

ANNEX

F. AGRO-INDUSTRY

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F. AGRO-INDUSTRY

1. Present Agro-Industry

1-1 General Situation in Egypt as a Whole

Agro-industry might cover an extensive scope of manufacturing activities, however, apart from textiles and leather, it could comprise mainly of food processing industries such as sugar refining, grain milling, vegetable and fruit canning and bottling, dairy processing, etc.

The modern food industry in Egypt has been growing inspite of many handicaps imposed on it from the very beginning for the last half-a-century at the rate of food consumption in the country, and this trend would probably continue in the future unless it should be increasingly export-oriented.

In the beginning of the 1960's, almost all the large and medium-scaled establishments of this industry were nationalised, and then, they have been operating depending on the supply of their main inputs and intermediaries to the Government allocation. However, the food price policy adopted by the Government with the prime purpose of affording the general mass of people to obtain daily foodstuff at reasonable prices tends to set ex-factory prices of Egyptian food industrial products at low level which often obliges many of these factories to replenish 30-40% of their costs by the Government subsidies.

1-2 Agro-Industry in the Nile Delta

The Delta no doubt provides a largest theatre for agro-industrial development in the country. In sugar refinery, it has Delta Sugar Company's sugar beet factory at Kafr el-Sheikh; in dairy processing, there are large-scale milk processing plants under the umbrella of Misr Dairy Company at Damietta and Ismailia; vegetable and fruit processing industry is almost monopolized by KAHA and EDFINA which altogether operate some 10 factories. Except the sugar beet plant which has started operating a few years ago under an international joint-venture, all the others are run by the Government Companies in the Public Sector.

The general phenomenon observable among most of these establishments is the underutilization of capacity which may be partly explained, if not justified, by seasonal nature of the supply of their main inputs. More fundamentally, however, it seems that the low productivity attributable to the capacity underutilization arises from unawakened entrepreneurship having a not necessarily high managerial and technical level. This helps countless bottlenecks remain in the supply route of their main inputs and intermediaries unbroken, and keeps their marketing campaign less enthusiastic.

1-3 Agro-Industry in the Project Area

Since agriculture is confined to a limited area (it corresponds to less than 10% of the entire expanse) and has been managed under numerous physical and non-physical constraints, there is now no established agro-industry, except cottage cheese which is primarily meant for the residents' own consumption.

2. Sugar Beet Processing

2-1 Introduction

A beet factory normally produces white sugar directly from sugar beet in a single integrated manufacturing process and molasses and beet pulp can be obtained as the principal by-products. There are the two major alternatives to increase the sugar yield, viz: by reprocessing the molasses, and by extending the annual operating period through storage of the partially processed products taken off after evaporation of the thick juice stages and completing the processing later. These alternative procedures are not taken up for techno-economic study in this report.

This proposal for a sugar beet processing plant is made on the assumption of a joint-venture by international and Egyptian entrepreneurs.

2-2 Factory Capacity

The capacity of the proposed beet sugar factory has been designed at 6,000 tons/day of washed beet sliced prior to the extraction stage. The sugar content of the material beet has been taken as 17% and the thickness juice purity after evaporation at 90.0. Major inputs and outputs for beet processing are shown in Fig. F-2-1.

The size of factory must meet to the duration of processing period that is 90-100 days beginning in late February and ending in May. The factory operation starts with the first harvesting of the beet and ends before the very high temperature begins ruling in the project area from June onward to make the handling and storage of the beet rather difficult.

At the full development stage, the material beet obtainable in the project are expected to reach a level of 678,400 tons per annum, while what is expected in the adjacent South Hussinia Valley would reach 402,500 tons. Since the same capacity of 6,000 tons/day is envisaged for the respective sugar beet processing plants in these two project areas, balancing of the material beet processing is being arranged as per Table F-2-1.

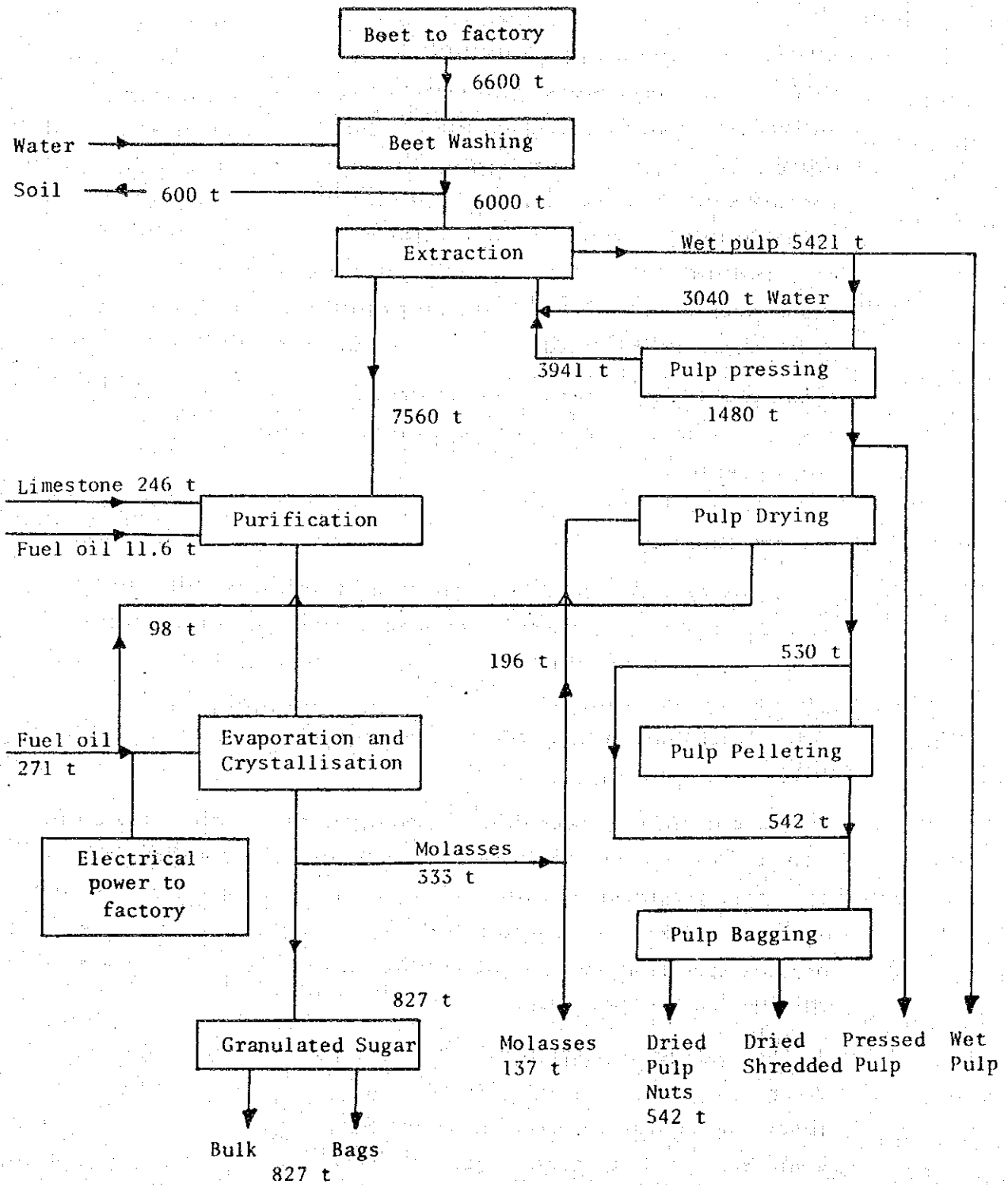


Fig. F-2-1 Major Inputs and Outputs for 6000 Tonnes of Beet Processed

Table F-2-1 Sugar Beet Available for Processing

('000 ton)

Year	SOUTH HUSSINIA PROJECT AREA				NORTH HUSSINIA/SOUTH PORT SAID PROJECT AREA			
	Factory Year	Local Production	Supply from North	Total Q'ty for Processing	Factory Year	Local Production	Supply to South	Total Q'ty for Processing
1992	3							
1993	4	11.2		11.2	1			
1994	5	145.4		145.4	2			
1995	6	198.8		198.8	3			
1996	7	204.8		204.8	4	75.3		75.3
1997	8	298.3		298.3	5	143.0		143.0
1998	9	334.8		334.8	6	308.7		308.7
1999	10	357.9		357.9	7	418.0		418.0
2000	11	374.4		374.4	8	547.9		547.9
2001	12	389.2		389.2	9	602.1		602.1
2002	13	402.5	44.1	446.6	10	644.1	44.1	600.0
2003	14	402.5	68.1	470.6	11	668.1	68.1	600.0
2004	15	402.5	78.0	480.5	12	678.4	78.0	600.4
2005	↓	↓	↓	↓	↓	↓	↓	↓
2006								
2007								

Performance of the proposed sugar beet factory in its productive activities is shown in Table F-2-2.

2-3 Factory Location

The supply of beet to the factory must be the most costly and complex operation to be arranged for. The relatively high temperatures prevent the storage of more than 24 hours supply at the factory or on the farms and the shortest possible transport distance would therefore be advantageous to both the beet quality and cost.

Other important considerations called for selecting the factory location include:

- a good road system to handle up to 100-125 vehicles/hour
- an electrical power supply of around 2 megawatts
- a supply of fresh water for processing and site irrigation
- a supply of drinking water
- staff amenities close to the factory
- telephone and telex facilities

Eventually, the proposed sugar beet factory will be located at the northwest of the Project Area.

2-4 Factory Layout

A practical factory layout is normally fixed after taking into consideration the location of incoming roads and services, the prevailing wind, site gradients etc. The layout of a typical beet sugar factory is shown in Fig. F-2-2. Each square dividing the envisaged factory site would represent approximately 5 feddan.

The factory itself would be of two storeys, with the major processing plant sited in the second floor, 8 m above ground level. Pumps, tanks, etc. would be on the ground floor.

2-5 Factory Processing Equipment

The main process stages and the sequence of operations are shown in the flow sheet as per Fig. F-2-3.

