Detailed Project Report

on

Cold Chain Development in Milk Procurement

SAMPLE

ABBREVIATIONS

1	Automated Milk Collection Unit	AMCU
2	Bulk Milk Coolers	BMC
3	Compounded Annual Growth Rate	CAGR
4	Dairy Cooperative Societies	DCS
5	Indian Dairy Machinery Company Ltd.	IDMC
6	Skimmed Milk Powder	SMP
7	Solid Not Fat	SNF
8	Whole Milk Powder	WMP

SAMPLE

CONTENTS

SAMPLE

1. Introduction:

- India is the world's largest producer and consumer of dairy. The dairy industry in India was worth INR 5,000 billion in 2016. India is also globally the largest milk producing country since 1997. In India, the co-operatives and private dairies have access to only 20% of the milk produced. Approximately, 34% of the milk is sold in the unorganized market while 46% is consumed locally. This is in comparison to most of the developed nations where almost 90% of the surplus milk is passes through the organized sector.

- Indian dairy industry is contributing significantly in the country's economy besides improving the health standard by increasing the nutritional value of the food. The milk production in 2016-17 was 165.40 million tones as compared to 155.50 million tones in 2015-16. The per capita milk availability of the milk was 355 grams per day in 2016-17. Major milk producing states are Uttar Pradesh, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Bihar, Maharashtra etc.

- Milk is a perishable commodity and bacterial activity starts immediately after milking which leads to degradation of quality of milk. According to various international standards, it is required that immediately after cooling, milk must be cooled preferably to 4° Celsius. This requires mechanical refrigeration or milk cooling tanks. It is important to remember that under a hot environment milk will spoil within 3-4 hours after milking due to increased bacteriological activities. Cooling will lower the temperature of milk which in turn will slow down the bacterial growth.

- To provide fresh milk and milk products to end consumers it is required to develop and maintain a cold chain in milk procurement. Cold chain in milk procurement will include collection of milk from farmers/producers at collection centres equipped with Bulk Milk Coolers (BMCs), Automated Milk Collection Unit(AMCU), Milk Adulteration Testing Equipment and Insulated Milk Tankers for

SAMPLE

transporting chilled milk to milk processing plant/dairy where the milk will be further processed into market/liquid milk and milk products.

2. The Project and the Proposal:

Project: Project aims to establish cold chain in milk procurement in operational area of District Cooperative Milk Union.

3. Objectives:

Project is designed with an aim to fulfill following objectives:

a) Reduction in bacterial growth, freshness retention and increasing the shelf life of milk and milk products;

b) Reduction in economic losses to the producers due to spoilage/sourage of milk;

c) Reduction in cost of transportation;

d) Stoppage of milk adulteration and encouraging quality milk production;

e) Better quality of milk and milk products to end consumers.

f) Increase in farmers/producers income.

4. SWOT Analysis:

The Strengths and weaknesses are factors that are directly controllable, while opportunities and threats derive from the external environment.

STRENGTH	WEAKNESS
• Large number of small and marginal farmers are involved in dairying • Very large number of animals and huge scope to enhance productivity.	• Milk production is scattered over a large number of famers producing miniscule quantities • Because of low credit and risk taking ability, farmers can't increase their herd size • Highly unorganized sector.

SAMPLE

OPPORTUNITIES	THREATS
• Increased farmer income by exploiting the demand • Increased awareness among consumers regarding quality milk and milk products	• Because of high prices sensitivity for dairy products, people are not willing to pay for quality • Low productivity and scattered production leading to high cost of transportation • Emphasis on milk fat and not on SNF content maintaining relatively lower prices of milk.

