



FIVE YEAR DAIRY DEVELOPMENT PLAN

FY 2077/078-2081/082

Government of Nepal
National Dairy Development Board
Harihar Bhawan, Lalitpur, Nepal



Consultant

Citizen Development Solution Pvt. Ltd
MountDigit Technology Pvt. Ltd



July 2020

Acknowledgment

The Five Year Dairy Development Plan (FY 2077/078-2081/082) is jointly prepared by Citizen Development Solution Pvt. Ltd, Bhaktapur and MountDigit Technology Pvt. Ltd., Lalitpur with the support of National Dairy Development Board (NDDDB), Government of Nepal. The main objective is to develop a concrete dairy development plan and project to be implemented in the country in the next five years to streamline the dairy sector development in the country.

In the preparation of Five Year Dairy Development Plan, numbers of experts, individuals, policy makers, Ministry, Departments, government officials, private sectors, dairy professionals, National Dairy Development Board and Dairy Associations, dairy entrepreneurs and milk producers have supported through providing information and suggestions for making it useful document. We therefore would like to express great appreciation to the Ministry of Agriculture and Livestock Development and National Dairy Development Board; Executive Director-Rajendra Prasad Yadav, Deputy Executive Director-Babukaji Panta, and Directors- Dr. Balak Chaudhari, Dr. Hasana Maiya Shrestha, Bidur Rai and Officers-Dipendra Adhikari, Rajesh DC, Om Kharel, Ajaya Pokhrel, Narayan Deshar and Amogh Kafle.

A special appreciation goes to our Expert team; Team Leader-Mr. Tek Bahadur Thapa, Dairy Specialist-Mr. Siyaram Prasad Singh, Agri. Economist-Mr. Tek Bahadur Bam and Planning Expert-Bhim Bahadur Muktan who provided tireless efforts to conduct the study and preparation of Five-Year Dairy Development Plan. Similarly, Data Analyst-Mr. Nagendra Bastakoti and Study Enumerators of 12 districts are equally important for the study and preparation of Plan.

Our special thanks goes to Mrs. Bimala K.C. (Honorable Minister, Ministry of land management, Agriculture and cooperative, Karnali Pradesh), Dr. Rajendra Prasad Mishra (Joint secretary, Planning and Dev Aid Coordination Division, Ministry of Agriculture & Livestock Development), Mr. Banshi Sharma (Director General, Department of Livestock Services), Mr. Rudra Prasad Paudel (General Manager, Dairy Development Cooperation), Mr. Dilli Ram Sedai (Project Director, Nepal Livestock Sector Innovation Project), Dr. Bimal Kumar Nirmal (Secretary, Ministry of land management, Agriculture and cooperative, Janakpur), Dr. Som Prasad Shrestha (Director, Livestock & Fishery Directorate), Nabin Ghimire (Under Secretary, Ministry of Agriculture and Livestock Development), Mr. Bhim Prasad Pulami (Senior Food Technologist, Department of Food Technology and Quality Control), Mr. Raj Kumar Dahal (Chairperson, Dairy Industry Association), Mr. Pralahd Dahal (General Secretary, Nepal Dairy Association), Mr. Ram Prasad Acharya (Central Dairy Cooperative Association), Mr. Baburam Adhikari (Chairperson, Central Livestock Producers Cooperative Association), Mr. Giridhar Bajracharya (General Secretary, Nepal Dairy Science Association), Mr. Krishna Prasad Sapkota (Central Dairy Cooperative Association), Mr. Arun Shrestha (Former Executive Director, NDDDB), Mr. Sunil Singh (Prime Minister Agriculture Modernization Project) and Provincial level Officials who have provided suggestions and feedbacks to the study and Five Year Dairy Development Plan preparation team.

We are thankful to those who have provided ample information in the course of consultations and study. Our thanks go to milk producers, milk suppliers, milk collectors, dairy entrepreneurs, feed suppliers, cooperatives, milk processors, dairy equipment manufacturers, dairy plant operators and dairy industries. We always appreciate the comments and suggestions for the dairy sector development in Nepal.

Citizen Development Solution Pvt. Ltd, Bhaktapur
Email: solution.cds3@gmail.com
Website: cdsnepal.com

MountDigit Technology Pvt. Ltd., Lalitpur
Email: info@mountdigit.com
Website: mountdigit.com

ACRONYMS & ABBREVIATIONS

AGC	: Agriculture Gyan Center
AI	: Artificial Insemination
BOD	: Board of Director
CBS	: Central Bureau of Statistics
CDCAN :	: Central Dairy Cooperative Association of Nepal
CTEVT	: Council for Technical Education and Vocational Training
DDB	: Pradesh Dairy Development Board
DDC	: Dairy Development Cooperation
DDF	: Dairy Development Fund
DFTQC	: Department of Food Technology and Quality Control
DG	: Director General
DIA	: Dairy Industries Association-Nepal
DLS	: Department of Livestock Service
DMPCUs	: District Milk Producers' Cooperative Unions
ED	: Executive Director
FAO	: Food and Agriculture Organizations of United nations
FGD	: Focus Group Discussion
FMD	: Food and Mouth Diseases
FY	: Fiscal Year
GDP	: Gross Domestic Product
GHP	: Good Hygienic Practices
GM	: General Manager
GMP	: Good Manufacturing Practices
HHs	: Households
JSR	: Joint Sectoral Review
KIIs	: Key Informants' Interview
LPD	: Liter Per Day
MOALD	: Ministry of Agriculture and Livestock Development
MPCSs	: Milk Producers' Cooperative Society (s)
MT	: Metric Ton
NARC	: Nepal Agriculture Research Center
NDA	: Nepal Dairy Association
NDDB	: National Dairy Development Board
NDRTI	: National Dairy Research and Training Institute
NDSA	: Nepal Dairy Science Association
NLBC	: National Livestock Breeding Center
NLSIP	: Nepal Livestock Support Innovation Project, DLS/WB
QC	: Quality Control
SMP	: Skimmed Milk Powder

SNF : Solid Not Fat
SPSS : Statistical Package for the Social Science
SWOT : Strength, Weakness, Opportunity, Threat
TCP : Technical Cooperation Project
UHT : Ultra High Temperature
UN : United Nations
WB : World Bank
WHO : World Health Organization

Tables

Table 1: Sample size.....	6
Table 2: Cattle population, production & productivity by Province.....	12
Table 3: Cow milk production in major milk pockets of Nepal.....	13
Table 4: Buffalo population and milk production by Province.....	13
Table 5: Milking Population and its Production.....	14
Table 6: Yak/Nak/Chauri population & milk production.....	15
Table 7: Annual milk production by Ecological Region.....	15
Table 8: Projection Milk Production, Formal sector handling and additional chilling capacities requirement.....	16
Table 9: Milk production forecast with different rates and per person milk.....	17
Table 10: Milk production and sales.....	22
Table 11: Socioeconomic constraints.....	25
Table 12: Input supply constraints.....	26
Table 13: Production constraints.....	27
Table 14: Marketing constraints.....	27
Table 15: Institutional development constraints.....	30

Figures

Figure 1: Household Income.....	21
Figure 2: Livestock breed & Source.....	21
Figure 3: Methods of reproduction.....	22
Figure 4: Feed Sources.....	22
Figure 5: Milk production skill and technology adoption.....	23
Figure 6: Milk price comparison.....	24
Figure 7: Access to credit.....	28
Figure 7: Access to credit.....	28
Figure 8: Financial service rating.....	28
Figure 8: Financial service rating.....	28

Contents

Executive Summary

CHAPTER I: INTRODUCTION	1
1.1 Background	1
1.2 National Dairy Development Board	2
1.3 Objectives	2
1.4 Scope of the Study	2
1.5 Rationale	2
1.6 Significance of the Study.....	3
1.7 Study Limitation	3
CHAPTER II: METHDOLOGY	5
2.1 Study Approach.....	5
2.2 Study tools and techniques	5
2.3 Kick off meeting	6
2.4 Training to the enumerators.....	6
2.5 Sampling	6
2.6 Field Survey.....	6
2.6.1 Key Informant’s Interview (KII)	6
2.6.2 Focus Group Discussion (FGD):	7
2.6.3 Transect walk/direct observation	7
2.6.4 Provincial Level Consultations/Meeting	7
2.6.5 Federal level Consultations/Meeting	7
2.7 Quality control of the data collection	7
2.7.1 Consistency checking in the field	7
2.7.2 Data cleaning and entry	7
2.8 Data Analysis.....	8
CHAPTER III: CURRENT STATUS OF DAIRY SECTOR	9
3.1 Desk Review and findings	9
3.1.1 Dairy Sector Development:.....	9
3.1.2 Dairy Sector Stakeholders	9
3.1.3 Milk Collection and Processing	9
3.1.4 Linkage between Primary Cooperatives and Dairy Plants	10

3.1.5 Current status of National Dairy Development Board (NDDB).....	10
3.1.6 Dairy Development Corporation (DDC)	11
3.1.7 Milk Quality Control and Standards.....	11
3.1.8 Corona Effect	12
3.1.9 Cattle Population	12
3.1.10 Buffalo Population	13
3.1.11 Milk production.....	14
3.1.12 Yak/Nak, Chauri Population	14
3.1.13 Milk Production in different ecological zone	15
3.1.14 Per Capita Milk Availability	15
3.1.15 Trend of Milk production	15
3.1.16 Projection of Milk Production and Formal sector handling.....	16
3.1.17 Milk production forecast with different rates and per person milk	17
3.1.18 Demand and Supply Situation.....	17
3.1.19 Import and Export Scenario of the milk and milk products.....	18
3.1.20 Processing	18
3.1.21 Dairying Through Cooperatives	19
3.1.22 Milk and Milk Products	19
3.2 Survey Data Analysis and Interpretation	19
3.2.1 General:.....	19
3.2.2 Milk producers' cooperatives	19
3.2.3 Dairy Entrepreneurs.....	20
3.2.4 Household Income	21
3.2.5 Animal holding size	21
3.2.6 Livestock breed and source	21
3.2.7 Method of reproduction	21
3.2.8 Veterinary services.....	22
3.2.9 Feed Sources	22
3.2.10 Milk Production and Sales.....	22
3.2.11 Milk Production Trend	23
3.2.12 Milk production skill and technology adoption	23
3.2.13 Milk selling point.....	23
3.2.14 Milk price of cow and buffalo milk at different selling point	23

3.3 Key constraints and opportunities.....	24
3.3.1 Policy constraints	24
3.3.2 Human Resource Constraints.....	24
3.3.3 Socio-economics constraints	25
3.3.4 Input Supply constraints	26
3.3.5 Production constraints.....	26
3.3.6 Marketing constraints	27
3.3.7 Product Diversification constraints.....	28
3.3.8 Access to Finance constraints	28
3.3.9 Infrastructure Facilities constraints	29
3.3.10 Institutional Development constraints	29
3.4 SWOT Analysis of Dairy Sector.....	31
CHAPTER IV: CONCLUSIOIN AND RECOMMENDATIONS.....	34
4.1 Policy Recommendations.....	34
4.2 Restructuring of NDDDB structure	34
4.3 A new division (Project Formulation and Implementation Division).....	35
4.4 Establishment of QC Laboratory	35
4.5 National Dairy Research and Training Institute Establishment	35
4.6 Linkages with Pradesh Agriculture Ministry	35
4.7 Creation of Dairy Development Fund	35
4.8 Upgrading milk quality standard.....	36
4.9 Product Diversification	36
4.10 Milk pricing policy (For both producer and consumer)	36
4.11 Expanding milk collection and cold chain network	37
4.12 Corona effect and revival mechanism	37
4.13 Develop strong linkage between primary dairy cooperative and industry	38
4.14 Support to Dairy Equipment Manufacturing Industries	38
4.15 Upgradation and new plant establishment	39
4.16 Foreign Investment.....	39
4.17 Funding Proposal	39
4.18 Dairy Promotion and collaboration with international dairy agencies	39
CHAPTER V: FIVE YEAR DAIRY DEVELOPMENT PLAN.....	41
5.1 Overall Goal and Objectives.....	41

5.2 RESULTS	41
5.3 Constraints and Strategies to address	42
5.3.1 Policy Constraints and Strategy	42
5.3.2 Production Constraints & Strategy	43
5.3.3 Infrastructure Constraints and Strategy	44
5.3.4 Raw Milk & Product Quality Constraints and Strategy	45
5.3.5 Market Constraints and Strategy	46
5.3.6 Financial Constraints and Strategy.....	46
5.3.7 Linkage & collaboration constraints and Strategy	47
5.3.8 Technology/Technical Skills Constraints and Strategy.....	48
5.3.9 Institutional Development Constraints and Strategy	49
5.4 Result based Plan.....	50
5.5 Estimated Budget.....	54
CHAPTER V: MONITORING AND EVALUATION	57
5.1 Monitoring and Evaluation Plan	57
5.2 Internal Monitoring System.....	57
Appendixes	58
Annex-1: Questionnaire and checklist	59
Annex-2: Federal and Provincial Level Consultation Meeting	69
Annex-3: Field Survey KII & FGD Participants	71
Annex-4: Milk and Milk Product Import and Export of Five Year	73
Annex-5: DDC Milk collection and sale 2070/71-2075/76.....	74
Annex-6: Milk handling and processing by dairy cooperatives	75
Annex-7: Milk handling by NDA Member dairies	76
Annex-8: Milk handling by DIA member dairies	82
Annex-9: Comparison of Milk Price and quality standards between Nepal and India	85
Annex-10: Cost of Milk for Producer and consumer:	87
Annex-11: Guidelines for Grant allocation	89
Annex-12: Draft Five Year Dairy Development Plan Validation Workshop	90
References:	92

EXECUTIVE SUMMARY

The main objective of Five-Year Dairy Development Plan study is to develop a concrete dairy development plan and project to be implemented in the country in the next five years to streamline the dairy sector. When this study was underway, corona pandemic affected the national economy including dairy sector. Thus, measures for revival of dairy sector is a priority.

Milk production is increasing at around 3.6% annually (MoALD 2075/76). Due to limited milk marketing and product diversification, it has not been possible to collect all milk from the farmers during flush production period resulting in frequent milk holidays. Thus, this study is proposing plans to increase the formal sector processing through quality improvement measures, expanding milk collection and cold chain networks, research and manpower development, upgrading the existing processing facilities and establish new high value product plants and promote the consumption of milk and milk products through initiating the celebration of *Nepal Milk Year* and *Introduction of School Milk Program*.

During wider consultations with series of dairy industry stakeholders, the need of strengthening National Dairy Development Board was emphasized, as a priority. The need of restructuring of NDDDB was advocated which also included the reduction of board size, appointment of full-time chairman, as well the appointment process and need of professionally competent executive director.

A new Project Formulation and Implementation Division should be created in NDDDB.

A Full-fledged and well-equipped QC laboratory should be established and made operational in NDDDB, as well collaborate with Bagmati Pradesh DDB. Qualified experts/technologist should manage and lead the laboratory team.

To meet human resource need of dairy sector, a National Dairy Research and Training Institute (NDRTI) should be established under NDDDB in collaboration with Animal Science Institute of NARC, dairy and food technology college under Purbanchal university and CTEVT.

NDDDB should establish linkages with Pradesh Agriculture Ministry, and recommended to establish a NDDDB Pradesh coordination unit attached to the Pradesh Agriculture ministries; rather than each Pradesh forming their own independent dairy board.

To generate dairy development fund (DDF), through the collection of per litre milk or per unit dairy products sold by the industries, a Dairy Development Fund (DDF) should be created to support the national dairy development program.

Upgrading and revision of current standard for milk quality is urgently needed which will contribute to ease number of dairy industry problems including milk holidays and butter stock

buildup. Existing milk pricing policy should also be reviewed and revised to make more scientific. Fat-Protein based system should be piloted.

Support should be provided to develop network of milk collection and cold chain networks especially in Hulaki and Madya Pahadi highways, and other needy and potential areas.

Upgrading of existing dairy plants and establishment of high value dairy products plants needed. Dairy plant requiring advanced technology and higher investment focusing on high value products including export, should be permitted for foreign collaborations with private and public sector companies. Dairy cooperatives should also be encouraged for upgrading their existing plant facilities to produce value added dairy products.

Special revival package for saving the dairy sector from corona effect are proposed in the plan.

To create ground for export of Nepalese dairy products, FMD free certification for cattle should be initiated and organized by DLS/MoALD in consultation with World Organization for Animal Health (OIE) and Food and Agriculture Organization of UN (FAO).

Establish Dairy information and data management system under NDDDB, as well establish a well-equipped library.

A national dairy sector study is needed to have most updated information on the overall status of dairy development in the country.

NDDDB/MoALD should request *FAOUN for a TCP funding* in order to help NDDDB to develop programs and funding proposals to revive the dairy sector post corona pandemic. Organize *National Dairy Conference* in collaboration with dairy experts, professional bodies, entrepreneurs and industries, government and non-governmental agencies working locally and internationally every year.

To implement the recommendations, a five-year dairy development result-based plan is developed with the funding requirement of NPR 4,933,450,000 (4.93 Arab Nepalese rupees). Upon implementation of the plan, it is expected to generate additional around 2,16,100 jobs in the dairy sector.

CHAPTER I: INTRODUCTION

1.1 Background

Livestock is an integral and important component of the mixed farming system in Nepal. The dairy sub sector is the most important component of the livestock sector and contributes almost two third (63%) of the livestock GDP. The sector not only contributes in national GDP, but also ensures flow of money from urban to rural sectors. More than a half million dairy farmers produce milk, with a large number engaged in the milk processing industry in both rural and urban areas. Nepal has 73,76,306 cattle and 52,77,819 buffalo (MoALD 2017/018). From about 2.1 million dairy cattle and buffalo population, the annual milk production stands at around 2.168 million metric tons (2076). Despite a larger cattle population, the buffaloes contribute around 65% of the annual milk production and rest contributed by cattle. The production and productivity of dairy animals are comparatively low due to poor genetic potentials culminated by poor feeding and health care management. According to the Ministry of Agriculture and livestock development, Nepal produced 21,68,434 MT of milk during fiscal year 2075/76 (2018/19). Based on CBS population estimate, Nepal population is around 29,218,867 during 2076, thus per capita availability of milk comes to 74.21 litres per person per year, whereas FAO/WHO recommends 92 litres milk per annum per person. The subsistence production is gradually transforming into commercial/semi-commercial enterprise production, particularly in the peri urban areas and with private dairy industries. There are 4 large scale dairy industries with processing capacity of more than 50,000 liters per day, around 30 industries with medium processing capacity of 10,000-50,000 liters per day, and several hundred small scale industries with less than 10,000 liters processing capacity per day. More than 1,700 primary milk producers' cooperatives are playing a vital role in channeling the milk produced by smallholder farmers in the formal milk market. The government has made a commitment to make the country self-sufficient in dairy products. However, currently the country is importing various dairy products including skim milk powder (SMP) worth billions of rupees annually (refer annex-4).

Despite the importance of and contribution from the dairy sector to the national economy, the Nepalese dairy sector remains delicate and unstable with frequent market ups and down. Since 1992, a practice of 'Milk Holiday' started in which in certain days of the week, the government owned Dairy Development Corporation and few private dairy industries could not purchase milk produced by the farmers during the flush season. To address the situation, private dairy industries with various capacities were established. Gradually the demand for fluid milk increased and many dairy farms were established. Again, the supply side exceeded the demand of processing industries and thus powder milk plant was established to absorb excess milk during flush season. However, due to many internal and external factors including price fluctuation of SMP in international markets, the newly established milk processing plant with the capacity of processing 320,000 litres of milk per day producing SMP and butter couldn't compete and survive. The demand and supply side assessment and projection is poor, that hard hit both the producers' and processors' sides. Raw milk purchase price is much higher than neighbouring India (refer annex-8), thus local products are not able to compete with imported products. Another important issue, which the dairy farmers always raise in any dairy forum is high cost of milk production given the lower productivity of the existing dairy animals. This has been mostly linked with the high cost of inputs, particularly feed. Lack of proper land use policy is also hindering farmers from adopting a forage-based feeding system which has been time and again recommended for reducing the cost of production. The production cost also has been increased due to compulsion for management of unproductive dairy cattle due to prevailing laws. The unproductive dairy cattle are also creating the socio-cultural and environmental concerns (clashes, free roaming animals in the road causing accidents, and flocks of animals left unmanaged in the jungle).

1.2 National Dairy Development Board

National Dairy Development Board (NDDDB) is an apex level policy-making body for dairy development in Nepal. Keeping in view the constraints and opportunities of the dairy sector, His Majesty's Government of Nepal (HMG/Nepal) prepared a Ten-Year Dairy Development Plan (1990-2000) in 1990/91 with the financial assistance from the Royal Danish Government. Based on the recommendation of the Plan, NDDDB was established in 1992 (2048 B.S.) under the National Dairy Development Board Act, 1992 as an autonomous body. Key functions of NDDDB include a) Formulates and recommends policies on import and export of good necessary for production and promotion of milk and milk products as well as animal feeds, and accelerates the implementation of approved policies b) Formulates and recommends pricing policy of milk to HMG/N c) Recommends HMG/N on the well-being of dairy professionals and consumers d) Encourages development of dairies through the medium of cooperatives and e) Registers dairy industries. Within the objectives of NDDDB, the Five Year Dairy Development Plan objectives remain as follows;

1.3 Objectives

The main objective of this study is to develop a concrete dairy development plan and project to be implemented in the country in the next five years to streamline the dairy sector development in the country with the following specific objectives

- Develop dairy development project for external/internal funding.
- Identify strategy and programs to make country self-sufficient in milk and milk products.
- Develop policy and strategy measures to make the dairy farmers more resilient to external shock with policy intervention

1.4 Scope of the Study

- Review of Nepalese and other south Asian countries dairy sector
- Perform SWOT analysis of Nepalese dairy sector
- Analyze and recommend roles and responsibilities of government, private and NGOs involved in the dairy sector in the context of federal constitutions provisions.
- Recommend role and responsibility of NDDDB and its linkages with federal government.
- Assess funding requirement for research and development in dairy sector
- Enlist fundable research and development projects
- Enlist possible donor agencies.
- Access available human resources in country, requirements and plan for human resource development
- Develop climate smart dairy production technologies and enhance dairy production and productivity
- Explore need and possibility of establishing SMP plant/ UHT plant/ Condensed milk plant
- Recommend solution to overcome problem of unproductive dairy cattle
- Recommend concrete solutions to overcome the current uncertainty situation of dairy sector
- Analyze international trend and recommend to absorb socks in dairy sectors
- Develop of action plan for GHP and GMP implementation

1.5 Rationale

Cattle and buffalo farming are important as a source of milk production in the country. Commercial dairy farming in Nepal is a recent phenomenon and is on the rise. This is mainly because of the high cost of production of milk that reduces the expected benefits of the farmers. Functions and duties of NDDDB includes formulation and recommendations on policies on import and export of goods necessary for

production and promotion of milk and milk products, acceleration of the implementation of approved policies; formulation and recommendation on pricing policy of milk to Government of Nepal; encouragement to development of dairies through the medium of co-operatives; monitoring, evaluation and review of dairy development; and registration of dairy industries.

With the emerging steps undertaken by the NDDB, gradual commercialization of dairy farming is coming up to fill the gap of fluid milk deficit. The demand and supply gap may further widen with rapid urbanization, changing food habits and improving economic status. Thus, it has become very essential to analyze the real situation of dairy sector so that appropriate policy and strategy could be developed and recommend for holistic dairy sector development in the country for the benefits of dairy farmers at large. The present study is therefore being commissioned to develop appropriate dairy development plan and project for external/internal funding, as well collaborate with on-going mega livestock development projects, and develop policy and strategy to make the dairy farmers more resilient to external shock with policy intervention

1.6 Significance of the Study

Milk production is the main daily regular activity in the rural area. This is the means to carry the money from the urban area to the rural area. It creates self-employment in the farm family and employment to the milk sellers both in the rural and urban area. Production of 100 liters milk in the rural area can create one full time employment in the country (Singh, 2010). Livestock farming prevails in all regions of the country, including the Mountain, Hill and Terai belts, with variations based on climate, topography, and socio-economic factors. The LSS has a strong gender dimension in that women contribute some 70 percent of the livestock farming work but usually have no significant role in livestock marketing and finance. The LSS contributes to human food security and nutrition, livelihood of farmers, employment and income generation, inputs for farm operation (such as draft and manure), industrial production, and rural transportation. But the potential of this type of commodity has not been fully explored for the improvement in the country in line with rural development. Despite the importance of the milk value chain and the contribution in the rural economy, the country has not designed effective dairy development plans and strategies.

Thus, based on the dairy sectoral review, consultations and field findings, a five-year dairy development plan (2021/22 to 2024/25) is prepared proposing plans and programmes for restructuring of NDDB for efficient functioning; coordination mechanism with Pradesh Dairy Boards; establishment of autonomous national dairy research and training institute (NDRTI); creation of dairy development fund (DDF); upgrading and revision of milk quality standards and pricing systems; expanding milk collection and cold chain network in *Madhe Pahadi Rajmarg* and *Hulaki Marg*; upgrading the capacities of existing plants and new high value products plant establishment; revival measures from the corona pandemic effect; request FAO for a TCP funding in order to help NDDB to develop programs and funding proposals to revive the dairy sector post corona pandemic; and organization of national dairy workshop with the wider participation of dairy value chain stakeholders every year.

1.7 Study Limitation

The resources always remain constraints to conduct any nature of study. The resources include time, money, technology, human and materials. These resources had bound to limit the study that we expected. The limitations were;

- Pandemic COVID-19 had adversely affected to carry out the study due to country lock-down. This has restricted the free movement of people whenever they want. Even, mass gathering was completely restricted.

- The experts' visit to the field and interaction with respondents was disallowed due to country lock down.
- Consultation meetings at provincial level were limited to virtual only and exchanged the information through email and social media
- Country lock down has shrunk the timeframe for the study and planning

CHAPTER II: METHDOLOGY

2.1 Study Approach

Information and data-based planning is effective that justifies and rationalizes with subsequent evidences or facts. The information will be collected from primary and secondary sources. Both the qualitative and quantitative approach applied in analyzing the information and planning. Over the period of 12 decades long history of organized dairy development activities in Nepal, subsequent efforts and investments have been made by government, donors, supporting organizations and private sector for the development of dairy sector. The dairy sector is becoming one of the major sectors for the nutrition and economic development. It has been contributing significantly in GDP and creating employment opportunities for the rural and urban poor. However, larger quantities of dairy products are importing and exports are negligible amount. The existing situation of Dairy Development in Nepal needs to be assessed with systematic and organized way. Domestic demand and supply analysis, stakeholders' analysis, investment analysis, policy analysis, economic analysis, import & export situation, public-private partnership situation, supply chain analysis, product diversification situation, constraints/opportunities assessment for flowering dairy enterprises were key areas of situation analysis. Baseline data/information is crucial for projecting the plan and setting the priorities. Situation analysis information were collected through the following sources;

- a) **Primary source:** The study and planning team collected the first-hand information from dairy related stakeholders, key informants, milk producers, dairy cooperatives and dairy professionals and dairy industrialist. Information collection from the source covered strength, weakness, opportunity and threat (SWOT). This had helped to understand the current situation and strategies to be undertaken while preparing the plan.
- b) **Secondary sources:** The study team had reviewed the published and unpublished local, national and international studies, journals, case studies and conference presentations. This had gained the knowledge and ideas on what are the key strategies, practices for successful development. The review included technological, social, policy, programs, strategies, technical, financial, market etc.

