

## **Milk Processing**

### **1. INTRODUCTION**

1.1 The Indian dairy industry is contributing significantly to the country's economy, besides improving the health standard by increasing the nutrition value of the food. The value of output from Dairy Sector increased to Rs.5,00,510 million in 1994-95 from Rs.2,75,080 million in 1990 and is expected to reach the level of Rs. 8,50,000 million by the year 2000 A.D.

1.2 India occupies first position in the world having a total bovine population of 288 million compared to the world's total bovine population of 1420 million. As per 1992 livestock census, the country has about 62.90 million breedable cows and 42.46 million breedable buffaloes (Statewise and species/breedwise figures are given in Annexure I). The cross bred cattle are predominant in Kerala, Maharashtra, Tamil Nadu, Punjab and Uttar Pradesh, While buffaloes are very common in Uttar Pradesh, Andhra Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Gujarat, Punjab, Bihar, Karnataka, Haryana and Tamil Nadu

1.3 There has been a major improvement in milk production which increased from 17 million tones in 1951 to 70.1 million tonnes in 1997 and the growth was maximum between 1980 and 1990. Uttar Pradesh, Punjab, Madhya Pradesh, Rajasthan, Maharashtra, Gujarat, Andhra Pradesh, Haryana, Tamil Nadu and Bihar contributed to the extent of 85 percent of the total milk production in the country. Today, India is the second largest producer of milk in the world after the United States of America. The present per capita availability of milk is 205 gms as against the ICMR recommendation of 250 gms. The statewise milk production during 1992-93 and targets for 1996-97 along with the per capita availability of milk are given in Annexure I.

1.4 Recognizing the importance of the sector, the notable programmes taken up are key village schemes, intensive cattle development projects, crossbreeding projects through bilateral assistance, operation flood programme and technology mission by establishing National Dairy Development Board (NDDB).

1.5 In 1970 under the aegis of NDDB, "Operational Flood" programme was launched to modernize the dairy sector and flood the 4 metro cities with milk from dairy cooperatives. By the end of 1996-97, 74,383 village milk producers cooperatives were organised in 264 districts with an average rural milk procurement of 12.26 million liters per day.

1.6 Another step was taken in 1989, to augment rural income by launching Technology Mission on Dairy Development (TMDD), which aims at applying modern technology to improve productivity, reduce costs of operation and thus ensure greater availability of milk and dairy products.

1.7 With the liberalization of the Indian economy in 1991, the dairy sector too was delicensed. However, on June 9, 1992 GOI issued a Milk and Milk Products Order (MMPO), according to which, a dairy handling more than 10000 liters of milk per day is required to get itself registered. The registering authority shall be an officer of the State Government or Union Territory in respect of units handling upto 75000 liters/day, or 3750 MT of milk solids per annum, where the entire milkshed of the unit lies within a State / Union Territory. In case of those units, which are handling more than 75000 liters of milk per day or 3750 MT of milk solids per annum, the registering authority is Department of Animal Husbandry and Dairying, Ministry of Agriculture, Govt. of India.

## **2. MILK PROCUREMENT AND PROCESSING**

The organized dairy sector (both cooperatives and private) is presently handling only 10-12 percent of total milk production in the country. The target and achievements of milk production, procurement and processing in cooperative sector by the end of VIII Five year plan are given in Annexure II. Thus it indicates, there is a wide scope for processing of milk and manufacture of milk products for domestic consumption as well as export.

## **3. EXPORT PERFORMANCE**

Dairy products form one of the fastest growing segments in the livestock product export. The major products exported are malted milk foods, ghee and cheese (to some extent) to the countries like Bangladesh, UAE, Nepal, Sri Lanka, Bahrain and Oman. The export performance during the years 1980-81 to 1995-96 are given in Annexure III.

## **4. EXPORT POTENTIAL AND MARKETS**

Bangladesh, United Arab Emirates, Nepal, Sri Lanka and Oman are the potential countries for export of malted milk products, butter and ghee. The export of milk and milk products to currently existing markets would increase to Rs.285 million and to new markets to Rs. 155 million. Thus the exports is likely to touch Rs.440 million (APEDA estimates) by the turn of the century.

The GATT agreement further gave a boost to the dairy industry, as India has a comparative cost advantage in regard to milk production. NABARD has been actively involved in credit disbursement in number of schemes in dairy sector. It also encourages development of new products through its research and development funds besides guiding various entrepreneurs in new areas of business and technology.

## **5. OBJECTIVES OF THE PROJECT**

The financial assistance is extended for processing of milk with the following objectives.

- i) To enhance the keeping quality of milk and also to avoid economic losses to farmers.

ii) For manufacturing various milk products to make it available for the domestic market as well as for export markets.

