chairman

Y Y Patil
Executive Director

S Regupathi
General Manager
(Accounts)

Anand, 18th June, 2018

National Dairy Development Board ("NDDB" or "the Board")

(A Body corporate constituted under the National Dairy Development Board Act, 1987)

CASH FLOW STATEMENT for the year ended on 31st March, 2018

₹ in Million

PARTICULARS		2017-2018	2016-2017
Cash flow from Operating Activities			
Surplus during the year before tax		1,240.75	1,176.78
Adjustments for :			
Depreciation	152.32		131.06
(Write back)/Provision for inventory obsolescence	(0.10)		(0.79)
(Profit)/Loss on sale of investments	(2.44)		-
Interest income on fixed deposit and bonds considered separaterly	(1,202.76)		(1,048.60)
Dividend Income considered separaterly	(227.22)		(268.22)
(Profit)/Loss on sale/ Grant of fixed assets considered separately	(3.07)		(40.41)
Employee Retirement Benefit	60.08		216.84
Interest and financial charges to banks	4.44		3.00
Bad debts written off	339.05		152.01
Premium Amortised on Bonds and State Development Loans	16.83		0.61
		(862.87)	(854.50)
Operating Cash flow before changes in working capital		**377.88**	**322.28**
(Increase)/ Decrease in Inventories	0.24		1.68
(Increase)/ Decrease in Sundry Debtors	(127.48)		10.35
(Increase)/ Decrease in Loans and Advances	(2,070.21)		833.03
Tax refunded/(paid)	217.61		(82.27)
Increase/(Decrease) in current liabilities	831.62		440.89
		(1,148.22)	1,203.68
Net cash flow generated from /(used in) operating activities (A)		**(770.34)**	**1,525.96**
Cash flow from Investing activities			
Interest Income	995.79		897.52
Dividend Income	227.22		268.22
Proceeds from maturity of investments (Bonds)	200.00		100.00
Purchase of Investments (Bonds and State Development Loans)	(4,350.29)		(1,459.18)
Decrease / (Increase) in FDR's with banks more than 90 days (net)	2,942.02		(251.90)
Proceeds from sale of fixed assets	7.37		47.58
Grant received for purchase of Fixed asset	45.99		17.03
Purchase of fixed assets	(136.78)		(130.48)

₹ in Million

PARTICULARS		2017-2018	2016-2017
Net cash flow generated from /(used in) investing activities (B)		**(68.68)**	**(511.21)**
Cash flow from Financing activities			
Proceeds / (Repayment) of borrowed funds	561.81		(702.73)
Interest and financial charges to banks	(4.44)		(3.00)
Net cash flow from financing activities (C)		557.37	(705.73)
Net Cash flow during the year (A+B+C)		**(281.65)**	**309.02**
Cash and Cash Equivalents at the beginning of the year		**314.60**	**5.58**
Cash and Cash Equivalents at the end of the year		**32.95**	**314.60**
Cash and Cash Equivalents			
Balances with Banks:			
In fixed deposits		6,377.93	9,452.41
Less: Deposits with maturity more than 90 days		6,377.93	9,172.41
		-	280.00
In current accounts		32.88	34.54
Cash and Cheques on hand		0.08	0.06
Total		**32.96**	**314.60**
Significant Accounting Policies	XV		
Notes to Accounts forming part of Financial Statements	XVI		

Note : Cash Flow Statement has been prepared under the "Indirect Method" as set out in Accounting Standard - 3 on Cash Flow Statements.

In terms of our report of even date attached.

For Borkar & Muzumdar
Chartered Accountants
Firm's Reg No. 101569W

Devang Vaghani
Partner
Membership No. 109386

For and on behalf of the Board,

Dilip Rath
Chairman

Y Y Patil
Executive Director

S Regupathi
General Manager
(Accounts)

Anand, 18th June, 2018

NDDB Funds
ANNEXURE I

₹ in Million

		31.03.2018	31.03.2017
General Reserve (Note a)			
Balance as per last balance sheet	3,559.61		3,885.63
Add: Transferred from Grant for Fixed Assets	-		5.78
Less: Deferred Tax Liability on Special Reserve on 01.04.2016	-		**331.80**
		3,559.61	**3,559.61**
Grant for Fixed Assets (Note b)			
Balance as per last balance sheet	33.06		30.78
Add: Grant received during the year	45.99		17.03
Less: Transferred to General Reserve	-		5.78
Less: Recoupment of depreciation (Refer Note 4 of Annexure VIII)	8.95		8.97
		70.10	**33.06**
Special Reserve under section 36 (1) (viii) of the Income Tax Act, 1961			
Balance as per last balance sheet	1,099.25		958.73
Add: Transfer from Income and Expenditure Account	148.59		140.52
		1,247.84	**1,099.25**
Income and Expenditure Account			
Balance as per last balance sheet	24,082.79		23,157.53
Add: Surplus after appropriation during the year	893.80		925.26
		24,976.59	**24,082.79**
Total		**29,854.14**	**28,774.71**

Notes :

a. To promote, plan and organise programmes for development of dairy and other agriculture based and allied industries and biologicals as per the NDDB Act, 1987.

b. In accordance with Accounting Standard - 12 - 'Accounting for Government Grants'

Secured Loans
ANNEXURE II

₹ in Million

	31.03.2018	31.03.2017
Bank Overdraft (Secured against lien on fixed deposits with Banks)	611.92	50.11
Total	**611.92**	**50.11**