2.2 Study tools and techniques

The study involved the use of: (i) formal and non-formal interviews; (ii) semi-structured interviews by means of key informant's interview and focus group discussions and (iii) field survey through structured questionnaire and checklist. Under desk study, collection of secondary information critically reviewed, analyzed and synthesized the available information on national and international dairy sector were done. Reports of DDC and other private dairies, Department of Livestock Services (DLS), Dairy Development Corporation (DDC), CDCAN, NARC and other private dairies and reviewed the documents available were extensively studied for analyzing trends. Literatures related to dairy sector with special reference to milk production cost, milk pricing policy, practice and current status of production and marketing was collected and reviewed.

2.3 Kick off meeting

The team of consultant organized kick-off meeting with NDDB with concern authorities. This process provided clear insight on the mission, vision, and goal, objectives, working principles, strategies and activities of NDDB in general and dairy sector in particular. This process provided gravity of different components in milk production and marketing in Nepal.

2.4 Training to the enumerators

Using Zoom, one-day training was organized to the enumerators on the objectives and methodology of the study. The consultant/professional team member facilitated the training/orientation practicality on the sample selection, household selection, data collection technique, sampling frame and quality control of the data collection through mobile app and paper base.

2.5 Sampling

Total universe of dairy potential area was stratified based on the geographical locations and potential milkshed area. Milk Producer's Cooperatives (MPCs) was the basic entity to follow the sampling frame. A total of 13 FGDs, 41 KIIs, 44 HHs, 44 dairy entrepreneurs from 12 districts were selected randomly for information collection. This has included dairy farmers and dairy entrepreneurs, milk collectors, wholesaling/chilling centers, local milk retailers/processors and consumers. In addition, provincial and Federal level meeting and consultations with stakeholders had conducted separately.

2.6 Field Survey

Table 1: Sample size

SN	District	# FGD	KII	# HHs/ Milk producers	# Dairy Entrepreneur
1	Ilam	1	6	8	6
2	Morang	1			
3	Sarlahi	1	6	5	5
4	Kavre	1	7	9	6
5	Chitwan	1			
6	Rasuwa	1			
7	Kaski	2	6	6	4
8	Rupandehi	1	6	6	6
9	Palpa	1			
10	Surkhet	1	4	4	3
11	Kailali	1	6	6	4
12	Dadeldhura	1			
	Total	13	41	44	44

The survey covered all the provinces. Purposive and stratified random sampling method was used to select the survey area. Out of 35 milk potential districts, purposely 12 districts were selected for the study. These districts were selected to cover maximum geographical coverage and dairy potential regions.

2.6.1 Key Informant's Interview (KII)

As mentioned above KIIs were conducted at three levels; local government, provincial government and federal government. Interviews were conducted using semi-structured open ended questionnaire and checklist at their districts/locations. Available key informants were met and administered the approved

checklist in each sampled districts and vicinity. Key informants were among other were Agriculture Gyan Centers (AGC), dairy cooperative Managers/chairs, local governments, government officials, supporting organizations, development practitioners, community-based organizations, tea shops and general consumer. A total of 41 Key informants were interviewed from the district/local government level.

2.6.2 Focus Group Discussion (FGD):

There is certain information that is difficult to fully capture by structured interviews within the limited time. Focus Group Discussion (FGD) method is, therefore, needed to get insight into this information. The consultants conducted FGD with the participation of the respondents who are involved in dairy sector development. Each FGD was organized with maximum five participants. The FGD session was guided by a facilitator or moderator and was encouraged to talk freely and spontaneously about the issues of investigation. A total of 13 FGD conducted representing from all 12 districts.

2.6.3 Transect walk/direct observation

During the course of information collection enumerators and experts/professional of the study observed the production (breeding, feeding, care management, disease prevention control and milk delivery up to the collection center. These processes back-up them to triangulate the information collected from different stakeholders and in reality, from independent eyes.

2.6.4 Provincial Level Consultations/Meeting

The experts had consulted with stakeholders to obtain the information on milk and dairy product production, marketing, sales, demand, quality, challenges, opportunities and suggestions for the Planning. The participants were Pradesh Minister, Pradesh Secretary and officials from four provincial Ministry of land management, Agriculture and cooperative and Dairy Development Corporation.

2.6.5 Federal level Consultations/Meeting

The experts had consulted with stakeholders to obtain the information on milk and dairy product production, marketing, sales, demand, quality, challenges, opportunities and suggestions from Ministry of Agriculture and Livestock Development, National Dairy Development Board, Dairy Development Corporation, Dairy Industry Association-Nepal, Nepal Dairy Association, Central Dairy Cooperative Association Limited, Nepal, Nepal Dairy Science Association, WB funded Livestock Sector Innovation Project (NLSIP), Food Safety Laboratory Commercialization Program, Central Livestock Development Cooperative Association and Nepal Pasupalan Samaj (Commercial Dairy farmers association).

2.7 Quality control of the data collection

Following attempts were undertaken for the assurance of quality of the information collected:

2.7.1 Consistency checking in the field

The enumerators meet in the evening after coming back from the field for information collection and discussed on the data collection. They reviewed each of the survey questionnaires/ check lists and discussed whether they collected information correctly. They checked the information for consistency and completed the information collection process.

2.7.2 Data cleaning and entry

Data Analyst was checked all completed questionnaires in the field and re-interview some of the respondents to be sure about the quality of data. It was done rigorously so as to avoid return visit any particular site, which will consume much time. The Data Analyst were made responsible for conducting

field survey and data analysis. After receiving the data from all the enumerators, Data Analyst imported the data into SPSS.

2.8 Data Analysis

The Data Analyst analyzed collected data and information described the various aspects of dairy development sector using SPSS. Analytical data presented in diagram, bar chart, table etc.

CHAPTER III: CURRENT STATUS OF DAIRY SECTOR

3.1 Desk Review and findings

3.1.1 Dairy Sector Development:

Dairy development is one of the key drivers of the national economy, and the share of dairy (milk) in the national economy (GDP) is around 9 % which is very significant. According to the Ministry of Agriculture and livestock development, Nepal produced 21,68,434 MT of milk during fiscal year 2075/76 (2018/19). Based on CBS population estimate, Nepal population is around 29,218,867 during 2076, thus per capita availability of milk comes to 74.21 litres per person per year, whereas FAO/WHO recommends 92 litres milk per annum per person. Around 50 % of milk is utilized locally for home consumption as well for indigenous dairy products; 33 % passes and marketed through informal channel and reaches the consumers and end users, and remaining 17 % of total production passes through the public and private sector dairy processing plants which comes around to 1.0 million litres of milk per day on yearly average.

Significant quantities of value-added dairy products are imported such as milk powders, baby foods, cheeses, long-life milk and cream, butter, ghee etc. which could be produced in the country provided adequate finance, technology and processing facilities and trained dairy manpower is available. Nepal imported 7572.30 MT of milk and milk products valued at NPR 1,608,196,000.00 during FY 2075/76, whereas exported 288.75 MT worth of NPR 171,073,000.00 (annex-1: Details of Import Export). Thus, Five Year Dairy Development plan, besides many other factors, should focus on increasing the formal sector milk collection, processing, value addition and marketing including quality management; as well development and implementation of conducive dairy policy and restructuring and revamping of NDDB.

3.1.2 Dairy Sector Stakeholders

Dairy sector stakeholders include the dairy actors from farm to fork, as well the organizations and institutions directly and indirectly involved in the dairy sector development. Major dairy sector stakeholders and players include farmers, cooperatives, milk collection Centre, milk transporters and human porters, Dairy Development Corporation (DDC), Dairy Industries Association (DIA), Nepal Dairy Association (NDA), yak cheese and cow milk cheese plants, Chhurpi producers and exporters, Central Dairy Cooperatives Association of Nepal (CDCAN), feed manufacturers, dairy equipment manufacturers, dairy importers/exporters, dairy inputs and service providers. National Dairy Development Board (NDDB) is the apex dairy policy body having responsibility to steer the overall dairy development in the country, and other responsible agencies are Ministry of Agriculture and Livestock Development, Department of Livestock Services (DLS), Department of Food Technology and Quality Control (DFTQC), National Animal Science Research Institute and Food Research Division of Nepal Agriculture Research Council (NARC), Department of Cooperatives (DoC), Agriculture and Forestry University (AFU), Agro-Enterprises Center (AEC)/ FNCCI and private industries. Similarly, professional organizations such as Nepal Dairy Science Association (NDSA), Nepal Food Scientists and Technologists Association (NEFOSTA), Nepal Animal Science Association (NASA), Nepal Veterinary Association (NVA) have also been contributing in developing the dairy sector.

3.1.3 Milk Collection and Processing

Most milk is collected through cooperative societies, and chilled using bulk milk coolers in accessible milkshed areas with road network; and transported to nearby urban centres and larger markets like

Kathmandu valley, Pokhara, Biratnagar, Chitwan for processing, value addition and marketing. State owned DDC collected 48,803 MT of milk and processed into milk and milk products during FY 2075/76 (refer annex-2). During this period, 14 dairy Cooperatives/societies collected around 142,000 litres milk per day which also included Kamadhenu Cooperative Dairy and Tanahu District cooperative union; and cumulative annual milk collection from these cooperatives come to 21,494 MT (Refer annex-3). 147 Dairy processing plants associated with NDA have 175,900 LPD milk collection during this period (2077 BS); and projected annual milk collection turns out to be 63,324 MT (Refer annex-4). DIA associated dairy plants are reported have dairy processing infrastructures and capacity of around 10,75,000 LPD however their actual milk handling is 450,000 LPD (refer annex-11). Capacity wise, two of dairies have processing capacities above 50000 litres per day (LPD); thirty-two plants have capacities ranging from 10,000 to 49,000 LPD, and all remaining are below 10000 LPD handling with a range from 300–10000 LPD installed capacity. In addition, there are number of smallholder processors which are not member of these associations. There are three milk powder plants operational in the country located in Biratnagar, Chitwan and Pokhara. New powder plants are in process of establishment in Tarahara and Hetauda under public cooperative partnership; as well feasibility study for powder plant is underway for Kohalpur. There are number of yak milk cheese processing plants under public and private sector ownership scattered in high mountain region of Rasuwa, Dolakha, Ramechhap, Solu, Dolpa etc, as well Chhurpi popularly traded as Dog Chew is produced mostly in the mountainous belt of eastern Nepal. Chhurpi is the only milk product exported to Europe and America, and fetching premium price. Also, there are no information available of any milk collection and local milk processing facilities operational in the hilly and mountain regions of Karnali and Sudur Paschim Pradesh. However, sale of loose milk (Tupidoodh) in the urban centres including Kathmandu is popular, increasing due to pasteurised milk losing quality due to poor cold chain network while in transit from milk plant to consumers. Pasteurised Milk crates are kept for hours in the open air till the last packet of milk is sold. Thus, quality gets deteriorates and develops off flavour. A national dairy sector study is needed to have most updated information on the total status of dairy development in the country.

3.1.4 Linkage between Primary Cooperatives and Dairy Plants

Primary dairy cooperatives and dairy plants have just a relation of simple buyer and seller of liquid milk, and cooperatives do not get any support services for milk quality improvement, cattle feed, veterinary services, training and visits for members. Thus, due to this gap, there is a problem in getting desired quality milk by the dairies. Therefore, some kind of mechanism needs to be developed to address the issue of technical services supply and develop cordial relation. Very limited number of cooperatives are engaged in milk processing and marketing business. Dairy cooperatives are required to be supported for their viability and improvement in existing infrastructures. Dairy cooperatives having capability and interest to enter into processing activities and value-added milk product making should be encouraged and supported.

3.1.5 Current status of National Dairy Development Board (NDDB)

National Dairy Development Board (NDDB), established under NDDB Act 2048 (1992), is the apex dairy policy body having responsibility to steer the overall dairy development in the country having mandate to establish harmony among all the dairy entrepreneurs in the private and government sector in the country and carry out higher level study and research works on dairy development. NDDB was established through a DANIDA supported dairy project called Ten Year Dairy Development Plan (1990-2000), and after the project phased out in 2001, no bilateral or multilateral agency funded projects have supported the NDDB. However, number of Livestock Development projects were implemented with added mandate of dairy development by DLS. Current National Livestock Support Innovative Project (NLSIP) – a mega livestock

project under WB funding is operational with significant component of dairy industry development, without collaboration with NDDB. There is duplication of activities between DLS and NDDB, and even other agencies like NARC and so on. Number of NGOs and INGOs are implementing dairy activities for income generating, improving hygiene, managing the small-scale dairy enterprises, women enterprises etc in the grassroots level without the knowledge of NDDB.

Virtually, NDDB has been running on meagre annual budgetary allocation of government for almost twenty years. NDDB functioning has been grossly affected by unstable management due to political interferences. Examples are, every time government is changed chief executive is changed, and there are instances of appointment of ED from the party cadre, whereas chief executive should principally be experienced professional dairy expert having thorough knowledge and understanding of dairy sector.

Due to low budget and low number of technical staff, NDDB is just trying to survive. NDDB in India was born under the leadership of Dr. Verghese Kurien in 1965, and provided lifelong leadership, and brought India in the forefront of global dairy map as a highest milk producer in the world (187 million MT, 2019).

Thus, dedicated and visionary leadership is crucial for developing the NDDB and the dairy sector.

After the implementation of federal structure in 2018, each Pradesh are processing the establishment of Pradesh DDB without connection and collaboration with central NDDB. Now, there is serious need of coordination mechanism between NDDB and DDB. Experiences from the neighbouring countries says, NDDB should set up offices attached with Pradesh Agriculture ministry, and implement activities in collaboration with Pradesh government. NDDB board structure is too large; thus, stakeholders feel the need of restructuring to an efficient board and management.

3.1.6 Dairy Development Corporation (DDC)

DDC is a living history of dairy development in Nepal. It has inbuilt difficulties and limitations like other state-owned enterprises and corporations. DDC is facing acute shortage of trained dairy technology related middle level manpower and highly skilled dairy technologists and dairy engineers. Also, practical training is needed for floor level manpower working in milk collection, chilling and processing plants. Cold chain is a major problem in marketing pasteurised milk in Kathmandu and other cities. DDC requires large investment to rehabilitate and expand their facilities, as well Pradesh governments specially in *Karnali* and *Sudur Paschim* are expecting DDC to start dairy business in their areas. But it has not been able to pay back any dividend to state since its beginning. Thus, to efficiently run the business, restructuring of DDC should be considered and subsequent investment and funding plan should be developed.

3.1.7 Milk Quality Control and Standards

Milk quality is one of the major problems of the dairy sector. First of all, milk quality standards set for the compositional quality are low, and needing immediate revisions and amendments which has been recommended for last many years (NDSA, 2018). High quality milk and milk products cannot be made from low quality milk, thus standard revision will greatly contribute to improve the quality of pasteurised milk and dairy products. At the same time, the procurement price of raw milk is high due to which local dairy products like milk powders and butter cannot compete imported products.

Milk price in Nepal is fixed on the basis of two axis with fixed rate for fat and SNF for all types of quality. In India it is calculated on the basis of two axis with small modification, i.e. SNF rate is calculated as fat equivalent value ($2/3^{\text{rd}}$ value of fat rate), Fat and SNF rate increases with rise in composition as described

in the in the table in the annex-5. Thus, programmes to reduce the cost of milk production should be implemented by DLS and Pradesh government. As well milk pricing policy and pricing system should be reviewed and suitably revised to encourage quality milk collection.

3.1.8 Corona Effect

Entire dairy value chain activities are badly affected due to global *corona pandemic*. Since almost all economic and public activities were shut down due to corona fear, sale of milk products including liquid milk dropped to unexpected lower level. Stock of dairy products specially Skim milk powder (SMP) and butter piled up, causing storage problem and blockage of capital. Due to this, dairies are not able to pay the farmers, staffs, bank loan and so on. Thus, in order to revive the dairy industry, revival support programmes should be launched.

3.1.9 Cattle Population

The latest milk production data of Nepal shows that 2092403 MT of milk with cow milk 7,54,126 MT (36.04 per cent) and buffalo milk 13,38,277 MT (63.96 per cent) has been produced in 2017/18. The estimated population of cattle, buffaloes and yak/crossbred are 7.4 million, 5.3 million and 70 thousand, respectively. Of the total cattle population, the distribution in province one is the highest (26.42%) followed by province five (15.54%) and province two (14.92%). Similarly, the milking cow population was found to be mostly concentrated in the province one (26.16%) followed by province three (15.58%), province two (15.25%) and province five (14.65%). The cattle population was least in the Karnali province (7.64%). The production of the cow milk is also highest in province one (1,95,592 MT) followed by province three (1,23,797 MT) and province five (1,09,753 MT).

Table 2: Cattle population, production & productivity by Province

Particular	Provinces							Total
	1	2	Bagmati	Gandaki	5	Karnali	Sudurpaschim	
Cattle Population	19,48,899 (26.42%)	11,00,900 (14.92%)	10,51,263 (14.25%)	5,55,174 (7.53%)	11,45,631 (15.54%)	5,63,594 (7.64)	10,10,845 (13.70%)	73,76,306
Milking Cows	2,71,879 (26.16%)	1,58,523 (15.25%)	1,61,934 (15.58%)	71,065 (6.83%)	1,52,307 (14.65%)	80,416 (7.73%)	1,43,414 (13.80%)	10,39,538 (100%)
Cow Milk Production, MT	1,95,592 (25.94%)	1,08,946 (14.45%)	1,23,797 (16.42%)	67,878 (9.00%)	1,09,753 (14.55%)	44,370 (5.88%)	1,03,790 (13.76%)	7,54,126
Productivity (kg)	719	687	764	955	721	552	724	725

Source: MoALD, 2017/18

However, there is improved milk production and productivity of Jersey, Holstein, jersey cross, Holstein cross, and average per lactation production is 2801.8 kgs with average fat of 4.4 % and average protein of 3.29 % is reported.

Table 3: Cow milk production in major milk pockets of Nepal

Breeds	Milk production, 300 days (in kg)		Fat %		SNF %		Total Solid as fat and protein content (Kg)	
	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Deviation
Major Jersey	2469	853.6	4.5	0.7	3.3	0.2	192.7	67.2
Jersey*Holstein*Nepali	3056	991.9	4.4	0.8	3.3	0.2	236.5	79.1
Major Holstein	3239.1	1107.1	4.2	0.6	3.3	0.1	241.2	78.3
Jersey Cross Breed (50%)	2838.8	839.2	4.4	0.7	3.3	0.1	217.3	63.1
Major Holstein cross breed (50%)	3200	1008	4.3	0.7	3.3	0.1	240.2	74
Unknown/Mixed	2640.4	921.1	4.5	0.6	3.3	0.1	201.7	67.4
Total Average	2801.8	875.1	4.4	0.69	3.29	0.15	214.6	76.2

Source: Dairy Development strategy (2071-2091) by NDDB, and referenced from Shrestha et al 2010.

3.1.10 Buffalo Population

The distribution of buffaloes was highest in the province five (11,70,298) followed by in province three (8,94,453) and least in Karnali province (3,35,061). Likewise, distribution of milking buffaloes seems to be the similar order as the province five lead milking buffalo number. However, province three was found to be the highest milk producer (267245 MT) followed by province five (258132 MT), one (220745 MT), Gandaki province (206627) and province two (185249).

Table 4: Buffalo population and milk production by Province

Particulars	Provinces							
	1	2	Bagmati	Gandaki	5	Karnali	Sudurpaschim	Total
Buffalo Population	8,59,686 (16.29%)	7,80,047 (14.78%)	8,94,453 (16.95%)	7,18,675 (13.62%)	11,70,298 (22.17%)	3,35,061 (6.35%)	5,19,559 (9.84%)	52,77,819
Milking Buffalo	2,32,414 (15.13%)	2,89,169 (18.83%)	2,62,171 (17.08%)	1,96,322 (12.78%)	3,10,754 (20.23%)	95,594 (6.22%)	1,49,524 (9.73%)	15,35,948
Buffalo Milk Production (MT)	2,20,745 (16.49%)	1,85,249 (13.84%)	2,67,245 (19.97%)	2,06,627 (15.44%)	2,58,132 (19.29%)	69,004 (5.16%)	1,31,284 (9.81%)	13,38,277
Productivity (kg)	950	640	1020	1052	831	722	878	871

Source: MoALD, 2017/18

3.1.11 Milk production

Table 5: Milking Population and its Production

Province	Milking Cows No.	Milking Buffalo No.	Cow Milk (MT)	Buffalo Milk (MT)	Total Milk Produced(MT)
Province-1	271,879	232,414	195,592	220,745	416,337
Province-2	158,523	289,169	108,946	185,249	294,195
Bagmati	161,934	262,171	123,797	267,245	391,042
Gandaki	71,065	196,322	67,878	206,627	274,505
Province-5	152,307	310,754	109,753	258,123	367,876
Karnali	80,416	95,594	44,370	69,004	113,374
Sudurpaschim	143,414	149,524	103,790	131,284	235,074
Total	1,039,538	1,535,948	754,126	1,338,277	2,092,403

Source: MoALD, 2017/18

Though statistics on cattle and buffaloes population are not segregated by breed, it is estimated that around 10-12% of the cattle population and 25-36% of buffalo population are considered to be exotic or crossbred.

3.1.12 Yak/Nak, Chauri Population

At the present time, the total world yak population is estimated to number around 14.2 million, of which 13.3 million are in Chinese territories, about 0.6 million in Mongolia and the rest in other countries, notably those bordering the Himalayas and countries. The estimated population of yak and crossbred (Chauri) in the country was 69,978 which were rearing in the 29 Northern high hills and mountain district of the country. (DLS,2010).

Butter and other products are made by herders from milk for their own use. Large quantities of milk are made into a Swiss-style hard cheese into the butter in processing factories. The population of Yak, Nak and Chauries was 69,346 (MoALD 2016/17) However, a recent study estimated the total population of Nak, Yak and Chauries came out to be 95,446. The current milk production is estimated to be 13508 MT. Nepali Churpi is in a high demand in the global market nowadays. Traders are exporting Nepali Churpi to Canada, Germany, Hong Kong, India, Israel, Japan, Korea, Malaysia, Russia, Singapore, Taiwan, Thailand, United Arab Emirates, the United Kingdom and the United States mostly as a 'dog chew'. It has been regular source of income for rural farmers. Farmers of the Chhurpi producing area are receiving more orders from international buyers. There are also issues of quality certifications which chhurpi producers/exporters are facing, demands the support of government. However, this remains a niche product, and it is yet to be assessed whether the demand for such product is strong enough to drive further commercialization.

Table 6: Yak/Nak/Chauri population & milk production

Particulars	Provinces							
	1	2	Bagmati	Gandaki	5	Karnali	Sudurpaschim	Total
Population	21985		11,653	15472		19684	1184	69978
Milking Population	5496		3029	4177		5314	343	18359
Production (MT)	3957		2271	2965		4038	277	13508

Source: MoALD, 2017/18

3.1.13 Milk Production in different ecological zone

Milk production varies according to geographical region. It depicts the number of milking animal and milk production is less in the Terai compared to the hill. Similarly, the milk yield is also low in the Terai. The milk yield of cattle and buffalo is 831 kg and 902 kg per lactation respectively, which is the highest milk yield in the region compared to the Terai and mountain. The annual milk production was highest from the hill region 57.35% followed by Terai 35.63% and least in the Himalayan region 7.02% The productivity of animals in Terai and Hills were higher as compared to the productivity of animals at Himalayan region mainly due to gradual replacement of indigenous cattle and buffaloes with exotic or crossbred animals particularly in the region where milk collection facilities from organized sector (DDC and private dairies) have been established.

Table 7: Annual milk production by Ecological Region

Ecological Regions	Cattle			Buffalo			Total Milk (MT)	%
	Milking Animal	Milk Prodn. (MT)	Productivity (kg/yr)	Milking animal	Milk Prodn. (MT)	Productivity (kg/yr)		
Mountain	111045	62337	562	103657	84736	817	147073	7.02
Hills	532664	391972	736	895615	807972	902	1199944	57.35
Terai	395829	299817	757	536676	445569	831	745386	35.63
Total	1039538	754126	725	1535948	1338277	871	2092403	100

Source: MoALD, 2017/18

3.1.14 Per Capita Milk Availability

Per capita consumption requirement for milk is 92 litres, however Nepal produced 21,68,434 MT of milk during fiscal year 2075/76 (2018/19). Based on CBS population estimate, Nepal population is around 29,218,867 during 2076, thus per capita availability of milk comes to 74.21 litres per person per year. It is estimated that the average current deficit is around 550,000 litres of fluid milk per day with 10-20 % variability during the lean season (March-July) and the flush season (August-February). The production is increasing in the range of 3 to 4% annually, but demand is growing at 8%. As supply is not keeping pace with demand, the demand-supply situation is likely to widen over the years if the current milk production growth rate is not increased.

3.1.15 Trend of Milk production

The share of buffalo milk with cow milk is distinct with the ratio of almost 70 and 30 percent during 2007/08 to 2012 except in recent years where the total milk production stagnant is at 66 and 34 percent in the total

milk produced during 2013/14 to 2017/18. The high yield of buffalo milk suggests a high proportion of improved buffaloes, especially in accessible areas. The preference for buffaloes for milk production has led to a great demand for the high-yielding *Murrah* breed. This preference for buffaloes has led to a burgeoning business for buffalo traders. The buffaloes are brought from the Indian border areas in the lowlands and sold for a modest profit through various centers in the country. Different reports claimed that a total of 950,000 families are engaged in dairy sector rearing 2575486 number of milking animals with the production of 2092403 MT and channeled worth NPR 9 billion from urban to rural areas every year. However, value addition of the milk is low and almost 80 percent of the milk is marketed through informal channel including home consumption. Therefore, there are ample opportunities for adding value with product diversification from fluid to solid milk products.

3.1.16 Projection of Milk Production and Formal sector handling

The actual milk production of FY 2075/76 is reported as 21,68,434 MT, and formal sector share is around 17 %. Based on the current data, five years Projection for Milk Production, Formal sector handling and additional chilling capacities requirement is presented in the table-7.

