

MODEL BANKABLE PROJECT ON BULK MILK COOLING UNITS



**NATIONAL BANK
FOR AGRICULTURE AND RURAL DEVELOPMENT**

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MODEL BANKABLE PROJECT ON BULK MILK COOLING UNITS

1. Introduction:

1.1 Indian dairy industry is contributing significantly to the country's economy, besides improving the health standard by increasing the nutritional value of the food. India occupies first position in the world milk production with 17% share of in global milk output. The milk production is estimated at 133 million tonnes during 2012-13 as compared to 127.9 million tonnes of milk during 2011-12. The value of output of milk was Rs3,05,484 crore in 2011-12, which is higher than the value of output of paddy and wheat.

1.2 The milk production increased from 17 million tones in 1950-1951 to 132.43 million tonnes during 2012-2013. The milk production significantly increased from the level of 102.6 million tonnes at the end of the Tenth Plan (2006-07) to 127.9 million tonnes at the end of the Eleventh Plan (2011-12). The per capita availability of the milk was 296 grams per day during the year 2012-13, which is more than the world average of 294 grams per day and the ICMR recommendation of 250 gms. The organised sector is presently handling about 16 % of milk produced.

1.3 As per 19th Livestock census, 2012, the country has about 190.90 million cattle (122.98 million female cattle) and 108.7 million buffaloes (92.6 million female buffaloes). Breedable female cattle and breedable female buffaloes account for 76.685 million (21.268 million crossbred cattle and 55.417 million indigenous cattle) and 56.586 million numbers, respectively.

1.4 Recognizing the importance of the sector, the notable programmes taken up by GOI are key village schemes, intensive cattle development projects, crossbreeding projects through bilateral assistance, Operation Flood programme, Technology Mission etc. Most of the milk in the Country is produced by small, marginal farmers and landless labourers. About 15.1 million farmers have been brought under the ambit of 1,55,634 village level dairy corporative societies up to March 2013. The cooperative milk unions have procured an average of 32.8 million kgs of milk per day during the year 2012-13 as compared to 28.7 million kgs in the previous year recording a growth of 14.3 percent. The sale of liquid milk by cooperative sector has reached 23.7 million litres per day during the year 2012-13 registering a growth of 3.7% over the previous year.

1.5 For strengthening the efforts of the dairy cooperatives to increase productivity and income of the milk producers/farmers through improved management of breeding and feeding, Government has launched the National Dairy Plan (Phase-I) with effect from 2011-12 to be implemented during Twelfth Plan with an outlay of Rs 1,756 crore. The NDP-I will help to meet the projected national demand of 150 million tonnes of milk by 2016-17 from domestic production through productivity enhancement, strengthening and expanding village level infrastructure for milk procurement and provide producers with greater access to markets. NDP-I would focus on fourteen major milk producing states viz. Uttar Pradesh, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Bihar, West Bengal, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Orissa and Kerala account for over 90% of the country's milk production.

1.6 National Programme for Bovine Breeding and Dairy Development (NPBB&DD) : A new Scheme titled "National Programme for Bovine Breeding and Dairy Development" (NPBB&DD) has been launched on 27.02.2014 by merger of four ongoing schemes viz. Integrated Dairy Development Programme (IDDP), Strengthening Infrastructure for Quality & Clean Milk Production (SIQ-CMP), Assistant to Cooperatives (A to C) and National Project for Cattle & Buffalo Breeding (NPCBB), NPBB&DD will have two components (a) National Programme for Bovine Breeding (NPBB) and (b) National Programme for Dairy Development (NPDD). A budgetary provision of Rs1,800 crore has been made for implementation the scheme during 12th Five Year Plan.

Milk chilling capacity of 1,705 TLPD and 1844 YLPD has been created during 2012-13 and 2013-14 in Cooperative dairy sector.