Table F-2-2 Production of White Sugar, Molasses, Dried Molassed Pulp and Dried Pulp

CALENDAR YEAR	1996	1997	1998	1999	2000	2001	2002	2003	2004
FACTORY YEAR	4	5	6	7	8	9	10	11	12
Sugar Beet Purchases ('000 tons)	75.3	143.0	308.7	418.0	547.9	602.1	600.0	600.0	600.4
Requirement of dried molassed beet pulp ('000 tons)	1.50	3.00	6.20	8.30	11.00	12.00	13.00	14.00	15.00
<u>Physical Production (1st Stage)</u> ('000 tons)									
White sugar sold	11.22	21.30	45.98	62.26	81.60	89.68	89.36	89.36	89.42
Molasses @ 82% D.S.	4.51	8.55	18.47	25.00	32.77	36.02	35.89	35.89	35.91
Dried pulp	4.82	9.14	19.74	26.73	35.03	38.50	38.36	38.36	38.39
<u>Physical Production (2nd Stage)</u>									
Molasses included in dried @ 82% D.S.	0.54	1.08	2.24	3.00	3.97	4.33	4.69	5.05	5.42
molassed beet pulp @ 36.1%									
Dried pulp included in dried molassed beet pulp @ 63.9%	0.96	1.92	3.96	5.30	7.03	7.67	8.31	8.95	9.59
Balance of molasses @ 82% D.S. available for sale	3.97	7.47	16.23	22.40	30.06	31.69	31.20	30.86	30.49
Molasses sold	4.37	8.27	17.06	23.55	31.32	32.95	32.46	32.12	31.75
Balance of dried pulp sold	3.86	7.22	15.78	21.43	28.00	30.83	30.05	29.44	28.80

KEY

1. Sundries Weighbridge
2. Beet Weighbridge
3. Unloading points.
4. Automatic sampling.
5. Yards.
6. Beet pump.
7. Beet storage.
8. Beet washer.
9. Beet slicing.
10. Diffusion.
11. Pulp presses.
12. Pulp dryer.
13. Pulp bagging.
14. Pulp washhouse.
15. Evaporation and filtration.
16. Vacuum pans.
17. Sugar screening and bagging.
18. Sugar warehouse.
19. Sugar silo.
20. Molasses storage.
21. Boiler house.
22. Oil storage.
23. Lime kiln.
24. Lime slaker.
25. Limestone storage.
26. Mud thickener.
27. Turbine cooling tower.
28. Cooling tower.
29. Water storage.
30. Settling ponds.
31. Lime pond.
32. General office.
33. Car Park.

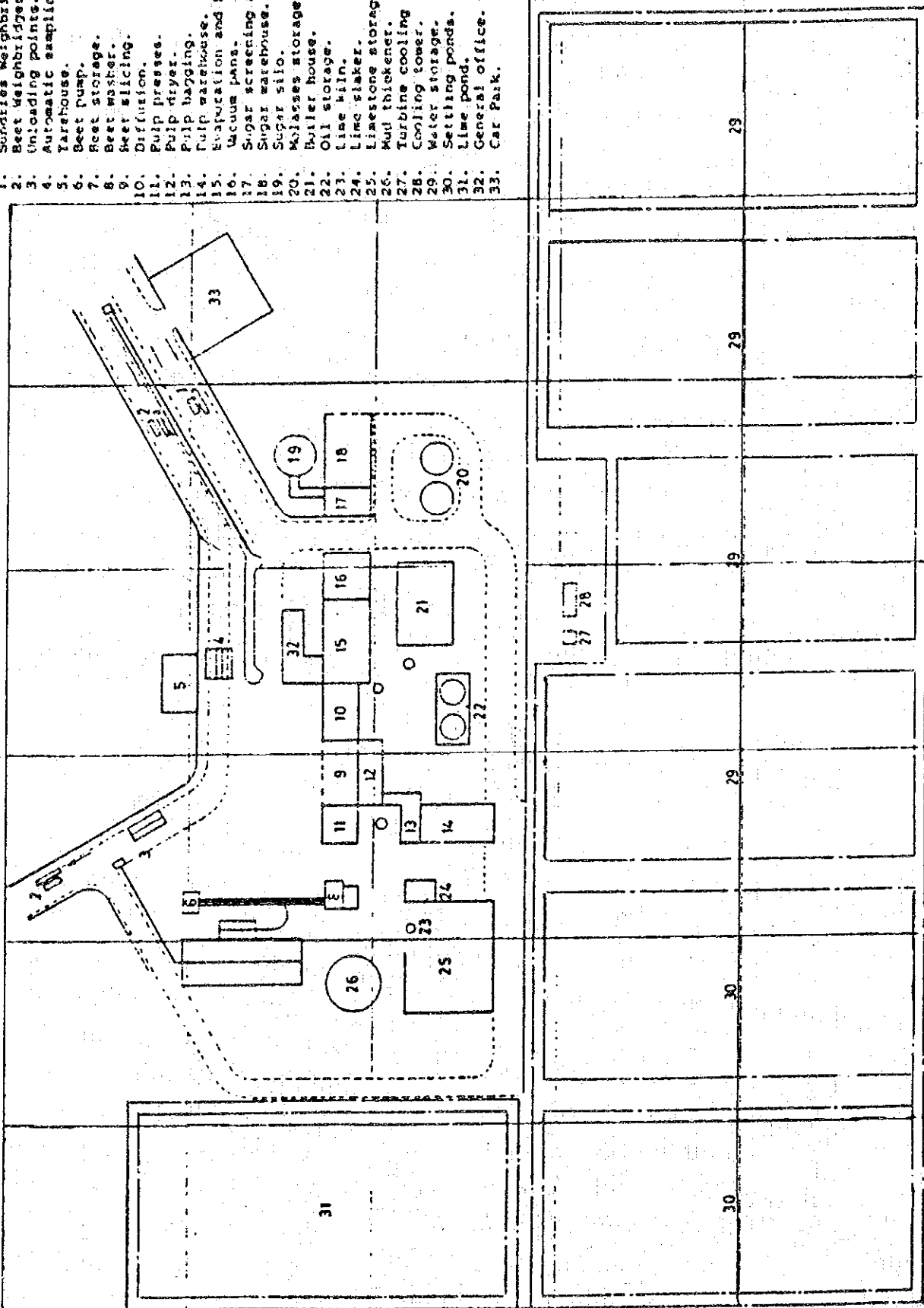


Fig. F-2-2 Layout of Typical Beet Sugar Factory

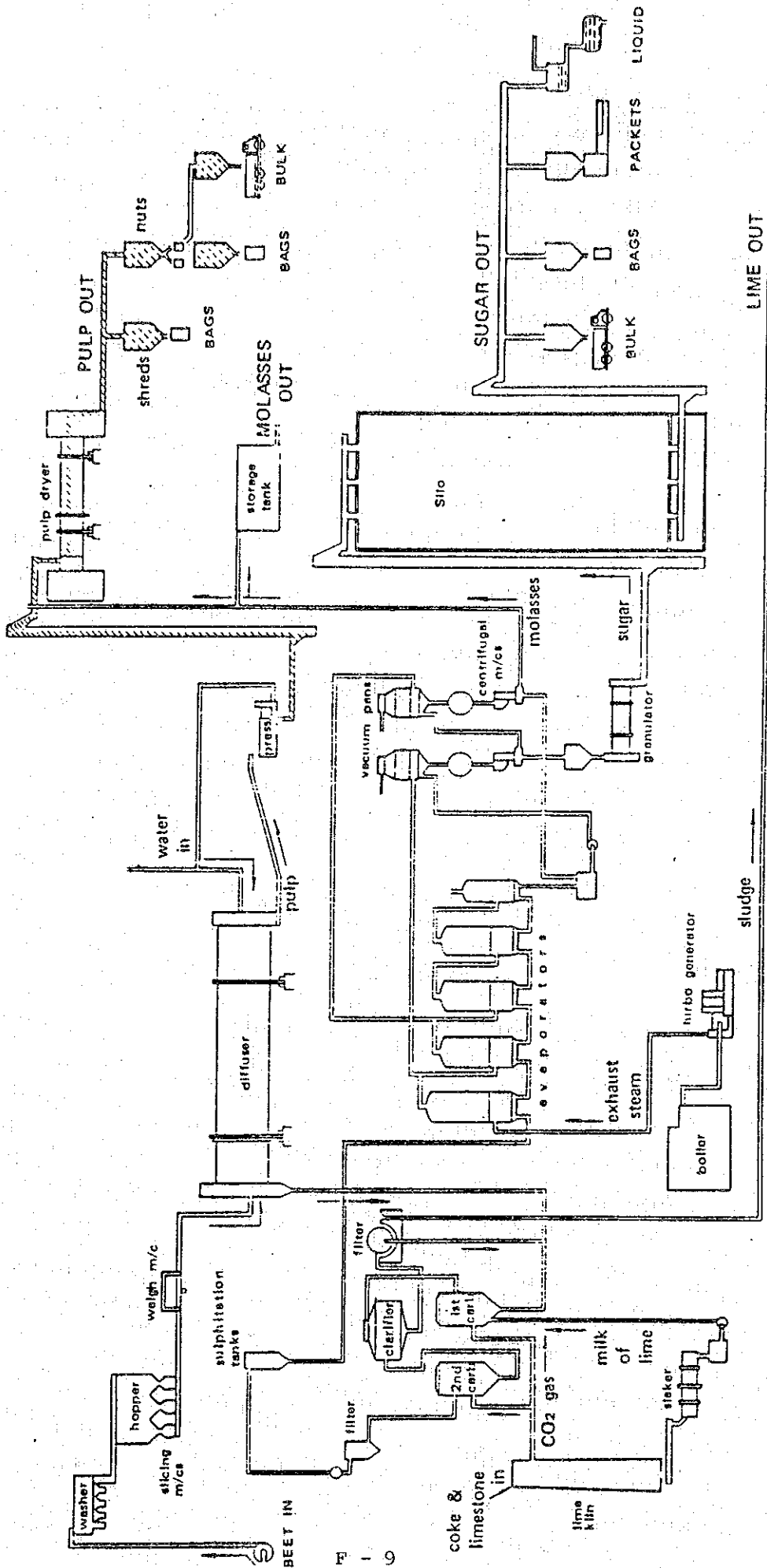


Figure F-2-3 Simplified Beet Sugar Process Flow Diagram

- i) Beet Reception and Storage
- ii) Beet Intake and Washing
- iii) Slicing and Diffusion
- iv) Juice Purification
- v) Evaporation
- vi) Crystallisation
- vii) Sugar Packing and Storage
- viii) Pulp Pressing, Drying, Peleting
- ix) Water and Effluent
- x) Plant Service
- xi) Steam and Power

2-6 Capital Costs

The following tables give details of the capital cost split into the main plant areas.