5. <u>Implementing Agency :</u>

- ABC Milk Union is a Co-operative organization registered in 1972 under Rajasthan Cooperative Societies act 1965. It is an affiliated milk union of Rajasthan Co-operative Dairy Federation Jaipur. Its area of operation is DEF district. Its motto is to procure milk through village level Dairy Cooperative Societies at a remunerative price at their door step round the year along with technical input services such as supply of cattle feed and feed supplement, Veterinary services such as breed improvement programme through, AI and Natural services, Animal treatment, Vaccination etc. and to make available safe and good quality milk and milk products to consumers at a competitive prices. ABC Milk Union has got a modern and technologically updated plant which can handle up to 2 lakh liters of milk per day, having 10 MT capacity powder plant. Milk Union also takes care for all round development of its producers, which includes socio economic development. Most of milk producers are Small, Marginal or Landless.

- Rajasthan is among the top five milk producing states in the country. The state also caters to the demand for milk in the national capital Delhi. State's milk brand Saras is one of the top brands and also the highest paying milk co-operative in

SAMPLE

the country. Rajasthan Co-operative Dairy Federation (RCDF) is one of the biggest dairy co-operatives in the country, collecting 24 lakh litres of milk per day, on an average. It has milk collection unions in 21 districts of the state with a turnover of over Rs 4,500 crore.

6. Milk Procurement Projection for next five years:

- During last 5 years, milk procurement has increased from 1.25 LLPD to 2 LLPD in 2017-18 at a compounded annual growth rate (CAGR) of 9.86%. Looking at the past performance of the Union in milk procurement the Union has proposed to increase its milk procurement to 4.1 LLPD by 2022-23 at a CAGR of 15.44%.
- Number of functional DCS will increase from 385 in 2017-18 to 578 in 2022-23. Membership will increase from present 40000 members in 2017-18 to 60000 in 2022-23. At present, Union is procuring milk from its member DCS through cans and milk tankers. Union proposes to start milk procurement through bulk milk coolers and insulated milk tankers.

7. Project Components:

For establishing cold chain in milk procurement, following components are proposed in the proposal:

a. Installation of Bulk Milk Cooler & accessories. Union will set up 10 BMCs of 2000 litres and 10 BMCs of 3000 litres capacity at 20 different milk routes. DG set will be required for uninterrupted power supply. For installation of BMC, primary societies will be selected based on their performance, potential and logistic location. Since the collection by individual primary society is inadequate to install BMC to each member society level, the union will make cluster of societies and will establish milk collection centre by installing BMC and supportive accessories. BMC will be purchased from supplier.

SAMPLE

b. **Automated Milk Collection Unit(AMCU)**: It comprises of weighing machine, weighing bowl, milkoscan for testing Fat and SNF, computer, printer for generating payment slips.

c. **Electronic Adulteration Testing Equipment:** For providing quality milk and milk products to end consumer, it is required that it should be free from any adulteration and it can be easily tested by installing testing equipment which will detect adulterants present in milk if any. Testing equipment will be purchased from supplier.

   Ownership of BMC, accessories and other supporting equipments will be with Union till the repayment period. After that the respective society will become the owner of the same.

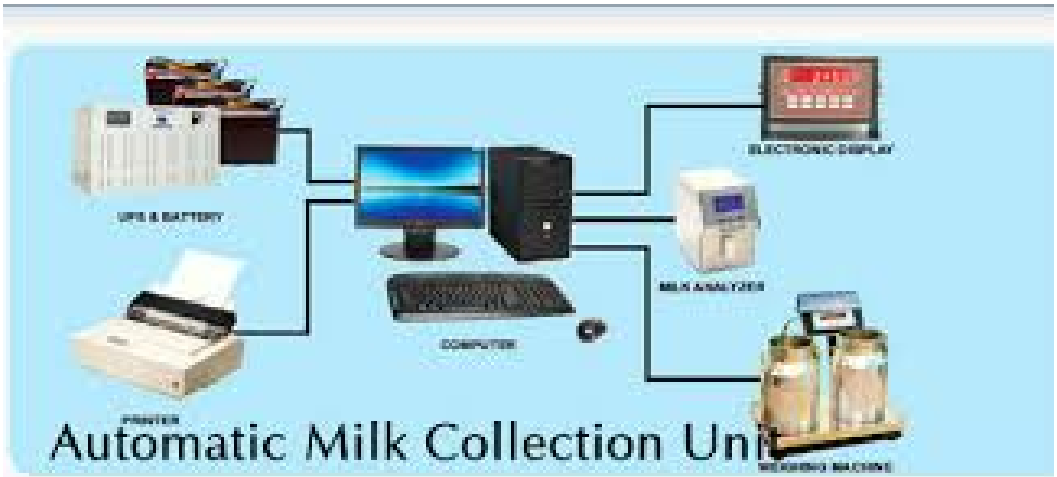
d. **Insulated Milk Tankers:** For transporting milk collected at milk collection centres to milk processing plant.