1.7 As per APEDA, the export dairy products (Butter, butter oil, cheese, butter milk, skimmed milk powder, milk for babies, whole milk and ghee) was to the tune of 1.59 lakh MT valued at Rs 3318.5 crore during 2013-14 to Bangladesh, Egypt, UAE, Algeria, Yemen and Pakistan.

1.8. Having made a significant stride in production and processing, efforts have to be directed to provide hygienically safe milk and milk products to the consumers. In addition to fat and SNF, the bacteriological quality has also be taken into account for determining quality of the milk. As per Codex Alimentarius, Milk and Milk products, WHO and FAO, immediately after milking, the milk must be cooled preferably to 4° C. 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. So cooling will lower the temperature of milk to prevent multiplication of bacteria. Further, for production of milk used for raw milk products, when milk for further processing is not collected or used within 2 hours after milking, it shall be cooled to a temperature equal to or below 6° C when collected on a daily basis; or cooled to or below 4° C when not collected every day.

1.9 The best alternative to the present collection system of milk is cooling of milk immediately after milking by Bulk Cooling Tanks. The usage of such tanks has become popular and is on the rise as it helps in increasing the shelf-life of milk, facilitates systematic and simple way of milk procurement and ensures procurement of more milk by covering untapped farther areas for Milk Collection. Further the efforts are aimed at setting up of collection centres along milk routes to increase procurement in the organized sector to facilitate scientific handling of milk as per quality norms. The emphasis has to be on veterinary support infrastructure and strengthening cold chain for quality milk production.

1.10.. NABARD has been actively involved in credit planning, fixation of unit costs and promoting credit flow for various investments under dairy sector. NABARD is also acting as the nodal agency for implementing the credit linked Dairy Entrepreneurship Development Scheme (DEDS) of Govt of India for routing of subsidy admissible (25 % or 33.33%) under the scheme. Purchase of Milking Machine/Milko testers/ Bulk Milk Cooling Units up to 5000 LPD capacity is one of the eligible activity under the scheme. The scheme has been extended for 12th Plan.

2. Objectives:

The financial assistance is extended for purchase of bulk milk coolers with the following objectives.

1. To arrest bacterial growth, retain freshness and enhance the keeping quality of milk
2. To avoid economic losses to the producers due to spillage/sourage of milk.
3. To make available quality milk for production of quality products for export as well as to meet the domestic requirements.
4. To reduce the transportation cost by regulating transportation of the milk on alternative days or once in day for two collections and also through reduction in expenditure on purchase and maintenance of cans.
5. To ensure clean milk production

3. Potential areas:

Bulk Milk Cooling Units are now taken up in all parts of the country. The scheme has potential to finance in Operation Flood programme(OFP) and also In non- OFP districts under Govt., private and cooperative sectors.

4. Beneficiaries:

Village Milk Cooperative Societies of Cooperative Milk Unions or Milk Collection Centres of private Dairies or units. Producer Companies, SHG Federations, individuals in tie up with private dairies can also take up the activity. The bulk cooling units are also considered as part of large dairy farms and processing units.

5. Project Details:

- **Components:** The components of Bulk Milk Cooling Unit comprises of bulk cooling tank with accessories, DG set, weighing machine, weighing bowl, roller conveyor, can wash tub, Automatic Milk Collection Unit (AMCU), water storage tanks etc.

- **Capacity** :The capacity of Bulk Milk Cooling Units is ranging from 500 to 10000 litres.
- **Specifications**: The specifications of different models manufactured by two firms are given in Appendix 1.
- **Equipment suppliers**: The machinery should conform to the BIS standards and are presently manufactured in the country by DeLaval Pvt Ltd, IDMC, IFS Industries Pvt Ltd,etc. The addresses of few manufacturers are given in Appendix II for reference.
- **Processing**: The operations involve collection of milk and chilling to a temperature of 4 °C
- **Advantages**:
 1. Elimination of souring/curdling of milk due to cooling at the collection centre itself.
 2. Adulteration of milk and spillage from cans can be eliminated during transport.
 3. Transportation cost of milk can be brought down by regulating transportation to the main dairy either on alternative days or once in a day.
 4. Saving of initial investment on purchase of cans and subsequent maintenance cost (Repairs, cleaning etc.).
 5. Improved quality of milk can be supplied to the main dairy to manufacture quality products for domestic as well as export markets.
 6. Flexibility in milk collection time results in increase in volume of milk collected at the centres.
 7. Farmers will get better returns for the quality of milk.
 8. Chilling at the Main dairy can be avoided.