Table F-2-3 Capital Cost of Main Plant Items for 6,000 TPD Beet Factory

<u>Plant Items</u>	<u>Cost in Hussinia Valley LE Thousand incl. Internal Transport and Installation</u>
Beet Handling and Laboratory	1,890
Diffusion and Ancillary Plant	2,900
Pulp Processing and Bagging	6,600
Juice Purification	1,540
Evaporators and Heaters	1,330
Sugar End Plant	4,110
Sugar Drying, Bagging and Storage	6,340
Boiler House and Power Generation	5,930
Lime Kiln	1,130
Water and Effluent	810
Others	2,030
<u>Total</u>	<u>34,670</u>

With additional items of construction and facilities for operation and maintenance of the factory, the total capital cost of the factory complex would be as follows:

Table F-2-4 Total Capital Cost of 6,000 TPD Beet Factory

<u>Items</u>	<u>Cost in Hussinia Valley LE. Thousand</u>
Main Plant	34,670
Less Saving by part local manufacture	5,330
<u>Total Main Plant</u>	29,340
Piping and Valves (part local)	5,590
Structural Steel	1,350
Building and Civil Works	17,650
Electrical Equipment	8,890
Instrumentation and Control	3,130
Plant Spares	2,080
Management and Design Fees	2,760
Commissioning	1,100
Staff Housing and Amenities	3,910
Vehicles and equipment	180
<u>Total Capital Cost of Factory Complex</u>	<u>75,980</u>

The total weight of the equipment is around 11,500 tons. There are two or three Egyptian firms who are able to undertake the manufacture of the less complicated mild steel pipework, tanks, vessels, etc., to the extent of about 3,500 tons in total weight.

The weight of structural steel required is about 2,600 tons and a recent large contract of a similar type (Delta Sugar Co.) was let for a price of LE 470/ton including erection.

Other capital costs including staff vehicles as well as housing and amenities are tabulated in Tables F-2-9 and F-2-10.

2-7 Material Supplies

The sugar beet available for processing has been estimated as below:

Table F-2-5. Sugar Beet Available for Processing ('000 Tons)

<u>Calendar Year</u>	<u>Factory Year</u>	<u>Local Production</u>	<u>Supply to the South</u>	<u>Total Quantity for Processing</u>
1995	3			
1996	4	75.3		75.3
1997	5	143.0		143.0
1998	6	308.7		308.7
1999	7	418.0		418.0
2000	8	547.9		547.9
2001	9	602.1		602.1
2002	10	644.1	44.1	600.0
2003	11	668.1	68.1	600.0
2004	12	678.4	78.0	600.4

As for the other materials, the following table has been prepared assuming average usage figures of the chemicals and supplies for the full anticipated slice. Actual amounts of many of the chemicals used vary from year to year and depend upon the purity and general condition of the beet. All the material supplies required are locally available, except Antifoam oil.

Table F-2-6 Material Supplies Required by Beet Sugar Process

<u>Material</u>	<u>Quantity Used and Full Development (tons/annum)</u>	<u>Price (LE/ton)</u>
Fuel Oil	30,511	110
Lime-stone	27,620	5
Sulphuric Acid	132	66
Hydrochloric Acid	30	295
Soda Ash	402	184
Caustic Soda	30	295
Salt	192	11
Antifoam Oil	depends upon type used	
Stick Sulphur	114	75
Filter Aid	126	450
Formaldehyde	126	47

Fuel - It is assumed that fuel oil would be used for boilers, pulp driers and for the lime kiln. Since the project is likely to be subject to international funding, the cost of the oil would not be subsidised and the expected future world market price of LE 110/ton has been used. The fuel is suppliable by Misr Petroleum, Alexandria.

Limestone - This is readily available near the site of the sugar factory but the locally available limestone should be checked particularly with respect of its quality, that is, the requisite hardness for shaft kilns.

Chemicals - Except Antifoam Oil which is normally imported from Germany, all other chemicals are available in Alexandria, Cairo and Kafr El Zayat (sulphuric acid).

The factory would generate its own electricity requirements during the campaign as the use of oil fired boilers and turbo-alternators would be cheaper as well as more reliable compared to the purchase of electricity from the national grid.

Labour costs are based upon continuous 7 day week/3 shift working, and the wage rates have been fixed on those offered at the new sugar beet factory in the Delta, by taking into consideration the Projected inflation rate.

An allowance has been made for an agricultural service in terms of providing technical assistance to beet growers in the project area. One staff member would be allocated to each of the small holder divisions and 9-10 fieldmen would be held responsible for assisting and advising outgrowers.

The maintenance total allows for the employment of all the regular skilled engineering technicians and process operators during the non-operating period, together with an allowance for the use of materials in the ratio of 40:60 on a cost basis. This ratio is definitely higher than normal materials cost ratio but believed to be justifiable because of the manufacturers' countries of origin.

2-8 Operating Costs

The operating cost include all activities up to the production of white sugar in 100 kg jute bags, dried beet pulp in 50 kg paper bags and molasses in store in the factory bulk tank. The data are presented in two sections. The first section sets out variable operating costs based on the campaign production, while the second covers the annual establishment overhead costs.

Tables F-2-7 and F-2-8 contain breakdowns of some important items of the overhead costs.

Other operating costs such as for the staff vehicles operation, temporary labour costs, and international staff costs are given in Tables F-2-11, F-2-12 and F-2-13, respectively.

2-9 Gross Cash Flow

The gross cash flow of the proposed beet factory is given in Table F-2-14.

2-10 Financial Internal Rate of Return

This has been computed as per Table F-2-15.

Table F-2-7 Annual Factory Operating Costs Data at Full Development

Cost Centre	Cost LE'000
A. CAMPAIGN OPERATING COSTS	
Fuel oil (boilers, pulp driers, lime kiln) 30,511 tons x LE 110	3356.2
Limestone - 27,620 tons x LE 5.0	138.1
Chemicals	150.1
Other supplies (knives, filter cloths, maintenance mats, etc.)	140.5
Bagging materials	849.0
Temporary labour	63.4
Start-up and shut-down costs (labour supplies)	30.0
Co-operative handling charges (@ LE 2/ton of sugar beet)	1200.8
<u>TOTAL A</u>	<u>5928.1</u>
B. OVERHEAD COSTS	
Permanent labour, management and clerical salaries	549.8
Administration (telephone, post, office supplies, etc.)	25.0
General (travel, training, etc.)	300.0
Maintenance of equipment (2% of capital cost)	260.0
Insurance (0.3% of the value)	211.0
Building repairs (1% of capital cost)	233.0
Vehicles (& Equipment) O&M ⁽²⁾	26.4
General off-season services (sugar, molasses, cleaning, etc.)	200.0
<u>TOTAL B</u>	<u>1805.2</u>
TOTAL COSTS	<u>7733.3</u>

(1) See Table F-2-8 .

(2) See Table F-2-10

Table F-2-8 Sugar Beet Factory (North) - Permanent Management and Labour Costs (LE)

Factory Year	3	4	5	6	7+
<u>Position/Title</u>	<u>Salary per annum (LE)</u>				
General Manager	17,650	17,650	17,650	17,650	17,650
Works Manager	14,120	14,120	14,120	14,120	14,120
Production Manager	10,240			10,240	10,240
Personnel Manager	8,830	8,830	8,830	8,830	8,830
Mechanical Engineer	8,830				8,830
Electrical Engineer	8,830	8,830	8,830	8,830	8,830
Chemist	7,060	7,060	7,060	7,060	7,060
Shift Manager	5,300	5,300	5,300	10,600	15,900
Asst. Mech. Eng.	5,300			5,300	5,300
Asst. Elect. Eng.	5,300			5,300	5,300
Agricultural Manager	8,830		8,830	8,830	8,830
Dept. Manager (out-growers)	5,830		5,830	5,830	5,830
Divisional Fieldsmen	2,650		5,300	7,950	10,600
Outgrower Fieldsmen	2,650		5,300	15,900	23,850
Chief Clerk	4,410	4,410	4,410	4,410	4,410
Office Dept. Heads	1,765		3,530	7,060	14,120
Clerks	1,325		3,975	5,300	14,575
Process Operators	1,590		39,750	79,500	154,230
Technicians (Mech.)	1,590		15,900	31,800	79,500
Technicians (Elect.)	1,940		7,760	15,520	31,040
Medical Officers	8,830		8,830	8,830	17,660
First Aid Staff	1,325		1,325	2,650	5,300
Maintenance Technicians	1,765		3,530	5,295	10,590
Shop/Club Staff	1,500		3,000	4,500	10,500
Timekeeper	1,500		1,500	1,500	1,500
Canteen Staff	1,060		2,120	3,180	8,480
Cleaners	800		2,400	4,800	7,200
Secretaries	1,765		3,530	3,530	5,295
Typists	1,410		2,820	2,820	4,230
Drivers	1,235	2,470	2,470	2,470	4,940
Office Juniors	700		1,400	1,400	2,800
Watchmen	700		1,400	1,400	2,800
<u>Total Cost per Annum</u>		<u>82,790</u>	<u>210,820</u>	<u>326,525</u>	<u>549,760</u>

Table F-2-9 Sugar Beet Factory - Phasing of Costs for Staff Vehicles

<u>Factory Year</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>Type of Vehicle</u>				
C.1	4960			4960
C.2	4300		4300	8600
Pickups (PU)	3640	10920	18200	7280
Pool Cars (C2)	4300	8600	8600	
TOTALS	<u>17200</u>	<u>19520</u>	<u>31100</u>	<u>20840</u>

Table F-2-10 Vehicle Operating Costs - Cumulative

C.1	590	590	590	1180 +
C.2	560	560	1120	2240 +
Pickups (PU)	520	2080	4680	5720 +
Pool Cars (C2)	5600	16800	17300	17300 +
TOTALS	<u>7270</u>	<u>20030</u>	<u>23690</u>	<u>26440 +</u>

Table F-2-11 Sugar Beet Factory - Phasing of Staff Housing and Amenity
Capital Costs (LE '000)