8. Process Flow:

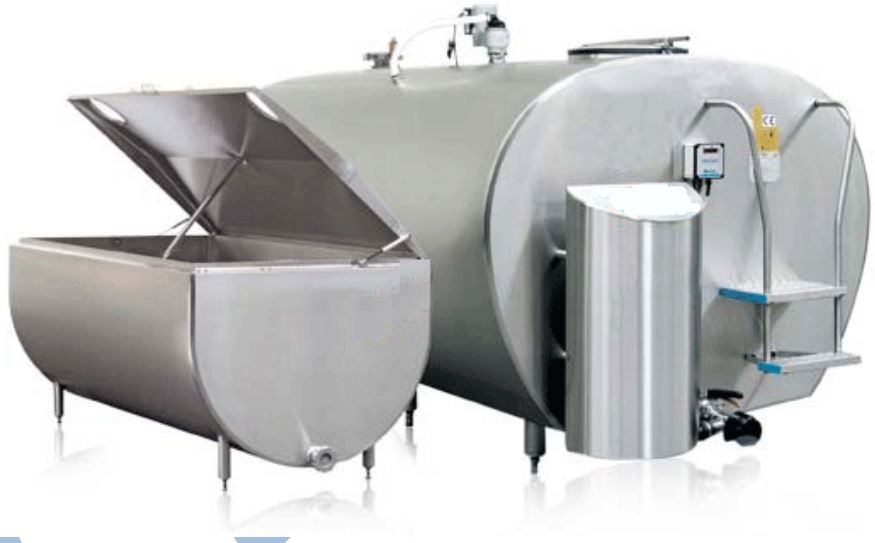
- Farmers/Producers will bring milk to the milk collection centre in cans/utensil where the milk will be collected in balance tank after weighing and sampling. A sample of 5 ml will be taken for testing the quality of milk i.e. for Fat, SNF and adulteration. Report will be displayed on computer screen and payment slip will be generated which contains all the details viz. quantity of milk, fat & SNF% and amount to be paid to farmer. From the balance tank milk will be transferred to Bulk Milk Cooler where it will be chilled to 4° and then it will be transferred to milk processing plant through insulated milk tankers for further processing.

- Milk will be collected twice a day at milk collection centre i.e morning and evening. Payment to the farmer/producer will be done after every 10 days.

SAMPLE



Bulk Milk Cooler



9. Justification of the Project:

Milk is a perishable commodity and it gets spoiled very fast under a hot environment. During summers temperature reaches to 44-47° Celsius during day time. So it is necessary to chill the milk to 4° Celsius immediately after milking and temperature should be maintained at 4° till it reaches processing unit. Advantages of cold chain development are as under:

i. Improvement in quality of milk, as the sourage/curdling will be reduced significantly;

ii. Reduction in transportation cost to the extent of 50 paise per ltr. Due to rationalization of tanker routes;

iii. Reduction in refrigeration load at dairy plant leads to savings of dairy;

iv. Adulteration will be reduced as milk will be tested for adulteration at milk collection centres.

v. Farmers/producers will get better returns for the quality of milk;

vi. Transparency in payment system can be achieved;

vii. Improvement in final product quality.