6. Technical Collaboration: Since the process is simple no technical collaboration is envisaged for the project, however the Milk Unions/Private Dairy Plants would be providing guidance to the societies/collection centres in purchase and installation of Bulk Milk Coolers, milk testing and in training of manpower in the operations and maintenance.

7. Capital Cost: The capital cost varies with the capacity and the specifications of the Bulk Milk Coolers. However, two models have been considered i.e. 2000 and 5000 litres capacity, whose unit costs are Rs. 11.80 lakhs and 17.25 lakhs respectively. The detailed unit cost is given in the Annexure I. It is assumed that the space available in the existing collection centre/cooperative society will be sufficient to install the equipment and accordingly no cost on civil structures is considered. In case if the civil structures are required to be considered, the same may be included under project cost. Similarly rental accommodation could also be explored. Constructed area of about 800 to 1200 sq.ft is sufficient.

8. Backward and forward Linkages

The location of the Bulk Cooling unit should in milk shed area having potential for milk procurement. Proper arrangements for milk procurement from farmers to the unit through milk routes or alternate means have to be taken care. Regular supply of utilities such as power, fuel and water have to be ensured. Man power in terms of operator, tester, workers, incharge , etc. are needed.

9. Economics of the project:

Based on the various techno economic parameters given in Annexure II, the economics of the project has been worked out and presented in Annexure III A and B for two different models. The items of income include saving due to reduction in souring/curdling of milk, reduction in spillage and pilferage of milk, payment received for chilling, saving in repairs and replacement of cans, saving in expenditure on transportation, etc. The components of expenditure include transport expenses from society to BMCU, power and fuel expenses, repairs and maintenance, manpower, miscellaneous expenses, etc.

10. Financial Analysis:

The income and expenditure details for two models are presented in Annexure III A and III B. Financial analysis covering the Benefit Cost Ratio (BCR) Net Present Worth (NPW) and Internal Rate of Return (IRR) have been worked out and presented in Annexure IV A and IV B. For the models of 2000 litres and 5000 litres, the BCR, NPW and IRR worked out to 1.124 :1 and 1.10:1; Rs. 5.13 lakhs and Rs.10.311 lakh and 27.89 % and 35.60 %, respectively. The entire bank loan can be repaid in nine / eight years without any grace period as per the repayment schedules presented in Annexure V A and V B.

11. Financial assistance:

Bulk Milk Cooling units of various sizes are eligible economic activities for loan from banks and refinance support by NABARD. The banks may consider financing for this activity subject to technical feasibility, financial viability and bankability.

12. Lending Terms and other requirements:

12.1 Margin Money: The society or Milk collection centre should normally meet 20% of the project cost

12.2 Interest rate: Interest rate will be as determined by the financing bank. For working out model, the rate has been considered at 12 percent.

12.3 Security: As stipulated by the RBI

12.4 Insurance: The financing bank may ensure that the society takes adequate insurance cover for the asset

12.5 Repayment period: Depends upon the gross surplus generated, it may be upto 8 -9 years without any grace period for the two models (Annexure-V- A and V – B)..

13 Special terms and conditions:

The special terms and conditions of the project are given in Annexure VI.

Annexure - I

Unit cost, bank loan and margin money for the Bulk Milk Cooling unit are shown in Annexure-I.