## **6. TYPE OF PROJECTS**

The type of milk processing projects that are normally considered for financial assistance are:

### **i) Milk Chilling plants:**

It involves collection of milk from the villages, chilling the milk to 3-4 degree Celsius and transporting to the main dairy for further processing and manufacture of products;

### **ii). Market Milk Plants:**

It involves procurement of milk from the villages, chilling, pasteurization, homogenization, packing of milk of various brands (whole, standard, toned and double toned milk) and supplying them to the consumers. The surplus fat is converted into ghee or table butter or sold as cream to bakeries;

### **iii). Composite Milk Processing Plants :**

The project involves the collection of milk and processing into market milk and products like milk powder, cheese, butter, ghee, etc.;

## **7. POTENTIAL AREAS:**

The scope for financing milk processing activities exists in the entire country. However, it is limited in East and North Eastern parts of the country because of under utilization of existing processing capacities, low milk production and scatteredness of production base.

## **8. BENEFICIARIES**

The beneficiaries may be individuals, partnership firms, companies, corporate bodies and cooperative societies/unions.

## **9. PROJECT DETAILS**

### **9.1 Land and Location:**

i) Ample space is required for buildings, future expansion, parking of transport vehicles and for empty cans. About two acres of land is required for a milk processing plant handling about 10000 liters of milk per day (8 hours). However the built up area to total

area should be around 1:3 ratio;

ii) The location of a plant should be close to the milk producing area in case of products manufacturing unit and if liquid milk is the main product it should be close to the consumer;

iii) The location of site should have proximity to road/rail facilities, services, such as water, electricity and effluent mains, social infrastructure, etc.

iv) The subsoil of the site should be firm with proper drainage.

## **9.2 Site Development:-**

i) Preferably the entire site should be fenced with barbed wire or compound wall is constructed with gates at suitable places;

ii) Internal roads should be of tar/bricks/WBM depending upon the soil conditions, rainfall and the number of vehicles moving every day.

## **9.3 Layout and Buildings:-**

The civil works comprises of factory building, quarters, office, garages, security post etc. The factory building for the milk reception, quality control, processing, packing and storage of milk products should be as per the BIS. The total covered area depends on the processes involved, products manufactured, the quantity of milk handled and the equipment chosen for services and product manufacturing. About 4000 sq.ft. area of building is required for handling 10000 liters of milk.. The essential sections of a milk processing plant are given in Annexure IV. The layout plans for a plant of 10000 liters per day is given in Figure 1 .

## **9.4 Plant and Machinery:**

The sectionwise equipment required, their specifications, quantity and costs for 10,000 liters capacity plant are given in Statement 3. The machinery should be as per the BIS. Most of the dairy machinery are manufactured in the country by ALFA-LAVAL, L&T, HMT, Nichrome Pvt. Ltd., Samarpan Fabricators , Goma Engineering Ltd. etc.

## **9.5 Technical Collaboration:-**

Normally the technical collaboration may be for supply of machinery, technical know-how for manufacture or marketing of products. If any such collaboration arrangement is there, name of the firm, country and term of agreement is required to be mentioned.

## **9.6 Manufacturing Process:-**

The operations involved in the manufacturing process should be given in the form of a

flow diagram. The flow diagram for a 10,000 litre per day milk processing plant is furnished in the Annexure V for guidance.

## **9.7 Infrastructural Facilities for Raw Material and Utilities**

### **9.7.1 Raw Material:**

The principal raw material is milk. The extent of milk shed area, milch animal population, average milk yield, percentage of animals in milk, marketed surplus, etc will determine the size of the plant. The method of procurement, transportation of milk and input supply to the farmers is required to be highlighted. The availability of other inputs such as packing materials, disinfectants and consumable should be ascertained.

### **9.7.2 Utilities:-**

#### **i) Power:**

Normally a three phase electricity supply is required for milk processing plants. The power requirement depends upon the load to be connected and the necessary approval from SEB should be obtained for connection. Depending upon the position of power supply, standby generators may be considered for connecting the essential sections.

#### **ii) Water:**

A milk processing plant requires the water in the ratio of 2:1 (2 liters of water for 1 liter of milk processed) for cleaning of equipment; cold storage and drinking purposes (source of water supply, quantity available and suitability for the purpose has to be mentioned). Accordingly, the size of the well is required to be designed and depends on the quality of water, the water softening plant may be considered.

#### **iii) Steam:**

The steam requirement (kg/hr) depends upon the processes involved and the source of steam may be met by coal/oil/gas fired / electric boiler;

#### **iv) Fuel:**

LDO/coal/gas requirement and the availability to be ascertained.

#### **v) Compressed Air:**

It will be required for various pneumatic operations flow control operations as well as for cleaning purposes. The total requirement of compressed air and the capacity of the compressors is required to be furnished.

vi) **Vehicles :**

The vehicles required for procurement and distribution of milk depends on the quantity of milk to be handled. The number of vehicles required, source of supply, rental charges etc. need to be furnished. Depending upon the need, the requirement of vehicles may be considered in the project cost.

vii) **Other Services:**

Although a maintenance workshop is an integral part of milk processing for carrying out repairs and maintenance of equipment.

viii) **Communication:**

Proper communication facilities is essential.

**9.8 Manpower:**

While selecting the site, the availability of manpower should be looked into and the total requirement of manpower depends on the operations involved and the quantity of milk handled. For a plant handling 10000 liters of milk per day the manpower required is given in Annexure VI

**9.9 Environmental Aspects and Pollution Control:**

There are no hazardous effluents generated from a milk processing plant. However, construction of effluent treatment plant is necessary in case of multiproduct large size plants for treating the effluents before discharging for proper disposal. The final effluent should meet the requirements of Pollution Control Board and is necessary to get clearance from them.