Current Liabilities and Provisions
ANNEXURE III

₹ in Million

		31.03.2018	31.03.2017
a) Current Liabilities			
Advances and deposits		35.58	32.36
Sundry creditors		246.81	205.85
Net liability on account of Consultancy Project			
Funds received	14,403.04		19,110.59
Add : Due to suppliers for expenses	1,212.27		938.34
	15,615.31		20,048.93
Less : Expenditure incurred	11,394.77		16,443.38
Advance to suppliers	376.07		556.59
	3,844.47		3,048.96
Add : Payable to NDDB (Per contra, Refer Annexure VI)	108.21		37.67
		3,952.68	**3,086.63**
b) Provisions for :			
Non-performing assets	1,082.41		1,890.89
General contingency on Standard Assets	55.28		30.20
Contingency	585.39		610.49
		1,723.08	**2,531.58**
c) Provisions for :			
Leave encashment (Refer Note 5 of Annexure XVI)	379.08		366.17
Post retirement medical scheme (Refer Note 5 of Annexure XVI)	71.19		73.38
Gratuity (Refer Note 5 of Annexure XVI)	15.54		33.02
VRS monthly benefits	18.74		30.51
		484.55	503.08
Provisions for income tax (net of taxes paid)		262.18	182.53
Total		**6,704.88**	**6,542.03**

Cash and Bank Balances
ANNEXURE IV

₹ in Million

		31.03.2018	31.03.2017
Balances with Banks			
In fixed deposits	6,377.93		9,452.41
In current accounts	32.88		34.54
		6,410.81	**9,486.95**
Cash and cheques on hand		0.08	0.06
Total		**6410.89**	**9487.01**

Note : Fixed deposits includes ₹ 2112.80 million (Previous Year ₹ 2112.80 million) placed with Banks which are under lien for the Overdraft facility and ₹ 0.05 million (Previous Year ₹ 0.05 million) for Bank Guarantee Margin Money.

Inventories
ANNEXURE V

₹ in Million

		31.03.2018	31.03.2017
Stores, spares and others	1.44		1.55
Project equipments	3.24		3.37
	4.68		4.92
Less : Provision for obsolescence	4.31		4.41
		0.37	**0.51**
Total		**0.37**	**0.51**

Loans, Advances and Other Current Assets
ANNEXURE VI

₹ in Million

		31.03.2018	31.03.2017
Loans to cooperatives			
Milk - Secured	11,363.13		9,363.91
Unsecured	345.47		521.43
		11,708.60	**9,885.34**
Oil (including interest accrued) - Unsecured		**945.03**	**1,753.45**
Loans and advances to subsidiary companies / managed units			
Secured	1,238.89		1,275.90
Unsecured	753.68		879.90
		1,992.57	**2,155.80**
Loans to employees			
Secured	0.90		1.21
Unsecured	7.49		10.32
		8.39	**11.53**
Interest accrued on -			
Loans and advances	51.59		52.54
Fixed deposits and investments	231.35		171.92
		282.94	**224.46**
Advances to suppliers and contractors		8.11	8.10
Recoverable on account of turnkey projects			
(Per contra, Refer Annexure III)		108.21	37.67
Sundry deposits		19.25	17.23
Income taxes paid (net of provisions)		890.13	1,174.78
Other receivables		8.79	6.22
Total		**15,972.02**	**15,274.58**

Note : Secured loans are secured against the mortgage of assets and/or hypothecation of stocks/assets.

Investments
ANNEXURE VII

₹ in Million

		31.03.2018	31.03.2017
Long term investments (at cost) :			
Equity Shares (unquoted) in subsidiary companies:			
Mother Dairy Fruit and Vegetable Private Limited (MDFVPL)	2,500.00		2,500.00
IDMC Limited (IDMC)	283.90		283.90
Indian Immunologicals Limited (IIL)	90.00		90.00
NDDB Dairy Services (NDS)	2,000.00		2,000.00
		4,873.90	4,873.90
Bonds (Quoted) of Government companies, financial institutions and banks (at cost)		4,897.28	4,015.94
(aggregate market value of bonds is ₹ 4868.80 million (Previous Year ₹ 4022.92 million) as at the balance sheet date)			
State Development Loans (Quoted) (at cost)		3254.55	-
(aggregate market value of State Development Loans is ₹ 3180.99 million (Previous Year NIL) as at the balance sheet date)			
Shares (unquoted) in Co-operatives and Federations	1.00		1.00
Less: Provision for diminution in value of investments	0.10		0.10
		0.90	0.90
Total		**13,026.63**	**8,890.74**

Fixed Assets
ANNEXURE VIII

₹ in Million

Particulars	Gross Block (at Cost)				Depreciation				Net Block	
	As at 01.04.2017	Addition	Deduction/ (adjustments)	As at 31.03.2018	As at 01.04.2017	For the year *(refer note 4)*	Deduction/ (adjustments)	As at 31.03.2018	As at 31.03.2018	As at 31.03.2017
FreeHold Land (refer note 1 to 3)	500.66	-	-	500.66	-	-	-	-	500.66	500.66
Lease Hold Land	64.16	-	-	64.16	11.55	0.75	-	12.30	51.86	52.61
Buildings and Roads	1,980.39	2.88	3.62	1,979.65	978.91	52.69	3.04	1,028.56	951.09	1,001.48
Plant and Machinery	54.82	-	0.75	54.07	53.42	0.24	0.75	52.91	1.16	1.40
Electrical Installations	159.86	12.82	0.60	172.08	102.04	10.07	0.53	111.58	60.50	57.82
Furniture, Computers and Others Equipments	883.63	94.29	15.04	962.88	677.83	95.74	11.39	762.18	200.70	205.80
Rail Milk Tankers	206.60	-	-	206.60	206.60	-	-	206.60	-	-
Vehicles	24.64	0.79	2.60	22.83	21.08	1.78	2.60	20.26	2.57	3.56
Total	**3,874.76**	**110.78**	**22.61**	**3,962.93**	**2,051.43**	**161.27**	**18.31**	**2,194.39**	**1,768.54**	**1,823.33**
Previous Year	*3,831.66*	*158.51*	*115.41*	*3,874.76*	*2,019.64*	*140.03*	*108.24*	*2,051.43*	*1,823.33*	*1,812.02*
Capital Work in Progress including capital advances									93.70	67.70
Total Fixed Assets									**1,862.24**	**1,891.03**