(Rs. in lakhs)

S. No.	Particulars	Models	
		2000 lit.	5000 lit.
1	Cost of Bulk Milk Cooler including accessories	5.3	8.9
2	Generator, weighing machine, weighing bowl, roller conveyor, can wash tub, AMCU, electricity connection, installation, etc	6.48	8.34
3	Total cost	11.78	17.24

4	Margin Money (20%)	2.36	3.45
5	Bank loan (80%)	9.42	13.79

Annexure - II

Techno-economic parameters - Bulk Milk Cooling Units

Sr.No.	Particulars	Model	
		2000 liters	5000 liters
A	Income		
1	Installed capacity (liters per day)	2000	5000
2	Capacity utilisation (%) First year for six months	60	60
	Second year	70	70
	Third year	80	80
	Forth year	90	80
	onwards		
3	Reduction in souring and curdling of milk as % of milk procured	1.0	1.0
4	Saving in income due to reduction in souring/ curdling (Rs./lit of sour milk)	6.825	6.825
5	Reduction in spillage and pilferage in cans during transportation as % of milk procured	1.0	1.0
6	Cost of raw material - Milk (Rs./lit.) avg price of milk (cow and buffalo milk at equal proportion)	27.30	27.30
7	Payment received from unions for chilling of milk (Rs/lit)	1.25	1.25
8	Saving in investment and repair of cans (Rs /lit)	0.05	0.05
9	Saving in transportation cost of milk (Rs /lit)	0.15	0.15
B	Expenditure		

1	Milk transportation expenses from society to BMCU (Rs 0.65 /lit)	3.559	8.304	9.490	9.490	9.490	9.490	9.490	9.490	9.490
2	Power and fuel consumption (Rs 0.25/litre)	1.369	3.194	3.650	3.650	3.650	3.650	3.650	3.650	3.650
3	Repairs and maintenance (@ Rs.0.05 / litre)	0.274	0.639	0.730	0.730	0.730	0.730	0.730	0.730	0.730
4	Man power cost (Rs 0.35/lit)	1.916	4.471	5.110	5.110	5.110	5.110	5.110	5.110	5.110
5	Miscellaneous expenses (Rs 0.08 /lit)	0.438	1.022	1.168	1.168	1.168	1.168	1.168	1.168	1.168
	Total Expenditure	7.556	17.630	20.148	20.148	20.148	20.148	20.148	20.148	20.148
C	Gross surplus (A-B)	2.252	5.254	6.004	6.004	6.004	6.004	6.004	6.004	6.004

Annexure - IV (A)

Financial analysis - BCR, NPW and IRR - Bulk Milk Cooling Unit of 2000 liters

(Rs. in lakhs)

Sr. No	Particulars	Years								
		I	II	III	IV	V	VI	VII	VIII	IX
1	Capital cost	11.78	-	-	-	-	-	-	-	-
2	Recurring cost	2.628	6.132	7.008	7.884	7.884	7.884	7.884	7.884	7.884
3	Total cost	14.408	6.132	7.008	7.884	7.884	7.884	7.884	7.884	7.884
4	Benefits	3.923	9.153	10.461	11.769	11.769	11.769	11.769	11.769	11.769
5	Depreciated value	-	-	-	-	-	-	-	-	0.118
6	Total benefits	3.923	9.153	10.461	11.769	11.769	11.769	11.769	11.769	11.886
7	Net benefits	-10.485	3.021	3.453	3.885	3.885	3.885	3.885	3.885	4.002
8	Discount Factor @ 15%	0.87	0.756	0.658	0.572	0.497	0.432	0.376	0.327	0.284
9	Present Worth of Costs @ 15% DF	12.535	4.636	4.611	4.510	3.918	3.406	2.964	2.578	2.239
10	Present Worth of Benefits @ 15% DF	3.413	6.920	6.883	6.732	5.849	5.084	4.425	3.848	3.376
11	Net Present Worth @ 15% DF	5.132								
12	Benefit Cost Ratio (BCR)	1.124								
13	Internal Rate of Return (IRR)	29.89%	1							