10. Project Cost:

Union proposes to establish the project at a total outlay of Rs. 700.00 lakh as per the following details:

(Rs. in lakh)

S.No.	Components	Unit Cost	No. of units	Total cost
1	Civil work	2.00	20	40.00
2	Plant & Machinery(2 KL BMC, AMCU & DG Set)	13.00	10	130.00
3	Plant & Machinery(3 KL BMC, AMCU & DG Set)	15.00	10	150.00
4	Electronic Adulteration Testing Equipment	2.00	20	40.00
5	Insulated Milk Tanker (3 KL)	20.00	17	340.00
	Total			700.00

11. Business/Revenue Model:

Revenue will be generated through savings on transportation cost, reduction in sourage of milk, saving sin energy consumption and can maintenance.

12. Pattern of Assistance:

Proposed pattern of assistance for the proposal will be as under:

SAMPLE

(Rs. in lakh)

S.No.	Particulars	(%)	Amount
1	NCDC Loan	80%	560.00
2	Members contribution	20%	140.00
	Total Project cost	**100.00%**	**700.00**

13. Repayment of loan:

The term loan of Rs. 560.00 lakh from NCDC to Union will be repaid over a period of 8 years with first year as grace period as per the repayment schedule presented at **Annexure-I**. The rate of interest on NCDC loan is considered at 10.85% per annum on monthly compounding basis. Union will ensure its timely repayment from the societies by deducting a fixed amount during every payment of milk collected from the respective society.

14. Security for the loan:

It is proposed that fixed deposit receipts having value 1.1 times of NCDC assistance will be given as security.

15. Project Implementation Schedule:

Union has planned to complete the project by installing all the proposed project components, within 12 months of sanction of assistance from NCDC. Accordingly, the following schedule has been chalked out:

S.No.	Action Plan	Commencement	Completion
1	Acquisition of land	Already in possession	
2	Development of land	Already developed	
3	Finalization of Tender for civil works	Within 1 month of sanction	60 days after sanction
4	Building work	30 days after sanction	60 days after sanction
5	Finalization of orders for machinery	60 days after sanction	75 days after sanction
6	Machinery foundation	75 days after sanction	90 days after sanction
7	Erection of Plant & Machinery	90 days after sanction	10 months after sanction

SAMPLE

8	Arrangement for power	Already available	
9	Arrangement for water	Already available	
10	Trial runs	After 11th month of sanction	12th month
11	Commercial operation	12th month	It will continue

16. Economics of the project:

Assumptions for working out cash flow are placed at **Annexure-II.** The economics of the project has been worked out and presented at **Annexure-III a&b** for two different models. The analysis indicates that the performance of the project in the generation of revenue and profits is satisfactory. IRR, DSCR & Payback Period of Discounted Cash Flow (DCF) basis of the components of different model is as under:

S.No.	Component	IRR	DSCR	Payback Period (DCF)
1	Chilling infrastructure and supporting facilities (BMC – 2000 litres)	15%	1.56	5 years 1 month
2	Chilling infrastructure and supporting facilities (BMC – 3000 litres)	25%	2.10	3 years 10 months

17. Risk Assessment:

Following risks are identified related to the project proposal:

i. Availability of Raw Material: Raw material i.e. milk is easily available in the project area. For ensuring continuous supply of milk, Union will give incentives on annual basis.

ii. Technical Manpower: Union will give proper training to the individuals for operating bulk milk coolers and other equipments.

iii. Electricity: For uninterrupted power supply, Union has made provision of installing DG Sets of suitable capacity at project location .

iv. Quality of raw material: For avoiding adulteration of milk, Union has proposed to install electronic adulteration testing machine in the proposed project.