Position/Title	House		3	4	5
	Type	F/Y			
General Manager (I)	A1		44,000		
General Manager	A1		44,000		
Works Manager (I)	A2		33,800		
Works Manager	A2		33,800		
Accountant	A2		33,800		
Production Manager (I)	A2		33,800		
Production Manager	A2			33,800	
Personnel Manager	A2		33,800		
Mechanical Engineer (I)	A2		33,800		
Mechanical Engineer	A2		33,800		
Electrical Engineer	A2		33,800		
Chemist	A2		33,800		
Shift Managers	A2		33,800	33,800	33,800
Asst. Mech. Engineer	A3			24,700	
Asst. Electrical Eng.	A3			24,700	
Agricultural Manager	A2		33,800		
Dept. Manager (Outgrowers)	A3		24,700		
Divisional Fieldsmen	B1		25,800	12,900	38,700
Outgrowers Fieldsmen	B1		25,800	51,600	38,700
Chief Clerk	A3		24,700		
Office Dept. Heads	B1		25,800	25,800	51,600
Clerks	B3		14,100	4,700	32,900
Process Operators	B2		220,000	220,000	413,600
Technician (Mech)	B2		88,000	88,000	264,000
Technician (Elect)	B2		35,200	35,200	70,400
Medical Officer	A3		24,700		24,700
First Aid Staff	B3		4,700	4,700	9,400
Maintenance Technician	B1		12,900	12,900	38,700
Shop/Club Staff	B2		17,600	8,800	35,200
Timekeeper	B2		8,800		
Canteen Staff	B3		9,400	4,700	23,500
Drivers	C1		2,440		2,440
Cleaners	C1		3,660	3,660	3,660
Temporary Process Operators	Hostel			141,200	
Temporary Technicians (Mech)	Hostel			53,000	
Guest House			53,000		
Club			40,000		
Supermarket			80,000		
Sub-Total			1,201,100	784,160	1,081,300
Plus: Infrastructure @ 40% (1)			480,440	313,664	432,520
TOTALS			<u>1,681,540</u>	<u>1,097,824</u>	<u>1,513,820</u>

House Cost by Type (LE)

A1	44,000
A2	33,800
A3	24,700
B1	12,900
B2	8,800
B3	4,700
C1	1,220

Table F-2-12 Sugar Beet Factory - Temporary Labour Costs (LE)

Factory Year		5	6	7+
<u>Position/Title</u>	<u>Monthly Salary</u> LE			
Village Buying Supervisors	130	1560	825	20420
Process Operators	65	15890	31470	42640
Technicians	85	310	310	310
TOTAL COSTS PER ANNUM		<u>17760</u>	<u>32605</u>	<u>63370</u>
Days Processing		45	73	95
Days Paid		50	80	105

Table F-2-13 Sugar Beet Factory - International Staff Costs (LE)

Factory Year		1	2	3	4	5
<u>Position/Title</u>	<u>Salary per Annum</u> LE					
General Manager	45000	45000	45000	45000	45000	45000
Works Manager	40000	400000	40000	40000	40000	40000
Production Manager	32500		32500	32500	32500	
Mechanical Engineer	32500		32500	32500	32500	
TOTAL COST PER ANNUM		<u>85000</u>	<u>150000</u>	<u>150000</u>	<u>150000</u>	<u>85000</u>

Table F-2-14 Sugar Beet Factory - Gross Cash Flow at Financial Prices (LE '000)

Calendar Year Factory Year	1993 1	1994 2	1995 3	1996 4	1997 5	1998 6	1999 7	2000 8	2001 9	2002 10	2003 11	2004 12
SUGAR BEET PURCHASES ('000)	-	-	-	75.3	143.0	308.7	418.0	547.9	602.1	600.0	600.0	600.4
PHYSICAL PRODUCTION												
- White Sugar	-	-	-	11.22	21.30	45.98	62.26	81.60	89.68	89.36	89.36	89.42
- Dried Molassed Sugar Beet Pulp	-	-	-	1.50	3.00	6.20	8.30	11.00	12.00	13.00	14.00	15.00
- Dried Unmolassed Sugar Beet Pulp	-	-	-	3.86	7.22	15.78	21.48	28.00	30.83	30.05	29.44	28.80
- Molasses	-	-	-	4.51	8.55	18.47	25.00	32.77	36.02	35.89	35.89	35.91
INCOME												
- White Sugar @ LE 400/ton	-	-	-	4488.0	8520.0	18392.0	24904.0	32640.0	35872.0	35744.0	35768.0	35768.0
- Dried Molassed Sugar Beet Pulp @ LE 100/ton	-	-	-	150.0	300.0	620.0	830.0	1100.0	1200.0	1300.0	1400.0	1500.0
- Dried Unmolassed Sugar Beet Pulp @ LE 150/ton	-	-	-	579.0	1083.0	2367.0	3214.5	4200.0	4624.5	4507.5	4416.0	4320.0
- Molasses @ LE 150/ton	-	-	-	676.5	1282.5	2770.5	3750.0	4915.5	5403.0	5383.5	5383.5	5386.5
TOTAL INCOME	-	-	-	5893.5	11185.5	24149.5	32698.5	42855.5	47099.5	46935.0	46970.5	46974.5
SUGAR BEET PURCHASES (A) @ LE 20/ton	-	-	-	1506.0	2860.0	6174.0	8360.0	10958.0	12042.0	12000.0	12000.0	12008.0
CAMPAIGN OPERATING COSTS (B)												
- Fuel Oil	-	-	-	560.2	999.6	1898.5	2336.6	3062.8	3365.7	3354.0	3354.0	3356.2
- Limestone	-	-	-	23.3	41.5	80.3	96.1	126.0	138.5	138.0	138.0	138.1
- Chemicals	-	-	-	23.7	42.2	81.5	97.8	128.2	140.9	140.4	140.4	140.5
- Bagging Supplies	-	-	-	90.4	190.2	436.5	591.1	774.7	851.4	848.4	848.4	849.0
- Temporary Labour	-	-	-	-	-	17.8	32.6	63.4	63.4	63.4	63.4	63.4
- Start-up & Shut-down Costs	-	-	-	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
- Co-operative Handling Charges	-	-	-	150.6	286.0	617.4	836.0	1095.8	1204.2	1200.0	1200.0	1200.8
SUB-TOTAL (B)	-	-	-	903.8	1635.3	3248.4	4124.7	5417.9	5944.6	5924.2	5924.2	5928.1
OVERHEAD COSTS (C)												
- Perm.Labour, Management & Clerical Salaries	-	-	82.8	210.8	326.5	544.5	549.8	549.8	549.8	549.8	549.8	549.8
- International Staff Costs	85.0	150.0	150.0	150.0	85.0	-	-	-	-	-	-	-
- Administration	-	-	10.0	15.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
- General	100.0	200.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0
- Maintenance of Equipment	-	-	-	100.0	200.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0
- Insurance	-	19.8	80.0	163.4	206.3	210.9	211.0	211.0	211.0	211.0	211.0	211.0
- Building Repairs	-	-	-	-	19.0	76.0	168.8	218.8	233.0	233.0	233.0	233.0
- Vehicles Operation & Maintenance	-	-	7.3	20.0	23.7	26.4	26.4	26.4	26.4	26.4	26.4	26.4
- General Off-Season Services	-	-	-	25.0	75.0	150.0	150.0	175.0	200.0	200.0	200.0	200.0
SUB-TOTAL (C)	185.0	369.8	630.1	984.2	1260.5	1592.8	1691.0	1766.0	1805.2	1805.2	1805.2	1805.2
TOTAL COSTS (A+B+C)	185.0	369.8	630.1	3394.0	5755.8	11015.2	14175.7	18141.9	19791.8	19729.4	19729.4	19741.3
GROSS CASH FLOW	(185.0)	(369.8)	(630.1)	2499.5	5429.7	13134.3	18522.6	24713.6	27307.7	27205.6	27241.1	27233.2

Table F-2-15 Sugar Beet Factory - Internal Rate of Return Calculation at Financial Prices (LE '000)

Calendar Year	Factory Year	Gross Cash Flow	Plant and Piping	Structures and Buildings	Electrical Equipment	Instruments and Control	Plant Spares	Design and Project Management	Staff Accommodation	Staff Vehicles	Average Additional Working Capital and Commissioning	Total Investment	Total Investment incl. 10% Contingency	Net Cash Flow
1993	1	(185.0)	3493.0	1900.0	889.0	313.0	-	460.0	-	-	-	7055.0	7760.5	(7945.5)
1994	2	(369.8)	10479.0	5700.0	2667.0	939.0	-	920.0	-	-	-	20705.0	22775.5	(23145.3)
1995	3	(630.1)	13972.0	7600.0	3556.0	1252.0	1040.0	920.0	1681.5	17.2	-	30038.7	33042.6	(33672.7)
1996	4	2499.5	6986.0	3800.0	1778.0	626.0	1040.0	460.0	1097.8	19.5	-	15807.3	17388.0	(14888.5)
1997	5	5429.7							1513.8	31.1	1675.2	3220.1	3542.1	1887.6
1998	6	13134.3								20.8	332.6	353.4	388.7	12745.6
1999	7	18522.8									185.3	185.3	203.8	18319.0
2000	8	24713.6								17.2	104.5	121.7	133.9	24579.7
2001	9	27307.7								19.5	84.2	103.7	114.1	27193.6
2002	10	27205.6								31.1	65.4	96.5	106.2	27099.4
2003	11	27241.1								20.8	43.1	63.9	70.3	27170.8
2004	12					3130.0					17.6	3147.6	3462.4	23770.8
2005	13	27233.2								17.2		17.2	18.9	27214.4
2006	14	27233.2								19.5		19.5	21.5	27211.7
2007	15	27233.2								31.1		31.1	34.2	27199.0
2008	16	27233.2								20.8		20.8	22.9	27210.3
2009	17	27233.2												
2010	18	27233.2								17.2		17.2	18.9	27214.3
2011	19	27233.2	11643.3		8890.0					19.5		20552.8	20608.1	4625.1
2012	20	27233.2								31.1		31.1	34.2	27199.0
2013	21	27233.2								20.8		20.8	22.9	27210.3
2014	22	27233.2												
2015	23	27233.2								17.2		17.2	18.9	27214.3
2016	24	27233.2	11643.3			3130.0				19.5		14792.8	16272.1	10961.1
2017	25	27233.2								31.1		31.1	34.2	27199.0
2018	26	27233.2								20.8		20.8	22.9	27210.3
2019	27	27233.2												
2020	28	27233.2								17.2		17.2	18.9	27214.3
2021	29	27233.2								19.5		19.5	21.5	27211.7
2022	30	27233.2								31.1		31.1	34.2	53890.0 ⁽²⁾
TERMINAL VALUE			8732.5	4750.0	6519.3	1878.0	2080.0		1073.3	27.8	1630.1	(26803.8)		

(1) Average annual working capital calculated as total costs ÷ 365 x days processed

(2) Includes terminal value

3. Vegetable Processing (Tomato Paste)

3-1 Introduction

The proposed factory is meant for production of tomato paste for export. As such, the product should have excellent quality as regards colour, fungal spore count, bacteria count, amount of insect fragments and other impurities, sugar/acid ratio and flavour. A high quality tomato paste acceptable by the international market can only be produced from quality tomato varieties with a high solids content.