Annexure - IV (B)

Financial Analysis - BCR, NPW and IRR - Bulk Milk Cooling Unit of 5000 liters

(Rs. in lakhs)

Sr. No	Particulars	Years								
		I	II	III	IV	V	VI	VII	VIII	IX
1	Capital cost	17.24	-	-	-	-	-	-	-	-
2	Recurring cost	7.556	17.630	20.148	20.148	20.148	20.148	20.148	20.148	20.148
3	Total cost	24.796	17.630	20.148	20.148	20.148	20.148	20.148	20.148	20.148
4	Benefits	9.807	22.883	26.152	26.152	26.152	26.152	26.152	26.152	26.152
5	Depreciated value	-	-	-	-	-	-	-	-	1.724
6	Total benefits	9.807	22.883	26.152	26.152	26.152	26.152	26.152	26.152	27.876
7	Net benefits	-14.988	5.254	6.004	6.004	6.004	6.004	6.004	6.004	7.728
8	Discount Factor @ 15%	0.87	0.756	0.658	0.572	0.497	0.432	0.376	0.327	0.284
9	Present Worth of Costs @ 15% DF	21.572	13.328	13.257	11.525	10.014	8.704	7.576	6.588	5.722
10	Present Worth of Benefits @ 15% DF	8.532	17.300	17.208	14.959	12.998	11.298	9.833	8.552	7.917
11	Net Present Worth @ 15% DF	10.311								
12	Benefit Cost Ratio (BCR)	1.10								
13	Internal Rate of Return (IRR)	35.60%	1							

Annexure - V (A)

Repayment schedule - Bulk Milk Cooling Unit of 2000 liters

(Rs. in lakhs)

Year	Bank Loan Beginning	Outstanding End	Gross surplus	Payment of interest	Repayment of principal	Total repayment	Net Available	DSCR
1	9.424	9.424	1.295	0.848	0.000	0.848	0.447	1.527
2	9.424	8.924	3.021	1.131	0.500	1.631	1.390	1.853
3	8.924	8.174	3.453	1.071	0.750	1.821	1.632	1.896
4	8.174	7.174	3.885	0.981	1.000	1.981	1.904	1.961
5	7.174	5.974	3.885	0.861	1.200	2.061	1.824	1.885
6	5.974	4.724	3.885	0.717	1.250	1.967	1.918	1.975

7	4.724	3.224	3.885	0.567	1.500	2.067	1.818	1.879
8	3.224	1.724	3.885	0.387	1.500	1.887	1.998	2.059
9	1.724	0.000	3.885	0.207	1.724	1.931	1.954	2.012
	Avg.DSCR		=	<u>1.894</u>				

Annexure - V (B)

Repayment schedule - Bulk Milk Cooling Unit of 5000 liters

(Rs. in lakhs)

Year	Bank Loan Beginning	Outstanding End	Gross surplus	Payment of interest	Repayment of principal	Total repayment	Net Available	DSCR
1	13.792	13.542	2.252	1.241	0.250	1.491	0.760	1.510
2	13.542	12.542	5.254	1.625	1.000	2.625	2.629	2.001
3	12.542	11.042	6.004	1.505	1.500	3.005	2.999	1.998
4	11.042	9.292	6.004	1.325	1.750	3.075	2.929	1.953
5	9.292	7.292	6.004	1.115	2.000	3.115	2.889	1.928
6	7.292	5.292	6.004	0.875	2.000	2.875	3.129	2.088
7	5.292	2.292	6.004	0.635	3.000	3.000	3.004	2.001
8	2.292	0.002	6.004	0.275	2.290	2.565	3.439	2.341
	Avg.DSCR		=	<u>1.977</u>				

ANNEXURE VI

Special Terms and Conditions - Bulk Milk Cooling Units

The financing bank may ensure that:

1. the milk union/ dairy identifies the societies/ milk collection centres whose milk collection is about 1400-1800 litres and 3000-4000 litres per day for installing 2000 litres & 5000 litres capacity bulk milk cooling units taking into consideration of the likely acceptance of the dairy farmers for the shift in the system.
2. the union/ dairy guides the society for purchase and installation of BMCU.