**9.10 Schedule of Implementation**

The activity wise schedule of implementation is to be given in the project.

**9.11 Products**

The major products and by products proposed to be manufactured along with quantities, composition in terms of fat and SNF and costing should be indicated.

**9.12 Marketing and Selling Arrangements**

The market for the product (domestic and export), type of arrangements for distribution and sales, commission and additional incentive to be given, the proposed net work and the advertisement plans should be furnished. Detailed market survey report is required

to be submitted.

### **9.13 Business Prospects:**

It involves the present demand-supply for various products, gap in supply and expected demand for various products. The major competitors and their present share is to be ascertained. The company projections for the next 3-5 years and the basis for projection may have to be furnished. The product wise quantities and countries where it is to be exported need to be mentioned.

### **10. CAPITAL COST OF PROJECT:**

Broadly the capital cost includes the cost of land, development of land, fencing, internal roads, civil works (Plant building, office, quarters, godowns, etc.), plant and machinery, preliminary and preoperative expenses, margin money for working capital, etc. Salient features of 10000 litre model milk processing plant is given in Statement 1. Capital cost of a model dairy processing plant with capacity to process 10000 litres per day works out to Rs.116.581 lakhs. The project cost comprises of Rs. 4.81 lakhs on land and land development , Rs.14.52 lakhs on civil structures, Rs. 64.38 lakhs on plant and machinery , Rs.22.43 lakhs on account of misc. fixed assets, deposits & preliminary and preoperative expenses, Rs. 3.50 on vehicles, Rs.4.57 lakhs of contingency and Rs. 2.37 lakhs of margin money for working capital. The detailed assessment of working capital and extent capitalised as margin money on working capital are presented in statement 2. The details of project cost are furnished in statement 3.

### **11. ECONOMICS OF THE PROJECT**

Based on the various techno-economic parameters, the economics of the project has to be worked out for the project period or till the repayment of bank loan. The items of income includes sale of liquid milk, milk products and miscellaneous items. while the expenditure includes the cost of raw material, transportation and commission, power, fuel packing distribution, wages and salary, repairs and maintenance, insurance, advertisement and other overheads. The income as well as expenditure for each year has to be worked out and then it should be subjected to cash flow analysis. For the model dairy processing plant of 10000 litres per day, the relevant techno-economic parameters are furnished in statement 4. The methodology for estimating the income and expenditure is given in statement 5 and 6 respectively. The depreciation schedules on straight line method and written down value are worked out (statement 7).

### **12. FINANCIAL ANALYSIS:**

The cash flow statement covering the Benefit Cost Ratio (BCR), Net Present Worth (NPW) and Internal/financial rate of return (IRR/FRR) has to be worked out for the project. Normally the BCR should be greater than 1, NPW should be positive and IRR/FRR should be greater than 15%. For the model project under consideration, the BCR is 1.12:1, NPW is Rs. 134.75 lakhs and IRR is more than 50%. The details of the

cash flow analysis (without considering income tax) is given in statement 8. For arriving at the tax liabilities, profit before tax was estimated and income tax was considered @35% as per the existing rates . On post tax income the FRR of the project is worked out as shown in statement 9. The entire bank loan can be repayable in six years including one year grace period during which only interest will be recovered (statement 10).

### **13. FINANCIAL ASSISTANCE**

The projects on milk processing including manufacturing of milk products would be considered for refinance support by National Bank. Therefore, all participating banks may consider financing this activity subject to their technical feasibility, financial viability and bankability .

### **14. LENDING TERMS AND OTHER REQUIREMENTS:**

#### **14.1 Margin Money:**

The promoters/company should normally meet 25% of the project cost out of their own resources. However, NABARD could consider providing margin money assistance in suitable cases.

#### **14.2 Interest Rate:**

Interest rate will be determined by RBI/NABARD from time to time.

#### **14.3 Security:**

As stipulated by the RBI.

#### **14.4 Repayment Period:**

Depends upon the gross surplus generated, it may be upto 8 years with first one/two years as the grace period.

#### **14.5 Refinance Assistance:**

NABARD provides refinance assistance as per the existing pattern from time to time.

### **15. CHECK LIST:**

A check list of various points to be considered for feasibility of the project is appended.