Table 8: Projection Milk Production, Formal sector handling and additional chilling capacities requirement

Projection of total milk production, used by formal sector and chilling need requirement and proposed chilling capacity increment							
Fiscal Year	Actual milk production, MT	Projected Milk production, MT	% of formal sector handling in total milk production (project implemented year 2077/78)	Projected milk handling through formal sector, MT	Projected milk handling through formal sector, LPD	Additional milk to be handled by formal sector, LPD	Additional chilling capacity required assuming 90% of milk collection chilled
		@ 3.6 % annual increment	@ 1 % annual increment		Existing handling by formal dairy sector =1,046,000 litre per day		
2073/74	1911239						
2074/75	2092403						
2075/76	2168434						
2076/77		2246498	17.0	381905	1046314		
2077/78		2327372	18.0	418927	1147745	101431	101431
2078/79		2411157	19.0	458120	1255123	107378	107378
2079/80		2497959	20.0	499592	1368744	113622	113622
2080/81		2587885	21.0	543456	1488920	120176	120176
2081/82		2681049	22.0	589831	1615975	127055	127055
Total chilling capacities needed by the end of five years period							569661
Total chilling capacity increment needed by the end of five years period, assuming 1000 litre per day per chilling centre.							546000

Source: Consultant's Estimate (2077) based on the existing milk production, projected growth and share of formal sector handling.

It is depicted that there is shortage of about 500,000 liters of fluid milk/day in the urban areas. Part of it is met through imports. Both APP and ADS has given high priority for dairy development, and milk comes to second after rice commodity-wise. However, there is huge investment gap. Small and scattered animal

holdings; low milk yield/animal; lack of basic infrastructure; inadequate skills in milk handling and milk hygiene leading to poor quality of milk; less efficient dairy plants and small scale of operation in milk processing and its product diversification; lack of capital investment even from private sector; low and non-remunerative producer prices; inadequate animal health care and breeding services and lack of professional management systems are hindering the growth of this sub-sector.

3.1.17 Milk production forecast with different rates and per person milk

Dairy farms remaining productive is going to be key to supplying enough milk to meet the rising demands to feed the growing population. Dairy products consumption has increased as the population migrate from a rural to a more urban. Although growth in milk production in Nepal has been stagnant in recent years. It is forecasted in the following table that the milk production would sufficient to meet FAO/WHO recommended 92 kg requirement in the year 2025 with the calculation of five percent increment.

Table 9: Milk production forecast with different rates and per person milk

Year	Population	3% increment rate		4% increment rate		5% increment rate	
		Milk production (MT)	Milk per person (kg)	Milk production (MT)	Milk per person (kg)	Milk production (MT)	Milk per person (kg)
2018	29218867	2092403	71.61	2092403	71.61	2092403	71.61
2019	29609623	2155175	72.79	2176099	73.49	2197023	74.20
2020	2,99,96,478	2219830	74.00	2263143	75.45	2306874	76.90
2021	3,03,78,055	2286424	74.28	2353668	77.48	2422218	79.74
2022	3,07,52,146	2355016	76.58	2447814	79.60	2543328	82.70
2023	3,11,16,913	2425666	77.95	2545726	81.81	2670494	85.82
2024	3,,1471,213	2498435	79.39	2647555	84.13	2804019	89.10
2025	3,18,14,161	2573389	80.89	2753457	86.55	2944219	92.54
2026	3,21,44,921	2650590	82.46	2863595	89.08	3091429	96.17

Source: Central Bureau of Statistics, 2017/18 and consultants' projection

It is depicted that there is shortage of about 500,000 liters of fluid milk/day in the urban areas. Part of it is met through imports. Both APP and ADS has given high priority for dairy development. However, there is huge investment gap. Small and scattered animal holdings; low milk yield/animal; lack of basic infrastructure; inadequate skills in milk handling and milk hygiene leading to poor quality of milk; less efficient dairy plants and small scale of operation in milk processing and its product diversification; lack of capital investment even from private sector; low and non-remunerative producer prices; inadequate animal health care and breeding services and lack of professional management systems are hindering the growth of this sub-sector.

3.1.18 Demand and Supply Situation

The demand for dairy products depends on the economic, geographic as well as demographic factors. Sharma (2002) showed that nearly 66% of urban and 23% of rural households purchased milk. The lower share in rural area reflects the fact that many rural households keep dairy animals. Manandhar (2014) showed that the daily demand for milk was 8.2 million liters and the daily supply was 4.26 million liters.

The demand for dairy products is increasing at a rate of 8% per annum but the production is increasing at only 3.8%.

3.1.19 Import and Export Scenario of the milk and milk products

Export and import of the dairy products show significant deficit. While comparing the five years data, import of the dairy products was the maximum in FY 2017/2018 calculated at NRs, 209.6 million which was 118.6 million in FY 2015/2016, 93.7 million in 2012/2013 and 106.4 million in FY 2011/2012. The total export of milk and milk products of the country is about 484913 kg with a value of NPR 159779276 whereas the import is six fold comparing to export.

Nepal imports milk powder, milk and cream, condensed milk, chocolates, Ghee; Buttermilk, curdled milk and cream, Cheese, Ice cream etc. The major importing countries for milk and milk products are India, USA, Denmark, Malaysia, Thailand, Singapore, Italy, Germany, the Netherlands, New Zealand and Australia. India is the main exporting country for Nepal, and almost 80% of Nepal's imports of dairy products originate in India. The open border and proximity to markets are the main element favoring trade between the two countries.

3.1.20 Processing

Processors are the main actors to mobilize various channels of milk and milk products marketing. They act as a bridge between the producers and consumers. In the urban areas they manage milk booths to sell processed milk. The private sector dairy business started during late 1970s with very small-scale operations in Kathmandu. After the economic liberalization in 1992, private sector dairy business has grown substantially. There are many private dairies (including cooperatives) of varied scale including cottage, small, medium and large both within and outside the Kathmandu valley. While almost all of the cottage and small-scale dairies are manually operated with traditional technology, the medium and large-scale dairies operate using modern technology and mechanized dairy plants.

State owned DDC collected 48,803 MT of milk and processed into milk and milk products during FY 2075/76 (refer annex- 2). During this period, 14 dairy Cooperatives/societies collected around 142,000 litres milk per day which also included Kamadhenu Cooperative Dairy and Tanahu District cooperative union; and cumulative annual milk collection from these cooperatives come to 21,494 MT (Refer annex-3). 147 Dairy processing plants associated with NDA have 175,900 LPD milk collection during this period (2077 BS); and projected annual milk collection turns out to be 63,324 MT (Refer annex-4). DIA associated 31 dairy plants are reported have dairy processing infrastructures and capacity of around 580,000 LPD however their actual milk collection figures are not available at this time (Thapa et al, 2019). Capacity wise, two of dairies have processing capacities above 50000 litres per day (LPD); thirty-two plants have capacities ranging from 10,000 to 49,000 LPD, and all remaining are below 10000 LPD handling with a range from 300–10000 LPD installed capacity. In addition, there are number of smallholder processors which are not member of these associations. There are three milk powder plants operational in the country located in Biratnagar, Chitwan and Pokhara. New powder plants are in process of establishment in Tarahara and Hetauda under public cooperative partnership; as well feasibility study for powder plant is underway for Kohalpur. There are number of yak milk cheese processing plants under public and private sector ownership scattered in high mountain region of Rasuwa, Dolakha, Ramechhap, Solu, Dolpa etc, as well Chhurpi popularly traded as Dog Chew is produced mostly in the mountainous belt of eastern Nepal. Chhurpi is the only milk product exported to Europe and America, and fetching premium price. Also, there are no information available of any milk collection and local milk processing facilities operational in the hilly and mountain regions of Karnali and Sudur Paschim Pradesh. However, sale of loose milk (Tupi doodh) in the urban centres including

Kathmandu is popular, increasing due to pasteurized milk losing quality due to poor cold chain network while in transit from milk plant to consumers. Pasteurized Milk crates are kept for hours in the open air till the last packet of milk is sold. Thus, quality gets deteriorates and develops off flavour.

3.1.21 Dairying Through Cooperatives

The fundamentals of the cooperatives is working together to build self-reliant communities. Cooperatives are often cited as one of the most effective way of grouping small dairy farmers to deal with the challenges of producing and marketing milk. As a result of the perishable nature of milk and the range of skills involved in its production and marketing, dairying requires a number of services that can best be provided by the farmers owned cooperative societies. At present, there are 1657 Milk Producer's Cooperative Societies (MPCs) functioning in 62 districts. These primary cooperatives used to have at least 25 member farmers. Nearly 100 thousand households/ members are involved in these primary cooperatives in which one third of the members are women. In the district level, District Milk Producers' Cooperative Unions (DMPCUs) are in function in 38 districts which coordinates and facilitates its member primary cooperatives within the district for dairy operation. Central Dairy Cooperative Association of Nepal (CDCAN) is the national level umbrella for primary cooperatives and union in the country.

3.1.22 Milk and Milk Products

Consumer receive various kind dairy products in the market areas. Fluid milk and different other dairy products are available in the market areas for the consumers. Fluid milk, dahi, ghee and paneer followed by, ice-cream, Mohi, and sweets are the most common products; Cheese and chhurpi are also available in the market areas of some of the consumers. This indicates that fluid milk, dahi, ghee and paneer are the dominant dairy products in the market areas for the consumers. It was found that the major dairy products like fluid milk, dahi, Ghee is inelastic in nature even when increase or decrease of income of the consumer. More than 50 percent of the respondent's consumer of fluid milk, dahi and ghee told that, consumption is not changed even if the income decrease or increase. Thus, it can be said that the consumer of such products is intact and habitual to those products. While on the other hand, when the income is less, they do purchase less quantity of the products like Cheese, condensed milk, SMP, butter, cream, chhurpi etc.

3.2 Survey Data Analysis and Interpretation

3.2.1 General:

About 34% of the survey participants were female and majority of respondent were from Brahmin, Chhetri, Thakuri community and about 25% were from Janajati community. Of the total respondent about 66% were household head or decision maker of house. About 14% household head were female. The average age of the respondent was 45.5 years and that of household head was 50 years. The average family size was about 5.5 in the survey area. The economic active population (16 to 60 years of age) was found to be 75% in the surveyed sample.

3.2.2 Milk producers' cooperatives

Overall, there was growth in both milk collection and turnover of all the milk producers' cooperatives, which were involved in the collection and marketing of the milk. They were collecting milk in both morning and evening time. On average, the cooperatives used to collect about 60% of the total volume of the milk collection in the flush season. However, the rest 40% used to be collected in a lean period. Though, there was a huge gap in milk collection between two seasons, neither of the cooperatives had practiced paying a higher rate of milk in the lean period. Nevertheless, about 50% of the cooperatives were willing to pay at

least NPR 5 per liter of milk collected in the lean period to promote milk production in that season as well. Besides, collecting milk all the cooperatives were providing inputs and technical supports to the farmers.

None of them was involved in the diversification of the milk product. But, about 50% of them expressed their interest to operate SMP plant if they get a government subsidy. In addition, they were seeking technical backstopping and market assurance from the government. In this regard, they were happy with the decision of the government to the banned import of SMP from India. According to Motiram Panta, a manager of Kamadhenu milk producer's cooperative in Kahairahani municipality, Jyamire Chitwan, it is an awesome decision took by the government of Nepal, which is in the favour of both Nepali producers and entrepreneurs. He added that this decision has increased the market demand for Nepali SMP.

According to the cooperatives, there was a higher demand for processed milk in comparison to raw milk. Even though, there were some constraints too. Irregularity in milk production in the different seasons was one of the biggest hurdles for continuous milk processing. Similarly, the risk associated with the investment with minimum security was another big challenge. Correspondingly, there was inadequate linkage & coordination between milk producers, suppliers, and milk processors. Nevertheless, there were good opportunities too. Trained dairy plant operators were available in the market. Likewise, the overall milk production was in increasing trend. Growing demand for diversified milk products, conducive government policies, and attractive income from the processing of the milk were some of the other opportunities.

3.2.3 Dairy Entrepreneurs

Dairy enterprises have been established individually in study area and have been selling milk along with value added products; curd, ghee, butter, paneer, sweet items and birthday cake. The normal milk selling capacity for small dairy entrepreneur was 100-150 litre and medium dairy entrepreneur was 1000-1500 liters. Dairy entrepreneurs have been selling 1.5 times more milk in flush season (summer) than lean period (winter) as curd is the major value-added products which has been sold maximum in flush season. To manage the dairy business, small dairy entrepreneurs have taken a loan from money lender at 24% annual interest while medium dairy entrepreneur have taken loan from bank at 12% annual interest and both small and medium dairy entrepreneur have been able to repay the loan in time. Fifty percent dairy entrepreneurs have utilized the grant provided by government organizations which was helpful to enhance their business. Dairy entrepreneurs got satisfied in quality of milk which received from farmers. Fifty percent dairy entrepreneurs have introduced the morning and evening milk collection. Small dairy entrepreneurs haven't produced SMP and white butter but medium dairy entrepreneur have produced SMP from the surplus milk. Restriction on import of SMP isn't good as it reduces the competition as well as quality will be low in the market. All the dairy entrepreneurs agreed that, the government need to reduce the tax on dairy enterprise. There was no technical input supply from dairy entrepreneur but only verbal facilitation services have been provided for those people who want to get knowledge regarding dairy products. There was no any difficulty to dispose the effluent of dairy products. The methods of milk processing, milk processing operational capacity and processing technology is simple in small dairy entrepreneurs and improved in medium entrepreneurs.

Market demand of processed milk is medium in both small and medium entrepreneurs. Irregular supply of milk, conventional milk processing plants, limited production of milk, complex procedures for financing services, lack of trained dairy plant operators, unfavorable government policy, less infrastructure support from government, lack of knowledge to adopt modern technologies are the major constraints in dairy business. Similarly, small entrepreneurs are lacking knowledge about dairy development policy and code

of practices. Increasing number of milk producing farmers, increasing insurance program and increasing demand of diversified milk products are the major opportunities for dairy sector. So, the dairy entrepreneurs have been excited to expand their business.

3.2.4 Household Income

The survey was only focused on the households that were involved in selling cow and buffalo milk recent months and income was estimated for normal period of the year. The impact of Covid-19 on household income was not considered and same applies for livestock income from selling milk. It revealed that about 40% of the total income comes from dairy sub-sector in dairy farmer. About 65% of household were holding 1 to 3 cow and/or buffalo (Field survey 2020).

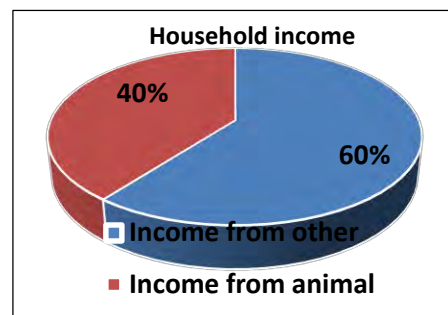


Figure 1: Household Income

3.2.5 Animal holding size

In the survey, it revealed that about 50% households have raised buffalo and that of 36% have raised cow only. And about 14% household have raised both cow and buffalo for milk. Of the total surveyed households, about 65% household had 1 to 3 dairy animals. And that more than 10 to 21 dairy animals were found in about 12% households (Field survey 2020).

3.2.6 Livestock breed and source

The improved breed and local breed proportion was 32% and 25% respectively. While the majority of households have raised mixed or crossed breed. In case of source of livestock, about 39% household found that they have bought from neighbors, 34% from own production and rest 27% bought from livestock traders (Field survey 2020).

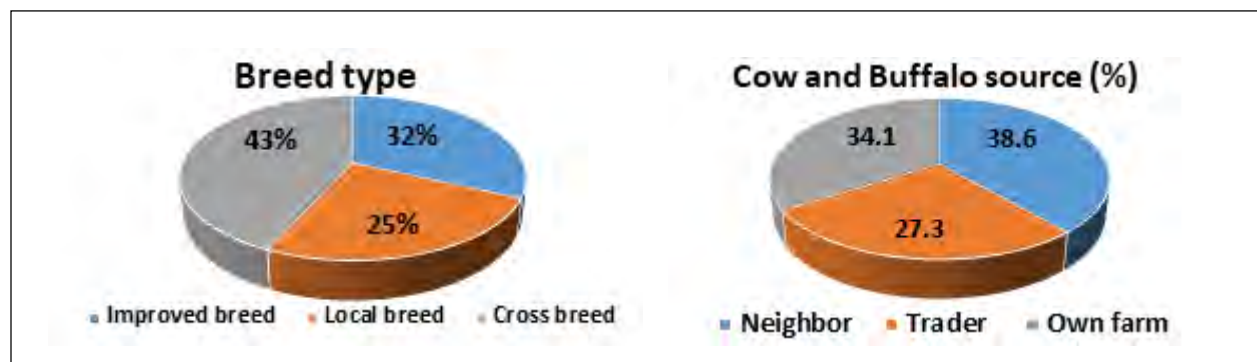


Figure 2: Livestock breed & Source

3.2.7 Method of reproduction

It revealed that Artificial Insemination (AI) is increasing in the villages. About 43% household have used AI for dairy animal, 27% households were still using natural breeding practices and rest about 30% have used both; natural and AI. It is evident that about 73% household have access to AI services. It might be due to availability of AI service at own village which accounts 70.5% of the AI source (Field survey 2020).

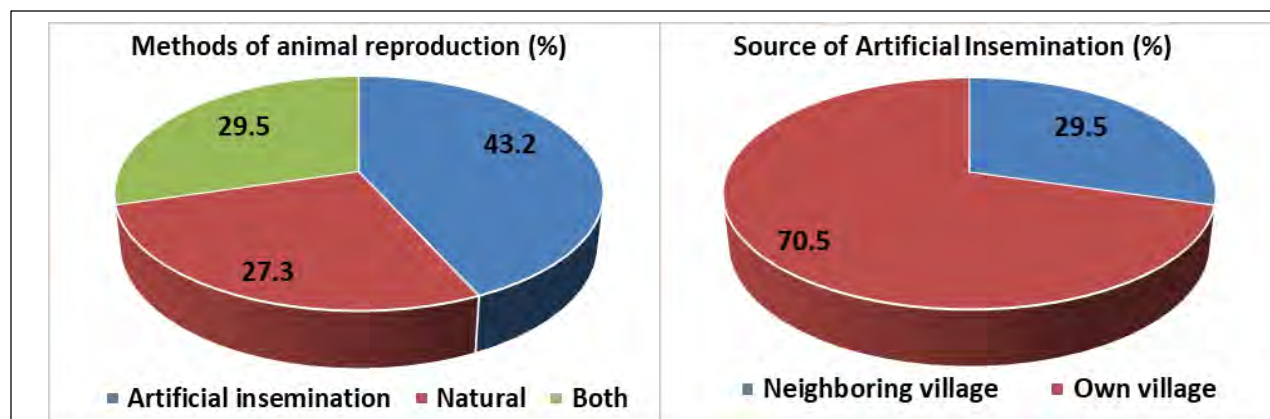


Figure 3: Methods of reproduction

3.2.8 Veterinary services

Majority of livestock owners are dependent on private agro-vets for vet services including medicine and vaccines for cow and buffalo followed by government offices which accounts 41% household have access to government services. While other civil society and own contribution is negligible.

3.2.9 Feed Sources

Of the total roughages feed source, about 77% farmers have own and purchased and about 22% farmers have purchased roughages. On the other hand, majority of farmers have purchased concentrate and only 2% used homemade concentrate. While about 41% farmers have used concentrate from both sources. This figure reveals that there is maneuver to feed sources and its quality for higher productivity. Farmers' dependency on concentrates can be minimized by introducing quality roughages (Field survey 2020).

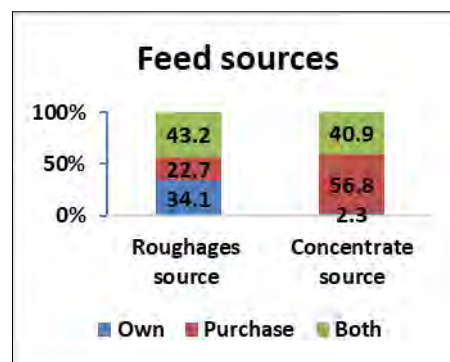


Figure 4: Feed Sources

3.2.10 Milk Production and Sales

In the surveyed household the average number of buffalo was found to be 3.46 per household with average per day milk production is 14 liters but there is high variation in holding buffalo which ranges from 1 to 21. The corresponding value for is 4 and the range is 15 and milk production from cow is 16.5 lit per day. Consumption of milk per day similar in both cows and buffalo milk.

Table 10: Milk production and sales

Parameters	N	Min.	Max.	Mean	Std. Deviation
Number of buffalo/HH	28	1	21	3.46	4.857
Number cow/HH	22	1	16	4.00	3.792
Av. Buffalo milk production liter /HHH/Day	28	1	85	14.07	19.478
Av. Cow milk production liter /HHH/Day	22	2	40	16.55	11.907
Buffalo milk sell lit/day/HH	28	2	84	12.79	19.676
Cow milk sell lit/day/HH	22	1	90	17.18	19.687
Buffalo milk consumption /day/HH	28	0	5	2.11	1.257
Cow milk consumption /day/HH	22	0	6	2.32	1.323

Buffalo milk price per liter	28	50	120	71.89	20.37
Cow milk price per liter	22	40	90	52.00	10.51
Revenue from buffalo milk/day	28	150.00	9240.00	1126	2276.27
Milk Revenue cow	22	45.00	2520.00	766.9	671.82

Source: Field survey 2020

3.2.11 Milk Production Trend

About 70% farmers have expressed that milk production has increased since last five years while about 11% has mentioned decreasing in their locality and 18% has said milk production is constant (Field survey 2020). While comparing this perception with national milk production trend it is increasing over the five years.

3.2.12 Milk production skill and technology adoption

None of the farmers are best in the milk production skill. However, about 68% farmers are good at milk production and 32% mentioned that they have limited knowledge on milk production. In such situation milk production skill can be imparted in to the large number of farmers to meet the best skill on milk production. Only 9% farmers were found to be adopted improved technology in milk production (Field survey 2020). However, this is good sign to continue for further.

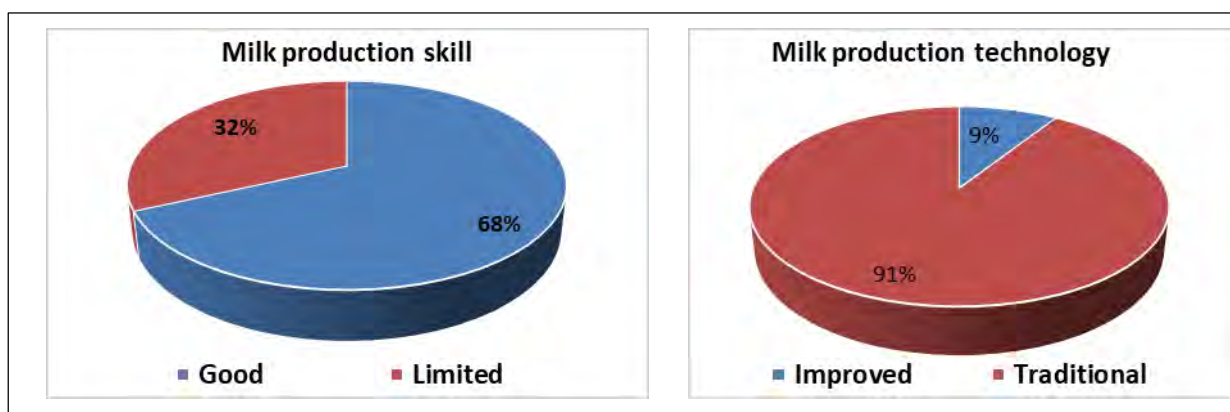


Figure 5: Milk production skill and technology adoption

3.2.13 Milk selling point

About 52% farmers are found to be selling milk at cooperatives followed by door to door selling (about 32%). Some farmers are also selling milk at local hotels (14%) and private traders (9%). It reveals that cooperatives are important selling point (Field survey 2020).

3.2.14 Milk price of cow and buffalo milk at different selling point

In all selling points, per liter milk price of buffalo is higher than that of cow milk. Among the selling points, farmers are getting higher price at households' door to door selling irrespective of milk production from type of dairy animal. There is huge difference in milk rate at trades point and least is in door to door selling (Field survey 2020).

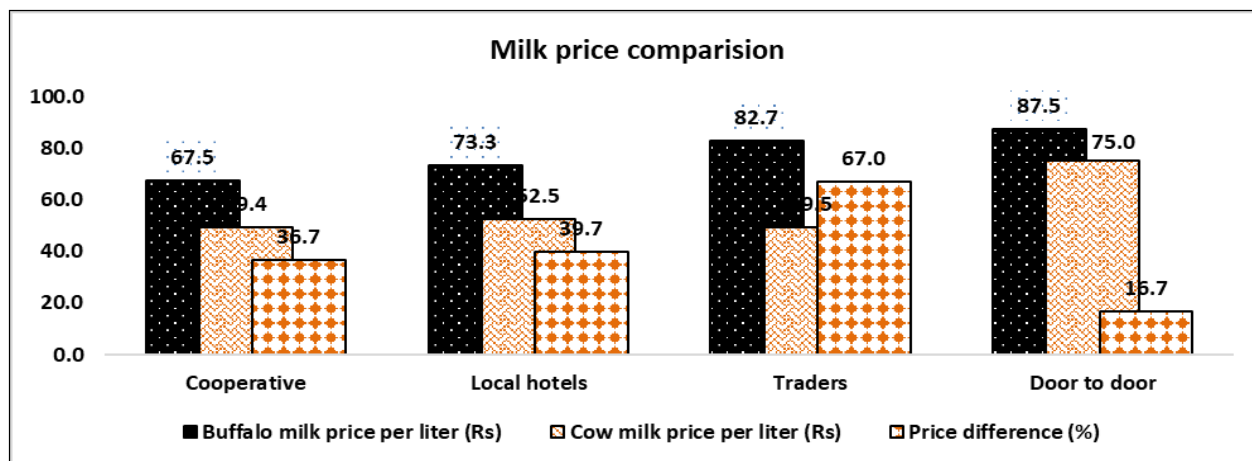


Figure 6: Milk price comparison

3.3 Key constraints and opportunities

3.3.1 Policy constraints

Among the related government policies approved by government of Nepal, the Dairy Development Policy (2007), is the most relevant policy relating to the development of dairy sector in the country. This Policy was developed in view of the importance of livestock sub-sector in the overall farming system. The policy is very comprehensive and encompasses all the major aspects of dairy development. The policy envisions investment in the income and employment generating and poverty-alleviating dairy business.

In the current policy, NDDB has given important responsibilities for its implementation and monitoring. It has directed NDDB to prepare working procedures for its implementation and take initiatives to make required changes in the present legal provision. Accordingly, the policy could be implemented only after the working procedure is prepared by NDDB and approved by MoALD. There are some of its objectives which are duplicating with other organizations. The mandate given to NDDB also overlaps with the functions of DLS with regard to finding remedies to problems relating to livestock development and animal health sector for dairy development and making arrangements for fodder and pasture resources. Moreover, NDDB is also mandated by Act to formulate and recommend pricing policy to the government whereas the Dairy Development Policy has adopted the free market policy for pricing of milk and milk products. But in practice, being the leading government institution, the DDC is the main actor while fixing the raw milk price. Price of milk has remained a sensitive issue among the producer farmers and the buyers (i.e. DDC and the private dairies) due to which marketing of milk has occasionally been constrained (Milk Marketing Strategy 2069).