Notes :

1. Land for FMD Control Project amounting to ₹ 0.39 million is obtained from Government of Tamil Nadu by alienation.
2. Freehold land includes land for Oil Tank farm, Narela amounting to ₹ 17.94 million which has been obtained on perpetual lease for which lease deeds are yet to be executed.
3. Land amounting to ₹ 65.98 million at Kannamangala Horticulture Farm received from Agriculture and Horticulture Department, Government of Karnataka is in the Name of the subsidiary company Mother Dairy Fruit and Vegetable Private Limited and transfer of title is pending.
4. Depreciation for the year in Income and Expenditure account excludes deprecition ₹ 8.95 million (Previous year :₹ 8.97 million) on account of recoupment from grants received.

Service Charges
ANNEXURE IX

₹ in Million

	2017-2018	2016-2017
Training fees	7.00	6.95
Procurement and technical service fees	234.49	159.77
Fees from consultancy and feasibility studies	13.43	0.15
Royalty and process knowhow fees	3.19	3.16
Total	**258.11**	**170.03**

Other Income
ANNEXURE X

₹ in Million

	2017-2018	2016-2017
Profit on sale of fixed assets (net)	6.79	40.41
Profit on disposal of investments	2.44	-
Excess provision and NPAs written back	400.26	410.00
Miscellaneous income	56.15	49.40
Total	**465.64**	**499.81**

Remuneration and benefits to employees
ANNEXURE XI

₹ in Million

	2017-2018	2016-2017
Salaries and Wages (including ex-gratia and retainership fees)	645.89	710.40
Contribution to Provident, Superannuation fund and Gratuity	110.86	191.51
Staff welfare expenses	57.29	49.88
Total	**814.04**	**951.79**

Remuneration excludes ₹ 23.11 million (Previous year : ₹ 24.76 million) shown as part of Research and Development expenses.

Administrative Expenses
ANNEXURE XII

₹ in Million

		2017-2018	2016-2017
Printing and stationery		6.07	6.38
Communication charges		10.71	9.90
Audit fees and expenses (including service tax)			
Audit fees	0.74		0.69
Tax audit	0.29		0.25
Fees for other services	0.16		-
Out of pocket expenses	0.07		0.04
		1.26	0.98
Legal fees		5.01	2.76
Professional fees		18.19	26.93
Vehicle expenses		3.05	2.78
Recruitment expenses		0.39	0.43
Advertisement expenses		5.53	3.34
Travelling and conveyance expenses		67.50	57.93
Electricity and rent		26.37	24.62
Other administrative expenses		2.94	3.36
Total		**147.02**	**139.41**

Maintenance of Assets
ANNEXURE XIII

₹ in Million

	2017-2018	2016-2017
Repairs and maintenance		
Buildings	145.67	121.75
Others	68.27	53.89
Rates and taxes	16.06	6.77
Insurance	1.86	2.47
Total	**231.86**	**184.88**

Other Expenses
ANNEXURE XIV

₹ in Million

	2017-2018	2016-2017
Training expenses	20.53	29.14
Computer expenses	16.14	13.06
Other expenditure	57.99	39.99
Total	**94.66**	**82.19**

National Dairy Development Board ("NDDB" or "the Board")

Significant Accounting Policies Forming Part of Financial Statements
ANNEXURE XV

1. Basis of preparation

The financial statements are prepared on accrual basis, using the historical cost convention and Generally Accepted Accounting Principles ("GAAP") in India including accounting standards issued by the Institute of Chartered Accountants of India, as applicable to the Board. The financial statements are presented in Indian Rupees rounded off to the nearest million, unless otherwise stated.

2. Use of Estimates

The preparation of financial statements in conformity with the GAAP requires the management to make estimates and assumptions that affect the reported amounts of assets and liabilities, revenues and expenses and the disclosure of contingent liabilities as at the date of the financial statements. Such estimates and assumptions are based on the Management's evaluation of relevant facts and circumstances as on the date of the financial statements. Management believes that the estimates used in the preparation of the financial statements are prudent and reasonable; however the actual outcome may diverge from this estimate which is recognized prospectively in the current and future periods. Any changes in such estimates are recognized prospectively in current and future period.

3. Asset Classification and Provisioning

NDDB being a Public Financial Institution follows the guidelines of Reserve Bank of India (RBI) for asset classification applicable to "Systemically Important Non-Banking Financial (Non-Deposit Accepting or Holding) Companies Prudential Norms, 2015". Provision for Non-Performing and Standard Assets is made at the rates approved by the Board.

4. Revenue Recognition

Interest income on standard assets in accordance with the RBI guidelines is recognized on an accrual basis. Interest income from non-performing assets classified in conformity with the guidelines is accounted on cash basis upon realisation.

Interest income on fixed deposits with Bank and investment in Bonds is recognized on a time proportionate basis.

Income from Services to co-operatives etc. is recognized on proportionate completion basis and in accordance with the terms of relevant agreement.

Sale of milk commodities is accounted for on transfer of substantial risk and rewards, which is on dispatch of the commodities from the warehouse.

Dividend income is accounted for when unconditional right to receive income is established.

Other income is recognized when there is no uncertainty as to its ultimate collectability.

5. Grants

a. Grants relating to fixed assets are initially credited to Grant for Fixed Assets under the General Fund. This amount is recognized in the Income and Expenditure Account on a systematic basis over the useful life of such fixed asset as a recoupment of depreciation on such assets.

b. Revenue grants received during the year are recognized in the Income and Expenditure Account.

c. Grants received for specific projects are credited to the Project Funds and is utilized by disbursements for these projects.