These must be selected for growing in the project area. It is most desirable, therefore, that the tomato producers will be put under the careful control of the factory through their co-operatives.

The factory would have to be supplied with good quantities of potable water which is indispensable for washing the fresh tomatoes as well as for the operation of the evaporator-condenser and the can cooling operation. The supply of fuel and power should also be dependable since power failure and/or shortage of fuel would cause plant shut-downs and deterioration or loss of fresh tomatoes. High quality tin cans and corrugated paper boxes are essential for exporting the product.

3-2 Factory Capacity

Material tomatoes would be harvested twice a year in the project area: during the months of June to September in summer, and during the months of December to February in winter. At full development approx. 75,000 tons of tomatoes, 86% during winter and 14% during summer, would be produced. The proposed factory is intended to process the entire tomato expected to be produced in the project area.

The proposed processing line has been designed to process an average of 6-7 tons of tomatoes per hour or 150 tons per day. With a processing campaign of around 170 days, three lines would be required to handle the production expected at full development. As mentioned earlier, the factory is primarily meant for export product, it is planned to produce triple strength (38-40 per cent solids) tomato paste for reprocessing abroad. At full development about 9530 tons of triple strength tomato paste would be produced.

3-3 Factory Location

The factory should have a good access road to the port of Alexandria, an adequate supply of water and be close to housing and amenities for the labour and management required to operate the factory. Eventually, it is proposed to establish the factory at the North-western part of North Hussinia Block.

3-4 Factory Buildings

A single storey building with a floor space of 1600 sq. metres (approx. 50 x 32 m) should provide enough space for each processing line. A single storey warehouse with 6000 m² of floor space (or two single storey warehouses @ 3000-3200 m² floor space each) would be needed for finished products and raw materials.

Office and laboratory space with a floor space of approx. 230 m² have been included for these facilities. A site of six feddan would provide sufficient space for the buildings and their approaches.

3-5 Factory Processing Equipment

The factory would accommodate modern, medium to large scale automated processing equipment; a flow sheet for a single line is shown in Fig. F-3-1. The following three sections may describe the proposed operations and plant:

- (a) Preparation of Juice for Concentration
- (b) Tomato Juice Concentration and Tomato Paste Sterilization
- (c) Filling, Seaming and Colling Filled Cans

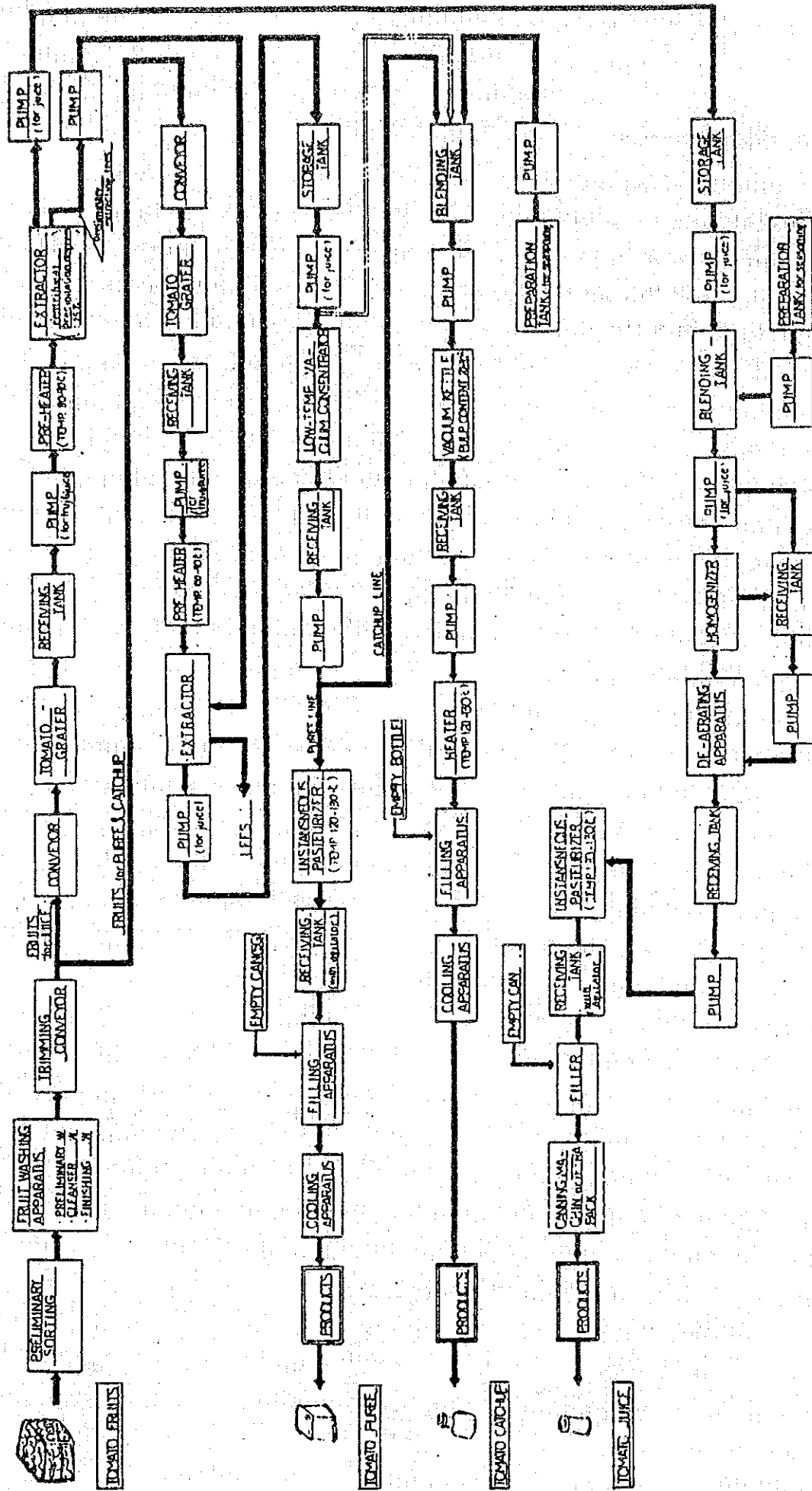


Figure P-3-1 Tomato Paste & Ketchup Factory

3-6 Capital Costs

In estimating the processing equipment costs, the standard equipment have been taken into consideration and priced at c.i.f. Alexandria mainly in view of the saving in ocean freight. This does not preclude the purchase of non-European equipment if it is competitive. Capital cost of plant items for 150 ton/day line is given in Table F-3-1 and F-3-2.

Table F-3-1 Capital Cost of Plant Items for 150 TPD Line

Plant Items	LE
<u>Juice Preparation Line</u>	
Washing machine with sorting table	
1 Centrifugal rotary pump for tomato washing	
1 Rotary air blower	
1 Automatic controlling and recording set	
1 Single stage air compressor	
1 Metal cabinet for controls	
1 Collection tank for refined tomato juice	
1 Metal frame with SS steel collector	
Sub-total	78,200
<u>Juice Concentration and Paste Sterilization</u>	
1 Continuous plant for concentration of tomato juice	
1 Tomato paste sterilizing unit	
Sub-total	273,710
<u>Can Filling, Seaming and Cooling</u>	
1 Automatic volumetric can filler	
1 Connecting disc to seaming machine	
1 Automatic seaming machine	
1 Metal control cabinet	
1 Filled can cooler	
1 Electric control cabinet	
1 Filled can conveyor	
1 Elevator can conveyor	
Sub-total	117,300
<u>Other Equipment</u>	
1 500 Hp steam generator	
1 Water treatment plant	
1 Gasoline fork truck (1 ton)	
1 Electric fork truck (1 ton)	
3000 Pallets, each	
1 Sem-automatic case loader and sealer	
Sub-total	<u>170,480</u>
Total price c.i.f. Port of Alexandria	639,690
<u>Plus: 5.0% internal costs</u>	<u>31,985</u>
	<u><u>671,675</u></u>

While supply of the material tomatoes is not large, that is, during Factory Years 2 and 3, only one line will be put into operation; then, as material tomato supply becomes more, 2 lines will start working during Factory Years 4 and 5. Since Factory Year 6 onward, 3 lines would be working. With three lines required to handle the anticipated production at full development, the total capital cost of plant would be as follows:

Table F-3-2 Total Capital Costs for 450 TPD Tomato Factory

	<u>LE '000</u>
Main Plant (LE 671,680 x 3 lines)	2,015.0
Office equipment and furniture	15.0
Laboratory equipment and furniture	26.0
Installation costs and spare parts	213.3
Processing buildings, 4800 m @ LE 120	576.0
Warehouse, 6000 m ² @ LE 100	600.0
Laboratory and office, 230 m ² @ LE 150	34.5
Architect fees and supervision @ 8% building costs	96.9
Staff housing (see Table F-3-3)	34.4
Staff vehicles (see Table F-3-4)	34.4
	<u>4,548.9</u>

Capital costs would also include staff housing and vehicle costs; their annual costs are given in Tables F-3-3 and F-3-4 respectively.

3-7 Material Supplies

The proposed plant would process only high quality fresh tomatoes and the production of tomato paste for export would take place in stages as the experience of the tomato growers groups in sorting and delivery advances year after year. Thus the plant would start processing 10,000 tons a year, gradually increasing the quantity till it handles a constant amount of 75,000 tons in Factory Year 9 onward.