### **Statement 1**

### **Project at a glance for 10000 litres model milk processing plant**



1	Land requirement	2 acres
2	Milk handling capacity	10000 liters/day
3	Products to be manufactured	Toned milk, Standard milk, Cream, Gee
4	Market	Domestic
5	Cost of the project	Rs. 116.581 laches
6	Bank loan	Rs. 87.436 laches
7	Margin money (Down payment)	Rs. 29.145 laches
8	Financial viability ( at 15% D F )	
	BC R	1.12 : 1
	N P W	Rs.134.75 lakhs
	I R R	> 50%
	FRR ( Considering income tax liability)	>50%
9	Repayment	6 years with one year grace period

## Statement 2

### CALCULATION OF MARGIN MONEY ON WORKING CAPITAL

(Rs. in lakhs)

Sr.No.	Particulars	Unit cost (Rs.)	Period days	Years		
				I 70%	II 80%	III onwards 90%
1	Stock in progress	7.80	1	0.546	0.624	0.702
2	Packing material	0.40	30	0.840	0.960	1.080
3	Chemicals & detergents	0.07	30	0.147	0.168	0.189
4	Stores, spaces and fuel**	--	30	0.399	0.408	0.405
5	Finished goods					
	Toned Milk	9.00	1	0.394	0.450	0.504
	Standard Milk	10.00	1	0.220	0.250	0.280
	Saleable Cream	40.00	10	0.400	0.460	0.540
	Saleable Ghee	40.00	30	6.686	5.577	6.798
6	Receivables		7	5.670	6.523	7.452

	Total ( 1 to 6)			13.301	15.420	17.950
	Less sundry creditors (days)		7	3.822	4.368	4.914
	Total working capital required			9.479	11.052	13.026
	Margin money @ 25% of working capital			2.370	2.763	3.259
	Bank Cash credit			7.110	8.289	9.377
	Interest on working capital @ 16%			0.569	1.326	1.564

\*\* Outlay on stores and spares is considered @ Rs.0.19, Rs.0.17, Rs.0.15 per litre during first year, second year and third year onwards respectively on assuming 40% of power and fuel charges and repairs and maintenance. (statement 5).

Note : 1. Interest on working capital during first year is considered for 6 months only.

2. It is assumed that payment to the producers are made once in a week.

### Statement 3

#### CAPITAL COST OF THE PROJECT

Sr. No.	Particulars	Specification	Quantity	Unit Cost (Rs)	Total Cost (Rs. In lakhs)
1	2	3	4	5	6
<b>A)</b>	<b>LAND AND SITE DEVELOPMENT</b>				
i)	Land (including registration charges)	--	2 acres	78000/acre	1.56
ii)	Development charges	brick wall	424 RM	165/RM	0.70
iii)	Gates	Steel	2	15000 each	0.30
iv)	Land leveling and roads	WBM	--	LS	0.50
vi)	Water Supply (borewell, tank, pump)	--	--	LS	1.75
	<b>Total</b>				<b>4.81</b>
<b>B)</b>	<b>CIVIL WORKS</b>				
i)	Dairy plant building	RCC	3000 sq.ft	300/sq.ft.	9.00
		ACC	1000 sq.ft.	200/sq.ft.	2.00
ii)	E T Tanks	--	--	LS	0.75

iii)	Condenser tank	--	--	LS	0.57
iv)	Supervisor quarters	ACC	450 sq.ft.	250/sq.ft.	1.12
v)	Workers quarters	ACC	600 sq.ft.	180/sq.ft.	1.08
	<b>Total</b>				<b>14.52</b>
<b>C)</b>	<b>PLANT AND MACHINERY</b>				
i)	Can conveying and washing system	--	--	LS	1.23
ii)	Weigh scale	500 kg	2	1,18,000	2.36
iii)	Dump tank and accessories	1000 lts	1	59,000	0.59
iv)	Detergent tank	--	1	LS	0.31
v)	Milk chiller	3000-5000lph	1	LS	0.97
vi)	Cream Separator	2000-5000 lph	1	LS	5.7
vii)	Milk pasteuriser	5000 lph	1	LS	7.82
viii)	Storage tanks	10,000 lts	2	3,19,000	6.38
ix)	S S tanks	300 lts	1	75,500	0.76
x)	Packaging machine & accessories	2500 pph	1	3,13,500	3.14
xi)	Ghee boiler	500 kg	1	1,76,000	1.76
xii)	Ghee storage tank	1000 lts	1	99,000	0.99
xiii)	Boiler & accessories	300 kg/h	1	LS	5.46
xiv)	D.G. set	62.5KVA	1	LS	3.00
xv)	Refrigeration equipment	--	--	LS	15.21
xvi)	Electrical panels & cables	--	1 set	LS	3.02
xvii)	Pumps	--	4	30,000	1.20
xviii)	S S pipes & fittings	--	--	LS	2.00
xix)	Erection & commissioning	--	--	LS	2.50
	<b>Total</b>				<b>64.38</b>
<b>D)</b>	<b>MISC. FIXED ASSETS</b>				
i)	Furniture	--	--	LS	0.50
ii)	Computer	Pentium	--	LS	0.50
iii)	Fire fighting equipment	--	--	LS	0.10
iv)	Collection centre equipment	Centrifuge, butyr.20	--	3000/centre	0.60
v)	Work table	--	--	LS	0.28
vi)	Milk cans	40 lts (plastic)	500	600	3.00
vii)	Crate conveying system & trolleys	--	--	LS	0.52
viii)	Lab equipment	--	--	LS	2.50
ix)	Effluent treatment plant	--	--	LS	3.25