3.3.2 Human Resource Constraints

Human resource is one of the key constraints of dairy sector. For efficiently operating dairy value chain livestock specialists, veterinarian, feed and fodder specialists are needed at the dairy production level to produce quality milk at sustainable and competitive cost. Dairy technologists and specialists are required after post-harvest handling from farm to fork. There is enough manpower like livestock specialists, veterinarian, feed and fodder specialists but there is acute shortage of manpower for processing industries especially dairy technologist and engineer of highly skilled, middle level and lower middle level including shortage of floor level dairy processing technicians for cooperatives, chilling centres, processing plants etc. dairy industry stakeholders are strongly demanding the establishment of National Dairy Training and Research Institute (NDRTI) to conduct research, as well produce higher level (graduate and post-graduate);

middle level manpower needed for the processing industries in the post-harvest milk value chain; and floor level dairy technicians and workers for the cooperatives, chilling centres, processing plants and so on.

National Workshop on Availability and Requirement of Dairy Science and Technology Related Human Resources in Nepal (2019) has discussed and recommended the remedies to produce much needed dairy technology related manpower for the dairy industries. Already Dairy college under Purbanchal University produced B. tech. and diploma level dairy technology manpower, the college needs to be strengthened with pilot plant facility. Similarly, a dairy training centre is established in Pokhara under FAO technical support. It can organise short courses to meet the need of floor level technicians workshop recommended; Twenty-year projection shows formal sector milk processing will increase from 17 % to 37 % in the 20th year (2039) from the base year 2019. In the base year, 261 dairy technologists/technical officers are required which will increase to 1256 at the end of 20-year dairy human resource plan period. Similarly, the need of diploma or supervisory level dairy technologists and technicians increases from 522 to 2512, in order to diversify and develop a competitive dairy processing industry in the country. This projection is based on the average (2011/12 – 2017/18) annual growth rate of 4.4 % in milk production (Bhattarai U. K. et al, 2019).

3.3.3 Socio-economics constraints

It revealed that there is barrier to include Dalit community in milk enterprise. Though Dalit community was not involved in the survey, about 32% other community members have mentioned that there is barrier to Dalit community on milk selling. Similarly, about 32% respondents mentioned that dairy enterprise is not suitable to low income families. It might be due high investment in capitals like shed construction, purchasing dairy animals, managing feed, etc. Most of the respondents (68%) agreed that women involvement in dairy sector is tradition and 34% agreed that dairy enterprise is socially ignored profession.

Farmers have also seen opportunities in milk production that there is huge potential of engaging community people irrespective caste. About 66% said that there is not social barrier on selling milk based on caste. Similarly, 75% of the respondents said that economic strata do not affect people engaging in dairy enterprise. In case of social recognition, about 59% said that the business is now recognized in the community and most of them agreed that this enterprise gives a sustained income for the family. All respondents said that dairy enterprise is environment friendly. It does not harm to others and the environment.

Table 11: Socioeconomic constraints

Parameter	Do not know	No	Yes	Rank
Socio-culture are the barrier to include the Dalit community in dairy enterprise	1(2.3)	29(66)	14(31.9)	IV
Dairy enterprise is not suitable for low income families		30(68.2)	14(31.9)	IV
Social recognition is quite low for milk producers	2(4.6)	24(54.6)	18(41)	II
Women involvement in dairy sector is tradition rather interest & income		14(31.9)	30(68.2)	I
Socially ignored profession/enterprise		29(66)	15(34.1)	III

Source: Field survey 2020

3.3.4 Input Supply constraints

About 52% farmers said that feed suppliers in the villages are limited in numbers, 16% said suppliers are not available in the village or locality. Only 32% farmers known or got connected with the feed suppliers in the village. And about 39% farmers have got feed in the village. About feed price, 66% respondents said that feed price is set in monopoly approach however 75% said that quality of feed is good. Only 20% farmers rated that quality of feed is poor. About 23% said that feed supply is uncertain in the village. It revealed that among different constrains mentioned by farmers' cattle feed supply is the major constraints (70%) followed by feed price, improper storing and packaging of cattle feed, feed grading is not maintained. About 29% farmers are unaware about feed suppliers training.

More than 95% farmers said that dairy enterprise is lucrative, as a result milk producer is increasing. Most of the farmers said that there is special insurance program for dairy animals and transportation is not a big problem for milk delivery and financial opportunities are broaden up. Hence the milk enterprise is expanding.

Table 12: Input supply constraints

Parameter	No	Unknown	Yes	Rank
Limited cattle feed supplier	12(27.3)	1(2.3)	31(70.5)	I
Unavailability of cattle feed	38(86.4)	1(2.3)	5(11.4)	IX
Poor quality of cattle feed	29(66)	3(6.9)	12(27.3)	VIII
Non-competitive cattle feed pricing	13(29.6)	4(9.1)	27(61.4)	II
Uncertainty of cattle feed delivery	27(61.4)	1(2.3)	16(36.4)	VII
Cattle feed grading is not maintained	13(29.6)	7(16)	24(54.6)	IV
Cattle feed supplier is not trained	12(27.3)	13(29.6)	19(43.2)	VI
Cattle feed supply chain is unsystematic	13(29.6)	10(22.8)	21(47.8)	V
Improper storing and packaging of cattle feed	14(31.9)	5(11.4)	25(56.9)	III

Source: Field survey 2020

3.3.5 Production constraints

Inadequate knowledge and skills and costly treatment are hindering dairy enterprise. Moreover, in traditional cattle sheds, heavy investment and unreliable technical services are also major constraints to milk production. There are several opportunities in dairy enterprise. Among them, higher demand for milk ranks the first followed by higher income as compared to other agro enterprises. Majority of farmers have ranked cattle insurance provision at villages on 3rd. Other opportunities like availability of cattle feed veterinary service on demand are equally important and are available around the village.

Table 13: Production constraints

Parameter	No	Unknown	Yes	Rank
Attraction of youth towards cattle farming is decreasing	18(41)	5(11.4)	21(47.8)	
Fodder and Pasture land is inadequate	18(41)	1(2.3)	25(56.9)	
Inadequate knowledge and skills for cattle farming	7(16)	1(2.3)	36(81.9)	
Traditional cattle shed	13(29.6)		31(70.5)	
High risky business	25(56.9)	1(2.3)	18(41)	
Low income or return on investment	23(52.3)	1(2.3)	20(45.5)	
Heavy investment required	14(31.9)	1(2.3)	29(66)	
Unreliable livestock technical service from government	14(31.9)		30(68.2)	
Lack of high milking cattle availability	18(41)		26(59.1)	
Disease treatment and vaccination are costly	7(16)	4(9.1)	33(75)	
Improved cattle feed is not locally available	20(45.5)		24(54.6)	

Source: Field survey 2020

3.3.6 Marketing constraints

Regarding dairy milk market, all farmers agreed that demand for milk high and more than 90% said that milk collection at villages are encouraging farmers. More than 65% farmers said that milk cooperatives are also operating in the village and price is competitive. Low volume milk production is the top most constraints followed by unfair pricing. Ineffective milk supply chain is ranked on 3rd and unorganized producers are ranked in 4th. Farmers have ranked irregularity in milk price payments at 5th. Increased consumers and locally available collection centers are ranked top most opportunities. Transport and delivery and increasing milk volume are ranked on 2nd and 3rd, respectively.

Table 14: Marketing constraints

Constraints	No	Unknown	Yes	Rank
Demand of fresh milk is low	40(91)		4(9.1)	VIII
Monopoly market/unfair pricing	20(45.5)	1(2.3)	23(52.3)	II
Milk collection/collectors are not locally available	36(81.9)		8(18.2)	VI
Milk supply chain is ineffective	17(38.7)	6(13.7)	21(47.8)	III
Milk collection centre/cooperative is not available	38(86.4)	1(2.3)	5(11.4)	VII
Low volume of milk production	19(43.2)		25(56.9)	I
No reliable payment of milk sales	28(63.7)	1(2.3)	15(34.1)	V
Milk producers are unorganized	25(56.9)		19(43.2)	IV

Source: Field survey 2020

3.3.7 Product Diversification constraints

Product Diversification is an important aspect of dairy business strategy for increased profitability, reduction in risk, increasing competition, higher growth and more efficient resource allocation (McDougall & Round, 1984). In terms of poverty reduction, product diversification is appealing with most high-value food commodities generating quick returns, hence offering smallholders a perfect opportunity to increase their incomes (Birthal, Joshi, Roy & Thorat, 2007; Singh, 2011). Product diversification can be very much benefited through improving the overall operational profit by value adding in milk, and substituting imported dairy products. However, product diversification in the dairy sector is limited mainly due to low quality raw milk, lack of qualified technical staff for product development, lack of assessment of market potentiality of different products, and reluctant private sector to introduce new products owing to risk.

3.3.8 Access to Finance constraints

The survey revealed that more than 80% farmers have access to credit and most of them are available for medium term period. Only about 14% farmers said loan is available for longer term. There were eight financial constraints reported by the households. Among them, limited availability of government grants and or subsidy was ranked first. With this regard, about 77% of the households reported it as the main problem. While about 6% of the households reported it as not a problem. Whereas, about 7% of the households had no idea whether it was an issue? Consequently, lack of long-term loan facility and high-interest rate on loan ranked second and third position with votes of about 66%, and 61% of households respectively. While, both lengthy and complex procedures for obtaining a loan, and less investment priority was ranked in the sixth position with an equal about 57% votes of the households. Likewise, a limited number of financial service providers, less attractive financial products, and discouraging financial services were ranked fifth, sixth, and seventh positions getting preference of about 55%, 53%, and 41% of the households respectively.

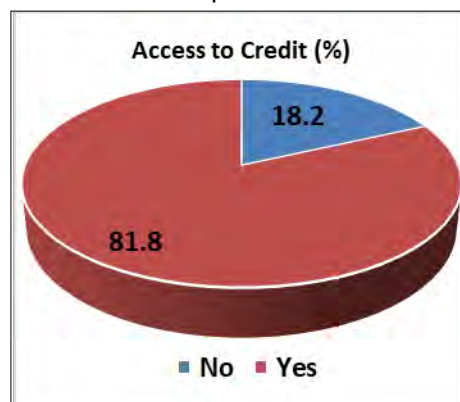


Figure 7: Access to credit

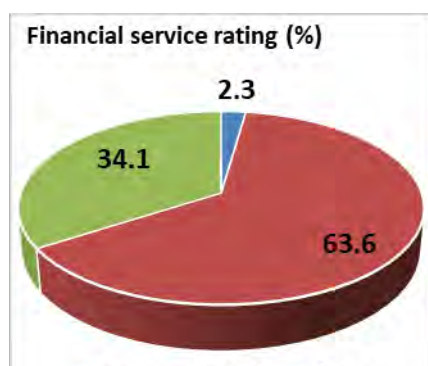


Figure 9: Financial service rating

Figure 10: Financial service rating

Despite having an issue on access to financial services there were some awesome opportunities as well identified from the survey. Similar to the constraints eight opportunities were identified and ranked based on the judgment from the households. Among them, competitive interest loan was identified in the first rank. About 61% of the households assumed it is an opportunity for the dairy sector. While about 31% of the households reported it as not an opportunity. Whereas, about 9% of the households were unable to reply whether it is an opportunity? Similarly, competitive financial services, having enough financial service providers, a higher priority of financial institution for investing in the dairy sector and simple procedure for obtaining loan facility were ranked second, third, fourth and fifth

Figure 8: Access to credit

being the choice of about 46%, 41%, 36% and 30% of the households respectively. Likewise, about 21% of the households reported financial products were attractive for the dairy sector ranking it in the sixth position. Finally, both government grants/subsidy and special discounts/schemes were ranked at the last getting preference from only 16% of the households.

3.3.9 Infrastructure Facilities constraints

Different seven infrastructure facilities in the dairy sector were scrutinized through a household survey to know their current status. The household survey revealed that the majority of the household reported energy and communication services, market centers, and availability of dairy cooperatives as a reliable infrastructural facility. With this regard, about 71% of the households reported energy services as a reliable source. Similarly, communication service, market centers, and dairy cooperatives got selected by about 89%, 77%, and 72% of the households. Regarding the government technical supports officer, only 11% of the households reported it as a reliable infrastructure. While a majority, 46% of the household said it is available but not reliable. Whereas almost equal, 43% of the households reported that government technical supports were not available. Similarly, about 64% of the households reported that there were not any road facilities available to transport dairy products. Likewise, 41% reported that there was not any availability of milk processing or dairy Industry. However, about 36% of the households experienced that though it was available there was not reliability in services. While about 29% of the households reported that it was available with reliability.

Different seven infrastructure services were ranked as constraints for dairy sector development based on votes from households. The seven services are quality of the road, energy services, internet facilities, presence of dairy cooperatives, accessibility of government technical offices, availability of dairy industry to avoid milk holiday, and availability of market centres. However, only below 50% of the households reported them as constraints. Among them, lack of dairy industry for avoiding milk holiday ranked first getting complained of about 48% of the households. Similarly, inaccessible government technical office, unreliable electricity/energy services and not having milk collection centre/market centres were ranked second, third, and fourth position with the report of about 46%, 27%, and 25% of the households respectively. Likewise, only about 29%, 18%, and 16% of households respectively reported that dairy cooperatives were not functional/not present, telephone/internet facilities were poor, and road/transportation facilities were of poor quality.

About 96% of the households respectively reported that availability of electricity/energy services (ranked first) and good road/transportation facilities (ranked second) were the opportunities for dairy sector development. Besides, more than 80% of the household believed availability of telephone and internet (ranked third) and good market Centre (ranked fourth) are the other opportunities. Similarly, more than 60% of the households reported functional and supportive dairy cooperatives (ranked fifth) and operational dairy industries (ranked sixth) were the added infrastructural opportunities. Subsequently, about equal percentage of the households, 41% and 40% respectively reported an access of technical assistance from government office (ranked seventh) and government/donors' investment in dairy infrastructure development (ranked eighth) were the other opportunities.

3.3.10 Institutional Development constraints

Households were asked about the institutional status in which they belonged to. Among them only 60% of the households reported that they had enough internal capacities. Similarly, about 57% households reported that the institutions had limited service coverage area. While, about 34% and 9% respectively

reported that of medium and large service coverage areas. Likewise, about 55% of the household had experienced good governance of the institutions. In contrast, only about 30% of the households experienced systematic procurement system in the institutions. While, about 21% had experienced adhoc and about 50% had experienced unsystematic procurement system. Likewise, about 66% households reported that there were limited numbers of trained technical persons in the institutions. Regarding the monitoring and review mechanism, only about 7% households faced systemic monitoring system while the rest of the households reported it as occupational or lack of monitoring system within the institutions. Also, about 30% of the households were claimed for practice of participatory decision-making process in the institution they involved. While the rest claimed it as either partial participatory or single decision making. Finally, most of the households (about 64%) believed that financial resources of the institutions are average while the other believed it as a nominal.

In total 13 constraints were asked to the households to record their experiences. Among them institutes having occasional monitoring and review was the most disappointing factor, which ranked first among with about 86% of the households having similar experience. Similarly, limited service coverage, inadequate financial resources weak institutional policy and guideline implementation, and improper internal and external communications were ranked second, third fourth and fifth having experience of about 82%, 80%, 77% and 70% of the households respectively. While, scope for institutional governance to be set up, poor service delivery and inadequate institutional policy and guidelines were ranked in sixth position having equal vote of 68% of the households. By the same token, poor institutional setup, Non-functional/existence of procurement unit, not having reward and punishment mechanism and lack of trained technical persons were ranked seventh, eighth, ninth and tenths positions. The following table presents the details;

Table 15: Institutional development constraints

Constraints	No	Unknown	Yes	Rank
Trained technical persons are not available	23(52.3)	2(4.6)	19(43.2)	X
Institutional set up is poor	12(27.3)	3(6.9)	29(66)	VII
Improper internal and external communications	11(25)	1(2.3)	32(72.8)	V
Institutional governance is yet to be set up	10(22.8)	4(9.1)	30(68.2)	VI
Decision making process is non participatory	20(45.5)	6(13.7)	18(41)	XI
Inadequate financial resource	9(20.5)	2(4.6)	35(79.6)	III
Poor service delivery	12(27.3)	11(25)	30(68.2)	VI
Non-functional/existence of procurement unit	9(20.5)	1(2.3)	24(54.6)	VIII
Monitoring and review is occasional	5(11.4)	1(2.3)	38(86.4)	I
Service coverage area is limited	7(16)	6(13.7)	36(81.9)	II
Institutional policy and guidelines are inadequate	8(18.2)	5(11.4)	30(68.2)	VI
Institutional policy and guideline implementation are weakening	5(11.4)	10(22.8)	34(77.3)	IV
Reward and punishment mechanism is not established	11(25)		23(52.3)	IX

Different 12 opportunities for institutions were asked to the households and results thus obtained are presented. Among the opportunities, participatory decision-making process ranked first with the experience of about 50% of the households. While, about 41% of the households stated it is not the opportunity whereas about 9% households were unknown about it. Besides, good service delivery ranked

second having vote of about 47% of the households. Similarly, enough human resources, institutional governance and functional sectoral units were ranked in third with the report from equal 39% of the households. Likewise, having highly dedicated staff and institutional policy and guidelines were ranked in fourth with an opinion from equal about 34% of the households. Consequently, good physical infrastructure and adequate financial resource were ranked in fifth having vote from equal 36% of the households. Ultimately, service coverage, and reward and punishment mechanism were ranked in sixth with the vote from equal 29% of the households. Finally, monitoring and review was ranked at the last choosing by about 21% of the households.

3.4 SWOT Analysis of Dairy Sector

SWOT (strengths, weaknesses, opportunities and threats) for the dairy sector has been analyzed which is expected to help in developing and framing five-year dairy development plan in progress.

Strength

- Presence of primary level dairy cooperatives in milk procurement activities especially in milk shed areas.
- Increasing trend of organized sector dairies nationwide. Established network for milk collection, processing and marketing.
- Dairy sector contributing urban money flow to rural areas, improved income and rural employment.
- NDDDB apex dairy policy body making efforts to develop dairy sector programs; and there is scope to strengthen the entire NDDDB functioning.
- People are passionate in animal keeping, increasing involvement of NGOs and private sector in livestock development activities in rural area.
- Increasing the availability of technical support services and veterinary health care and creating employment (full or part) for millions of HHs (formal and informal sector),
- Stable and daily source of income.
- Increasing involvement of NGOs and private sector in livestock development activities particularly in providing technical support services and veterinary health care.
- Opportunities for collaboration by private and public sector dairy industries with foreign investors for capital injection and diversification in dairy processing.
- Studies demonstrated the average composition of high yielding and their cross-bred cows have average 4.4 % fat and 3.29 % protein.

Weakness

- Shortage of skilled technical manpower (dairy technologists, mid-level and lower level technical manpower)
- Poor quality of raw milk and milk products including market milk
- Irregular and poor quality assurance system for both in milk collection and dairy plant.
- Pricing policy is not supportive of quality milk collection and dried milk and value-added dairy products plant establishment.
- Most of the dairy plants including DDC are using old fashioned technology and so not suitable for cost economization and value-added product production.
- Poor relationship between industry and dairy cooperative, and no support services.
- No strong and sensitive government body responsible for dairy sector development; and so much overlapping of activities.
- NDDDB board is too large and does not have required specialized experts' apex, no units for project

formulation, poor data management system, and does not have even a dairy information systems and library.

- NDDDB do not enough resources, and do not have its fund to support dairy industries to revive from the corona pandemic effect.
- Dairy sector does have required raw milk cold chain network, as well cold chain network for the promotion and marketing of dairy products.
- No coordination mechanism with donors and funding agencies.
- No specialized dairy research and Training institute to produce lower, middle level dairy technologists as well highly trained dairy technologists, dairy engineers and dairy QC personnel.
- Pradesh Dairy board do not have coordination and connection with central NDDDB.
- Mandatory minimum quality standards for raw milk and processed milk is low, and not amended despite series of recommendations.
- Small-scale dairy businesses promoted by government are facing crisis to survive in the market due to new dairy directives (2075).
- Large number of low productive cattle and buffaloes (avg. annual production-469 liter/milking cow and 867/milking buffalo),
- Poor infrastructure and information networking, inadequate quality feeding resources for dairy animals,
- Inadequate and inappropriate breeding support services as there is shortage of improved breeding bulls as well as artificial insemination services
- Lack of knowledge among the farmers regarding improved dairy farming and thereby limiting their capacity to adopt new technology for production enhancement,
- Inadequate financial service in the rural areas as the rural branches of the financial institutions were closed down.
- Poor or almost no coordination between DLS, NARC, dairy colleges, industries association and dairy professional bodies, as well lots of overlapping of activities thus confusing the beneficiary.
- No updated authentic data on the dairy sector, and getting data from the private sector is not easy.
- Cooperatives are disjointed with dairy plants, and not getting input services like animal health, cattle feed, training and education of cooperative members.
- Lack of quality-based milk pricing.
- Most time consumers have complained on the quality of packet milk supplied in the market.

Opportunity

- High demand for high quality of milk and milk products
- There is increasing scope for organic, value added, long life and specialized milk products nicely packed milk-based products such as sweets, fermented drinks, fruit yoghurt, yak cheese and other exportable products.
- There is sizable demand of Nepalese Yak cheese and chhurpi (as dog chew) in international market
- Livestock are widely distributed with even distribution of cattle and buffaloes throughout the country.
- Market opportunities of milk and milk products is increasing particularly in the newly developed urban areas
- Involvement of private sector in dairy business is increasing enabling the establishment of new dairy plants especially in the field of dried milk, cheese, ice-cream, dairy equipment manufactures and cattle feed factories.
- Increasing tourist flow at different locations
- Good opportunity for local level employment generation.

- National Dairy sector study for updating the most recent info under federal structure.
- Possibilities to strengthen and restructure the NDDB for efficient functioning.
- Establishment of National Dairy Research and Training Institute in collaboration with NARC and dairy college under Purbanchal University.
- NDDB to expand its offices in Pradesh in collaboration Pradesh Agric Ministry.
- Creation of dairy development fund by NDDB.

Threat/Challenge

- Compulsion for coexistence of productive and unproductive (old, male, diseased) cattle further depleting scarce feeding resources
- poor competitiveness with imported milk and milk products due to poor quality, unattractive packaging and lower shelf life of local products
- Higher cost of milk production due to rising cost of inputs and absence of mechanism to regularly assess the farmers' cost of milk production and relating it to the pricing of milk,
- Increasing political dominance in price fixation of producers and consumer's price rather than based on cost-benefit analysis.
- Reluctance of financial institutions on lending for livestock purchase and commercial farming.
- the rising awareness on carbon trade among people has resulted in increasing closure of community forests country) for animal grazing
- Due to Corona, tourist flow is almost nil.
- Recent corona pandemic may negatively affect the further growth of dairy sector for a long time.
- Sustainability of dairy sector difficult due to political pricing of milk; border area milk prices are lower.

CHAPTER IV: CONCLUSIOIN AND RECOMMENDATIONS

4.1 Policy Recommendations

At present, Nepal's national level policies related to the livestock subsector are scattered across different national policies. These policies should be integrated into a single National Livestock Policy. Furthermore, the policy and programs provisions in different national policies broadly relate to agriculture as a whole, whereas there is a need to have such policies and programs specifically for the livestock subsector and in particular for the dairy sector development.

Dairy Development Policy (2064) and Code of Practices (CoP) developed by NDDDB are yet to be implemented effectively. Upon implementation of this policy and CoP, the quality improvement and diversification of the dairy processing by the dairy industries could be improved substantially.

4.2 Restructuring of NDDDB structure

NDDDB should be restructured to make it function smoothly and efficiently. Provision of appointment of full-time professional Chairman; as well the board members with competency and who could contribute for the development of board. Board size should be reduced. Large number of BOD is hampering the prompt and effective decision-making process, which is a key factor for efficient management. It has been realized that this institution is not fulfilling the need of dairy industries for growth and thus failed in fulfilling the expectations. During wide consultation with various industry stakeholders, officials, board members, dairy associations, cooperative societies and unions, Pradesh government, dairy food industry professional and experts, they advocated about the need of restructuring the NDDDB board, as well the appointment process and need of professionally competent executive director. Every time when the government is changed or minister is changed, the ED is changed leading to unstable management. A seven-member board is proposed as below;

1. **Chairman:** A renowned professional with wide knowledge and experience of dairy/food industries, with proven experience in successful corporate business or public enterprise management as well command and respect of industry stakeholders should be provisioned and appointed as NDDDB Chairman. Political or party cadre should not be appointed in the position of Chairman, for the sake of neutrality.
2. **Member** : Joint-Secretary, Ministry of Agriculture and Livestock Development
3. **Member** : Joint-Secretary, ministry of finance
4. **Member** : Representative from dairy industries
5. **Member** : Chairman or representative, central dairy cooperative union/Cooperative dairies.
6. **Member:** Professional dairy expert
7. **Member secretary:** Executive director, He/She should have experience of successful running of a corporate or public enterprise as chief or deputy, having post-graduation in the field of dairy technology/food technology/ mechanical or dairy engineering/MBA/ Livestock/ veterinary science with good communication and project implementation skill.

Note: DG, DLS, DG DFTQC, GM, DDC and Pradesh Board Representative could be invited in the Board meeting as invitees if case of need pertaining to the work of their respective organizations.

4.3 A new division (Project Formulation and Implementation Division)

This should be created consisting mechanical, civil and dairy engineers, project formulation experts to develop, implement and monitor the upcoming dairy industry projects related activities, as per the need of the country.

4.4 Establishment of QC Laboratory

Full-fledged and well-equipped QC laboratory should be established and made operational directly under executive director or board. Qualified experts/technologist should manage and lead the laboratory team. Already Bagmati Pradesh DDB is in process of setting up dairy QC lab in Kathmandu valley, thus this lab should be established in collaboration with Pradesh DDB. This lab can be used for monitoring and providing advisory services to the dairies for improvement as well as conducting the research work for new product development.

4.5 National Dairy Research and Training Institute Establishment

Establishing autonomous national dairy research and training Institute (NDRTI) under the umbrella of NDDDB. NDRTC should collaborate with Animal Science Institute of NARC, dairy and food technology college under Purbanchal university and CTEVT. NDRTC should start with organizing short-term need-based tailor-made training programs, as well middle level manpower as per the CTEVT norms. It should be equipped with a pilot dairy training plant and livestock farm. NDRTC should be assigned with the responsibility of providing all types of training/education required for the dairy sector. Also, there should be competitive scholarship programmes on dairy technology (B. Tech (Daiying), M. Tech. (Dairying), Masters in dairy engineering, and masters in Quality management and control to motivate the already employed personnel and for the potential new entrants. Similarly, training should be organized for middle level and lower level technicians, farmers and cooperative members. A separate team consisting of NDDDB, concerned university, CTEVT and renowned person(s) in the sector should be formed and assigned the responsibility of preparing a detailed proposal related to site selection, mode of operation, courses to be conducted, budgetary requirement, detail need of teaching and research faculty etc.