Table F-3-3 Phasing of Housing Costs for Tomato Processing Plant (LE)

Designation	Type of House	Cost per House	Factory Year					
			1	2	3	4	5	
General Manager	A1 (1)	44,000	44,000					
General Manager	A1 (1)	44,000		44,000				
Assistant Manager	A2 (3)	33,800	33,800		33,800			33,800
Quality Control Supervisor	A2 (1)	33,800	33,800					
Quality Control Assistants	A3 (3)	24,700	24,700		24,700			
Accountant	A3 (1)	24,700	24,700					24,700
Clerks	B1 (3)	12,900	12,900			12,900		12,900
Drivers	C1 (3)	1,200	2,440			1,200		
Plant Supervisor	A3 (2)	24,700	49,400					
Shift Foremen	B1 (9)	12,900	12,900	12,900		51,600		38,700
Chief Mechanic	A3 (1)	24,700	24,700					
Asst. Mechanic	B1 (6)	12,900	12,900	12,900		25,800		25,800
Canfilling Operators	C1 (18)	1,220	7,320			7,320		7,320
Can Packers	C1 (18)	1,220	7,320			7,320		7,320
Forklift Drivers	B3 (21)	4,700	32,900			32,900		32,900
Weighters	C1 (6)	1,220	2,440			2,440		2,440
General Labourers	C1 (12)	1,220	4,880			4,880		4,880
Hostel	(1)	141,200	141,200					
Total:			472,300	69,800	204,880	-	190,760	

Table F-3-4 Staff Vehicle Costs

<u>Number</u>	<u>Type of Vehicle</u>	<u>Cost of Vehicle</u>	<u>Factory Year</u> <u>1</u>
2	C1	@LE 4960	9,920
2	C2	@LE 4300	8,600
2	Pool Cars	@LE 4300	8,600
2	Pick-ups	@LE 3640	<u>7,280</u>
		Total	<u><u>34,400</u></u>

Nevertheless, the tomato growers and the plant would be put in an awkward position as regards the determination of the purchase price of the material tomatoes. While a high purchasing price would apparently be beneficial for the growers, a low purchasing price should be more favourable to the plant. Thereupon, three cases of (x), (y) and (z) have been compared by fixing the unit purchase price of fresh tomato at LE 60, LE 80 and LE 100, respectively, each per ton.

As a result, the percentage of material tomato cost in the total operating cost of the plant has been identified at 61% in case of (x), 67% in case of (y), and 72% in case of (z), at full development. By taking into consideration the high quality which is the basic requirement, plus the labour in sorting and delivery by the tomato growers' co-operative, case (y) has been ultimately adopted, since (x) would be too harsh to the growers but (z) might give severe pressure on the plant management (for details, see Table F-3-5 Gross Cash Flow in Financial Prices).

Among other materials, the containers and packaging materials are available in Egypt and the utilities such as fuel oil and electricity are also present in the project area. Their unit costs have been computed as follows:

Table F-3-6. Costs of Raw Materials and Other Supplies

Tomatoes	@ LE 80/ton
Cans 5 kg gross (4.5 kg net)	@ LE 0.70/ton paste
Cartons	@ LE 22.5/ton paste
Fuel Oil	@ LE 9.7/ton tomato
Electricity	@ LE 0.5/ton tomato

3-8 Operating Costs

The operating costs have been estimated in three sectors of (A): Purchase of Tomatoes; (B): Other Materials and Supplies, and (C): Overhead Cost. Permanent and temporary staff costs which are included in the Overhead Costs are estimated as per Table F-3-7.

TABLE F-3-7 Staff Costs for Tomato Processing Plant (LE)

Calendar		1996	1997	1998	1999	2000	2001	2002	2003	2004
Factory Year		1	2	3	4	5	6	7	8	9+
	Annual Salary	Number Required On Full Development								
<u>Administration</u>										
General Manager	Fee	1	38,500	38,500	38,500	38,500	38,500	38,500	38,500	38,500
General Manager	12,500	1	--	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Asst. Managers	7,800	3	--	7,800	7,800	15,600	23,400	23,400	23,400	23,400
Quality Control Supervisor	7,800	1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800
" " Assistants	1,700	3	--	1,700	3,400	3,400	5,100	5,100	5,100	5,100
Accountant	1,700	1	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700
Clerks	1,560	3	--	1,560	3,120	3,120	4,680	4,680	4,680	4,680
Secretary	1,560	1	1,560	1,560	1,560	1,560	1,560	1,560	1,560	1,560
Typists	1,250	1	--	1,250	1,250	1,250	1,250	1,250	1,250	1,250
Office Juniors	625	3	--	625	625	1,250	1,875	1,875	1,875	1,875
Drivers	1,000	3	2,000	2,000	3,000	3,000	3,000	3,000	3,000	3,000
Watchmen	625	3	625	625	1,250	1,250	1,875	1,875	1,875	1,875
Sub-Total		24	52,185	65,120	77,620	90,930	52,430	64,740	64,740	64,740
<u>Operation</u>										
Plant Supervisors	1,700	2	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400
Shift Foremen	1,870	9	1,870	3,740	3,740	11,220	16,830	16,830	16,830	16,830
Chief Mechanis	7,800	1	7,800	7,800	7,800	7,800	7,800	7,800	7,800	7,800
Assist. Mechanics	1,700	6	1,700	3,400	6,800	6,800	10,200	10,200	10,200	10,200
Canfilling Operators	1,560	18	--	9,360	18,720	18,720	28,080	28,080	28,080	28,080
Can Packers	1,560	18	--	9,360	18,720	18,720	28,080	28,080	28,080	28,080
Forklift Drivers	1,560	21	--	10,920	21,840	21,840	32,760	32,760	32,760	32,760
Weishters	1,560	6	--	3,120	6,240	6,240	9,360	9,360	9,360	9,360
General Labourers	625	12	--	2,500	5,000	5,000	7,500	7,500	7,500	7,500
Sub-Total		93	14,770	53,600	99,740	99,740	144,010	144,010	144,010	144,010
TOTAL PERMANENT STAFF COSTS			66,955	118,720	131,220	190,670	152,170	208,750	208,750	208,750
<u>Temporary Labour</u>										
Tomato Graters		90	16,800	16,800	33,600	33,600	50,400	50,400	50,400	50,400

At full development, the total operating costs are estimated as follows:

Table F-3-8 Annual Factory Operating Cost at Full Development

	<u>LE 000's</u>
Raw Materials and Other Supplies	8460.3
Permanent Staff Costs	208.8
Temporary Staff Costs	50.4
Insurance	9.8
Machinery and Equipment Repairs	82.2
Building Repairs	42.9
Administration	<u>13.0</u>
	<u>8867.4</u>

(For details, see Table F-3-5 : Gross Cash Flow at Financial Prices)

3-9 Gross Cash Flow

The gross cash flow of the proposed tomato processing plant is given in Table F-3-5 : Gross Cash Flow at Financial Prices

3-10 Financial Internal Rate of Return

This has been computed as per Table F-3-9 : Financial Internal of Return.

TABLE F-3-5 Tomato Paste Processing Plant - Gross Cash Flow at Financial Price (LE 000's)

Project Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Factory Year	1	2	3	4	5	6	7	8	9	
<u>Physical Output (000's Tons)</u>										
Tomato Paste @12.7 % of fresh tonnage		1.27	2.54	3.81	5.08	6.35	7.62	8.89	9.53	
<u>Income (LE '000)</u>										
Tomato Paste @LE 1,200		1,524	3,048	4,572	6,096	7,620	9,144	10,668	11,436	
Purchase of Tomatoes (000's Tons)		10.0	20.0	30.0	40.0	50.0	60.0	70.0	75.0	
<u>Tomato Purchase (A)</u>										
@LE 60/Ton (X)		600	1,200	1,800	2,400	3,000	3,600	4,200	4,500	
" 80/Ton (Y)		800	1,600	2,400	3,200	4,000	4,800	5,600	6,000	
" 100/Ton (Z)		1,000	2,000	3,000	4,000	5,000	6,000	1,382.9	1,482.4	
- Skg (Gross) Cans (4.5 kg net) @LE0.70		197.6	395.1	592.7	790.2	987.8	1,185.3	1,382.9	1,482.4	
- Fuel Oil @LE 9.7/Ton of tomatoes processed		97.0	194.0	291.0	388.0	485.0	582.0	679.0	727.5	
- Cartons @LE 22.5/Ton paste		28.6	57.2	85.7	114.3	142.9	171.5	200.0	214.4	
- Electricity @LE 0.5/Ton of tomato processed		5.0	10.0	15.0	20.0	25.0	30.0	35.0	36.0	
Sub-Total		328.2	656.3	984.4	1,312.5	1,640.7	1,968.8	2,296.9	2,460.3	
<u>Overhead Costs (L)</u>										
		1 line	1 line	2 lines	2 lines	3 lines				
- Perm-Management, Labour & Clerical Salaries	67.0	118.7	131.2	190.7	152.2	308.8	308.8	208.8	208.8	
- Temporary Labour	-	16.8	16.8	33.6	33.6	50.4	50.4	50.4	50.4	
- Administration	6.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	
- Maintenance of Equipment @ 4% of Capital Cost		28.5	28.5	55.4	55.4	82.2	82.2	82.2	82.2	
- Insurance @ 0.3% of Value (Buildings & Equipment)		5.8	5.8	7.8	7.8	9.8	9.8	9.8	9.8	
- Building Repairs @ 2% of Capital Cost		35.1	35.1	39.2	39.2	42.9	42.9	42.9	42.9	
Sub-Total	73.5	217.9	230.4	339.7	301.2	407.1	407.1	407.1	407.1	
	(X)	73.5	1,146.1	2,086.7	3,124.1	4,013.7	5,047.8	5,975.9	6,904.0	7,367.4
TOTAL COSTS (A + B + C)	(Y)	73.5	1,346.1	2,486.7	3,724.1	4,813.7	6,047.8	7,175.9	8,304.0	8,867.4
	(Z)	73.5	1,546.1	2,886.7	4,324.1	5,613.7	7,047.8	8,375.9	9,704.0	10,367.4
	(X)	(73.5)	377.9	961.3	1,447.9	2,082.3	2,572.2	3,168.1	3,764.0	4,068.4
GROSS CASH FLOW	(Y)	(73.5)	177.9	561.3	847.9	1,282.3	1,572.2	1,968.1	2,364.0	2,568.6
	(Z)	(73.5)	(22.1)	161.3	247.9	482.3	572.2	768.1	964.0	1,068.6

TABLE E-3-9 Tomato Paste Processing Plant - Financial Internal Rate of Return (LE 000's)