SAMPLE

Annexure-I

Repayment Schedule for NCDC Loan

(Rs. in lakh)

Loan period - 8 years with moratorium of 1 year on repayment of Principal

Project cost		**700.00**
Loan	80%	**560.00**
Union's Share	20%	**140.00**

NCDC rate of interest **10.85%**

Compounding frequency 12

Loan repayment schedule

Installments	Out standing loan	Principal	Interest	Total
				-560.00
1	560.00	0	63.87	63.87
2	560.00	80.00	63.87	143.87
3	480.00	80.00	54.75	134.75
4	400.00	80.00	45.62	125.62
5	320.00	80.00	36.5	116.50
6	240.00	80.00	27.37	107.37
7	160.00	80.00	18.25	98.25
8	80.00	80.00	9.12	89.12
Total		560.00	319.35	879.35
Effective Rate of Interest				**11.41%**

SAMPLE

Annexure-II

Assumptions			
S.No.	**Particulars**	**BMC Model**	
		2000 litre	3000 litre
1	Installed capacity (litres/day)	2000	3000
2	Capacity utilization	80%	80%
3	Savings on transportation (Rs./ltr)	0.35	0.35
4	Energy savings at Main Dairy (Rs. Ltr)	0.05	0.05
5	Sourage Savings (in %)	0.75%	0.75%
6	Savings on Can Maintenance (Rs./ltr.)	0.03	0.03
7	Energy + Maintenance cost (Rs./ltr.)	0.30	0.3
8	Incentives to societies (Rs./ltr.)	0.04	0.04
9	Interest Rate (monthly compounding)	10.85%	
10	Depreciation rate	Civil works-10% & Plant & Machinery - 15%	
11	Loan Period	8 years	
12	Moratorium Period	1 year	

SAMPLE

Annexure-IIIa

Cash FlowAnalysis for BMC of 2000 ltr capacity

Particulars	Assumptions	Yr-0	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8
Installed capacity		2000								
Capacity Utilization			80%	80%	85%	85%	90%	90%	95%	95%
Milk procurement in liters/day			1600	1600	1700	1700	1800	1800	1900	1900
Income										
Savings on transportation (Rs./ltr)	0.35		204400.00	204400.00	217175.00	217175.00	229950.00	229950.00	242725.00	242725.00
Energy savings at Main Dairy (Rs. Ltr)	0.05		29200.00	29200.00	31025.00	31025.00	32850.00	32850.00	34675.00	34675.00
Sourage Savings (in %)	0.75%		4380.00	4380.00	4653.75	4653.75	4927.50	4927.50	5201.25	5201.25
Savings on Can Maintenance (Rs./ltr.)	0.03		319740.00	319740.00	339723.75	339723.75	359707.50	359707.50	379691.25	379691.25
Total Income			**557720.00**	**557720.00**	**592577.50**	**592577.50**	**627435.00**	**627435.00**	**662292.50**	**662292.50**
Expenses										
Energy + Maintenance cost (Rs./ltr.)	0.30	0	175200.00	175200.00	186150.00	186150.00	197100.00	197100.00	208050.00	208050.00
Incentives to societies (Rs./ltr.)	0.04		23360.00	23360.00	24820.00	24820.00	26280.00	26280.00	27740.00	27740.00
Total Expense		**0**	**198560.00**	**198560.00**	**210970.00**	**210970.00**	**223380.00**	**223380.00**	**235790.00**	**235790.00**
Surplus		**0**	**359160.00**	**359160.00**	**381607.50**	**381607.50**	**404055.00**	**404055.00**	**426502.50**	**426502.50**
Interest Repayment		0	155123.76	155123.76	132963.22	110802.69	88642.15	66481.61	44321.07	22160.54
Depreciation		0	245000.00	209250.00	178762.50	152758.13	130573.41	111643.50	95487.46	81695.78
Net Profit		**0**	**-40963.76**	**-5213.76**	**69881.78**	**118046.69**	**184839.44**	**225929.89**	**286693.97**	**322646.18**
Net Cashflow for IRR		-1700000.00	359160.00	359160.00	381607.50	381607.50	404055.00	404055.00	426502.50	426502.50
IRR		**15%**								
Instalment of Principal		0	0	194285.71	194285.71	194285.71	194285.71	194285.71	194285.71	194285.71
Debts to be Serviced		0	155123.76	349409.47	327248.93	305088.40	282927.86	260767.32	238606.78	216446.25
DSCR			2.32	1.03	1.17	1.25	1.43	1.55	1.79	1.97
Average DSCR		**1.56**								
Discounted Cash Flow @ 11.41%			322376.81	289360.75	275958.88	247696.69	235407.13	211298.03	200194.60	179691.77
Payback period @ DCF		**6 years 7 months**								
NPV		**₹ 28,011.74**								