4.6 Linkages with Pradesh Agriculture Ministry

NDDDB should work and implement the program in collaboration with provincial governments especially related with the respective Pradesh (province). Few Pradesh are in process of forming their respective Pradeshic board, thus a coordination mechanism has to be in place to implement the dairy activities, avoiding duplications etc. It is advisable to establish a NDDDB Pradesh coordination unit attached to the Pradesh Agriculture ministry; rather than each Pradesh forming their own independent dairy board. So National level NDDDB should implement its program in coordination with such or any other type of body responsible for dairy development in the respective province.

4.7 Creation of Dairy Development Fund

Generate dairy development fund (DDF), through the collection of per litre milk or per unit dairy products sold by the industries including DDC, in the consumer price (as decided by the NDDDB). DDF should be used to strengthen and expand the dairy industry in consultation with stakeholders. Transparent mode of operation should be designed and implemented after approval of NDDDB board. Fund to be raised per litre or per unit sale of milk or dairy products at consumer price or @ 0.05% of total transaction amount payable monthly from all processing industries as decided by NDDDB board. Any dairy not contributing in this fund will not be eligible for getting any support/fund. The fund will be used for crisis management, conducting

research, study and any other activities as specified by BOD of NDDB, and will not be used for regular operating expenses of NDDB. These criteria will be applicable to all private and cooperative enterprises involved in the business of dairy processing, ice cream making and dairy equipment manufacturers but not to dairy farms, milk collection centers, milk chilling centers, primary dairy cooperative.

4.8 Upgrading milk quality standard

Current milk quality standard is low for raw milk and as well processed market milk; thus, it is encouraging adulteration. Therefore, there is urgent need of upgrading the legal standard for raw milk as well standardized milk and whole milk sold in the market. NDDB should play active role to get it done with support and participation of Ministry of Agriculture and Livestock Development DLS and DFTQC. It is proposed to increase the raw milk standard for cow milk to 3.5 % fat and 8.5 % SNF; & for buffalo milk to 5.5 % fat and 8.7 % SNF; as well should revise pasteurized standard milk standard to 3.5 % fat and 8.5 % SNF for cow milk and pasteurized whole milk standard to 5.5% fat and 8.7%. Near normal milk from udder should be provided to the consumers unless, it is special milks like low fat etc. Milk quality standards followed by Sudha dairy, Patna in our neighborhood with whom Nepal buys, as well sells milk to them, is in the annexes. This move could help to improve the consumer quality milk, as well minimize the milk holiday problem and glut of butter during flush period (NDSA 2018). NDDB should take serious initiative to get it done. If required, an independent team of dairy specialist should be formulated to suggest change in standard.

- a) Introducing two times milk collection (compulsory).
- b) Introduce fat and protein-based pricing on pilot scale as proposed in proposed pricing system
- c) Make necessary provision of raw milk chilling at primary coop or milk collection centre; thus, Bulk milk cooler with support services should be made available to all collection points, and Instant Plate chiller should be used if volume is high enough for Instant chilling.
- d) Introduce heavy penalty for acidic and adulterated milk
- e) Implement code of practices formulated and enforced by DFTQC.
- f) Provide necessary grant/low interest loan to the industries for modifying and upgrading their infrastructure for improved efficiency and quality.

4.9 Product Diversification

For a dairy farmer adding value by processing the milk is one way to diversify. Milk can be converted into literally many products: cheeses, butter, skim milk powder, whey proteins, cottage cheese and ice cream. Cadbury, chocolate, vanilla milk, coffee milk, and others are some of the diversified products to be included in the milk industries. One of the provinces have already initiated the programme to establish powder milk and Cadbury production engaging the cooperative with the investment of 70 and 30 percent. Similar diversified products could be established in feasible provinces

4.10 Milk pricing policy (For both producer and consumer)

Existing pricing policy for raw milk is based upon fat and SNF content. SNF (solid not fat) consists of all solids except fat. Due to this, the measurement of SNF may also include non-milk solids added to raise the SNF to get the higher price. To discourage the addition of such non milk solids such as sugar, starch etc. alternative method should be considered seriously. One such test may be the measurement of milk protein. Addition of protein is costly and not easily available. But limitation of this test is that it requires costly Milko-Analyzer or Milko-Scan. Such equipment is not available at all places and comparatively costly. But

recently the use of milko analyzer is increasing rapidly. Thus, it is proposed to introduce the fat and protein based raw milk pricing in phase wise manner. In first phase, pilot scale of protein-based pricing should be implemented with financial support and monitoring of NDDDB. The existing two axis pricing system of raw milk should be modified and the calculation should be based upon following criteria. This will be justifiable for both producer and industries.

- a) Fix the price per kg of fat by taking average price of ghee sold in market
- b) Calculate the rate of SNF per kg by taking two third value of fat rate.
- c) Separate rate has to be decided for flush and lean season.
- d) Low quality raw milk with higher acidity and having low SNF and Fat should be discouraged by paying at reduced rate. Rate of fat and SNF should increase with increase in fat and SNF level from set minimum raw milk standard, and vice-versa. Milk added with any type of adulterants/neutralizers should be rejected. In case such milk is received prior to test result, such milk should not be paid at all.
- e) Calculate the total cost involved in market milk starting from milk collection to sale (consumer) and then decide the price of producer and consumer. Refer annex-9 for method of calculation for consumer price.

4.11 Expanding milk collection and cold chain network

Network of milk cooling facilities should be developed nearby newly developed/constructed road especially Hulaki and Madya Pahadi highways. A separate fund for milk chilling centre should be created for this purpose. Any dairy cooperative or individual will be entitled to get the support from this fund created for this purpose who will agree to comply the following requirements:

- a) Bulk cooler (1000 ltr or above), electricity connection preferably 3-phase, milk pump, 2 number of milk hoses, hot water geyser, overhead water tank, sufficient space for milk vehicle uploading, MBRT testing facility, milk analyzer with suitable capacity inverter and battery, Gerber testing equipment and chemicals.
- b) Should agree to pay the farmers in time and in a transparent way. He/she should provide the milk reception slip to the farmer promptly at the time of milk reception.
- c) Must collect the milk in morning and evening separately.
- d) Milk should be chilled to 4 degrees centigrade and stored at the same temperature till dispatch.
- e) Should have a reliable place/buyer to sell the milk collected.
- f) Should agree to NDDDB's condition for penalty and other action as specified in case of misusing the fund and not complying with above requirement.

4.12 Corona effect and revival mechanism

Dairy activities are badly affected despite relaxation provided by government to continue the operation of dairy during lock-down period. Since almost all economic and public activities were shut down, sale of milk products including liquid milk has dropped to unexpected lower level. Stock of SMP, butter and cheese has piled up, causing blockage of capital. Due to this, dairies are not able to pay the farmers, staffs, bank loan and so on. Thus, in order to revive the dairy industry and establish the faith of farmer's, some measures are proposed for the earliest possible actions.

- Provide bank loan at subsidized rate of 2 to 3 % against the product stock guarantee for a period of one year for farmer's payment and conversion cost payment.

- Soft loan/working capital needs to be provided to ease out the regular operation of the dairies at maximum 3 to 4 percentage for a minimum of two years.
- Electricity bill of dairy factory and their chilling centers should be reduced by 50% at least for 2 years
- As there is little or no chance of utilizing SMP and butter stock in near future as flush season has started. Due to limited self-life of these products there is urgent need to sale or dispose off such product within 6 to 8 months or much before they expire. This issue needs urgent attention otherwise many large dairies will suffer, and even may lead to closing down. Here are few suggestions to dispose off the SMP and Ghee which will save the dairy industry from fall out. SMP and butter/ghee should be provided to security personnel such as APF and Army through government in their ration at least for remaining period of running fiscal year. Relief distribution packet should include one kg SMP and one kg Ghee. Mid-Day meal provided in school program may be added with such milk and milk products, as appropriate.

4.13 Develop strong linkage between primary dairy cooperative and industry

Dairy sector is fortunate enough to get milk without their investment except running few chilling centers. The relation between dairy cooperative and industry is of simply buyer and seller. This doesn't help in quality improvement and input supply services to farmers. Hence a linkage mechanism is proposed here to make favorable environment for both dairy plant and cooperative.

- a) Each dairy having more than 5000 LPD milk collection should create a farmer' development fund. This fund should be used for farmer's welfare scheme such as insurance, malnutrition etc.
- b) Regular meeting of chairmen /representative of the society/collection centre should be invited to discuss the quality, animal husbandry, and farmer's related issues.
- c) Regular short training/visit program for the farmers should be organized by industry.
- d) Services of veterinary technician should be provided by the dairy.
- e) Free transportation for cattle feed should be done by the plant.
- f) An agreement should be done between buyer (dairy plant) and sellers (cooperative) covering above aspects.

4.14 Support to Dairy Equipment Manufacturing Industries

Few dairy equipment manufacturers have come up and involved in making various dairy equipment especially chilling vat, PHE, and batch pasteurizer of acceptable standard. They face problem in price competition with Indian dairy equipment. To make local equipment competitive, the excise duty (5% of value) should be abolished as importer of similar equipment from India get refund. Supports are needed to promote the production of equipment in Nepal.

Similarly, the government should revamp the then agriculture tool factory which is under the NARC as the organized sector would require creation of additional chilling capacities, milk processing infrastructure along with additional drying capacities & dairy products manufacturing infrastructure and Feed & Feed supplement infrastructure. The demand of automated dairy processing plants and processing lines for new products will be increased in days ahead. Emphasis will be given on energy efficient equipment's. Technology, price, delivery and performance standards would determine the market for any dairy equipment Most of the dairy units are now looking into the improvement of sanitary and hygienic conditions by adopting ISO certification. The Sanitary and Phyto-Sanitary (SPS) measures are becoming mandatory for export and serious efforts have to be made to achieve the international standards of quality.

4.15 Upgradation and new plant establishment

Dairy industry is limited mostly to the production and sale of liquid milk since its beginning to till date. Recently SMP production is increasing which helps easing out milk holiday issues. Production of dahi, paneer, cheese is also increasing but at slow rate. These products are also limited to their more traditional style. Due to this, profit margin in dairy business is limited and so are not able to modify or update their technology nor assist for farmer's development activities. So dairy sector should be promoted to start either new product-based plant or add new equipment for value added milk product manufacturing. Addition of any new plant should only be promoted depending upon the real need and technological transfer. Buffalo milk-based products like Khoa/ Peda and other sweets, different varieties of yoghurt, Lassi, cheese, Mohi, Chhurpi and many others as per consumer's choice may be future of Nepalese dairy industry.

Existing plant upgradation: Up gradation and capacity expansion of existing plants with modern equipment should be promoted on priority level. This will help to make the existing plant viable and self-sufficient to cater good quality product with sufficient value addition. This will also help the dairies to build ground for milk product export. There is a need to invest in skim milk powder ware house and deep freeze cold storage for butter.

New plant Establishment: Promotion of any new dairy plant should be based upon milk availability, new technology transfer; farmer's benefit, local demand and export potential of the products produced by such plant. Cheese and chhurpi-based milk plant should be promoted with an objective to produce exportable type of products.

4.16 Foreign Investment

Foreign/ multinational investment can be encouraged if the local private or public sector companies are willing and see the scope of expanding their dairies to produce high value product such as yak/cow milk cheese, processed cheeses, baby food, milk chocolate, whey powder, casein powder, UHT milk and similar products, if the proposed plant is solely set up for export purposes; and if such plant is proposed for remote/ listed in least developed areas.

4.17 Funding Proposal

NDDB/MoALD should request FAO for a TCP funding in order to help NDDB to develop programs and funding proposals to revive the dairy sector post corona pandemic.

As well, meeting with potential donors like World Bank, ADB, IFAD, FAO and other bilateral donors should be organized to present the Five-Year Dairy Development plan for possible funding.

This plan should also be partly funded by on-going livestock development projects like NLSIP/DLS/MoALD and other donor funded livestock development projects.

4.18 Dairy Promotion and collaboration with international dairy agencies

- a) NDDB creates a dairy logo/symbol for recognized access to uninterrupted transportation of perishable milk and milk products to be used by dairy stakeholders from farm to fork; from local, Pradesh to federal level.

- b) To create ground for export of Nepalese dairy products, FMD free certification for cattle should be initiated and organized by DLS/MoALD in consultation with World Organization for Animal Health (OIE) and Food and Agriculture Organization of UN (FAO).
- c) Establish Dairy information and data management system under NDDB, as well establish a well-equipped library.
- d) Introduce **School Milk Programme** to promote milk consumption and improved nutrition to the school children.
- e) NDDB to initiate the process of celebration of **National Milk Year (RASTRIYE DUDH BARSHA)** to promote dairy sector as well increase milk consumption.
- f) A **National Dairy Sector Study**, needed to be conducted to have most updated information on the current status of dairy development in the country.
- g) Nepal should take membership of IDF through NDDB, as focal point and member-secretary, and initiate the process of forming national committee of IDF, as per the guidelines provided by IDF.

These recommendations should be implemented through NDDB in a phase wise manner as proposed in this report.

CHAPTER V: FIVE YEAR DAIRY DEVELOPMENT PLAN

5.1 Overall Goal and Objectives

Goal:

To Increase formal sector processing and marketing through improved in milk collection and cold chain networks, upgrading processing facilities and strengthening policy institutions.

Objectives:

1. To increase investment in physical infrastructure Development for enhancing milk collection and strengthening/expanding processing facilities
2. To promote appropriate technology for quality milk production and productivity enhancement
3. To promote the domestic and international dairy product market
4. To strengthen the operation of dairy cooperatives to encourage in the dairy processing industry
5. To strengthen the institutional capacity and functioning of National Dairy Development Board
6. To improve economic status of Milk Producers, dairy entrepreneurs and skilled persons

5.2 RESULTS

Result-1.1: Increased Access to Infrastructure services

Result -2.1: Increased Production and productively

Result-2.2: Improved Quality of raw milk and dairy products

Result-3.1: Increased access to domestic and International market

Result-4.1: Increased Collaborative actions among stakeholders

Result-4.2: Enabled Policy Environment

Result-5.1: Strengthened Institutional Capacity

Result-6.1: Increased employment opportunities to milk producers and dairy entrepreneurs

Result-6.2 Increased employment opportunities to dairy qualified persons

5.3 Constraints and Strategies to address

5.3.1 Policy Constraints and Strategy

Constraints & opportunities	Strategies to address the constraints
<ol style="list-style-type: none"> 1. Policy Implementation 2. Unscientific milk pricing policy 3. Unfavorable policy & supporting environment for dairy development 	<ol style="list-style-type: none"> 1. Integrated and specific policy: At present, Nepal's national level policies related to the livestock subsector are scattered across different national policies. These policies should be integrated into a single National Livestock Policy. Furthermore, the policy and programs provisions in different national policies broadly relate to agriculture as a whole, whereas there is a need to have such policies and programs specifically for the livestock subsector and in particular for the dairy sector development. Dairy Development Policy (2064) and Code of Practices (CoP) developed by NDDDB are yet to be implemented effectively. Upon implementation of this policy and CoP, the quality improvement and diversification of the dairy processing by the dairy industries could be improved substantially. 2. Milk pricing policy (For both producer and consumer): Existing pricing policy for raw milk is based upon fat and SNF content. SNF (solid not fat) consists of all solids except fat. Due to this, the measurement of SNF may also include non-milk solids added to raise the SNF to get the higher price. One such test may be the measurement of milk protein. Addition of protein is costly and not easily available. But limitation of this test is that it requires costly Milko-Analyzer or Milko-Scan. Such equipment is not available at all places and comparatively costly. But recently the use of milko analyzer is increasing rapidly. Thus, it is proposed to introduce the fat and protein based raw milk pricing in phase wise manner. In first phase, pilot scale of protein-based pricing should be implemented with financial support and monitoring of NDDDB. The existing two axis pricing system of raw milk should be modified and the calculation should be based upon following criteria. This will be justifiable for both producer and industries. <ol style="list-style-type: none"> a) Fix the price per kg of fat by taking average price of ghee sold in market b) Calculate the rate of SNF per kg by taking two third value of fat rate. c) Separate rate has to be decided for flush and lean season. d) Low quality raw milk with higher acidity and having low SNF and Fat should be discouraged by paying at reduced rate. Rate of fat and SNF should increase with increase in fat and SNF level from set minimum raw milk standard, and vice-versa. Milk added with any type of adulterants/neutralizers should be rejected. In case such milk is received prior to test result, such milk should not be paid at all.

	<p>e) Calculate the total cost involved in market milk starting from milk collection to sale (consumer) and then decide the price of producer and consumer</p> <p>3. Increase policy dialogue: Joint Sectoral Review (JSR) team holds the policy dialogue meeting with parliamentary members of provincial and federal governments. JSR team further advocates with National Planning Commission, relevant ministries and funding donors.</p>
--	--

5.3.2 Production Constraints & Strategy

Constraints	Strategies to address the constraints
<p>4. Low milk production and productivity</p> <p>5. Use of conventional production technology</p> <p>6. Inadequate knowledge on cattle feedings</p> <p>7. Limited access to financial services</p>	<p>1. Feed and Fodder management: The dairy animal feeding system in the country is determined mostly by the availability of feeding resources in the livestock farming areas and their production potentials. Thus, great variation in the feeding system prevailing in the different locations of the country can be observed. Crop residues, rice and wheat straw, maize stovers, tree fodder, leaf litters and other green fodder collected from cultivated lands and forest are the major feeding resources in Nepal. In concentrate, maize is the main feed ingredient followed by rice bran, wheat bran, soybean meals, mustard cake, sunflower cake and other legumes by-products. Due to fast growing poultry and dairy farming, the local production of maize and soybean does not meet national feed demand and these are imported from India and other countries. Presently, the main problem faced by the dairy processors is the shortage of local raw milk. Increase in milk production and productivity has become urgent. For this, more concerted efforts are required in the areas of fodder development.</p> <p>2. Animal Health support system improvement: NDDB focusses on issues related to animal health that significantly affect the profits of the dairy farmers. In line with the national goal of doubling the farmers' income by the next decade, NDDB is playing an active role in formulating robust, cost-effective, farmer-centric disease control models which can be adopted across the country. The animal health is important for producing optimum level of milk from improved cattle and buffaloes. Good animal health is an essential prerequisite to any improvement in livestock production. DLS's limited financial resource is thinly spread over the entire country. At present, the animal health services are inadequate to meet the requirements of the country's massive livestock population. DLS provide nationwide general livestock services and its limited resources are diluted to the total livestock development programs.</p> <p>3. Increase access to breeding Services: Animal breeding and scientific genetic improvement programmes have been initiated for a few important dairy breeds to enhance the productivity of huge cattle and buffalo population in the country. To meet the challenges arising from climate change, maintaining biodiversity in the bovine population is important as some of our indigenous breeds have resistance to diseases and parasites, resilience to climatic stress and ability to cope with variable access to nutrients. These characteristics are</p>

	<p>vital to mitigate the impact of climate changes. Equally important is to raise the genetic potential of some of the indigenous dairy breeds so that they are able to compete with exotic breeds or their crosses. National Livestock Breeding Centre (NLBC) formally known as Animal Breeding and Artificial Insemination Section under Department of Livestock Services is fully responsible for producing frozen semen in the country for cross breeding and upgrading of dairy animals. Animal Breeding Division under NARC is responsible to undertake research activities to improve productivity of dairy animals.</p> <p>4. Access to AI Delivery Services: Dairy cattle and buffalo breeding is an important technic in the enhancement and promotion of dairy production in Nepal. The introduction of germ plasm through AI is crucial to enhance the production potential of the local breeds. A variety of dairy breeding services are currently available to farmers, ranging from natural service to AIDLS. Dairy cattle and buffaloes resource centre establishment program has been created in potential districts of Nepal. The cross-breeding of local animals with higher producing species has been beneficial only to the lesser extent because of the shortage of adequate feeding and lack of improved feeding practices. Breed improvement through cross-breeding has frequently been regarded as a means of increasing animal productivity, but it does not provide a quick solution to animal production problems when delivered in isolation and without supporting animal health and feeding. The artificial insemination (AI) services through using locally produced as well as imported semen is though successful in some locality, this service has been limited to accessible areas and is constrained by trained operators and unreliable liquid nitrogen supplies.</p>
--	--

5.3.3 Infrastructure Constraints and Strategy

Constraints	Strategies to address the constraints
<ol style="list-style-type: none"> 1. Limited Infrastructure Facilities 2. Inappropriate construction of structures 3. Lack of training Institution for developing skilled manpower 	<ol style="list-style-type: none"> 1. Existing plant upgradation: Upgradation and capacity expansion of existing plants with modern equipment shall be promoted on priority level. This will help to make the existing plant viable and self-sufficient to cater good quality and value-added products. This will also help the dairies to reduce imports, and explore possible grounds for milk product export. There is a need to invest in skim milk powder warehouse and deep freeze cold storage for butter. 2. New plant Establishment: Promotion of any new dairy plant shall be based upon milk availability, new technology transfer; farmer's benefit, local demand and export potential of the products produced by such plant. Cheese and chhurpi-based milk plant shall be promoted with an objective to produce exportable type of products. 3. National Dairy Research and Training Institute Establishment: Establishing autonomous national dairy research and training center (NDRTC) under the umbrella of NDDDB. NDRTC should collaborate with Animal Science Institute of NARC, dairy and food technology college under Purbanchal university and CTEVT. NDRTI should start with organizing short-term need-based tailor-made training programs, as well middle level manpower as per the CTEVT norms. This

	<p>will be equipped with a pilot dairy training plant and livestock farm. NDRTC shall be assigned with the responsibility of providing all types of training/education required for the dairy sector. A separate team consisting of NDDDB, concerned university, CTEVT and renowned person(s) in the sector shall be formed and assigned the responsibility of preparing a detailed proposal related to site selection, mode of operation, courses to be conducted, budgetary requirement, detail need of teaching and research faculty etc.</p> <p>4. Expansion of Milk Collection Networks: Presently, apart from the milk production, availability of transportation is another driving force to expand milk collection. Moreover, presently almost entire milk is collected only in the morning. Evening milk is not collected because the farmers do not have the habit of milking early in the evening as well as absence of milk chilling facility at the MPCs. In view of the above, there is big potentiality of expansion of milk collection networks in the new areas. Both the DDC and private dairies should therefore expand their milk collection networks in the accessible areas instead of competing in the same areas. This will not only enable them to collect more milk but will also create income and employment opportunities in larger scale to the people, particularly the small and marginal ones, through improved livestock keeping for milk production. Further, milk collection in the evening should also be introduced which could increase milk intake in the processing plants. Since there is transportation accessibility in many MPCs now and the MPCs have also started to install smaller chilling units, milk collection in the evening could be started by providing some additional incentives to the farmers/MPCs.</p> <p>5. Increase Cooperatives Coverage: Dairy cooperative would need to expand their coverage to new uncovered areas so as to bring more milk producers under the fold of organized sector, thereby providing rural milk producers with greater access to organized milk processing sector. Dairy Cooperatives would need to increase their share in milk production and processing.</p>
--	---

5.3.4 Raw Milk & Product Quality Constraints and Strategy

Constraints	Strategies to address the constraints
<ol style="list-style-type: none"> 1. Quality based pricing policy 2. Low quality standards and poorer Quality control mechanism 3. Poor quality control facilities in the 	<ol style="list-style-type: none"> 1. Establishment of QC Laboratory: Full-fledged and well-equipped laboratory should be established and made operational directly under executive director or NDDDB board. Qualified experts/ technologist should manage and lead the laboratory team. Already Bagmati Pradesh DDB is in process of setting up dairy QC lab in Kathmandu valley, thus this lab should be established in collaboration with Pradesh DDB. This lab can be used for monitoring and providing advisory services to the dairies for improvement as well as conducting the research work for new product development. 2. Quality based pricing System: Existing pricing policy for raw milk is based upon fat and SNF content. SNF (solid not fat) consists of all solids except fat. Due to this, the measurement of SNF may also include non-milk solids added

dairy value chain	<p>to raise the SNF to get the higher price. To discourage the addition of such non milk solids such as sugar, starch etc. alternative method should be considered seriously. One such test may be the measurement of milk protein. Addition of protein is costly and not easily available. But limitation of this test is that it requires costly Milko-Analyzer or Milko-Scan. However, the use of milko analyzer is increasing rapidly. Thus, it is proposed to introduce the fat and protein based raw milk pricing in phase wise manner. In first phase, pilot scale of protein-based pricing should be implemented with financial support and monitoring of NDDB.</p> <p>3. Revision of Milk Quality standard: Current milk quality standard is low and encouraging adulteration. Thus, Government/Ministry of Agriculture, NDDB, DLS and DFTQC should revise the minimum raw milk quality standards for cow milk to 3.5 % fat and 8.5 % SNF; & for buffalo milk to 5.5 % fat and 8.7 % SNF; as well should revise pasteurized standard milk standard to 3.5 % fat and 8.5 % SNF. Near normal milk from udder should be provided to the consumers unless, it is special milks like low fat etc. Milk quality standards followed by Sudha dairy, Patna in our neighborhood with whom Nepal buys, as well sells milk to them, is in the annexes. This move could help to improve the consumer quality milk, as well minimize the milk holiday problem and glut of butter during flush period (NDSA 2018). NDDB should take serious initiative to get it done. If required, an independent team of dairy specialist should be formulated to suggest change in standard.</p>
-------------------	---

5.3.5 Market Constraints and Strategy

Constraints	Strategies to address the constraints
<ol style="list-style-type: none"> 1. Limited cold chain in milk and milk products selling networks 2. Less priority for high value product diversification 	<ol style="list-style-type: none"> 1. Diversification of dairy products: About 80 per cent of the processed milk in Nepal is sold as pasteurized milk leaving only a marginal quantity for being converted into other milk products. Nepalese dairy industry can be very much benefited through product diversification in terms of improving the overall operational profit by utilizing additional milk, and substituting imported dairy products, opening export possibility in longer term, and improving the overall sustainability of the sector. 2. Strengthening and expanding the cold chain network for marketing of processed milk and milk product: Milk booths with refrigerated and basic facility to store and sell milk and milk products shall be developed in various urban centres.