x)	Water softener	--	--	LS	0.20
	<b>Total</b>				<b>12.45</b>
<b>E)</b>	<b>VEHICLESs</b>				
i)	Jeep Mahindra		1	3,25,000	3.25
ii)	Scooter Bajaj		1	25,000	0.25
	<b>Total</b>				<b>3.50</b>
<b>F)</b>	<b>DEPOSITS</b>				
i)	State electricity board	--	--	LS	0.35
ii)	Telephone	--	--	LS	0.25
	<b>Total</b>				<b>0.60</b>
	<b>PRELIMINARY &amp; PREOPERATIVE EXPENSES</b>				
i)	Incorporation of company				0.20
ii)	Project preparation				0.25
iii)	Market survey				0.30
iv)	Establishment ( Salary & wages )				4.73
v)	Travelling				0.3
vi)	Consultancy				1.00
vii)	Administrative expenses				1.00
viii)	Interest during construction				2.50
	<b>Total</b>				<b>9.38</b>
<b>H)</b>	<b>CONTINGENCY ( @ 5% of cost of buildings, plant &amp; machinery and misc. fixed assets )</b>				
					<b>4.57</b>
<b>I)</b>	<b>MARGIN MONEY FOR WORKING CAPITAL</b>				
	( 25% of first year's requirement - statement - 2 )				<b>2.37</b>
<b>J)</b>	<b>GRAND TOTAL ( A+B+C+D+E+F+G+H )</b>				<b>116.58</b>

#### Statement 4

#### TECHNO ECONOMIC PARAMETERS

S.No	Particulars	Unit	YEARS		
			I	II	III onwards
1.	Installed capacity	litres /day	10000		

2.	Capacity utilisation	%	70	80	90
		Litres	7000	8000	9000
3.	No. of Working days		182	365	365
4.	Raw material – Milk	lakh litres/yr.	12.74	29.20	32.85
5.	Cost price of milk	Rs. /litre	7.40	7.40	7.40
6.	Commission on milk collection	Rs. /litre	0.20	0.20	0.20
7.	Transportation charges	Rs. /litre	0.20	0.20	0.20
8.	Power and fuel	Rs. /litre	0.42	0.37	0.33
9.	Packing material	Rs. /litre	0.40	0.40	0.40
10.	Chemicals & detergents	Rs. /litre	0.07	0.07	0.07
11.	Salaries and wages	Lakhs Rs./yr	4.73	9.49	9.49
12.	Repairs and maintenance	Rs. /litre	0.05	0.05	0.05
13.	Over heads (incl. Of insurance)	Rs. /litre	0.12	0.12	0.12
14.	Milk distribution cost	Rs. /litre	0.60	0.60	0.60
15.	Product mix				
i)	Toned milk (3% fat)	litres /day	4375	5000	5600
ii)	Standard milk (4.5% fat)	litres /day	2200	2500	2800
iii)	Cream (50% fat)	litres /day	390	460	555
iv)	Saleable cream (25% of iii approx.)	litres /day	100	115	135
v)	Ghee	Kg/day	142	169	206
16.	Selling prices				
	Toned milk	Rs. /litre	9.00	9.00	9.00
	Standard milk	Rs. /litre	10.00	10.00	10.00
	Cream	Rs. /litre	40.00	40.00	40.00
	Ghee	Rs./kg	110.00	110.00	110.00
17.	Depreciation (%)		Straight line method		Written down value method
	Civil Structures		3		10
	Plant and Machinery		10		25
	Misc. Fixed assets		10		33

## Statement 5

## INCOME PROJECTIONS

S.No	Particulars	Unit	Years		
			I	II	III onwards
1	Milk procured	litres/day	7000	8000	9000
2	Yield per day				
i)	Toned milk ( 3% fat )	litres/day	4375	5000	5600
ii)	Standard milk (4. 5% fat )	litres/day	2200	2500	2800
iii)	Cream ( 50% fat )	litres/day	390	460	555
iv)	Saleable cream ( 25% of iii approx. )	litres/day	100	115	135
v)	Ghee	kg/day	142	169	206
3	Income per day				
i)	Toned milk (Rs.9.00 / litre )	Rs. Lakhs	0.394	0.450	0.500
ii)	Standard milk ( Rs. 10.00 / litre )	Rs. Lakhs	0.220	0.250	0.280
iii)	Cream ( Rs.40.00/ litre)	Rs. Lakhs	0.040	0.046	0.054
iv)	Ghee ( Rs. 110.00/kg)	Rs. Lakhs	0.156	0.186	0.227
4	Total income/day	Rs. Lakhs	0.810	0.932	1.065
5	Income per year (1st year for 6 months i.e. 182 days)	Rs. lakhs	In 147.411	340.144	388.579

### Statement 6

## EXPENDITURE PROJECTIONS

S.No	Particulars	Unit	YEARS		
			I	II	III onwards
1.	Milk processing per year	Lakh litres/day	12.740	29.200	32.850
2.	Raw material - milk	Rs.7.40/litre	94.276	216.080	243.090
3.	Commission on milk collection	Rs.0.20/litre	2.548	5.840	6.570
4.	Transportation charges	Rs.0.20.litre	2.548	5.840	6.570
5.	Power and fuel (As per statement -		5.351	10.804	10.841

	No. 4)				
6.	Packing material	Rs.0.40.litre	5.096	11.680	13.140
7.	Chemicals & detergents	Rs.0.07.litre	0.892	2.044	2.300
8.	Salaries and wages(as per statement4)		4.733	9.492	9.492
9.	Repairs & maintenance	Rs.0.05.litre	0.637	1.460	1.643
10.	Overheads	Rs.0.06.litre	1.529	3.504	3.942
11.	Milk distribution cost (As per statement 4)	--	7.644	17.520	19.710
	<b>Total operational cost</b>	Rs. lakhs	<b>125.253</b>	<b>284.264</b>	<b>317.297</b>

### Statement 7

#### DEPRECIATION SCHEDULES OF CIVIL WORKS, PLANT & MACHINERY AND MISC. FIXED ASSETS

Note : The figures corresponding to each year represent end year values for the preceding year.