6. Research and Development Expenditure

Research and Development Expenditure (other than cost of fixed assets acquired) are charged as expenses in the year in which they are incurred. Fixed assets used for the Research and Development purpose with alternate use is depreciated over its useful life based on the Board's policy.

7. Employee Benefits

a. Defined Contribution Plan: Contribution to Provident Fund and Superannuation Fund is made at a predetermined rate and is charged to Income and Expenditure account.

b. Defined Benefit Plans: The Board's liabilities towards gratuity, compensated absences and post-retirement medical benefit schemes are determined using the projected unit credit method which considers each period of service giving rise to an additional unit of benefit entitlement and measures each unit separately to build up final obligation. Actuarial gains and losses based on actuarial valuation done by the independent actuary carried out annually are recognized immediately in the Income and Expenditure account as income or expense. Obligation is measured at the present value of estimated future cash flows using a discounted rate that is determined by reference to the market yields at the Balance sheet date on the Government bonds where the currency and terms of Governments bonds are consistent with the currency and estimated terms of defined benefit obligation.

Compensated absences: The Board has a scheme for compensated absences benefit for employees, the liability for which is determined on the basis of an actuarial valuation carried out at the end of the year.

The Board has funded its liability towards gratuity by participating in Group Gratuity cum Life Assurance Scheme of Life Insurance Corporation of India.

8. Fixed Assets and Depreciation

Tangible fixed assets are carried at cost less depreciation and impairment loss. Cost comprises of purchase price, import duties and other non-refundable taxes or levies and any directly attributable costs to bring the asset ready for its intended use.

Depreciation on fixed assets costing more than ₹ 10,000 each is charged on Straight Line Method basis at the rates fixed by the Board. Depreciation is charged for the full year in the year of capitalization and no depreciation is charged in the year of disposal. Each asset costing ₹ 10,000 or less is depreciated at 100 percent in the year of purchase. Depreciation rates, as approved by the Board, for various classes of assets are as under:

Assets	Rate (in %)
Factory buildings, Godown and Roads	4.00
Other buildings	2.50
Cold storage	15.00
Electrical installation	5.00
Computers (including software)	33.33
Office and Lab equipment	15.00
Plant and machinery	10.00
Solar equipment	30.00
Furniture	10.00
Vehicles	20.00
Rail milk tankers	10.00

Leasehold Land is amortized over the duration of lease. Depreciation on the assets located on leasehold land shall be at lower of lease duration or useful life of that asset.

Capital assets under installation / construction are stated in Balance Sheet as "Capital Work in Progress".

9. Impairment of Assets

The carrying value of assets at each Balance Sheet date is reviewed for impairment of assets. If any indication of such impairment exists, the recoverable amount of such asset is estimated and impairment is recognized, if the carrying amount of these assets exceeds the recoverable amount. The recoverable amount is greater of net selling price and their value in use. Value in use is arrived at by discounting their future cash flows to their present value based on appropriate discount factor. When there is indication that an impairment loss recognized for an asset in prior accounting periods no longer exists or may have decreased such reversal of impairment loss is recognized in Income and Expenditure Account.

10. Investments

Long term investments are valued as under:

a) Shares in Subsidiaries, Co-operatives and Federations – at cost of acquisition;

b) Debentures / bonds in Government Companies, Financial Institutions and Banks / State Development Loans - at cost of acquisition net of amortised premium, if any.

Current investments are valued at lower of cost or market value.

Long term Investments are valued at cost. In case cost price is higher than the face value, the premium is amortised over the remaining period of maturity of the underlying security. Such investments are stated in balance sheet at acquisition price less amortised premium.

Provision for any diminution other than temporary in value of investments is made in the year in which such diminution is assessed.

11. Inventories

Inventories including stores and project equipment are valued at cost or net realizable value whichever is lower, cost being worked out on first-in-first-out basis. Provision for obsolescence is made, wherever necessary.

12. Foreign Currency Transactions

Transactions in foreign currencies are recorded at the exchange rate prevailing on the date of the transactions.

Monetary items denominated in foreign currency and outstanding at the Balance Sheet date are translated at the exchange rate prevailing at the year-end. Non-monetary items are carried at historical cost.

Exchange differences arising on foreign currency transactions are recognised as income or expense in the period in which they arise.

13. Accounting for Voluntary Retirement scheme

The cost of voluntary retirement scheme including ex-gratia is charged to the Income and Expenditure Account in the period of separation of employees. A provision for Monthly Benefit Scheme is made for the employees opting for the voluntary retirement scheme in the period of separation of employees and the same is adjusted against the payments made.

14. Taxes on Income

Current tax is the amount payable on the taxable income for the year as determined in accordance with the provisions of the Income Tax Act, 1961.

Deferred Tax is recognized on timing differences, being the differences between the taxable income and the accounting income that originate in one period and are capable of reversal in one or more subsequent periods.

Deferred Tax Assets in respect of unabsorbed depreciation and carry forward losses are recognized if there is a virtual certainty that there will be sufficient future taxable income available to set-off such tax losses. Other deferred tax assets are recognized when there is reasonable certainty that there will be sufficient future taxable income to realize such assets.

15. Leases

Lease arrangements where the risks and rewards incidental to ownership of an asset vest substantially with the lessor are recognized as operating leases. Lease rent under operating leases are recognized in the Income & Expenditure Account with reference to lease terms.

16. Provisions and Contingencies

A provision is recognized when the Board has a present obligation as a result of past events and it is probable that an outflow of resources will be required to settle the obligation, in respect of which a reliable estimate can be made. Provisions (excluding retirement benefits) are not discounted to their present value and are determined based on the estimate required to settle the obligation at the Balance Sheet date. These are reviewed at each Balance Sheet date and are adjusted to reflect the current best estimates. Contingent liabilities are disclosed in Notes to Accounts.