5.3.6 Financial Constraints and Strategy

Constraints	Strategies to address the constraints
<ol style="list-style-type: none"> 1. Lack of dairy development fund 	<ol style="list-style-type: none"> 1. Creation of Dairy Development Fund: Generate dairy development fund (DDF), through the collection of per litre milk or per unit dairy products sold by the industries including DDC, in the consumer price (as decided by the

<p>2. Lack of favorable policy to promote domestic dairy equipment manufacturing</p> <p>3. Disaster in dairy sector by the corona virus</p> <p>4. Inadequate investment of government and supporting organization in dairy sector</p>	<p>NDDB. DDF shall be used to strengthen and expand the dairy industry in consultation with stakeholders. Transparent mode of operation should be designed and implemented after approval of NDDB board. Fund to be raised @ 0.05% of total transaction amount payable monthly or per litre or per unit sale of milk or dairy products at consumer price from all processing industries as decided by NDDB board. Any dairy not contributing in this fund will not be eligible for getting any support/fund. The fund will be used for crisis management, conducting research, study and any other activities as specified by BOD of NDDB, and will not be used for regular operating expenses of NDDB. These criteria shall be applicable to all private and cooperative enterprises involved in the business of dairy processing, ice cream making and dairy equipment manufacturers but not to dairy farms, milk collection centers, milk chilling centers, primary dairy cooperative.</p> <p>2. Promotion of manufacturing dairy equipment: Few dairy equipment manufacturers have come up and involved in making various dairy equipment especially chilling vat and batch pasteurizer of acceptable standard. They face problem in price competition with Indian dairy equipment. To make local equipment competitive, the excise duty (5% of value) should be abolished as importer of similar equipment from India get refund.</p> <p>3. Corona effect and revival mechanism: Dairy activities are badly affected despite relaxation provided by government to continue the operation of dairy during lock-down period. Since almost all economic and public activities were shut down, sale of milk products including liquid milk has dropped to unexpected lower level. Stock of SMP, butter and cheese has piled up, causing blockage of capital. Due to this, dairies are not able to pay the farmers, staffs, bank loan and so on. Thus, in order to revive the dairy industry and establish the faith of farmer's, some measures are proposed for the earliest possible actions</p> <p>4. Increment funding of government and supporting organizations: Government and Foreign/ multinational investment shall be increased to high tech plant with a focus to produce value added demand-led dairy products such as Yak/cow milk cheese, baby food, dairy whitener, chocolates, UHT milk, new varieties of yoghurt, flavored milk etc.</p>
---	---

5.3.7 Linkage & collaboration constraints and Strategy

Constraints	Strategies to address the constraints
<p>1. Poor collaboration with line ministries/departments</p> <p>2. Lack of linkage between primary dairy</p>	<p>1. Linkages with Pradesh Agriculture Ministry: NDDB shall work and implements the program in collaboration with provincial governments especially related with the respective Pradesh (province). Few Pradesh are in process of forming their respective Pradeshik board, thus a coordination mechanism has to be in place</p>

cooperatives and industry	<p>to implement the dairy activities, avoiding duplications etc. It is advisable to establish a NDDDB Pradesh coordination unit attached to the Pradesh Agriculture ministry; rather than each Pradesh forming their own independent dairy board. So National level NDDDB shall implement its program in coordination with such or any other type of body responsible for dairy development in the respective province.</p> <p>2. Establish Joint Sectoral Review (JSR) mechanism: Led by NDDDB, a joint sectoral review mechanism will be established representing DLS, DDC, dairy industries, cooperatives, development projects, dairy professional bodies and other relevant organizations to reduce overlapping works, enhance collaboration and bring synergic results in dairy sector.</p> <p>3. Develop strong linkage between primary dairy cooperative and industry: Dairy sector is fortunate enough to get milk without their investment except running few chilling centers. The relation between dairy cooperative and industry is of simply buyer and seller. This doesn't help in quality improvement and input supply services to farmers. Hence a linkage mechanism is necessary to make favorable environment for both dairy plant and cooperative. Regular meeting of chairmen /representative of the society/collection centre, short training/visit program by dairy industry and an agreement should be done between buyer (dairy plant) and sellers (cooperative) are essential to discuss the quality, animal husbandry, and farmer's related issues. Regular short training/visit program for the farmers should be organized by industry.</p>
---------------------------	--

5.3.8 Technology/Technical Skills Constraints and Strategy

Constraints	Strategies to address the constraints
1. Inadequate technical manpower and skills for dairy industry	<p>1. Technical manpower development: Human resource is one of the key constraints of dairy sector. For efficiently operating dairy value chain livestock specialists, veterinarian, feed and fodder specialists are needed at the dairy production level to produce quality milk at sustainable and competitive cost. Dairy technologists and specialists are required after post-harvest handling from farm to fork. There is enough manpower like livestock specialists, veterinarian, feed and fodder specialists but there is acute shortage of manpower for processing industries especially dairy technologist and engineer of highly skilled, middle level and lower middle level including shortage of floor level dairy processing technicians for cooperatives, chilling centres, processing plants etc. dairy industry stakeholders are strongly demanding the establishment of National Dairy Training and</p>

	Research Institute (NDRTI) to conduct research, as well produce higher level (graduate and post-graduate); middle level manpower needed for the processing industries in the post-harvest milk value chain; and floor level dairy technicians and workers for the cooperatives, chilling centres, processing plants and so on.
--	--

5.3.9 Institutional Development Constraints and Strategy

Constraints	Strategies to address the constraints
<p>2. Less effective structure of NDDB</p> <p>3. Inadequate human resources with NDDB</p> <p>4. Lack of institutional arrangement at provincial government level</p> <p>5. Limited training exposure to staff on new technologies</p>	<ol style="list-style-type: none"> 1. Restructuring of NDDB structure: NDDB shall be restructured to make it function smoothly and efficiently. Provision of appointment of full-time professional Chairman; as well the board members with competency and who could contribute for the development of board. Board size shall be reduced. Political appointment and large number of BOD is hampering the prompt and effective decision-making process, which is a key factor for efficient management. It has been realized that this institution is not fulfilling the need of dairy industries for growth and thus failed in fulfilling the expectations. 2. A new division (Project Formulation and Implementation Division): This shall be created consisting mechanical, civil and dairy engineers, project formulation experts to develop, implement and monitor the upcoming dairy industry projects related activities, as per the need of the country 3. Set up institutional arrangement at Province level: After the implementation of federal structure in 2018, each Pradesh are processing the establishment of Pradesh DDB without connection and collaboration with central NDDB. Now, there is serious need of coordination mechanism between NDDB and DDB. Experiences from the neighbouring countries says, NDDB should set up offices attached with Pradesh Agriculture ministry, and implement activities in collaboration with Pradesh government. 4. Establish learning exchange mechanism: NDDB will conduct research, training and an introduction of new technologies through collaboration with technical institutions and funding organizations. Professional dairy Association will be the strategic partner of NDDB for supporting on dairy science & technology. 5. Digitization: Digitization will be the central part for the institutional development and enhancing efficiency in service delivery. 6. Hire the advisor/consultant for specialized responsibility as per need of NDDB for supporting in project development and implementation etc.

5.4 Result based Plan

Key results & Indicators	Description	Baseline	Target	Year 1	Year 2	Year 3	Year 4	Year 5	Means of Verification	Frequency
Objective-1: To increase investment in physical infrastructure Development for enhancing milk collection and strengthening/expanding processing facilities										
Result 1.1: Increased Access to Infrastructure services										
1.1.1 Expanded the number of chilling centres	Subsidy-chilling centres (individual/cooperative/dairy factory)		546	161	140	85	82	78		
1.1.2 Strengthened infrastructure facilities of primary cooperatives			950	300	250	200	100	100		
1.2.3 Established the new dairy plants/ industries			10		3	3	2	2		
1.2.4 Upgraded existing dairy plants/ industries			705	235	130	130	105	105		
Objective-2: To promote appropriate technology for quality milk production and productivity enhancement										
Result 2.1: Increased Production and productively										
2.1.1 Reduced milk deficit		21%	5%	20%	19%	18%	17%	16%		
2.1.2 Increased annual milk production (,000 MT) through improved breed, animal health, feeds & fodder		2246 (2076/77)		2327	2411	2497	2587	2681	Based upon actual growth of 2077/78 @ 3.6% annual(DLS)	

Key results & Indicators	Description	Baseline	Target	Year 1	Year 2	Year 3	Year 4	Year 5	Means of Verification	Frequency
2.1.8 Revived dairy enterprises from the Corona Pandemic effect			100	50	25	25				
Result 2.2: Improved Quality of dairy products										
2.2.1 Set up fully equipped dairy QC laboratory at NDDDB premises			1		1					
Objective-3: To promote the domestic and international dairy product market										
Result -3.1: Increased access to domestic and International market										
3.1.1 Strengthened and expanded the cold chain network for marketing of processed milk and milk product			3500	700	700	700	700	700		
3.1.2 Introduced and expanded school milk program			5000	1000	1000	1000	1000	1000		
3.1.3 Increased per capita milk & milk products consumption (ltr) through promotional campaigns		72	10	74	76	78	80	82		
3.1.4 Established and celebrated National Milk Year (Rastriya Dudh Barsha)			1		1					
Objective-4: To enhance collaboration among the stakeholders for enabling dairy entrepreneurs' friendly policy environment and synergic results										
Result -4.1: Increased Collaboration among stakeholders										
4.4.1 Collaborated with DLS, provincial government, projects			5	1	1	1	1	1		

Key results & Indicators	Description	Baseline	Target	Year 1	Year 2	Year 3	Year 4	Year 5	Means of Verification	Frequency
and supporting organizations for National Dairy Conference										
4.4.2 Established the joint review and sharing mechanisms			2		1			1		
Result -4.2: Enabled Policy Environment										
4.2.1 Reformed milk pricing policy for producers through supporting milko-analyzer			375	100	100	75	50	50		
4.2.2 Increased institutional relationship for raising funding opportunities			4	2		1	1			
Objective-5: To strengthen the institutional capacity and functioning of National Dairy Development Board										
Result -5.1: Strengthened Institutional Capacity										
5.1.1 Restructured NDDB			1	1						
5.1.2 Established national dairy research and training institute			1		1					
5.1.3 Set up institutional arrangement at Province level			7	4	2	1				
5.1.4 Established learning exchange mechanism			5	1	1	1	1			
5.1.5 Improved data information and management System as well established well equipped library			1		1					
5.1.6 Established a new division (Project Formulation and Implementation Division) within NDDB			1	1						
Objective-6: To improve economic status of Milk Producers, dairy entrepreneurs and skilled persons										

Key results & Indicators	Description	Baseline	Target	Year 1	Year 2	Year 3	Year 4	Year 5	Means of Verification	Frequency
Result-6.1: Increased employment opportunities to milk producers and dairy entrepreneurs										
6.1.1 Additional milk producers engaged/ employed in milk production and sales			200000	50000	50000	33000	33000	34000		
6.1.2 New jobs/ employment created in milk processing and marketing			15000	3000	3000	3000	3000	3000		
Result-6.2 Increased employment opportunities to dairy qualified persons										
6.2.1 Developed dairy qualified persons and employed in dairy industries			1100		200	300	300	300		
6.2.2 Hired specialized advisor/consultant for advising, developing implementation of project as required			8	2	2	2	1	1		

5.5 Estimated Budget

Key results & Indicators	Target	Total budget	Year 1	Year 2	Year 3	Year 4	Year 5
Objective-1: To increase investment in physical infrastructure Development for enhancing milk collection and strengthening/expanding processing facilities							
Result 1.1: Increased Access to Infrastructure services							
1.1.1 Expanded the number of chilling Centers	171	70,110,000	14,760,000	16,400,000	14,350,000	13,120,000	11,480,000
1.1.2 Strengthened infrastructure facilities of primary cooperatives	450	135,000,000	30,000,000	30,000,000	30,000,000	30,000,000	15,000,000
1.2.3 Established the new dairy plants/ industries	5	250,000,000		100,000,000	50,000,000	50,000,000	50,000,000
1.2.4 Upgraded existing dairy plants/ industries	81	332,000,000	86,074,074.07	86,074,074.07	61,481,481.48	53,283,950.62	45,086,419.75
Sub total		787,110,000	130,834,074	232,474,074	155,831,481	146,403,951	121,566,420
Objective-2: To promote appropriate technology for quality milk production and productivity enhancement							
Result 2.1: Increased Production and productively							
2.1.8 Revived dairy enterprises from the Corona Pandemic effect	100	130,000,000	65,000,000.00	32,500,000.00	32,500,000.00		
Result 2.2: Improved Quality of dairy products							
2.2.1 Set up fully equipped dairy QC laboratory at NDDDB premises	1	7,500,000	5,000,000.00	2,500,000.00			
Sub total		137,500,000	70,000,000	35,000,000	32,500,000	-	-
Objective-3: To promote the domestic and international dairy product market							
Result -3.1: Increased access to domestic and International market							

3.1.1 Strengthened and expanded the cold chain network for marketing of processed milk and milk product	2000	400,000,000	80,000,000	80,000,000	80,000,000	80,000,000	80,000,000
3.1.2 Introduced and expanded school milk program	700	125,000,000	25000000	25000000	25000000	25000000	25000000
3.1.3 Increased per capita milk & milk products consumption (ltr) through promotional campaigns	5	25,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000
3.1.4 Established and celebrated National Milk Year (Rastriya Dudh Barsa)	1			10,000,000.00			
Sub total		550,000,000	110,000,000	120,000,000	110,000,000	110,000,000	110,000,000
Objective-4: To enhance collaboration among the stakeholders for enabling dairy entrepreneurs' friendly policy environment and synergic results							
Result -4.1: Increased Collaboration among stakeholders							
4.4.1 Collaborated with DLS, provincial government, projects and supporting organizations for National Dairy Conference	5	12,500,000	2,500,000	2,500,000	2,500,000	2,500,000	2,500,000
4.4.2 Established the joint review and sharing mechanisms	2	800,000		400,000			400,000
Result -4.2: Enabled Policy Environment							
4.2.1 Reformed milk pricing policy for producers through supporting milko-analyzer	165	82,500,000	12,500,000	20,000,000	20,000,000	15,000,000	15,000,000
4.2.2 Increased institutional relationship for raising funding opportunities	4	800,000	400,000		200,000	200,000	
		96,600,000	15,400,000	22,900,000	22,700,000	17,700,000	17,900,000
Objective-5: To strengthen the institutional capacity and functioning of National Dairy Development Board							

Result -5.1: Strengthened Institutional Capacity							
5.1.1 Restructured NDDB	1	75,000	75,000				
5.1.2 Established national dairy research and training institute	1	33,500,000	500,000	20,000,000	4,000,000	5,000,000	4,000,000
5.1.3 Set up institutional arrangement at Province level	7	3,500,000	2,000,000	1,000,000	500,000		
5.1.4 Established learning exchange mechanism	5	10,000,000	2500000	2,500,000	2,500,000	2,500,000	
5.1.5 Improved data information and management System as well established well equipped library	1	5,000,000		5,000,000			
5.1.6 Established a new division (Project Formulation and Implementation Division) within NDDB	1	30,000,000	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000
Sub total		82,075,000	11,075,000	34,500,000	13,000,000	13,500,000	10,000,000
Objective 6: To improve economic status of Milk Producers, dairy entrepreneurs and skilled persons							
6.1 Hired specialized advisor/consultant by NDDB	8	28,800,000	7,200,000	7,200,000	7,200,000	3,600,000	3,600,000
Sub total	8	28,800,000	7,200,000	7,200,000	7,200,000	3,600,000	3,600,000
Total		4,933,450,000	1,026,775,000	810,200,000	718,475,000	1,753,050,000	624,950,000

CHAPTER V: MONITORING AND EVALUATION

The purpose of monitoring and evaluation is to track implementation and outputs systematically, and measure the effectiveness of program. It helps determine exactly when a program is on track and when changes may be needed. Monitoring and evaluation forms the basis for modification of interventions and assessing the quality of activities being conducted. Monitoring and evaluation can be used to demonstrate that program efforts have had a measurable impact on expected outcomes and have been implemented effectively. It is essential in helping managers, planners, implementers, policy makers and donors acquire the information and understanding they need to make informed decisions about program operations. Monitoring and evaluation helps with identifying the most valuable and efficient use of resources. It is critical for developing objective conclusions regarding the extent to which program can be judged a “success”. Monitoring and evaluation together provide the necessary data to guide strategic planning, to design and implement program and projects, and to allocate, and re-allocate resources in better ways.

5.1 Monitoring and Evaluation Plan

A monitoring plan of Five-Year Dairy Development Plan will be prepared to ensure that;

- a) NDDDB team members are well informed about the rationale of M&E Framework
- b) Annual budget is allocated in line with set result indicators
- c) Resources are generated and utilized in prioritized sector/program
- d) Annual progress tracking, reporting and reviewing practices against the plan are carried out
- e) Mid-term and End-line evaluation against the Five-Year Dairy Development Plan is carried out by external sourcing

5.2 Internal Monitoring System

Aiming to fully implement the Dairy Development Plan, a team of three members will be formed to monitor and support in planning, resource allocation, internal & external linkages, progress monitoring, timely feedback etc. The monitoring team will set the monitoring frequency, responsible, monitoring techniques, monitoring checklist, monitoring reporting template to establish the system within NDDDB.

Appendixes

Annex-1: Questionnaire and checklist

1. INPUT

1.1 Input Supply Status

Particular	A	B	C
Feed supplier	Not available	limited	Sufficient
Available of cattle feed	Not available	limited	Sufficient
Quality of cattle feed	Poor	good	best
Pricing of cattle feed	Monopoly	reasonable	competitive
Delivery of cattle feed	Uncertainty	Certainty	Timely

1.2 Input supply constraints

Particular	Yes	No	Unknown
Limited cattle feed supplier			
Unavailability of cattle feed			
Poor quality of cattle feed			
Non-competitive cattle feed pricing			
Uncertainty of cattle feed delivery			
Cattle feed grading is not maintained			
Cattle feed supplier is not trained			
Cattle feed supply chain is unsystematic			
Improper storing and packaging of cattle feed			

List out additional 3-5 key constraints

- 1.
- 2.
- 3.
- 4.
- 5.

1.3 Input supply opportunities

Particular	Yes	No	Unknown
Milk producers are increasing			
Feed industry is existed			
Subsidy grants are available			
Profitable business			
Easy financing opportunities			
Easy to maintain quality			
Special Insurance package available			
Easy to transport and delivery			
Priority sector of government			
Advanced skills is not required			

2. PRODUCTION

2.1 Production status

Particular	A	B	C	D
An average per household no. of cattle	1-2	3-5	6-10	11 above
An average per day milk production of cow (Ltr)	2	3-5	6-10	11 above
An average per day milk production of buffalo (ltr)	2	3-5	6-10	11 above
Per household milk production per day	1-2	3-5	6-10	11 above
Milk production skills with producer	poor	Limited	good	advanced
Use of milk production technology	traditional	Improved	advanced	
Species of milking cattle	local	Improved	High breed	
Percentage of buffalo mortality	5	6-10	11-15	16-20
Percentage of cow mortality	5	6-10	11-15	16-20

2.2 Production constraints

Particular	Yes	No	Unknown
Attraction of youth towards cattle farming is decreasing			
Fodder and Pasture land is inadequate			
Inadequate knowledge and skills for cattle farming			
Traditional cattle shed			
High risky business			
Low income or return on investment			
Heavy investment required			
Unreliable livestock technical service from government			
Lack of high milking cattle availability			
Disease treatment and vaccination are costly			
Improved cattle feed is not locally available			
Cattle mortality rate is high			

List out additional 3-5 key constraints

- 1.
- 2.
- 3.
- 4.
- 5.

2.3 Production opportunities

Particular	Yes	No	Unknown
Fodder and paster land is sufficient			
Commercial cattle farming is encouraging by government			
Special grants/facilities are available for commercial cattle farming			
Veterinary services are available in time			

Advanced knowledge and skills are not required			
High income business			
Cattle insurance provision is available			
Quality cattle feed is available			
Market demand is high			
High milk yielding cattle is available in the market			
Government/donor funding opportunity			

List out the most potential area for milk production

- 1.
- 2.
- 3.

3. MARKETING

3.1 Marketing status

Particular	Yes	No	Unknown
Demand of fresh milk is high			
Competitive market/pricing			
Milk collection/collectors are locally available			
Effective milk supply chain is in place			
Cooperatives are in operation			

3.2 Marketing constraints

Particular	Yes	No	Unknown
Demand of fresh milk is low			
Monopoly market/unfair pricing			
Milk collection/collectors are not locally available			
Milk supply chain is ineffective			
Milk collection centre/cooperative is not available			
Low volume of milk production			
No reliable payment of milk sales			
Milk producers are unorganized			

List out additional 3-5 key constraints

- 1.
- 2.
- 3.
- 4.
- 5.

3.3 Marketing opportunities

Particular	Yes	No	Unknown
Milk consumers are increasing			
Competitive market and pricing			
Milk collection/collectors are locally available			
Milk supply chain is effective in operation			
Accessibility of transporting and delivery			

Volume of milk production in increasing to market it			
Reliable payment system on milk sales			
Milk producers are organized			

4. PROCESSING

4.1 Processing (Technology, products, skills, capacity)-Status

Particular	A	B	C
Methods of milk processing			
Milk processing operational capacity (daily)			
Processing technology	Simple	Improved	Advanced
Dairy processing operator's skills	Poor	good	best
Milk processing plant's cost (Million)			
Quality of processed milk	low	medium	high
Milk products/product diversification (no.)			
Market demand	low	medium	high

4.2 Processing (Technology, products, skills, capacity)-Constraints

Particular	Yes	No	Unknown
Irregular/seasonal production of milk			
In adequate knowledge and skills to dairy plant operators			
Milk processing plants are conventional/traditional			
Limited production of milk for processing			
Milk processing technology is costly			
Milk processing investment is risky and investment security is minimal			
Low demand of diversified milk products			
Complex procedures for financing service accessibility			
Government policy is not favourable			
In adequate linkage & coordination between milk producers/suppliers and milk processors			
Basic infrastructure for dairy industry is not provided by government			

List out the additional 3-5 key constraints

- 1.
- 2.
- 3.
- 4.
- 5.

4.3 Processing (Technology, products, skills, capacity)-Opportunities

Particular	Yes	No	Unknown
Milk producers/suppliers are growing			

Trained dairy plant operators are available in the market			
Advanced milk processing plants are available in competitive price			
Increasing milk production and supply			
Insurance coverage is high and competitive			
Special grants/provisions are made by government for the dairy industry			
Diversified milk products demand are increasing			
Easy access to financing			
Government policy is conducive			
Income from dairy is attractive			
Basic infrastructure facilities provided by government is satisfactory			
New investors in dairy sector is attracting/increasing			

5. FINANCING

5.1. Financing-Status

Particular	A	B	C	D
Interest rate on loan (%)	5-10	11-15	16-20	21 above
Available of loan and term	short	Medium	Long	
Financing service	poor	good	best	
Government grants/subsidy	low	attractive	More attractive	
No. of financial service providers	limited	adequate		
Financial service process	Easy	time taking	Complex	
Investment priority for dairy sector by financial institutions	low	medium	high	

5.2 Financing-constraints

Particular	Yes	No	Known
High interest rate on loan (%)			
Lengthy and complex procedures for obtaining loan facility			
Financial services are discouraging			
Government grants/subsidy are very limited			
No. of financial service providers are limited			
Financial products are not attracting to dairy			
Less priority is given for investing in dairy sector			
Lack of long term loan facility			

List out the additional 3-5 key constraints

- 1.
- 2.

- 3.
- 4.
- 5.

5.3 Financial –opportunities

Particular	Yes	No	Known
Interest loan is competitive			
Simple procedure for obtaining loan facility			
Financial services are competitive			
Government grants/subsidy is attractive			
No. of financial service providers are sufficient			
Financial products are attractive			
Priority of financial institution for investing dairy sector is high			
Special discount/schemes are available for diary			

6. INFRASTRUCTURE

6.1 Infrastructure Facilities-Status

Particular	A	B	C	D
Energy services	Not available	Not reliable	Reliable	
Communication Services	Not available	Not reliable	Reliable	
Transportation/road	poor	satisfactory	good	
Government technical support offices	Not available	Available		
Market centre	far	distant	Near	
Milk processing/Dairy Industry	Not available	Limited	Sufficient	
Dairy cooperative	No presence	not operational	operational	

6.2 Infrastructure Facilities-constraints

Particular	Yes	No	Unknown
Poor quality of road/transportation facility			
Unreliable electricity/energy services			
Telephone/Internet facilities are poor			
Dairy cooperatives are not functional/not presence			
Inaccessibility to government technical office			
Lack of dairy industry for avoiding milk holiday			
Milk collection centre/Market centre are not established			

List out the additional 3-5 key constraints

- 1.
- 2.
- 3.
- 4.
- 5.

6.3 Infrastructure Facilities-opportunities

Particular	Yes	No	Unknown
Good road/transportation facility			
Electricity/energy services are available			
Telephone/Internet facilities are available			
Dairy cooperatives are functional/supporting			
Access of technical assistance from government office			
Dairy Industries are operational			
Good Market Centre			
Government/donors are investing in dairy infrastructure development			

7. INSTITUTIONAL DEVELOPMENT

7.1 Institutional Development-Status

Particular	A	B	C	D
Trained technical persons	low	limited	sufficient	
Institutional set up	poor	good	Best	
Internal and external communications	poor	good	Best	
Institutional governance	poor	good	Best	
Decision making process	Single	partial participation	Participatory	
Available of financial resource	nominal	average	good	
Service delivery status	poor	good	Best	
Procurement system	unsystematic	ad hoc	systematic	
Monitoring and review mechanism	non	occasional	systematic	
Service coverage area	small	medium	large	

7.2 Institutional Development-constraints

Particular	Yes	No	Unknown
Trained technical persons are not available			
Institutional set up is poor			
Improper internal and external communications			
Institutional governance are yet to be set up			
Decision making process is non participatory			
Inadequate financial resource			
Poor service delivery			
Non-functional/existence of procurement unit			
Monitoring and review is occasional			
Service coverage area is limited			
Institutional policy and guidelines are inadequate			
Institutional policy and guideline implementation is weakening			
Reward and punishment mechanism is not established			

List out the additional 3-5 key constraints

- 1.
- 2.
- 3.
- 4.
- 5.

7.3 Institutional Development-opportunities

Particular	Yes	No	Unknown
Highly dedicated staffs			
Good physical infrastructure			
Sufficient number of human resource			
Institutional governance are in place			
Decision making process is participatory			
Adequate financial resource			
Good service delivery			
Sectoral units are functional			
Monitoring and review is well scheduled			
Service coverage area is huge			
Institutional policy and guidelines are in place			
Reward and punishment mechanism is in place			

8. SOCIO-ECONOMIC

8.1 Socio-economics-status

Particular	A	B	C	D
Percentage of dalit participation in milk production	0-5	6-10	11-15	16-20
Percentage of Brahmin/chhetri participation in milk production	10-20	21-30	31-40	41-50 or above
Percentage of janjati participation in milk production	10-20	21-30	31-40	41-50 or above
Percentage of women involvement in milk production	10-20	21-30	31-40	41-50 or above
Percentage of interested producers are excluding in dairy due to lack of financial service	0-5	6-10	11-15	16-20
Social-culture barrier for flowering dairy enterprise	0-5	6-10	11-15	16-20
Percentage of household income contribution from dairy sector	20-30	31-40	40-50	51-60 or above
Percentage of person employed from dairy enterprise	10-20	21-30	31-40	41-50 or above
Percentage of manure contribution for agriculture production and productivity	20-30	30-40	51-60	60-70 or above

8.2 Socio-economic-constraints

Particular	Yes	No	Unknown
Socio-culture are the barrier to include the dalit in dairy enterprise			
Dairy enterprise is not suitable for low income families			
Social recognition is quite low for milk producers			
Women involvement in dairy sector is tradition rather interest & income			
Socially ignored profession/enterprise			

List out the 3-5 key constraints

- 1.
- 2.
- 3.
- 4.
- 5.