### Statement 8

#### CASH FLOW ANALYSIS WITHOUT CONSIDERING THE INCOME TAX LIABILITY

(Rs. In lakhs)

Sr.No.	Particulars	I	II	Years III to V	VI
1.	Costs				
	i) Capital cost \$	114.212			
	ii) Recurring cost	125.253	284.264	317.296	317.296
	Total cost	239.465	284.265	317.297	317.297
2.	Benefits	147.411	340.144	388.579	388.579
	i. Residual value of				
	a) Civil Structures	--	--	--	11.906
	b) Plant & machinery & misc. fixed assets	--	--	--	--
		--	--	--	31.312
	Total benefits	147.411	340.144	388.579	431.797
3	Net benefits (3-(1+2))	-92.054	55.880	71.283	114.501

4	D F at 15%	0.869	0.756	1.726	0.432
	a) P W of costs @ 15% DF	208.095	214.904	547.654	137.072
	b) P W of benefit @ 15% D F	128.100	257.148	670.687	186.536
		BCR = 1.12:1			
		NPW = + 134.75			
5	D F at 50%	0.667	0.444	0.625	0.088
6	N P W at 50% D F	-61.369	24.810	44.552	10.076
		IRR is more than 50%.			

\$ The capital cost considered excludes the capitalised margin money on working capital.

### Statement 9

### CASH FLOW ANALYSIS ON CONSIDERING THE INCOME TAX LIABILITY

(Rs. in lakhs)

Sr. No.	Particulars	Years					
		I	II	III	IV	V	VI
1	Income (Statement 5)	147.411	340.144	388.579	388.579	388.579	388.579
2	Operational cost (Statement 6)	125.253	284.264	317.297	317.297	317.297	317.297
3	Gross operating profit	22.158	55.880	71.283	71.283	71.283	71.283
4	Less						
i)	Interest on term loan @ 16%	9.609	12.812	10.250	7.559	4.869	2.130
ii)	Interest working capital @ 16%	0.569	1.326	1.564	1.564	1.564	1.564
iii)	Depr. On straight line method						
	Civil works	1.452	1.307	1.176	1.059	0.953	0.857
	Plant and machinery	16.096	12.072	9.054	6.791	5.093	3.820
	Misc. fixed assets	5.263	1.150	2.362	1.583	1.060	0.711
iv.	Amortisation of preliminary and preoperative expenses	0.215	0.215	0.215	0.215	0.215	0.215
5.	Profit before tax	-11.046	26.997	46.661	52.512	57.528	61.986
6.	Tax at 35%	0.000	9.449	16.331	18.379	20.135	21.695
7.	Net profit	-11.046	17.548	30.330	34.133	37.394	40.921



8.	Net income available (7+4)	22.158	46.431	54.951	52.903	51.148	49.588
9.	Net benefit after tax (capital cost in 1st yr. + residual value in last year)	-82.242	46.431	54.951	52.903	51.148	92.806
10.	Financial rate of return (%)						
	Discount factor @ 45%	0.690	0.476	0.328	0.226	0.156	0.108
	Discounted financial returns	-56.719	22.083	18.025	11.968	7.980	9.985
	Discount factor @ 50%	0.667	0.444	0.296	0.198	0.132	0.087
	Discounted financial returns	-54.828	20.636	16.282	10.450	6.735	8.148

F R R is more than 50%

### Statement 10

### REPAYMENT SCHEDULE

(Rs. in lakhs)

Year	Loan outstanding		Principal	Int. on Term Loan \$	Int. on Working capital	Total repayment (4+5+6)	Net income	Balance left with company (8-7)
	2	3						
1	2	3	4	5	6	7	8	9
	Beginning of year	End of year						
1	80.077	80.077	0.000	9.609	0.569	10.178	22.158	11.979
2	80.077	64.062	16.015	12.812	1.326	30.154	46.431	16.276
3	64.062	47.246	16.816	10.250	1.564	28.631	54.951	26.321
4	47.246	30.429	16.816	7.559	1.564	25.940	52.903	26.963
5	30.429	13.312	17.117	4.869	1.564	23.550	51.148	27.597
6	13.312	0.000	13.312	2.130	1.534	16.976	49.588	32.611
						135.429	277.178	
						D S C R = 2.047:1		

1. \$ During the first year the average loan utilisation is considered at 75% of the total amount.
2. Repayment period : 6 years including 1 year grace period.
3. Interest on Term loan and Working loan is assumed @ 16% per annum.