The Board created provisions in respect of loans and other assets prior to the year 2001-02. Based on the movement in underlying assets for which such provision was created, Board reallocates / write back, such provisions based on identified events. Accordingly, the Board had made allocation of contingency provision for possible diminution in value of its asset or for unforeseen events leading to such liability.

National Dairy Development Board ("NDDB" or "the Board")

Notes to Accounts forming part of the Financial Statements

ANNEXURE XVI

1 At the request of the concerned authorities, the NDDB has been managing West Assam Milk Producers' Co-operative Union Ltd. and Jharkhand State Cooperative Milk Producers' Federation Ltd. These are separate and independent entities and their accounts are maintained by the respective authorities and audited separately.

2 **Contingent Liabilities:**

2.1. Principal amount of claims not acknowledged as debt : ₹ 56.55 million (Previous Year : ₹ 58.49 million)

2.2. Guarantees outstanding : ₹ 0.05 million (Previous Year : ₹ 0.05 million)

2.3. Income tax demands (excluding interest and penalty applicable under respective statutory provisions) ₹ 804.09 million (Previous Year : ₹ 491.08 million)

2.4. Service tax demands ₹ 442.66 million (Previous Year: ₹ 442.66 million)

2.5 Other Demands

₹ in Million

Particulars	Authority	2017-18	2016-17
Settlement of Land dues	Land and Land Reform Department, Siliguri	0.39	0.39
Demand for Municipal Tax for Land at Itola	Taluka Development Officer, Vadodara	4.73	4.73
Demand for Property Tax for Oil Tanks	Brihan Mumbai Mahanagar Palika	1.98	-

Demands presented hereinabove at 2.3 to 2.5 have been contested by the Board before appropriate forums. Future cash flows in respect of the same are determinable only on receipt of judgment / decision of the forums where the demands are contested.

3 Funding for National Dairy Plan – I (NDP-I) is through a line of credit from International Development Association, which along with the share of Government of India, flows from the budget of Department of Animal Husbandry, Dairying and Fisheries to the Project Management Unit (PMU) in NDDB as "Grant-in-aid for onward distribution to the End Implementation Agencies". A separate bank account is being maintained for receipt of funds. Separate Project accounts are being maintained for NDP-I funds which are audited by the statutory auditors of NDDB.

4 **Segment information:**

NDDB is a body corporate constituted under the National Dairy Development Board Act, 1987. As per the objectives set out in the Act, all the activities of NDDB revolve around the Dairy/Agriculture sector which in terms of Accounting Standard-17 on "Segment Reporting" constitute a single reportable segment.

5 **Disclosure as per Accounting Standard 15 (Revised 2005) regarding Employee Benefits is as under:**

Employee benefit plans

Defined Contribution Plans

The Company makes Provident Fund and Superannuation Fund contributions to defined contribution plans for qualifying employees. Under the Schemes, the Company is required to contribute a specified percentage of the payroll costs to fund the benefits. The Company recognised ₹ 58.09 millions (Year ended 31 March, 2017 ₹ 59.23 millions) for Provident Fund contributions and ₹ 39.57 millions (Year ended 31 March, 2017 ₹ 39.49 millions) for Superannuation Fund contributions in the Income and Expenditure Account. The contributions payable to these plans by the Company are at rates specified in the rules of the schemes.

Defined Benefit Plans

The Company offers the following employee benefit schemes to its employees:

i. Gratuity

ii. Post-Retirement medical benefits schemes (PRMBS)

iii. Leave Encashment

The following table sets out the funded status of the defined benefit schemes and the amount recognised in the financial statements:

₹ in Million

Particulars	Year ended 31 March, 2018			Year ended 31 March, 2017		
	Gratuity	Post-Retirement medical benefits schemes (PRMBS)	Leave Encashment	Gratuity	Post-Retirement medical benefits schemes (PRMBS)	Leave Encashment
Components of employer expense						
Current service cost	24.20	-	23.87	24.41	-	25.01
Interest cost	27.16	5.50	27.46	23.34	6.15	22.42
Expected return on plan assets	(24.62)	-	-	(21.94)	-	-
Actuarial losses/(gains)	(11.83)	(2.90)	(8.76)	67.16	(5.22)	75.51
Total expense recognised in the Income and Expenditure Account	**14.91**	**2.60**	**42.57**	**92.97**	**0.93**	**122.94**
Actual contribution and benefit payments for year						
Actual benefit payments	(44.72)	(4.78)	(29.67)	(44.41)	(4.39)	(36.95)
Actual contributions	32.39	-	-	71.22	-	-
Net asset / (liability) recognised in the Balance Sheet						
Present value of defined benefit obligation	(357.02)	(71.19)	(379.07)	(362.20)	(73.38)	(366.17)
Fair value of plan assets	341.48	-	-	329.18	-	-
Net asset / (liability) recognised in the Balance Sheet	**(15.54)**	**(71.19)**	**(379.07)**	**(33.02)**	**(73.38)**	**(366.17)**
Change in defined benefit obligations (DBO) during the year						
Present value of DBO at beginning of the year	362.20	73.37	366.17	291.71	76.84	280.18
Current service cost	24.20	-	23.87	24.40	-	25.01
Interest cost	27.17	5.50	27.46	23.34	6.15	22.42
Actuarial (gains) / losses	(11.83)	(2.90)	(8.76)	67.16	(5.22)	75.51
Benefits paid	(44.72)	(4.78)	(29.67)	(44.41)	(4.39)	(36.95)
Present value of DBO at the end of the year	**357.02**	**71.19**	**379.07**	**362.20**	**73.38**	**366.17**
Change in fair value of assets during the year						
Plan assets at beginning of the year	329.18	-	-	280.44	-	-
Acquisition adjustment	-	-	-	-	-	-
Expected return on plan assets	24.62	-	-	21.94	-	-