Factory Year	Gross Cash Flow	Buildings	Plant & Equipment	Installation & Spare Parts	Architector Fee & Supervision	Staff Housing	Staff Vehicles	Average Additional Annual Working Capital (1)	Total Investment Incl. 10% Capital (1)	Net Cash Flow
1	(73.5)	1210.5	712.7	71.1	32.3	472.3	34.4		2786.6	(2860.1)
2	177.9					69.8		403.8	421.0	(343.1)
3	561.3		671.7	71.1	32.3	204.9		746.0	1898.6	(1337.3)
4	847.9							1117.2	1228.9	(381.0)
5	1202.3		671.7	71.1	32.3	190.8	34.4	1444.1	2688.8	(1406.5)
6	1572.2									1572.2
7	1968.1									1968.1
8	2364.0									2364.0
9	2568.6									2568.6
10	2568.6									2568.6
11	2568.6		712.7				34.4		821.8	1746.8
12	2568.6									2568.6
13	2568.6		671.7						738.9	1829.7
14	2568.6									2568.6
15	2568.6		671.7						738.9	1829.7
16	2568.6						34.4		37.8	2530.8
17	2568.6									2568.6
18	2568.6									2568.6
19	2568.6									2568.6
20	2568.6									2568.6
21	2568.6		712.7				34.4		821.8	1746.8
22	2568.6									2568.6
23	2568.6		671.7						738.9	1829.7
24	2568.6									2568.6
25	2568.6		671.7						738.9	1829.7
26	2568.6						34.4		37.8	2530.8
27	2568.6									2568.6
28	2568.6									2568.6
29	2568.6									2568.6
30	2568.6									2568.6 ⁽²⁾
TERMINAL VALUE		302.6								

(1) Average annual working capital is estimated as 30% of total operating costs

(2) Includes terminal value

4. Milk Processing

4-1 Introduction

Assuming that the livestock development plan proposed in this report will be realized according to its keynote, raw cow milk available in the Project area for processing is expected to increase from 8,030 tons in 1993 to 170,000 tons in 2006 in the following order:

<u>Calendar Year</u>	<u>Factory Year</u>	<u>Ton per Year (thousand tons)</u>	<u>Daily Arrivals at the Factory</u>	
			<u>Thousand Litres</u>	<u>Tons</u>
1993	2	8.03	21.37	22.0
1994	3	14.75	39.28	40.4
1995	4	20.67	54.99	56.6
1996	5	28.22	75.07	77.3
1997	6	37.63	100.08	108.1
1998	7	47.03	129.00	128.8
1999	8	56.44	150.14	154.6
2000	9	65.84	175.15	180.4
2001	10	75.25	200.16	206.2
2002	11	84.67	225.21	232.0
2003	12	98.78	262.74	270.6
2004	13	112.89	300.27	309.3
2005	14	141.11	375.34	386.6
2006	15	169.33+	450.41+	464.9+

Note: 1 litre milk = 1.039 kg
1 ton milk = 970.81 litres

4-2 Factory Capacity

To avoid capacity under-utilization, the plant will start with 1 line which is capable of processing 75,000 litres per 8 hours shift or 27.4 million litres per annum (assuming 365 days processing) and, as milk delivery increases, two more lines of the same capacity will be added, one by one, within 8 years since its inauguration. All the three lines will start working on 2 shifts, the first line since F/Y 12, the second line since F/Y 13,

and the third line since F/Y 15. This would put the plant's capacity in such a position as to deal with increasing supply of milk for processing as illustrated in the below:

Factory Year	1st Line	2nd Line	3rd Line	Total Capacity (mil.litres)	Estimated Total Supply of Milk/Year (mil.litres)
	27.4 million litres per shift	27.4 million litres per shift	27.4 million litres per shift		
1	Installation				
2				27.4	7.80
3				"	14.33
4				"	20.07
5		Installation		"	27.40
6				54.8	36.53
7				"	45.66
8			Installation	"	54.79
9				82.2	63.92
10				"	73.05
11				"	82.20
12				109.5	96.00
13				136.9	109.59
14				"	136.99
15				164.4	164.39

4-3 Products to be Manufactured

This factory is designed to process about 40 percent of its daily throughput into U.H.T. milk, 40 percent into white cheese, and 20 percent into butter.

For collection of raw milk 9,000 litres milk tankers will be used.

Although an exact assessment of the number of tankers required could

be made only upon identification of the location of the village milking centres were known, 22 milk tankers of the said capacity would be required at full development (including 2 spare tankers).

All milk should be strained at the village milking centres equipped with chilling facilities (bulk coolers). It is recommended that the milk should be chilled at least to 10°C within 2 - 3 hours after milking and to -4°C within 5 - 6 hours. Any milk containing antibiotics used for mastitis control should be rejected, and the spore forming bacteria needs to be removed from the raw milk by 99.0 percent prior to pasteurisation.

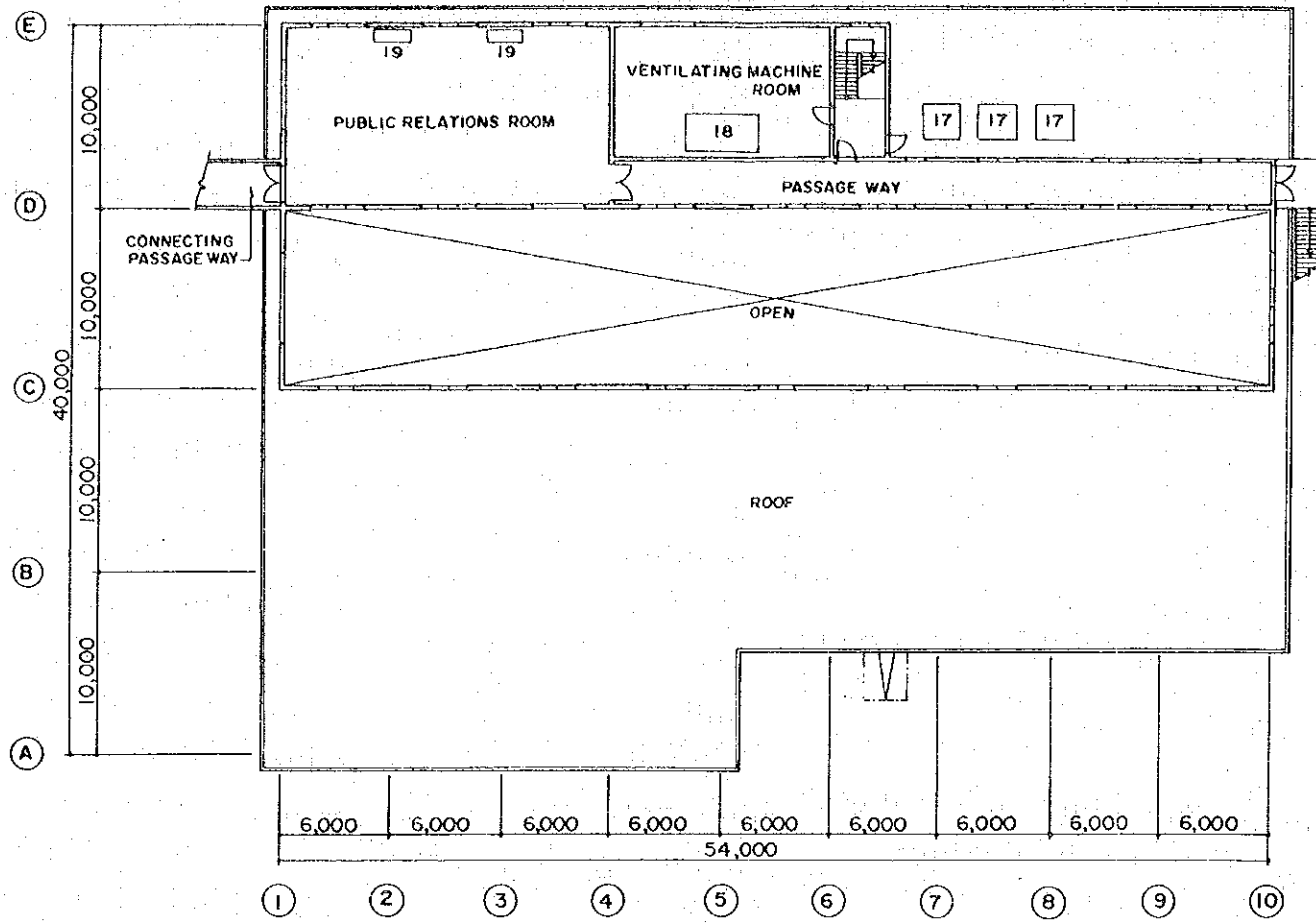
4-4 Plant Layout and Processing Procedures

Figure F-4-1 shows a layout for U.H.T. milk to which necessary facilities for butter and white cheese would have to be added. In the proposed milk plant, indirect method will be adopted for U.H.T., that is: the final heating of the milk is done by heat exchange without the milk coming into direct contact with the heating medium.

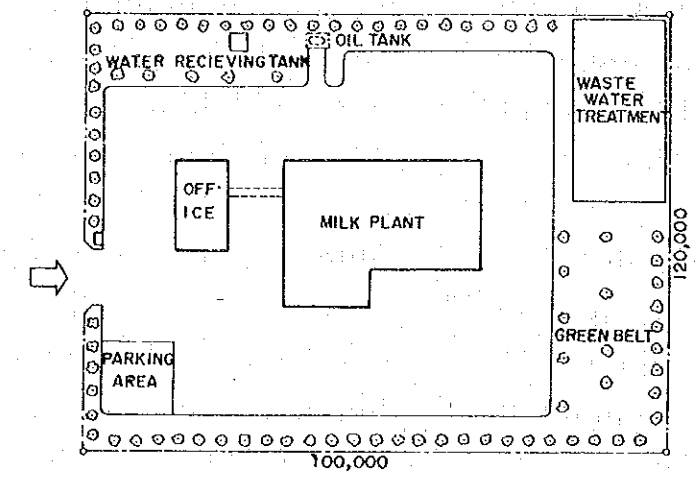
The plant would need to have a well-equipped laboratory which is staffed with qualified and experienced personnel capable of carrying out check and control of the incoming raw milk quality, control of processing operations and monitoring of the quality of products leaving the factory.