## Annexure I

### STATE WISE CATTLE AND BUFFALOES, MILK PRODUCTION AND PER CAPITA AVAILABILITY OF MILK

Population – in thousands (1992 census)

Production – in thousand tonnes

Availability – in gms.

Sr. No.	Name of the state	Cattle			Buffaloes	Milk production		Per capita availability
		Cross bred	Indige-nous	Total		1992-93	1996-97 Target	
1	2.	3.	4.	5.	6.	7.	8.	9.
1.	Andhra Pradesh	221	2411	2632	4729	4221	4400	163
2.	Arunachal Pradesh	7	88	95	3	22	44	64
3.	Assam	136	2931	3067	298	698	740	80
4.	Bihar	65	5301	5366	2586	3250	3390	97
5.	Goa	4	26	30	20	36	39	81
6.	Gujarat	126	1990	2116	3130	4459	4750	280
7.	Haryana	159	543	702	2220	4062	4062	630
8.	Himachal Pradesh	122	602	724	468	663	700	332
9.	Jammu & Kashmir	251	774	1025	417	780	900	257
10.	Karnataka	277	3605	3882	2315	3004	3260	173
11.	Kerala	905	825	1730	110	2117	2370	192
12.	Madhya Pradesh	89	8590	8679	3501	5048	5205	195
13.	Maharashtra	897	4879	5776	3201	4811	5200	156
14.	Manipur	28	147	175	38	64	62	89
15.	Meghalaya	10	190	200	10	54	57	77
16.	Mizoram	3	21	24	3	14	18	51
17.	Nagaland	45	71	116	10	46	44	92
18.	Orissa	262	3965	4227	434	584	650	48
19.	Punjab	730	449	1179	2808	6215	7100	795
20.	Rajasthan	43	4478	4521	4091	5103	5350	296
21.	Sikkim	16	48	64	1	32	34	200
22.	Tamil Nadu	800	2493	3293	1552	3695	3867	174

23	Tripura	44	255	299	7	38	40	35
24	Uttar Pradesh	648	6297	6945	10097	11321	12463	209
25	West Bengal	430	5256	5686	233	3250	3440	123
26	Union Territories	41	62	103	174	364	387	80
	GRAND TOTAL	6359	56297	62656	42456	63951	68581	191

Source : Directorate of Economics and Statistics and State Department of Animal Husbandry and Dairying.

## Annexure II

### DAIRY DEVELOPMENT TARGETS AND ACHIEVEMENTS FOR VIII FIVE YEAR PLAN

Sr. No.	Particulars	Targets	Achievements
1.	Milk production (million tonnes)	65	70.1
2.	Per Capita availability (gm)	192	205
3.	No. of Milk sheds	191	170
4.	No of Dairy Co-operatives	150000	74383
5	Average milk procurement(LLPD)	150	122.60
6	Processing capacity(LLPD)	220	265.10

## Annexure III

### YEARWISE EXPORT OF DAIRY PRODUCTS

Year	Quantity(tonnes)	Value (Rs. in crore)
1980-81	1084	1.99
1985-86	395	1.04
1990-91	604	2.4
1991-92	2643	11.24
1992-93	3800	8.37
1993-94	2031	12.47
1994-95	8957	40.11
1995-96	NA	32.57

## **Annexure IV**

### **ESSENTIAL SECTIONS OF A MILK PROCESSING PLANT**

**The milk processing plant shall have the following essential facilities.**

- i) Raw Milk Reception Dock (RMRD) - consisting of can conveyor, can washer, weighting balance, dump tank etc.
- ii) Processing Hall - cream separator, chiller, homogenizer, pasteuriser and other related machinery are installed.
- iii) Storage area- for milk storage tanks.
- iv) Products manufacturing area-depends upon the type of products and the quantity of milk handled, the required equipment needs to be installed.
- v) Packing area-for packing of liquid milk and other products.
- vi) Cold storage-for keeping the milk and milk products before sending to market.
- vii) Quality Control Laboratory-for testing the quality of milk and milk products.
- viii) Utilities area-for installing boiler, generator set, water treatment plant, maintenance and store area for spares.
- ix) Waste water treatment plant area-for treating the dairy effluents before releasing to the fields.
- x) Quarters and office area-for all the essential staff.
- xi) Vehicle parking area-both for the milk procurement and distribution vehicles.
- xii) Input supply area- for providing veterinary service, supply of feed, fodder seeds, etc.