Particulars	Year ended 31 March, 2018			Year ended 31 March, 2017		
	Gratuity	Post-Retirement medical benefits schemes (PRMBS)	Leave Encashment	Gratuity	Post-Retirement medical benefits schemes (PRMBS)	Leave Encashment
Actual company contributions (Excluding Contribution made by Gratuity Trust and charges deducted by LIC)	32.39	-	-	71.22	-	-
Actuarial gain / (loss)	-	-	-	-	-	-
Benefits paid	(44.71)	-	-	(44.41)	-	-
Plan assets at the end of the year	**341.48**	**-**	**-**	**329.19**	**-**	**-**
Actual return on plan assets	24.62	-	-	21.94	-	-
Composition of the plan assets is as follows:						
Government bonds	50%	-	-	50%	-	-
PSU bonds	45%	-	-	45%	-	-
Equity & Equity related Investments	5%	-	-	5%	-	-
Others	0%	-	-	0%	-	-
Actuarial assumptions						
Discount rate	7.75%	7.75%	7.75%	7.50%	7.50%	7.50%
Expected return on plan assets	8.25%	NA	NA	8.44%	NA	NA
Salary escalation	8.50%	3.00%	8.50%	8.50%	3.00%	8.50%
Attrition	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Medical cost inflation	NA	5.00%	NA	NA	5.00%	NA
Mortality tables	Indian Assured Lives (2006-08) ultimate Mortality Rates	Indian Assured Lives (2006-08) ultimate Mortality Rates and LIC Annuitants (1996-98) ultimate Mortality Rates	Indian Assured Lives (2006-08) ultimate Mortality Rates	Indian Assured Lives (2006-08) ultimate Mortality Rates	Indian Assured Lives (2006-08) ultimate Mortality Rates and LIC Annuitants (1996-98) ultimate Mortality Rates	Indian Assured Lives (2006-08) ultimate Mortality Rates

Experience adjustments

₹ in Million

	2017-18	2016-2017	2015-2016	2014-2015	2013-2014
Gratuity					
Present value of DBO	357.02	362.20	291.71	274.86	222.51
Fair value of plan assets	(341.48)	(329.18)	(280.44)	(258.27)	(217.71)
Funded status [Surplus / (Deficit)]	(15.54)	(33.02)	(11.27)	(16.59)	(4.80)
Post-Retirement medical benefits schemes (PRMBS)					
Present value of DBO	71.19	73.38	76.84	76.86	66.22
Other defined benefit plans (Leave Encashment)					
Present value of DBO	**379.07**	**366.17**	**280.18**	**246.31**	**187.85**

	For the year ended 31 March, 2018	For the year ended 31 March, 2017
Actuarial assumptions for long-term compensated absences		
Discount rate	7.75%	7.50%
Expected return on plan assets	8.25%	8.50%
Salary escalation	8.50%	8.50%
Attrition	1.00%	1.00%

The discount rate is based on the prevailing market yields of Government of India securities as at the Balance Sheet date for the estimated term of the obligations.

The estimate of future salary increases considered, takes into account the inflation, seniority, promotion, increments and other relevant factors.

The contribution expected to be made by the Board during FY 2018-19 has not been ascertained.

6 Disclosure of related party and Transactions with them for the year ended 31st March, 2018 as per Accounting Standard 18

a) Related Party and their relationship

1) Wholly owned subsidiaries
   IDMC Limited
   Indian Immunologicals Limited
   Mother Dairy Fruit and Vegetable Private Limited
   NDDB Dairy Services
   Pristine Biologicals (NZ) Limited (wholly owned subsidiary of Indian Immunologicals Limited)

2) Other enterprises where management has significant influence over the management
   The West Assam Milk Producers' Co-operative Union Ltd.
   Animal Breeding Research Organisation (India)
   Anandalaya Education society
   Jharkhand State Cooperative Milk Producers' Federation Ltd.
   NDDB Foundation for Nutrition

3) Key management personnel

Mr. Dilip Rath	Chairman
Mr. Sangram Chaudhary	Executive Director
Mr. Y Y Patil	Executive Director w.e.f. 1st April 2017

b) Transactions with related parties

(figures in Italic represent previous year figures)