8.3 Socio-economic-opportunities

Particular	Yes	No	Unknown
There is no social and cultural barrier for dairy enterprise			
Economy strata doesn't affect involving in dairy sector			
Social recognition is high for dairy entrepreneur			
Dairy is most promising enterprise for sustainable income			
Women friendly			
Environment friendly			

9. POLICY/LEGAL

9.1 List out 3-5 key policy level constraints

- 1.1
- 1.2
- 1.3
- 1.4
- 1.5

9.2 List out 3-5 policy level opportunities

- 2.1
- 2.2
- 2.3
- 2.4
- 2.5

10. PROMOTION

10.1 List out 3-5 key policy level constraints

- 1.1
- 1.2
- 1.3
- 1.4
- 1.5

10.2 List out 3-5 policy level opportunities

- 2.1
- 2.2
- 2.3
- 2.4
- 2.5

Annex-2: Federal and Provincial Level Consultation Meeting

1. National dairy development board (NDDB)
 - Dr. Rajendra Yadav - Executive director, NDDB
 - Mr. Babu Kaji Panta - Deputy Executive director, NDDB
 - Dr. Balak Chaudhary - Technical Director, NDDB
 - Dr. Hasana Maiya Shrestha - Technical Director, NDDB
 - Mr. Bidur Rai – Admin Director, NDDB
 - Mr. Rajesh D.C., Research officer, NDDB
 - Mr. Dipendra Adhikari, section officer, NDDB
 - Mr. Narayan Deshar, Research officer, NDDB
 - Mr. Ajay, Research officer, NDDB

2. Ministry of Agriculture and Livestock Development, Kathmandu
 - Dr. Rajendra Prasad Mishra, Joint secretary, Planning and Dev Aid Coordination Division
 - Shankar Sapkota, Planning and Dev Aid Coordination Division

3. Pradesh 1
 - Ganesh Yadav, Manager, DDC Biratnagar
 - Pashupati Pokhrel, Planning and monitoring, Pradesh Agric ministry, Biratnagar
 - Baburam Dahal, Chairman, Kamadhenu Dairy cooperative, Tarahara, Sunsari

4. Province 2
 - Dr. Bimal Kumar Nirmal - Secretary, Ministry of land management, Agriculture and cooperative, Janakpur.
 - Mr. Damodar Dhakal - Project manager, Janakpur Milk supply schemes (DDC), Dhalkebar
 - Mahendra Yadav, Private Dairy entrepreneur, Mahendranagar, Dhanusha

5. Bagmati Prasesh
 - Dr. Narayan Shrestha – Director, Pradesh dairy board, Bagmati Pradesh, Lagankhel
 - Mr. Lal Kumar KC, Agricultural advisor, Bagmati Pradesh Government

6. Karnali Pradesh
 - Mrs. Bimala K.C. - Honorable Minister, Ministry of land management, Agriculture and cooperative, Karnali Pradesh, Surkhet.
 - Mr. Krishna Prasad Aryal - Project manager, Dhangadi Milk supply schemes (DDC)

7. Dairy development corporation
 - Mr. Rudra Prasad Poudel - General Manager
 - Mr. Rajendra Prasad Adhikari - Acting Deputy General Manager
 - Anjan Adhikari, Economist
 - Sanjeev Jha, Chief Marketing

8. Dairy Industry Association - Nepal (DIA)
Mr. Rajkumar Dahal – President
Mr. Niranjan Shrestha, Vice-president
9. Nepal Dairy Association (NDA)
Mr. Radha Krishna Sapkota - President
Mr. Sumit Kedia - Immediate past president
Mr. Pralad Dahal – General Secretary
10. Central Dairy Cooperative Association Limited, Nepal (CDCAN) :-
Mr. Narayan prasad Devkota – President
11. Nepal Dairy Science Association (NDSA)
Mr. Arun Shrestha, Formerly Executive Director, NDDDB and Past President NDSA
Mr. Rajendra Gopal Shrestha - Advisor
Mr. Ishwari Raj Neupane - Advisor
Mr. Ram Tapeshwar Chaudhary – Vice president
Mr. Giri Dhar Bajracharya – General Secretary
Mr. Niranjan Timilsina – Treasurer
Mr. Rajesh D.C. - Executive committee member
Mr. Shankar Adhikari - Executive committee member
Dr. Binod Prasad Gupta – General member
12. Dr. Dilli Ram Sedhai, Project Director, Nepal Livestock Sector Innovation Project (NLSIP),
DLS, Lalitpur
13. Dr Damodar Sedai, National Consultant, TA- Food Safety Laboratory Commercialization
Program, Tripureswar
14. Mr. Baburam Adhikari, Chairman, Central Livestock Development Cooperative Association,
Kathmandu.
15. Mr. Madan Thapa, EC member, Central Livestock Development Cooperative Association,
Kathmandu.
16. Mr. Anand Neure, Chairman, Nepal Pasupalan Samaj (Commercial Dairy farmers association),
Chitwan.

Annex-3: Field Survey KII & FGD Participants**a) KII Details**

Name	Designation	Organization	Address	Contact number
Surya Prasad Bhusal	Manager	Kamadhenu milk producer's cooperative limited	Khairahani-1, Jyamire Chitwan	9845049473
Motiram Panta	Manager	Janaki Milk producer's cooperative limited	Khairahani-1, Jyamire Chitwan	9855080472
Rudra Kumar Shrestha	Livestock development officer	Khairahani Municipality, Livestock service unit	Khairahani Municipality, Chitwan	9845114767
Kumar Katwal	Proprietor		Lalbandi municipality, Sarlahi	9815838714
Mahesh Pokhrel	Collector		Gurbhakot Municipality, Surkhet	9848051878
Dipendra Tiwari	Collector		Birendranagar Municipality, Surkhet	9848037308
Netralal Sharma	Chairperson	Karekhola Krishi tatha pasu palan Bahumukhi sahakari sanstha and Nepal Dairy Association, district	Birendranagar Municipality-13, Surkhet	9863407407
Dinesh prasad acharya	Proprietor	Namuna Dairy Udyog	Birendranagar Municipality-7, Surkhet	9848230600
Laxmi Prasad Upadhyaya	Proprietor	Shubha Laxmi Dairy Udyog	Birendranagar Municipality-6, Surkhet	9848074915
Suman Ghorasaini	Executive member	Surkhet Dairy Uddhyog	Birendranagar Municipality (Industrial Area), Surkhet	9860014525
Krishna Psd. Bashyal	Proprietor	Himalayan Dairy	Lahare Pipal-Tansen-4	9847115565
Dan Bahadur Kanwar Magar	Technician 4 th Level	Tansen Municipality Office	Tansen Palpa	9847028224
Tikaram Kharal	Proprietor	Tansen Municipality	Tansen Palpa	
	Staff	Paunge Dairy Bhimsen tole, Tansen Municipality	Tansen Palpa	
Devi Ram Kandel	Vet-Technician	VDIL, Surkhet	Surkhet.	9858051807

Name	Designation	Organization	Address	Contact number
Bishnu Giri	Secretary	Amuna Agriculture Cooperative, Belbari-1	Amuna Agriculture Cooperative, Belbari-1	
Purna Bahadur Katawal	Proprietor	Pathibhara Dairy Uddhyog	Letang Municipality-4, Morang	9842120326
Ram Prasad Neupane	Proprietor	Sharma Dairy	Dhangadhi-18, Dipobazar, Kailali	9815636945
Hikmat Malla	Proprietor	ANG Dairy Udhog	Dhangadhi-18, Pachhisghar, Kailali	9865682540
Gyanendra Bajhagain	Proprietor	Bajhagain Dairy Udhog	Pokhara-26, Budhibazar, Kaski	9856028738
Rewati Rawan Bastakoti	Proprietor	Bastakoti Dairy Pasal	Pokhara-27, Arghaun, Kaski	9846044480
Krishna Dhami	JTA, 5 th level	Livestock Service Centre	Dhangadhi-18, F Gaun, Kailali	9848425952
Nabaraj Adhikari	Livestock Officer- 6 th level	Pokhara Metropolitan City Livestock Division	Newroad, Pokhara, Kaski	9856025840

b) FGD list

Date	Participants	Gender	Location	Contact
2077/02/29	Sunmaya Thapa Magar	Female	Dhangadhi-18, Dipobazar, Kailali	9814689021
	Sita Thapa	Female	Dhangadhi-18, Dipobazar, Kailali	9869972539
	Kulprasad Tiwari	Male	Dhangadhi-18, Dipobazar, Kailali	9824605530
	Bhojraj Bhattarai	Male	Dhangadhi-18, E Gaun, Kailali	9800616146
	Khim Maya Sapkota	Female	Dhangadhi-18, Dipobazar, Kailali	9814676770
	Bhagawati Paudel	Female	Dhangadhi-18, Dipobazar, Kailali	9825676950
2077/02/30	Surya Bahadur Gharti	Male	Pokhara-27, Jaruwa, Kaski	9825153743
	Nirjala Adhikari	Female	Pokhara-27, Arghaun, Kaski	9806636513
	Ravi Adhikari	Male	Pokhara-27, Dharmashala, Kaski	9846047504
	Laxu Burja	Female	Pokhara-27, Kholako Dil, Kaski	9826137004
	Shivamaya Sherpuja Pun	Female	Pokhara-27, Jaruwa, Kaski	9806616768
	Kumar Sapkota	Male	Pokhara-27, Dadabari, Kaski	9806638914

Annex-4: Milk and Milk Product Import and Export of Five Year

a) Import of milk and milk product according to the department of customs of last five year from 072-73 to 076-77

Product	Year	Quantity(kg)	Imports (Rs.'000)
Milk and milk product	072-73	4,728,888	1484227
Milk and milk product	073-74	10311674	2441163.596
Milk and milk product	074-75	7882676	2448180.88
Milk and milk product	075-76	7,572,303.91	1,608,196
Milk and milk product	076-77 (till baishak)	6,757,376	1,687,432

b) Export of milk and milk product according to the department of customs of last five year from 072-73 to 076-77

Product	Year	Quantity(kg)	Exports (Rs.'000)
Milk and milk product	072-73	451,981	210,059
Milk and milk product	073-74	507749.96	296355.15
Milk and milk product	074-75	431787.8	283569.18
Milk and milk product	075-76	288754	171073
Milk and milk product	076-77 (till baishak)	22,521	7,886

Annex-5: DDC Milk collection and sale 2070/71-2075/76

आर्थिक बर्ष	दूध संकलन (लाख लिटरण)	दूध विक्री (लाख लिटर)	धुलो दुध उत्पादन (के.जी.)	मखन उत्पादन (के.जी.)	दही उत्पादन (लि.)	दही बिक्री (लि.)	चिज उत्पादन (के.जी.)	जम्मा कारोबार (लाख)
२०७०/०७१	५८९.९६	५०३.४३	३७६५२५	५८०५४५	३८९१२६३	३८८५६७७	२४४२५८	४०६८१.०६
२०७१/०७२	६०३.४५	५७०.०३	५६१८५०	१२०१७४९	३७५००४५	३७३३०१२	२४६६९६	४४४१२.०७
२०७२/०७३	५३२.९६	४९९.९०	४००१७५	६९३८५६	३६९३०००	३६७२३४४	१८१६७६	४३४६७.४६
२०७३/०७४	५३१.८६	४८६.०३	४६२१६६	८६५७५४	३६१८५२४	३६१९८८४	२३१६६१	४१७४८.३५
२०७४/०७५	५४१.२६	४४३.९०	७९९११३	७७४०९०	३०४३९१७	३०५३८८७	१९४७२०	४६६०९
२०७५/०७६	४८८.०३	४०२.७०	९११०००	८४६०००	२६२७०००	२७९१०००	२४२०००	४००६१

Annex-6: Milk handling and processing by dairy cooperatives

क्र.सं.	सहकारी संस्था	ठेगाना	दैनिक संकलन (लि.)	मासिक संकलन (लि.)	चि.भ्या. क्षमता (लि.)	दुग्ध विविधिकरण
१	कामधेनु दुग्ध विकास सहकारी संस्था	हसिवोसा- २, तरहरा, सुनसरी	८५००	२६०,०००	२०,०००	दूध, दही, पनिर, घिउ, नौनी, चिज, छुपी, आदि
२	डुमरवाना दुग्ध उत्पादक सहकारी संस्था लि.	जितपुरसिमरा- १५, बारा	९५००	३००,०००	९५००	दूध, दही, पनिर, घिउ, नौनी, आइसक्रिम, आदि
३	वागदेव दुग्ध उत्पादक सहकारी संस्था लि.	निजगढ- ६, बारा	६०००	२४५,२२५	१०,०००	दूध, दही, पनिर, नौनी, आदि
४	मकवानपुर जिल्ला दुग्ध उत्पादक सहकारी संघ लि.	चौकिटोल, हैटौडा, मकवानपुर	४०,०००	१२,००,०००	६५०००	दूध, दही, पनिर, नौनी, आदि
५	गंगानगर दुग्ध उत्पादक सहकारी संस्था लि.	भरतपुर- २२, चितवन	५०००	१५०,०००	३०००	दूध, दही, महि, पनिर, नौनी, घिउ, बटर, आदि
६	अन्नपूर्ण दुग्ध उत्पादक सहकारी संस्था लि.	भरतपुर- ६, चितवन	८०००	२४०,०००	८५००	दूध, दही, महि, पनिर, नौनी, घिउ, बटर, आदि
७	नन्दिनीदुग्ध उत्पादक सहकारी संस्था लि.	खैरानी - १०, चितवन	३०००	९०,०००	५०००	दूध, दही, पनिर, नौनी, घिउ, आदि
८	नाँग डाँडा दुग्ध उत्पादक सहकारी संस्था लि.	अन्नपूर्ण गा.पा.- १, कास्की	३०००	८५,०००	३०००	दूध, दही, पनिर, नौनी, घिउ, आदि
९	सप्तगण्डकी दुग्ध उत्पादक सहकारी संस्था लि.	कास्की- ७, पोखरा	२०००	७०,०००	१५००	दूध, दही, पनिर, बटर, आदि
१०	तनहुँ जिल्ला दुग्ध उत्पादक सहकारी संघ लि.	दमौली- ११, तनहुँ	४५,०००	१३,५०,०००	५०००	दूध, दही, पनिर, नौनी, घिउ, आइसक्रिम, आदि
११	बागलुङ्ग जिल्ला दुग्ध उत्पादक सहकारी संघ लि.	बागलुङ्ग- २	२५००	७०,०००	२०००	दूध, दही, पनिर, नौनी, घिउ, आइसक्रिम, छुपी, आदि
१२	गाउँसुधार दुग्ध उत्पादक सहकारी संस्था लि.	गलङ्ग -८, स्याङ्जा	८००	२६,०००	१५००	दूध, दही, पनिर, घिउ, बटर, आदि
१३	सृजना दुग्ध उत्पादक सहकारी संस्था लि.	कोहलपुर- ११, बाँके	५००	१५,०००	१०००	दूध, दही, पनिर, घिउ, बटर, छुपी, आदि
१४	भगवती दुग्ध उत्पादक सहकारी संस्था लि.	बढैयाताल- ७, तिलगाना, बर्दिया	८०००	२४०,०००	९५००	दूध, दही, पनिर, घिउ, बटर, छुपी, आदि
			१४१८००	१७९१२२५	२१४९४७००	

Source: केन्द्रीय दुग्ध सहकारी संघ लि. नेपाल

Annex-7: Milk handling by NDA Member dairies

क्र सं	उद्योगको नाम	ठेगाना	साधारण अवस्थामा दुध संकलन दैनिक	बजार विक्री	हाल दैनिक संकलन
१	सिताराम गोकुल मिल्क्स	किर्तिपुर	४००००	१८०००	२२०००
२	जयश्री कृष्ण डेरी उद्योग	पाँचखाल	८०००	४०००	४०००
३	रितिका डेरी उद्योग	झापा	१५०००	६०००	९०००
४	एच.डी. डेरी मिल्क्स	काठमाडौं	४०००	१५००	२५००
५	लभकुस डेरी	पोखरा, कास्की	८०००	२५००	५५००
६	श्रीकृष्ण डेरी	पोखरा, कास्की	१०००	३००	७००
७	नारायणी मिल्क	हेटौडा, मकवानपुर	०	०	०
८	खप्तड डेरी उद्योग	धनगड, कैलाली	३०००	१०००	२०००
९	मिल्को इण्डस्ट्रिज	सिराह	१५००	७००	८००
१०	पन्थी डेरी	पोखरा, कास्की	६०००	२०००	४०००
११	मालिका डेरी उद्योग	गोठार, काठमाडौं	५००	२००	३००
१२	धुम्बाराही डेरी कम्पनी प्रा.लि.	सुकेधारा, काठमाडौं	६००	३००	३००
१३	बागमती डेरी कम्पनी प्रा.लि.	काठमाडौं	७००	३००	४००
१४	जसन डेरी उद्योग	पोखरा	१५००	६००	९००
१५	गोकुल दुग्ध उद्योग	हेटौडा, मकवानपुर	२०००	९००	११००
१६	शिवकली डेरी मिल्क उद्योग	गौर न.पा. रौतहट	१५००	६००	९००
१७	मिलन डेरी	सिमरा, बारा	१०००	४००	६००
१८	मां भावना डेरी	धनगडी, सिराह	१०००	४००	६००
१९	अनुपम डेरी	बाँके	२०००	७००	१३००
२०	पवित्र डेरी	रुपन्देही	४०००	१०००	३०००
२१	शिवगंगा डेरी	देवदह, रुपन्देही	६०००	२५००	३५००
२२	पवन डेरी उद्योग	चितवन	२०००	७००	१३००
२३	उग्रचण्डी डेरी	काठमाडौं	१२००	५००	७००
२४	श्रीराम डेरी उद्योग	महाराजगंज, काठमाडौं	३०००	१०००	२०००

क्र सं	उद्योगको नाम	ठेगाना	साधारण अवस्थामा दुध संकलन दैनिक	बजार विक्री	हाल दैनिक संकलन
२५	काफ्ले डेरी	बानेश्वर, काठमाडौं	४००	२००	२००
२६	कृतिका डेरी एण्ड स्वीट सेन्टर	काठमाडौं	१२००	४००	८००
२७	अशोक डेरी उद्योग	काठमाडौं	६००	२००	४००
२८	उज्वल डेरी उद्योग	काठमाडौं	२०००	७००	१३००
२९	नमुना डेरी उद्योग	काठमाडौं	८००	३००	५००
३०	दिपक दही पसल	काठमाडौं	४००	२००	२००
३१	पलाञ्चोक डेरी उद्योग	काठमाडौं	१५००	३००	१२००
३२	धमला सौगात दुग्ध वि. स.सं.	कोटेश्वर	३००	१००	२००
३३	अनुप (रोयल) डेरी उद्योग	काठमाडौं	२०००	७००	१३००
३४	विदुर डेरी उद्योग	काठमाडौं	३००	१००	२००
३५	सुलभ डेरी मिल्क	भक्तपुर	६००	२००	४००
३६	ईन्द्रावति दुध भण्डार	काठमाडौं	३००	१००	२००
३७	बैसिगाउँ दही एण्ड बेकरी	काठमाडौं	४००	१००	३००
३८	पारसी देवी डेरी प्रा.लि.	जोरपाटी, काठमाडौं	४०००	१५००	२५००
३९	मितेरी डेरी	जोरपाटी, काठमाडौं	३००	१००	२००
४०	दहाल डेरी	जोरपाटी, काठमाडौं	४००	२००	२००
४१	शुभानी डेरी	जोरपाटी, काठमाडौं	५००	२००	३००
४२	कागेश्वरी दुध डेरी	कुमारीगाल, काठमाडौं	४००	२००	२००
४३	चामुण्डा दुध डेरी	जोरपाटी, काठमाडौं	३००	१००	२००
४४	सत्कार डेरी	जोरपाटी, काठमाडौं	३००	१००	२००
४५	सिन्धु डेरी	दक्षिणढोका, काठमाडौं	४००	१५०	२५०
४६	श्रीकृष्ण डेरी	जोरपाटी, काठमाडौं	४००	१५०	२५०
४७	ढकाल डेरी	जोरपाटी, काठमाडौं	६००	२००	४००
४८	श्री राधाकृष्ण डेरी फार्म	जोरपाटी, काठमाडौं	६००	२००	४००
४९	दंगाल डेरी	जोरपाटी, काठमाडौं	३००	१००	२००

क्र सं	उद्योगको नाम	ठेगाना	साधारण अवस्थामा दुध संकलन दैनिक	बजार विक्री	हाल दैनिक संकलन
५०	बद्री डेरी	जोरपाटी, काठमाडौं	४००	१५०	२५०
५१	काभ्रेपलाञ्चोक डेरी	गंगबु, काठमाडौं	८००	३००	५००
५२	श्रीराम दुग्ध भण्डार	सानेपा, ललितपुर	४००	१००	३००
५३	श्रीराम डेरी फार्म	सानेपा, ललितपुर	३००	१००	२००
५४	रोशिन डेरी	काठमाडौं	४००	२००	२००
५५	श्रीकृष्ण डेरी उद्योग	चुनइदेवी काठमाडौं	८००	३००	५००
५६	विवेक डेरी	कालोपुल, काठमाडौं	४००	१५०	२५०
५७	श्री मुक्तिनाथ डेरी	चप्पली, काठमाडौं	३००	१००	२००
५८	कोमल डेरी	काठमाडौं	५००	२००	३००
५९	खरिबोट दुग्ध भण्डार	मिनभवन, काठमाडौं	४००	१५०	२५०
६०	भगवान डेरी	सल्लापारी, काठमाडौं	३००	१००	२००
६१	न्यू ईन्द्र डेरी	गंगबु, काठमाडौं	८००	३००	५००
६२	प्रसिध्द प्रशान्त डेरी	काठमाडौं	३०००	११००	१९००
६३	श्री कृष्ण दुग्ध भण्डार	काठमाडौं	४००	२००	२००
६४	धमला डेरी प्रोडक्स	घट्टेकुलो, काठमाडौं	४०००	१५००	२५००
६५	एलिसाज डेरी	बनस्थली, काठमाडौं	२५००	९००	१६००
६६	गोपिकृष्ण डेरी	धुम्बाराही, काठमाडौं	४००	१००	३००
६७	चामुण्डा डेरी फार्म	बुध्दनगर, काठमाडौं	५००	२००	३००
६८	त्रिशुल डेरी	नुवाकोट	२०००	८००	१२००
६९	कैलाश डेरी	कालोपुल, नक्साल	८००	३००	५००
७०	हिमालय दुग्ध वि. केन्द्र	कुशादेवी, काठमाडौं	६०००	२१००	३९००
७१	गोकर्णेश्वर दुध डेरी	गोकर्णेश्वर न.पा. ९	४००	२००	२००
७२	बजगाईं दुध डेरी	जोरपाटी	५००	२००	३००
७३	संगम डेरी	कोटेश्वर ३५	२५००	८००	१७००
७४	शिवानी डेरी उद्योग	भक्तपुर	५००	२००	३००
७५	विन्धाबासिनी डेरी उद्योग	बुढानिलकण्ठ	२५००	८००	१७००

क्र सं	उद्योगको नाम	ठेगाना	साधारण अवस्थामा दुध संकलन दैनिक	बजार विक्री	हाल दैनिक संकलन
७६	बजगाईं डेरी	लेखनाथ, कास्की	२०००	७००	१३००
७७	शक्ति डेरी उद्योग	लेखनाथ, कास्की	३०००	१०००	२००
७८	नाग डाँडा डेरी	पोखरा, कास्की	६०००	२०००	४०००
७९	पानवी डेरी उद्योग	पोखरा	२०००	७००	१३००
८०	जिल्ला सहकारी संघ लिमिटेड	पोखरा	३०००	१०००	२०००
८१	हिमाल डेरी उद्योग	पोखरा	२०००	७००	१३००
८२	गौरीशंकर दुग्ध उद्योग	पोखरा	३०००	११००	१९००
८३	शुभ डेरी	हेटौडा	२०००	७००	१३००
८४	गायत्री डेरी उद्योग	सानोपोखरा, हेटौडा	२५००	८००	१७००
८५	पटेल ब्रदर्स एण्ड डेरी फार्म	सप्तरी	२०००	७००	१३००
८६	मुस्कान डेरी उद्योग	बारी, गढिमाई	१०००	३५०	६५०
८७	न्यू आचल डेरी उद्योग	पहलमानपुर, कैलाली	२०००	५००	१५००
८८	पूर्णिमा डेरी	धनगढी, कैलाली	५००	२००	३००
८९	आचल डेरी	धनगढी, कैलाली	२००	१००	१००
९०	सर्बोदय डेरी	धनगढी, कैलाली	४००	१००	३००
९१	सागर समुद्र डेरी	धनगढी, कैलाली	२००	१००	१००
९२	न्यू कुश लव डेरी	धनगढी, कैलाली	४००	१५०	२५०
९३	जानकी डेरी	धनगढी, कैलाली	४००	२००	२००
९४	साउद डेरी	धनगढी, कैलाली	३००	१००	२००
९५	बढी मालिका डेरी	धनगढी, कैलाली	३००	१००	२००
९६	कर्णाली डेरी उद्योग	धनगढी, कैलाली	२५०	१००	१५०
९७	सगरमाथा डेरी उद्योग	विष्णुपुर, सिराह	२५०	१००	१५०
९८	हिमाल डेरी उद्योग	विष्णुपुर, सिराह	४००	१००	३००
९९	महावीर डेरी	गोलबजार, सिराह	३००	१००	२००
१००	कृष्ण बलराम डेरी	सिराह	३००	१००	२००

क्र सं	उद्योगको नाम	ठेगाना	साधारण अवस्थामा दुध संकलन दैनिक	बजार विक्री	हाल दैनिक संकलन
१०१	शिव डेरी	सिराह	३००	१००	२००
१०२	सिराह डेरी सेन्टर	सिराह	४००	१५०	२५०
१०३	आमा डेरी उद्योग	पशुपतिनगर १, धनगढी	७००	२५०	४५०
१०४	बालाजी डेरी उद्योग	लक्ष्मीनगर, धनगढी	८००	३००	५००
१०५	साझा डेरी	झापा	३००	१००	२००
१०६	पञ्चामृत डेरी	झापा	६००	१५०	४५०
१०७	केर्खा डेरी	झापा	३००	१००	२००
१०८	जयबागेश्वरी डेरी	बाँके	३००	१००	२००
१०९	पाठक डेरी	कञ्चनपुर	३०००	१०००	२०००
११०	आँचल डेरी उद्योग	झलारी, कञ्चनपुर	३००	१००	२००
१११	श्री कृष्ण धमला डेरी	धुलाबारी, झापा	३००	१००	२००
११२	माँकालिका दुग्ध वि.स.सं	वित्तमोड	४००	२००	२००
११३	निकिता दुग्ध ख.वि.के.	बुधबारे	३००	१००	१००
११४	पूर्व नेपाल दुग्ध वि. केन्द्र	दमक	८००	३००	५००
११५	अमृत डेरी उद्योग	धुलाबारी	३००	१००	२००
११६	श्री कृष्ण विवेक डेरी	वित्तमोड	४००	२००	२००
११७	जयमाता पाथिभारा दुविउ	हर्कटे, इलाम	५००	२००	३००
११८	शुभलक्ष्मी डेरी	रुपन्देही	५००	२००	३००
११९	पारोह डेरी	रुपन्देही	६००	२००	४००
१२०	सिध्दार्थ डेरी	रुपन्देही	१५००	५००	१०००
१२१	लुम्बिनी डेरी मिल्कस्	रुपन्देही	४००	२००	२००
१२२	गायत्री डेरी उद्योग	रुपन्देही	५००	२००	३००
१२३	सिद्धबाबा डेरी उद्योग	रुपन्देही	४००	१००	३००
१२४	मालिका डेरी सेन्टर	रुपन्देही	५००	२००	३००
१२५	पाण्डव डेरी	बुटवल, रुपन्देही	४००	२००	२००