## Annexure VI

### SALARIES AND WAGES

Sr.No.	Particulars	Number	Salary/Wages (Rs./month)	Total (Rs.year)
1.	Plant Manager	1	7500	90000
2.	Procurement officer	1	5000	60000
3.	Field supervisors	2	3000	72000
4.	Processing supervisors	2	3000	72000
5.	Mechanics	2	2000	48000
6.	Driver	1	1500	18000
7.	Watchman	3	1500	54000
8.	Administrative staff	3	2000	48000
9.	Laboratory staff	2	2000	48000
10.	Unskilled labour	8	1500	144000
	Total	25		678000
	Other perks	(40% of the salary		271200
	Total salary and wages			949200

### Index to Figure 1

S.No	Particulars	Quantity	H.P	Capacity/ Make
1	Roller conveyer	1	-	5 mts
2	Dump tank	1	-	1000 lts
3	Milk pump	1	2.5	5000 lph
4	Float balance tank	1	-	100 lts
5	Milk pump	1	2.6	5000 lph
6	Simple filter	1	-	-
7	Pasteuriser	1	-	5000 lph
8	Holding vessel	1	-	-
9	Control panel	1	-	-
10	Milk transfer pump	1	210	5000 lph
11	Hot water generator	1 set	1.5	100000 KCal/hr
12	Hot water pump	1	1.5	-
13	Electrical panel	1set	-	-
14	Remote control panel	1	-	-

15	IBT agitator	1	3.0	-
16	Ice bank tank	1	-	-
17	IBT coils	1	-	-
18	Liquid separator	1	-	-
19	Chilled water pump	2	6.0	Beacon
20	Frion Compressor	2	-	FK 750
21	Motor for compressor	2	15.0	Kirloskar
22	Frion recoveror	1	-	-
23	Pouch filling machine	1	2.5	2500/hr
24	Air compressor	1	7.5	Elgi Kirloskar
25	Air cooling unit	2	2.0	-
26	Cream separator	1	1.5	1000 lph
27	Can steaming block	1	-	-
28	Can scrubber	1	1.0	200 cans / hr
29	Can wash through	1	-	-
30	Ghee boiler	1	1.0	250 kg/hr
31	Ghee storage tank	1	1.0	500 kg
32	Ghee transfer pump	1	1.0	
33	Raw milk storage tank	2	2.0	5000 lts each

## **Appendix**

### **Check list for Milk Processing Project**

#### **A) ORGANISATIONAL**

- i) Type of beneficiary : Individual/Co-op Society Partnership Firm/Company
- ii) Address - Plant site Office :
- iii) Objectives of the organisation
- iv) Copy of the by-laws/ Regn. Certificate/ Memorandum and Articles of association (as applicable)
- v) Certification of incorporation/commence-ment of business
- vi) Bio-data of directors
- vii) Profit and loss account and balance sheet for the last three years.
- viii) Technology Indigenous/Imported. Name and address of foreign collaborator (If any).
- ix) Brief write up on the organisation and collaborators (Giving information on projects implemented, expertise etc.)
- x) Copy of agreement with foreign collaborator
- xi) Copy of import license for equipment/plant and machinery.
- xii) Copy of the RBI clearance regarding Foreign Exchange/Exports, if applicable.
- xiii) RBI Code Number :
- xiv) Import-export code No. :
- xv) Approvals / permissions required
  - a)NA permission from competent authority
  - b)Pollution Control Board :
  - c)Factory inspector :
  - d)Electricity board :



- e) Irrigation dept. for water lifting etc :
- f) Ground water report from competent authority
- g) Registration of brand name :
- h) MMPO registration :

## **PART B : FINANCIAL**

- i) Financial outlay with phasing (item wise detailed breakup of the outlay).
- ii) Promoters contribution :
- iii) Foreign collaborators contribution/equity participation from any organisation. :
- iv) Public issue, if any :
- v) Bank loan (Indian Rupee) :  
Name and address of the bank branch (letter of consent to be enclosed).
- vi) Foreign exchange component loan :
- vii) Name of the bank providing foreign exchange and letter of consent. :
- viii) Working capital requirement (Item wise detailed estimates) :
- ix) Arrangement for the working capital loan :
- x) Subsidy component (if any) and name the details regarding the organisation giving subsidy. :
- xi) Marketing arrangement/buy back arrangements(letter of consent) :
- xii) Arrangements for insurance of capital goods and the product. :
- xiii) Lending terms - rate of interest, repayment schedule, security. :

## **PART C : TECHNICAL**

- i) Location (present constraints on procurement, storing, transportation, processing, packaging). :
- ii) Present market demand/ supply and future projections - domestic and export. :

- iii) Promoters :
- iv) Proposed plant capacity :
- v) Availability of raw Material :
- vi) Site location - suitability of site, environmental social Issues. :
- vii) Project engineering :
  - a) Site plan and map along with necessary approval :
  - b) Land, Land Development fencing, drainage, :
  - c) Civil works - detailed drawings, specifications quantities and costs. :
  - d) Machinery - specification and costs, quotations, and layout plan (Section wise). :
  - e) Detailed list and cost of imported items of equipment and license for import. :
  - f) Utilities - water electricity, fuel with detailed specifications . :
  - g) Detailed processing mechanism (process flow Chart) :
  - h) Byproduct processing :
  - i) Handling, processing, packaging, preservation and marketing of milk including countries to be exported. :
  - j) Effluent treatment :
  - k) Other amenities, transport facilities, etc. :
  - l) R & D, quality control lab and equipment. :
  - m) Office, essential quarters etc. :
- viii) Man power requirement Technical staff and training needs. :
- ix) FDA regulations and Export of quality products. :
- x) Implementation schedule and PERT Chart. :
- xi) Steps to involve farmers participation in maintaining milch animals. :
- xii) Supply of inputs - AI,