SAMPLE

Annexure-IIIb

Cash Flow Analysis for BMC of 3000 ltr capacity

									Rs. in lakh	
Particulars	Assumptions	Yr-0	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8
Installed capacity		3000								
Capacity Utilization			80%	80%	85%	85%	90%	90%	95%	95%
Milk procurement in liters/day			2400	2400	2550	2550	2700	2700	2850	2850
Income										
Savings on transportation (Rs./ltr)	0.35		306600.00	306600.00	325762.50	325762.50	344925.00	344925.00	364087.50	364087.50
Energy savings at Main Dairy (Rs. Ltr)	0.05		43800.00	43800.00	46537.50	46537.50	49275.00	49275.00	52012.50	52012.50
Sourage Savings (in %)	0.75%		6570.00	6570.00	6980.63	6980.63	7391.25	7391.25	7801.88	7801.88
Savings on Can Maintenance (Rs./ltr.)	0.03		479610.00	479610.00	509585.63	509585.63	539561.25	539561.25	569536.88	569536.88
Total Income			**836580.00**	**836580.00**	**888866.25**	**888866.25**	**941152.50**	**941152.50**	**993438.75**	**993438.75**
Expenses										
Energy + Maintenance cost (Rs./ltr.)	0.30	0	262800.00	262800.00	279225.00	279225.00	295650.00	295650.00	312075.00	312075.00
Incentives to societies (Rs./ltr.)	0.04		35040.00	35040.00	37230.00	37230.00	39420.00	39420.00	41610.00	41610.00
Total Expense		**0**	**297840.00**	**297840.00**	**316455.00**	**316455.00**	**335070.00**	**335070.00**	**353685.00**	**353685.00**
Surplus		**0**	**538740.00**	**538740.00**	**572411.25**	**572411.25**	**606082.50**	**606082.50**	**639753.75**	**639753.75**
Interest Repayment		0	173373.62	173373.62	148605.96	123838.30	99070.64	74302.98	49535.32	24767.66
Depreciation		0	275000.00	234750.00	200437.50	171181.88	146233.59	124954.65	106801.95	91313.10
Net Profit		**0**	**90366.38**	**130616.38**	**223367.79**	**277391.08**	**360778.27**	**406824.87**	**483416.48**	**523672.99**
Net Cashflow for IRR		-1900000.00	538740.00	538740.00	572411.25	572411.25	606082.50	606082.50	639753.75	639753.75
IRR		**25%**								
Instalment of Principal		0	0	217142.86	217142.86	217142.86	217142.86	217142.86	217142.86	217142.86
Debts to be Serviced		0	173373.62	390516.48	365748.82	340981.16	316213.50	291445.84	266678.18	241910.52
DSCR			3.11	1.38	1.57	1.68	1.92	2.08	2.40	2.64
Average DSCR		**2.10**								
Discounted cash flow @ 11.41%			483565.21	434041.12	413938.33	371545.04	353110.70	316947.04	300291.90	269537.66
Payback period		**4 years 6 months**								
NPV		**₹ 42,017.61**								

SAMPLE