क्र सं	उद्योगको नाम	ठेगाना	साधारण अवस्थामा दुध संकलन दैनिक	बजार विक्री	हाल दैनिक संकलन
१२६	जय किसान डेरी गोरसघर	तानसेन, पाल्पा	७००	३००	४००
१२७	भैरब डेरी	पाल्पा	४००	१००	३००
१२८	बस्याल डेरी	पाल्पा	८००	३००	५००
१२९	ज्ञानोदय डेरी उद्योग	सुनवल, नवलपरासी	४०००	१५००	२५००
१३०	बसिष्ठ डेरी	नवलपरासी	८००	३००	५००
१३१	श्रीनगर डेरी मिल्क	पाल्पा	८००	३००	५००
१३२	साकार सौरभ डेरी	दाङ	७००	३००	४००
१३३	खनाल डेरी	दाङ	५००	२००	३००
१३४	लमही डेरी	लमही, दाङ	७००	३००	४००
१३५	गणेश डेरी उद्योग	दाङ	३००	१००	२००
१३६	राप्ती डेरी	दाङ	३००	१००	२००
१३७	स्वर्गद्वारी डेरी	दाङ	६००	३००	३००
१३८	न्यू पशुपति दुग्ध सं. केन्द्र	तुलसीपुर	३०००	१५००	१५००
१३९	पोखरेल डेरी	तुलसीपुर ८	४००	२००	२००
१४०	लिला डेरी	दाङ	३००	१००	२००
१४१	बाँकी १२५ डेरी उद्योगहरु		६००००	२५०००	४५०००
			२८८४००	११२५००	१७५९००

Annex-8: Milk handling by DIA member dairies

S.N.	Name of Dairy Industries	Address	Installed processing Capacity, LPD	Current handling, LPD	Average SMP Conversion Daily During flush season daily 180 Days	Major Products	Remarks
1	Adhunik Dairy Pvt. Ltd	Balaju, Ktm	24000	12000	2000	P. milk, curd, paneer, ghee	
2	Bhaktapur Dairy Pvt. Ltd	Bhaktapur	14000	4000	200	P. milk, ghee	
3	Kalika Dairy Co. Pvt. Ltd	Bhaktapur	35000	19000	2500	P. milk, curd, paneer, ghee	
4	Kathmandu Dairy Pvt. Ltd	Kathmandu	8000	8000	2000	P. milk, curd, paneer, ghee, icecream	
5	Kharipati Dairy Pvt. Ltd	Bhaktapur	40000	25000		P. milk, curd, paneer, ghee	
6	Nava Pravat Dairy Pvt. Ltd	Lalitpur	35000	19000	3000	P. milk, curd, paneer, ghee	
7	Nepal Dairy Pvt. Ltd	Lalitpur	35000	18000	3500	P. milk, curd, paneer, ghee, icecream	
8	Panchsheel Dairy Pvt. Ltd	Balaju, Ktm	7000	3500	200	P. milk, curd, paneer, ghee	
9	Sainju Dairy Pvt Ltd	Bhaktapur	35000	17000	2000	P. milk, curd, paneer, ghee	
10	Rajdhani Dairy Pvt. Ltd	Lalitpur	35000	20000	4000	P. milk, curd, paneer, ghee, khowa	
11	Sujal Dairy Pvt. Ltd, Pokhara	Pokhara, Ktm	120,000	60000	20,000	P. milk, curd, paneer, ghee, Skimmed Milk	
12	Modern dairy I. Pvt. Ltd	Bhaktapur	35000	10000	4000	P. milk, curd, paneer, ghee, icecream	
13	Integrated Dairy And Agro Products Ltd.	Panauti	14000	0			Closed
14	Sanjeevani Dairy Udhog	Bhaktapur	14000	7000	1000	P. milk, curd, paneer, ghee	

S.N.	Name of Dairy Industries	Address	Installed processing Capacity, LPD	Current handling, LPD	Average SMP Conversion Daily During flush season daily 180 Days	Major Products	Remarks
15	Chitawon Milk Ltd., Chitwon	Chitawon	150,000				Only SMP conversion
16	Jagadamba Dairy Pvt. Ltd	Nhaktapur	24,000	15000	1500	P. milk,curd, paneer,ghee	
17	Hetauda Dairy I. Pvt. Ltd	Hetauda	40000	22000	4000	P. milk,curd, paneer,ghee, Condensed Milk	
18	Kamadhenu Dairy Coop.,	Sunsari	40000	15000	2000	P. milk,curd, paneer,ghee	
19	Country Food Pvt. Ltd.	Bhaktapur	24000	12000	1000	P. milk,curd, paneer,ghee	
20	Samuhik Krishak Dairy Ltd.	Kathmandu	8000	5000	1000	P. milk,curd, paneer,ghee	
21	Samyukta Dairy Pvt. Ltd.	Lalitpur	40000	25000	4000	P. milk,curd, paneer,ghee, iccream	
22	Tulasa Dairy Pvt. Ltd	Kathmandu	24000	9000	500	P. milk,curd, paneer,ghee	
23	Shivam Dairy Pvt. Ltd.	Bhaktapur	16000	7000	500	P. milk,curd, paneer,ghee, Icecream	
24	Himilayan Dairy Pvt. Ltd	lalitpur	32000	15000	200	P. milk,curd, paneer,ghee	
25	NMC Dairy Coop Ltd	Jhapa	24000	12000	1000	P. milk,curd, paneer,ghee, icecream	
26	Lumbani Milk Limited	Butwol	24000	10000	1000	P. milk,curd, paneer,ghee, bluck milk	
27	Milan Dairy Pvt Ltd	Saptari	24000	10000	1000	P. milk,curd, paneer,ghee	
28	Kosheli Dairy	Sindhuli	2000	1500	0	P. milk,curd, paneer,ghee	

S.N.	Name of Dairy Industries	Address	Installed processing Capacity, LPD	Current handling, LPD	Average SMP Conversion Daily During flush season daily 180 Days	Major Products	Remarks
29	Fishtail Dairy	Pokhara, Ktm	24000	10000	1000	P. milk,curd, paneer,ghee, icecream	
31	Jeena Bikash Dairy	Bitatnagar	24000	10000	1000	P. milk,curd, paneer,ghee	
30	Anup DAiry	Banepa	24000	12000	1500	P. milk,curd, paneer,ghee	
31	Dharan Dairy Pvt	Dharan	10000	4000	0	P. milk,curd, paneer,ghee	
32	Kanchan Dairy	Bhakunde Besain	24000	9000	1000	P. milk,curd, paneer,ghee	
33	Milko Industries	Lahan	16000	4500	0	P. milk,curd, paneer,ghee P. milk,curd, paneer,ghee	
34	SK Dairy	Nepaljung	8000	4000	0	P. milk,curd, paneer,ghee	
35	Jaya Shambhu Dairt	Bhaktapur	8000	3000	500	P. milk,curd, paneer,ghee	
36	Purbardha Dairy Udhog	Jhapa	16000	7000	0	P. milk,curd, paneer,ghee	
	Total (Ltr)		10,75,000	450,000	65,000 ltr daily		180 days SMP conversion

Annex-9: Comparison of Milk Price and quality standards between Nepal and India

Raw milk Price comparison between of Nepal (DDC), Kolhapur-Maharashtra and Sudha dairy-Bihar, India

Milk price in Nepal is fixed on two axis basis having fixed rate for fat and SNF for all types of quality. In India it is calculated on the basis of two axis with small modification, i.e. SNF rate is calculated as fat equivalent value (2/3 rd value of fat rate), Fat and SNF rate increases with rise in composition as seen in below tables.

DDC (commission or any additional incentive not included) 2018					Kolhapur, Maharashtra (commission or any additional incentive not included) 2018			Sudha, Bihar (commission or any additional incentive not included) 2018				
For all fat and all SNF level					Different rate for different fat and SNF level			Different rate for different fat and SNF level				
	Fat rate per kg (Hetauda local)		SNF rate per kg (Hetauda local)	Price per litre (Hetauda local)	Fat rate per kg	SNF rate per kg	Price per litre		Fat rate per kg		SNF rate per kg	Price per litre
% fat		% SNF						% fat		% SNF		
3%	583	8%	286	40.37	3%	8.5%	35.68	3%	451.2	8.5%	300.80	39.10
4%	583	8.5%	286	47.63	4%	8.5%	42.4	4%	464	8.5%	309.33	44.85
5%	583	8.5%	286	53.46	5%	8.5%	47.2	5%	473.6	8.5%	315.73	50.52
6%	583	9%	286	60.72	Not available			6%	507.2	9%	338.13	60.86

1. Legal standard of market milk in India and Nepal

Type of Milk	Nepal Legal standard				India Legal standard(Bihar, Delhi, Gujarat)			
	Fat%, min.	SNF%, Min.	Coliform count/ml, max.	Total Bacteria /ml, Maximum	Fat%, min.	SNF%, Min.	Coliform count /ml, Maximum	Total Bacteria /ml, Maximum
Full cream milk	5%	8%	0/ml	50,000	6%	9%	10	20,000
Standard Milk	3%	8%	0/ml	50,000	4.5%	8.5%	10	20,000
Cow Milk	3.5%	7.5%	0/ml	50,000	3.5%	8.5%	10	20,000
Recombined milk				50,000	3%	8.5%	10	20,000

Type of Milk	Nepal Legal standard			India Legal standard(Bihar, Delhi, Gujarat)				
Toned milk	Do not exist	Do not exist	Do not exist	50,000	3%	8.5%	10	20,000
Double toned milk				50,000	1.5%	9%	10	20,000
Skim milk				50,000	0.5% max.	8.7%	10	20,000

2. Market milk Price in India and Nepal (2020)

Type of Milk	Price in NPR per litre in Nepal (DDC price)	Price in NPR per litre in Bihar (Sudha)	Price in NPR per litre (Amul Gujarat)	Price in NPR per litre (Mother dairy, Delhi)
Full Cream Milk	100	80	89.6	88
Standard milk	76	68.8	80	Not available
Cow Milk	90	65.6	Not available	75.2
Toned Milk	Do not exist	62.4	70.4	72
Double toned Milk	Do not exist	Not available	Not available	62.4

Milk Product price in Nepal and India (2020)

DDC Nepal	Nepal product price in open market	Sudha, Bihar	Amul	NOVA(standard)	DDC Nepal
All prices are in Nepali currency					
SMP per kg. standard quality	Not in market	660		496	448
Butter /100 g	Not in market		73.6	76	
Butter /500 g	250 for 250 g pack			376	
Processed cheese'200 g				182.4	
Pure Cheese	920 /500g Yak cheese 520/ 500 g cow milk cheese			744 /kg(Cheddar cheese)	
Paneer, 200 g	160		108.8	120	
Paneer, 500 g	385	500 g ND's			
Dahi, 200 ml cup	35/200 ml cup		35.2	35.2	
Dahi, 500 ml/cup	75/500 ml cup	80 for sweet, ND's 145 for 1 L, ND's	80	64 for 400 g	
Ghee , poly pack	900/ 1 litre 450/500 ml		368 per 500 ml	832/kg(cow milk ghee)	
Peda per 200 g			144		

Annex-10: Cost of Milk for Producer and consumer:**A. Total Expenditure for Milk:**

1) Feeds:

a) Cost of Green and Dry Fodder and food:

(i) 400 days for cow. (ii) 450 days for buffalo

b) Concentrate:

(i) 400 days for cow. (ii) 450 days for buffalo

Feed Cost ex-farmer's door step = a + b

2. Labour Charges:

Per day wage of labour 10 cattle x 400 days in the case of cows or
450 days in the case of buffalo

3. Light, water, medicine etc. –

4. Replacement 20% inter calving period –

5. Interest on Capital

6. Miscellaneous Expenses (Insurance, Veterinary Aid etc.)

7. Animal Shed Depreciation 6%

Total Expenditure of A = 1 to 7

B. Less Receipts:

i) Sale of Manures ii) Sale of Gunny Bags iii) Sale of Calf

Total Receipts B = I + II + III

Cost of Production of Milk for Producer = (Total of A - Total of B) / Total Milk in Litres**Price of Milk For Consumer:**

1. Price of Milk Paid by Milk plant to Producer

2. Cost of Procurement:

i) Commission for Dairy Co-operatives –

ii) Cost of Instruments or Depreciation of Instruments provided to Primary Co-op.
Societies,

iii) Transportation Charges for Procurement

iv) Risks, Insurance.

3. Cost of Processing:

i) Cost of Chilling and Pasteurization, Refrigeration Facilities,

ii) Cost of Standardization

iii) Cost of Packaging

iv) Handling Loss v) Cost of Cleaning (C.LP.)

vi) Quality Control and Lab.

vii) Loss in by-products

viii) Fuel, Electricity, Water

4. Cost of Distribution:

- i) Commission for Seller
- ii) Transportation upto Seller
- iii) Advertising
- iv) Leakages

5. Essential and Development Activities Cost:

- i) Veterinary Service Expenses –
- ii) Training and Development Programmes
- iii) Official, Clerical Work Expenses - (Managerial Costs, Stationery, Communications)

6. Cost of Infrastructure:

- i) Interest on Capital
- ii) Depreciation of Machinery and Plant
- iii) Maintenance and Repair

7) Wage Burden.

8) Insurance and Taxes

Conclusion: Thus, the Price for Consumer is total of 1 to 8.

Annex-11: Guidelines for Grant allocation






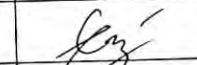

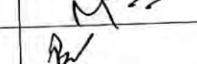
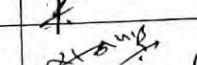
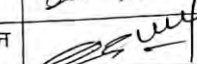

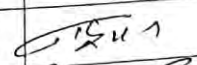
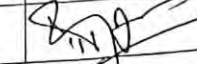
Guidelines for Grant allocation	
1.1.1 Expanded the number of chilling Centers	As per proposed budget detail, Subsidy for chilling centers (individual/cooperative/dairy factory as per NDDDB norms (with analyzer)
1.1.2 Strengthened infrastructure facilities of primary cooperatives	Financial support will be provided to cooperatives abiding with criteria set by NDDDB. Such criteria may include quality of milk, evening and morning collection status, quantity of milk collection, number of members, implementation of code of practices, farmer's welfare scheme etc.
1.2.3 Established the new dairy plants/ industries	Selection criteria may include technology transfer, value added and export-oriented products, location of the plant, farmer's welfare scheme etc.
1.2.4 Upgraded existing dairy plants/ industries	Support will be provided to such entrepreneurs who will comply with NDDDB norms and after evaluation the actual need. It will be provided in phase wise manner as per progress.
2.1.8 Revived dairy enterprises from the Corona Pandemic effect	Subsidy @ 5% interest of the loan against stock of milk products and 50 % rebate in electricity bill
3.1.1 Strengthened and expanded the cold chain network for marketing of processed milk and milk product	Subsidy for 3500 number of modern milks selling booth @ 200,000 each. Such dairy sale point will be developed at important locations of the city. Any individual or entrepreneur may be selected on the basis of guidelines of NDDDB.
3.1.2 Introduced and expanded school milk program	In coordination with local authorities, all together 5000 community schools will be selected for this program covering seven Pradesh. Equal amount should be distributed to each school through the fund allocated.
4.2.1 Reformed milk pricing policy for producers through supporting milko-analyzer	Privately or cooperative owned new or existing Chilling centre shall be provided @ Rs 75,000 each for procuring new milko analyzer as per NDDDB norms.

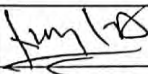
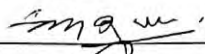
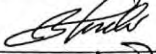
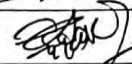


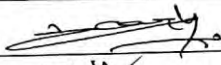
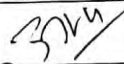




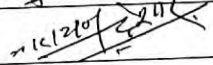

Annex-12: Draft Five Year Dairy Development Plan Validation Workshop

बैठक

आज मिति २०७७ साल असार २१ गते ११:०० बजे ५ वर्षे दुग्ध विकास योजनाको अन्तिम मस्यौदा प्रतिवेदनको प्रस्तुतीकरण कार्यक्रम बोर्डका कार्यकारी निर्देशक श्री डा. राजेन्द्र प्रसाद यादवज्यूको संयोजकत्वमा राष्ट्रिय दुग्ध विकास बोर्डको कार्यालय हरिहरभवनमा बसी निम्न लिखित निर्णयहरू गरियो ।

उपस्थिति

	विवरण	पद	हस्ताक्षर
१	डा. राजेन्द्र प्रसाद यादव	कार्यकारी निर्देशक, रा.दु.वि.बोर्ड	
२	श्री वंशी शर्मा	महानिर्देशक, पशु सेवा विभाग	
३	मलिना बैद्य	महानिर्देशक, खाद्य प्रविधि तथा गुण नियन्त्रण विभाग	
४	श्री रुद्र प्र. पौडेल	महाप्रबन्धक, दुग्ध विकास संस्थान	
५	श्री बाबुकाजी पन्त	उप कार्यकारी निर्देशक, रा.दु.वि.बोर्ड	
६	श्री डिल्लीराम सेडाई	नेपाल लाईभस्टक सेक्टर इनोभेसन	
७	श्री डा. सोम प्रकाश श्रेष्ठ	निर्देशक, पशु तथा मस्य निर्देशनालय, -१३	
८	श्री सुकिल शिरे	प्रधानमन्त्री कृषि आधुनिकीकरण परियोजना	
९	श्री नविन घिमिरे	ब.प.वि.अ.कृषि तथा पशुपन्थी मन्त्रालय	
१०	भिम प्रसाद पुलामी	ब.खा.अ.अ., खाद्य प्रविधि तथा गुण नियन्त्रण विभाग	
११	श्री राजकुमार दहाल	अध्यक्ष, डेरि उद्योग संघ	
१२	श्री प्रलाहद दाहाल	महासचिव, नेपाल डेरी एशोसियसन	
१३	श्री राम प्रसाद आर्चाय	महासचिव, केन्द्रिय दुग्ध सहकारी संघ	
१४	श्री बाबुराम अधिकारी	अध्यक्ष, नेपाल पशुपन्थी पालक सहकारी संघ	
१५	श्री गिरिधर वज्रचार्य	महासचिव, नेपाल डेरी साइन्स एशोसियसन	

१६	श्री टेक बहादुर थापा	सि.डि.एस., टिम लिडर	
१७	सियाराम प्रसाद सिंह	सि.डि.एस.,	
१८	टेक बहादुर बम	सि.डि.एस.,	
१९	भिम मुक्तान	सि.डि.एस.,	
२०	डा. बालक चौधरी	निर्देशक, प्रविधिक, रा.दु.वि.बोर्ड	
२१	श्री बिदुर राई	निर्देशक, प्रशासन, रा.दु.वि.बोर्ड	
२२	डा. हसनामैया श्रेष्ठ	, , ,	
२३	कृष्ण प्रसाद सापकाँर	केन्द्रीय दुग्ध संघ	
२४	अमण भुव	पूर्व कार्यालय निर्देशक, रा.दु.वि.	
२५	राजेश डि. सी	अनुसन्धान अधिकारी, रा.दु.वि.	
२६	अजय पौखरेल	, , ,	
२७	अमोघ काल्दो	श.क. , ,	
२८	दिपे-५ अधिकारी	श.क. , ,	
२९	नारायण देशा	क.क. , ,	
३०	शोकेल अधिकारी	क.क. , ,	

References:

1. Bhattarai U. K., Shrestha M.B. & KC, J.B. (2019). Availability and requirement of technical human resources in Nepal; Proceedings of One-day Workshop on Availability and Requirement of Dairy Science and Technology Related Human Resources in Nepal; jointly organized by CAFODAT, DFTQC, NDDDB, DDC, DIA, NDA, NDSA and NEFOSTA; 11 June, 2019 Kathmandu, Nepal.
2. Bhattarai UK (2064). Quality and Safty Status of Nepalese Dairy Industries, Paper presented in a workshop organised by NDDDB in 2066-03-24 at Lalitpur Nepal.
3. Cattle farming in Nepal: Why farmers cry, 2017
4. COVID-19 NEPAL:PREPAREDNESS AND RESPONSE PLAN, (NPR)
5. Dahal LR, DB Nepali, R Shah (2010). Total bacterial counts of raw milk in eastern Terai of Nepal. The Journal of Agriculture and Environment Vol:11, Jun.2010;Pp 46-50
6. DAIRY PRODUCTION AND ITS IMPLICATION IN HOUSEHOLD INCOME IN THE TARAI REGION OF NEPAL: A CASE STUDY OF CHITWAN DISTRICT, Manjeshwori Singh Keshav Lall Maharjan
7. Dairy Sector Strategy – Nepal, CASA, NEPAL COUNTRY TEAM, April 2020
8. Dairy Value Chain Study in Nepal, NDDDB, Nepal Environment protection centre, baneshower, Kathmandu
9. Department of Animal Nutrition and Management, Swedish University of Agricultural Sciences, P.O. Box 7024, SE-750 07 Uppsala, Sweden. 2Département d'élevage, Institut du Développement Rural, Université Polytechnique de Bobo-Dioulasso, BP 1091, Bobo-Dioulasso, Burkina Faso. Accepted 19 February, 2008
10. Devendra C (2001). Smallholder dairy production system in East and South-East Asia-expanding importance, environmental impacts and opportunities for improvement. CASREN working Paper No 11. ILRI, Metro Manila, Philippines. PP 1-19.
11. Dhakal and Pandey (1992). Journal of Institute and Animal Science.
12. FAO (2010). Dairy Sector Study of Nepal
13. Fourth National Veterinary Conference, Kathmandu, November 17–19.
14. Impact of Dairy Sector Subsidy and Support in Nepal, 2074/75
15. Kolachhapati, M. R., N. R. Devkota and D. B. Nepali. 1993. Performance Evaluation of Farmers' Buffalo Herd in Chitwan, Nepal. J. Inst. Agric. Anim. Sci. 14:97-101.
16. Livestock And Dairy Upgrades Raise Incomes And Help Nepal's Food Security, 2020
17. Lohani, M. N., and Rasali, D. P., 1992. Economic analysis of animal diseases in Nepal.
18. Ministry of Agriculture and Cooperatives Statistics at <http://www.moac.gov.np>
19. National Livestock Policy of Nepal: Needs and Opportunities: *Agriculture* 2015, 5, 103-131; doi:10.3390/agriculture5010103
20. NDDDB (1992). National Dairy Development Board Act, 2048 (1992) The Act Amending Some Nepal Acts, 2055 (1998) 2055.4.26 (10 August 1998). www.lawcommission.gov.np

21. NDDDB (2001). National Milk Marketing and Strategy Study. National Dairy Development Board, Harihar Bhawan, Lalitpur, Nepal.
22. NDDDB (2074). Ten-year Dairy Development Plan (2074/75 -2083/84 BS).
23. NDDDB (2074). Ten-year Dairy Development Plan (2074/75 -2083/84 BS).
24. NDDDB(2001). Quality of milk and milk products in Nepal- A benchmark survey report. National Dairy Development Board, Hariharbhawan, Nepal
25. NDDDB/C/RFP/2075/76/03, 2016
26. NDSA (2018). Proceedings of One-Day Workshop on Quality Milk for Good Health and Prosperity edited by TB Thapa; GD Bajracharya; SP Singh and N Timilsina; December 2018.
27. Neopane, SP and Pokharel PK (2005). Indigenous Cattle of Nepal. Animal Breeding Division, NARC
28. PRESENT STATUS, PROBLEMS AND STRATEGIES FOR THE DEVELOPMENT OF CATTLE FARMING IN NEPAL, Conference: Proceeding of the 10th National Workshop on Livestock and Fisheries Research in Nepal 5-7 March, 2017, At Lumle, Kaski, Nepal, 5-7 March 20
29. Rasali, DP, Gurung, DB and Yadav ER (1998). Performance recording of lactating local and crossbred cows and buffaloes of various exotic blood levels under farmers' management in the western hills (1995-97). Lumle Agricultural Research Centre, Pokhara Nepal. Working Paper No 98/39 (14 pp).
30. Shrestha BS, Amatya NG and Pokharel BR (2010). Dairy Cattle Improvement Project in Nepal – Current status, Lesson Learnt and Way Forward. Paper presented at Terminal Workshop of Dairy Cattle Improvement Project, May 21-22, 2010, Sauraha, Chitwan Nepal
31. Situation-of-milk-production-in-nepal, /https://kapilkhanal46.wordpress.com/2015/06/11
32. Smallholder Dairy Farming in Nepal: Smallholder Dairy Farming in Nepal: Smallholder Dairy Farming in Nepal: Characteristics, Constraints, and Development Opportunities, Bikash Shar Bikash Sharma Kamal Bansk amal Banskota
33. Study and Analysis of Dairy Value Chain in Nepal , Technical Consultation with MountDigit Technology (P.) Ltd. Dhobighat, Lalitpur-3, Nepal
34. Study on the Assessment of Manpower involved in Dairy Industries with Special Reference to Product Development, Quality of the Dairy Products, and Managerial and Financial,
35. Survey on dairy cattle milk production and milk quality problems in peri-urban areas in Burkina Faso V. Millogo¹, G. A. Ouédraogo², S. Agenäs^{1*}, K. Svennersten-Sjaunja¹
36. दुग्ध विकास नीति, २०६४ नेपाल सरकारबाट मिति २०६४/०६/१३ मा स्वीकृत
37. दुग्ध विकास रणनीति (२०७१ - २०९१)राष्ट्रिय दुग्ध विकास बोड, हरिहरभवन, ललितपुर
38. दुग्ध विकास नीति, २०६४ नेपाल सरकारबाट मिति २०६४/०६/१३ मा स्वीकृत



National Dairy Development Board

Harihar Bhawan, Pulchowk

Lalitpur, Nepal

Post Box: 5901

Tel.: 977-1-5525400 / 5544747

Fax: 977-1-5532096

E-mail: nddbnepal@mail.com