₹ in Million

Particulars	Interest Income	Dividend	Rent (Income)	Grant	Sale of Fixed Assets	Sale (others)	Other income	Other Expenditure	Current Account Balance outstanding Dr/ (Cr)	Loan Disbursed	Loan repaid / Adjusted		Loan Balance outstanding Dr/(Cr)
											Principal	Interest	
Subsidiary Companies													
IDMC Limited	26.30	18.22	0.46	-	-	-	0.12	-	0.25	175.08	-	21.39	435.08
	34.59	*18.22*	*0.58*	-	-	-	*0.12*	*0.01*	*(0.37)*	*300.00*	*1,620.75*	*33.51*	*260.00*
Indian Immunologicals Limited	77.61	9.00	31.03	-	-	-	0.08	-	(8.91)	-	212.10	68.28	803.81
	105.74	-	*27.70*	-	-	-	*0.09*	-	*(5.44)*	*397.38*	*362.20*	*95.09*	*1,015.91*
Mother Dairy Fruit and Vegetable Private Limited	-	200.00	104.84	-	-	-	2.42	3.15	113.11	-	-	-	-
	6.54	*250.00*	*99.92*	-	*4.05*	-	*0.68*	*11.88*	*43.08*	-	*336.45*	-	-
NDDB Dairy Services	0.01	-	2.45	-	-	-	1.04	-	0.07	-	125.00	-	750.00
	0.02	-	*1.53*	-	-	-	*0.41*	-	*0.57*	*428.27*	*384.85*	-	*875.00*
Total	**103.92**	**227.22**	**138.78**	**-**	**-**	**-**	**3.66**	**3.15**	**104.52**	**175.08**	**337.10**	**89.67**	**1,988.89**
	146.89	***268.22***	***129.73***	***-***	***4.05***	***-***	***1.30***	***11.89***	***37.84***	***1,125.65***	***2,704.25***	***128.60***	***2,150.91***
Other enterprises where management has significant influence over the management													
The West Assam Milk Producers' Co-operative Union Ltd.	0.22	-	-	-	-	-	1.88	0.03	0.79	15.00	16.23	0.22	3.68
	-	-	-	-	-	-	*0.57*	-	-	-	*1.23*	-	*4.90*
Animal Breeding Research Organisation (India)	-	-	0.01	-	-	0.01	0.86	0.06	0.06	-	-	-	-
	-	-	-	-	-	-	*1.86*	-	-	-	-	-	-
Anandalaya Education Society	-	-	0.45	-	-	-	0.01	-	0.14	-	-	-	-
	-	-	*0.51*	-	-	-	-	-	*0.14*	-	-	-	-
Jharkhand State Cooperative Milk Producers' Federation Ltd.	-	-	-	1.00	-	-	1.35	-	0.43	-	-	-	-
	-	-	-	*1.84*	-	-	*1.15*	-	*0.77*	-	-	-	-
NDDB Foundation for Nutrition	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	*5.00*	-	-	-	-	-
Total	**0.22**	**-**	**0.46**	**1.00**	**-**	**0.01**	**4.10**	**0.09**	**1.42**	**15.00**	**16.23**	**0.22**	**3.68**
	-	***-***	***0.51***	***1.84***	***-***	***-***	***3.58***	***5.00***	***0.91***	***-***	***1.23***	***-***	***4.90***

Remuneration to key management personnel

₹ in Million

Mr. T Nandakumar	-
	2.15
Mr. Dilip Rath	3.54
	3.54
Mr. Sangram Chaudhary	3.97
	3.73
Mr. Y Y Patil	4.14
	-
Total	**11.65**
	9.42

7 Disclosure as per Accounting Standard 19 – 'Leases'(Refer Annexure VIII):

Operating lease arrangements entered into by the Board as a Lessor for following assets:

a) Nature of Assets leased

₹ in Million

Class of Asset	Gross value of assets as at 31st March, 2018	Depreciation for the year	Accumulated Depreciation as at 31st March, 2018
Buildings and Roads#	1621.08	43.01	872.68
	1621.08	*43.15*	*829.67*
Electrical Installations#	31.55	1.24	23.41
	31.55	*1.24*	*22.17*
Furniture, fixtures, computers, software and office equipment	7.92	0.16	7.50
	7.92	*0.16*	*7.34*
Rail Milk Tankers	194.55	-	194.55
	194.55	-	*194.55*
Total	**1855.10**	**44.41**	**1098.14**
	1855.10	***44.55***	***1053.73***

including staff quarters and cold storage

(Figures in *italics* represent previous year figures)

These arrangements are cancellable with prior notice to the lessee.

b) Initial Direct cost relating to leasing arrangements is charged to Income and Expenditure account in the year of arrangement of lease.

c) Significant Leasing arrangements:
All assets mentioned above are leased out to subsidiaries, federations and others with an option to renew or cancellation of the agreement.

8 Deferred tax assets have been recognised as per Accounting Standard 22 – 'Accounting for Taxes on Income'. Details are as under:

₹ in Million

Particulars	Opening Balance as at 1st April, 2017	Adjustment during the year	Adjusted against General Reserve	Closing Balance at 31st March, 2018
Deferred Tax Assets /(Liability):				
Depreciation	(8.54)	5.10	-	(3.44)
	11.05	*(19.59)*	-	*(8.54)*
Expenditure allowable on payment basis	127.75	8.86	-	136.61
	98.01	*29.74*	-	*127.75*
Gratuity	11.43	(6.00)	-	5.43
	3.90	*7.53*	-	*11.43*
Voluntary Retirement Scheme	10.56	(4.01)	-	6.55
	15.41	*(4.85)*	-	*10.56*
Special Reserve	(380.43)	(55.62)	-	(463.05)
	-	*(48.63)*	*(331.80)*	*(380.43)*
Total	**(239.23)**	**(51.67)**	**-**	**(290.90)**
	128.37	***(35.80)***	***(331.80)***	***(239.23)***

(Figures in *italic* represent previous year figures)

9 Principal amount of ₹ 44.90 million and ₹ 32.14 million has been written off to the Income and Expenditure Account on account of one time settlement of loan to The Jamnagar Regional Oil seeds Growers Co-op. Union Ltd, Jamnagar and Regional Oilseeds Grower's Co-Op. Societies Union Ltd, Raichur respectively.

Junagadh Regional Oil seeds Growers Co. Op. Union Ltd, Shree Sardar Vallabhbhai Patel Regional Oil seeds Growers Co-Op. Union Ltd, IDAR, Gujarat Co-operative Oilseeds Growers' Federation Ltd (GROFED) and Bhavnagar-Amreli Regional Oilseeds Growers Co-op. Union Ltd are under liquidation over a long period of time. The required claims have been lodged with the respective liquidator. During the year principal amount outstanding of ₹ 262.01 million from the above mentioned borrowers are written off to the Income and Expenditure Account.