3. the union/ dairy imparts training to the secretary and other staff of the society/ milk collection centre in the operation and maintenance of BMCU and in testing of milk
4. the society/ milk collection centre enters into an annual contract with the equipment supplying firm for maintenance of BMCU.
5. the society/ milk collection centre insures the BMCU, provided the insurance coverage is available.
6. the milk union/ dairy in coordination with the bank explores the possibility of getting subsidy under other schemes for purchase of BMCU by the societies/milk collection centres.
7. the milk union/dairy can provided other services to the milk suppliers viz. supply of concentrate feed, fodder seed or rooted slips/ stem cuttings, veterinary and AI services, trainings, facilitate animal induction, etc.
8. the union/ dairy provides tie-up arrangement for the repayment of bank loan out of sale proceeds.
9. the union provides adequate compensation to the societies/ milk collection centre to meet the chilling cost of milk.
10. the union/ dairy gives better price for good quality chilled milk supplied by the society/milk collection centre.

Appendix I

Technical specifications of bulk milk coolers

Particulars		Mahesh Engineering	De Laval Pvt Ltd	ISF	
		BI-DX-HCL	Dx5000	3000	5000
1	Basis of Design	ISO 5708	ISO 5708	ISO 5708	ISO 5708
2	Types of Cooling System	Direct	Direct	Direct	Direct
3	Shape of Tank	Horizontal Semicylindrical	Closed Horizontal cylindrical	Closed Horizontal cylindrical	Closed Horizontal cylindrical
4	Compressor type	Hermetic	Scroll	Scroll	Scroll
5	No. of compressors	One	Two	Two	Two
6	No. of fans	Two	Four	Four	Four
7	Power supply	Single/ Three Phase 415V,	Three Phase 425V,50Hz	Three 415V,50Hz	Three Phase 415V,50Hz
8	Connected load	4.96 kw	13 kw	9 kw	13 kw
9	Voltage stabilizer	10 KVA	25 KVA	25 KVA	25 KVA
10	Temperature	From 35 C to 4 C	From 35 C to 4 C	From 35 C to 4 C	From 35 C to 4 C
11	Cooling time	3 hours	3 hours	3 hours	3 hours
12	Diesel Generator	15 KVA	25 KVA	25 KVA	25 KVA

DISCLAIMER

The views expressed in this model project are advisory in nature. NABARD assume no financial liability for anyone using this project report for any purpose. The actual costs and returns will have to be taken on a case by case basis considering the specific requirements of projects.

Appendix II

List of major suppliers of Bulk Milk Coolers

1. DeLaval Pvt Ltd
A-3 Abhimanshree Society, Pashan Road
Pune - 411 008, Maharashtra, India
2. Indian Dairy Machinery Company Ltd.
GIDC Estate
Vithal Udyognagar - 388121
Gujarat, India
3. New Dairy Engineering and Trading Company Pvt. Ltd.
B-8/5, Badli Industrial Estate
Phase I, Delhi - 110042,
India
4. IFS Industries Pvt Ltd
88 & 90 Madavilakkam village
Thirumazhisai, poonamallee Tq
Chennai- 600123
5. Indo Stainless Fabtech (Pvt.) Ltd.
No 439 SIDCO Industrial Estate
Ambattur
Chennai-600098
6. Mahesh Engineering works
G-10 Ravi Estate Rustam, Milk Compound
Near Torrent Power ltd
Dudeshwar Road
Ahmedabad – 380004, Gujarat