10 Disclosure as per Accounting Standard 29 – 'Provisions, Contingent Liabilities and Contingent Assets' is as follows:

₹ in Million

Particulars	Non-Performing Asset (NPA)	General Contingency on Standard Assets	Contingency
Opening balance	1890.89	30.20	610.49
	2,578.16	*32.81*	*611.32*
Created during the year from contingency	0.02	25.08	(25.10)
	-	-	-
Write-off of interest receivable	(408.24)	-	-
	(280.72)	-	-
Reversed/movement during the year	(400.26)	-	-
	(406.55)	*(2.61)*	*(0.83)*
Closing balance	**1,082.41**	**55.28**	**585.39**
	1,890.89	***30.20***	***610.49***

(Figures in italic represent previous year figures)

11 Other income includes insurance claim of ₹ 2.00 million received against damaged Rail Milk Tanker.

12 During the year there were no overdue to the entities that are classified as Micro and Small Enterprises under the Micro, Small and Medium Enterprises Development Act, 2006.

13 The figures of the previous year have been regrouped/re-arranged wherever necessary.

In terms of our report of even date attached.

For Borkar & Muzumdar
Chartered Accountants
Firm's Reg No. 101569W

Devang Vaghani
Partner
Membership No. 109386

For and on behalf of the Board,

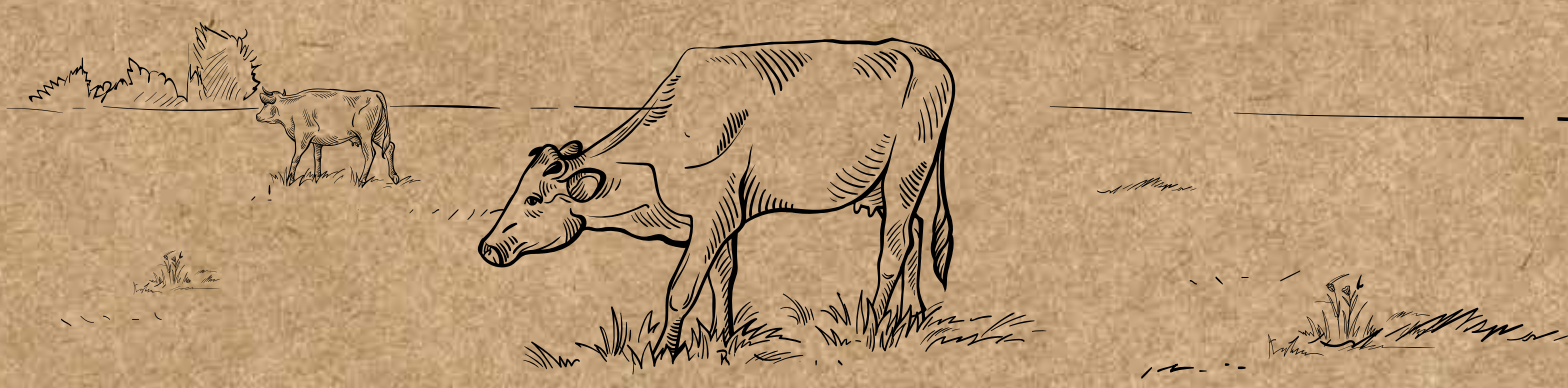
Dilip Rath
Chairman

Y Y Patil
Executive Director

S Regupathi
General Manager
(Accounts)

Anand, 18th June, 2018

NDDB OFFICERS



NDDB OFFICERS

(As on 31st March, 2018)

HEAD OFFICE, ANAND

Chairman & Chief Executive

Dilip Rath,
M A (Eco), M Sc (Eco)

Executive Director

Sangram R Chaudhary,
M Sc, PGDRM

Y Y Patil,
B Com, LLB, PGDRDM, ICWA (Inter), SAS (Comm)

Chief Executive's Office

A Rajasekaran, DY GEN MGR,
M Sc (Agri), PGDRM

Financial and Planning Services

Dhara N Lakhani, DY GEN MGR,
M Com, ACMA

K Manek, DY GEN MGR,
B Com, AICWA

Chintan Khakhariawala, MGR,
B E (Chem), MBA (Fin)

P V Subrahmanyam, MGR,
BBM, MBA (Fin)

Kahnu C Behera, MGR
B Sc (Agri), PGDRM

Smriti Singh, MGR
B A (Eng), PGDM (Mktg & HR)

Chandan Singh, MGR,
B Sc (Zoo), PGDM (Mktg & Fin)

Rohan B Buch, MGR,
B Com, MBA (Fin)

Chandani C Patel, MGR
B Com, PGDBM (E-Com), MBA (Fin)

Shilpa P Behere, MGR
BMS, PGDRM

Saurabh Kumar, MGR
B Tech (Elect & Comm), PGDM

Reeti, MGR
B Sc (Zoo), PGDM (Fin & Mktg)

Sanjay Nandi, DY MGR,
B Com, ICWAI

Cooperative Services

Rajesh Gupta, DY GEN MGR,
B Sc, MSW

M Jayakrishna, SR MGR,
M A (Eco), M Phil (Eco), Ph D (Eco)

Dhanraj Sahani, SR MGR,
MBA (Mktg), DPCS

Hrishikesh Kumar, MGR,
B Sc (Phy), PGDRM

Niranjan M Karade, MGR,
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Sandeep Dheeman, MGR,
B Com, M A (SW)

Sandeep Bharti, MGR,
B Sc, PGDDM

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Priyadarshini Paliwal, DY MGR,
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Prakashkumar A Panchal, DY MGR,
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B Tech (DT), M Tech (DT)

Prit H Gandhi, DY MGR,
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Quality Assurance

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Naveenkumara AC, DY MGR,
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U B Das, DY GEN MGR,
B E (Mech)

G S Sarvarayudu, DY GEN MGR,
B Tech (Civil)

V Srinivas, DY GEN MGR,
B E (Civil)

S Chandrasekhar, DY GEN MGR,
B E (Mech)

S Talukdar, DY GEN MGR,
B E (Mech), MIE

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