4-5 Capital Costs

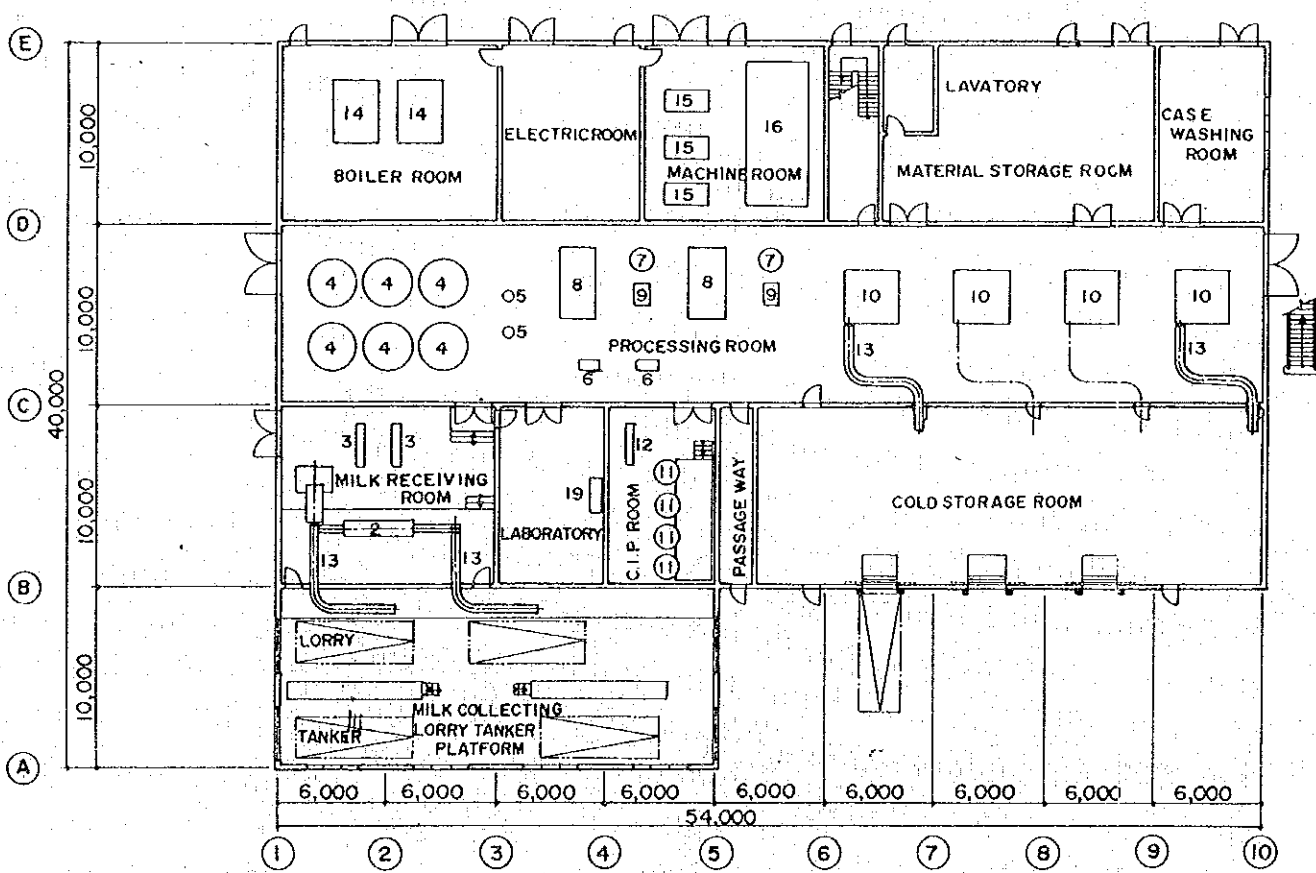
Tables F-4-1 and F-4-2 give details of the individual components of the proposed milk processing plants along with an estimate of capital costs.



SECOND FLOOR PLAN S:1:400



PLOT PLANS=1:3000



FIRST FLOOR PLAN S:1:400

19	AIR CONDITIONER
18	VENTILATOR
17	REMOTE CONDENSER
16	ICE BANK
15	REFRIGERATOR
14	BOILER
13	CONVEYOR
12	C.I.P. HEATER
11	T. I. P. TANK
10	FILLER
9	HOMOGENIZER
8	STERILIZER
7	BALANCE TANK
6	SEPARATOR
5	FLOAT BALANCE TANK
4	RAW MILK STORAGE TANK
3	RAW MILK COOLER
2	CHURN WASHER
1	WEIGHING UNIT
N O	EQUIPMENT LIST

Figure F-4-1		REFERENCE NO.
MILK PLANT		DRAWING NO.
		DATE
		SCALE

Table F-4-1 Milk Processing Plant-Capital Costs (LE '000)

1. <u>Specifications of Processing Equipment</u>	<u>Factory Year</u>				<u>Total</u>
	<u>1</u>	<u>2</u>	<u>5</u>	<u>8</u>	
Milk reception and recombining	340,340	-	340,340	340,340	1,020,020
Pasteurization	196,470	-	196,470	196,470	989,410
U.H.T. Treatment	483,200	-	265,300	263,300	849,900
Asceptic Packing	200,350	-	200,300	200,300	600,980
Butter	126,330	-	126,330	126,330	376,990
Cheese	94,400	-	94,400	94,400	283,200
Cold Store Lucubration	32,880	-	32,880	32,880	98,640
Boiler	62,520	-	62,520	62,520	187,560
Refrigration	297,080	-	297,630	297,030	891,890
Water and Air Supply	10,680	-	10,680	10,680	32,440
Electrical Installation	194,640	-	194,640	194,640	583,920
Stainless Steel, Pioes and Fittings	38,580	-	38,580	38,580	115,740
Steel Pipes, Fittings and Installation	45,300	-	45,300	45,800	136,900
Internal Transport	6,080	-	6,080	6,080	18,240
Laboratory Equipment	18,000	-	18,000	18,000	54,000
Miscellaneous Dairy Equipment	8,030	-	8,030	8,030	94,090
Working	25,000	-	-	-	25,000
Spare Parts	42,570	-	42,370	42,370	127,110
Total Price F.O.B. European Port (1)	2,022,250	-	1,997,050	1,997,050	6,016,750
Freight and Insurance European Port Alexsandria	364,000	-	359,500	359,500	1,082,000
Total Price C.I.F. Port Alexandria	2,286,260	-	3,356,750	2,356,750	7,099,750
Plus 5.070 in Level Costs	119,310	-	117,840	117,840	354,990
TOTAL COSTS:	2,505,560	-	2,474,590	2,474,590	7,454,740

Note (1) Processing equipment of the proposed plant have been estimated of their price as of European make.

(continued)	<u>Factory Year</u>				<u>Total</u>
	<u>1</u>	<u>2</u>	<u>5</u>	<u>8</u>	
2. Water Treatment Plant	66,180	-	66,180	-	132,360
3. Element Plant	125,750	-	125,750	-	251,500
4. Distribution Refrigeration Equipment	275,750	-	275,750	-	551,500
5. Mechanical Engineering Design and Planning	47,650	-	23,825	23,825	95,300
6. Erection and Running-in	317,000	-	317,000	317,000	751,000
7. Supervision of Building and External Work	64,860	-	64,860	64,860	194,580
<u>Capital Cost of Building</u>					
8. Foundation and External Works	551,600	-	551,600	551,600	1,654,800
Building Approx. 4,000 m ²	1,045,000	-	1,145,000	1,045,000	3,135,000
Staff Housing	178,800	357,240	274,560	99,600	910,200
	<u>1,775,400</u>	<u>357,240</u>	<u>1,871,160</u>	<u>1,696,200</u>	<u>5,700,000</u>
9. Factory Transport Staff Vehicles					
Distribution Vans for Milk Products @LE 14.000	28,000	-	28,000	28,000	84,000
Milk Collecting Tankers @LE 37.000	185,000	-	296,000	333,000	814,000
Staff Vehicles @LE 4.630	9,260	-	9,260	9,260	27,780
	<u>222,260</u>	<u>-</u>	<u>333,260</u>	<u>370,260</u>	<u>925,780</u>
TOTAL CAPITAL COSTS:	<u><u>5,400,410</u></u>	<u><u>357,240</u></u>	<u><u>5,552,375</u></u>	<u><u>4,946,735</u></u>	<u><u>16,256,760</u></u>

Table F-4-2 Milk Processing Plant - Planning of Staff Housing and Furniture Capital Costs (LE)

<u>Type of House</u>	<u>Number Requirement</u>	<u>Factory Year</u>				<u>Total</u>
		<u>1</u>	<u>2</u>	<u>5</u>	<u>8</u>	
A1	2	44,000	44,000	-	-	88,000
A2	4	33,800	67,600	33,800	-	135,200
A3	2	49,400	-	-	-	49,400
B1	14	51,600	51,600	51,600	25,800	180,600
B2	45	-	167,200	167,200	61,600	396,000
C1	50	-	26,840	21,960	12,200	61,500
		<u>178,800</u>	<u>357,240</u>	<u>274,560</u>	<u>99,600</u>	<u>910,200</u>

4-6 Factory Managerial and Labour Requirement

Table F-4-3 shows the factory's permanent labour and management force. When each line will start working on 2 shifts, necessary number of temporary labour will be employed.

Table F-4-3 MILK PROCESSING PLANT - PERMANENT MANAGEMENT & LABOUR COSTS

Operation	Position/Title	Gross Monthly Salary LE	Factory Year											
			1	2+	3+	4+	5+	6+	7+	8+	9+			
			No.	FE	No.	FE	No.	FE	No.	FE	No.	FE	No.	FE
1. General	Factory Manager	4,300	1	51,600	1	51,600	-	-	-	-	-	-	-	-
	International Staff													
	Factory Manager	1,180	1	14,160	1	14,160	1	14,160	1	14,160	1	14,160	1	14,160
	Asst. Factory Manager	740	1	8,800	1	8,800	1	8,800	1	8,800	1	8,800	1	8,800
Factory Engineer International Staff	Factory Engineer	3,680	1	44,160	1	44,160	-	-	-	-	-	-	-	-
	Secretary	440	1	5,280	1	5,280	1	5,280	1	5,280	1	5,280	1	5,280
2. Milk Reception	Supervisor	180	1	2,160	2	4,320	3	6,480	3	6,480	3	6,480	3	6,480
	Skilled Labourers	135	2	3,240	4	6,480	4	9,720	4	9,720	4	9,720	4	9,720
	Unskilled Labourers	60	2	1,140	4	2,880	4	3,420	4	3,420	4	3,420	4	3,420
3. Pasteurisation	Skilled Labourers	135	1	1,520	2	3,240	3	4,560	3	4,560	3	4,560	3	4,560
	Unskilled Labourers	60	1	720	2	1,440	3	2,160	3	2,160	3	2,160	3	2,160
4. Palarizator	Skilled Operator	180	1	2,160	2	4,320	3	6,480	3	6,480	3	6,480	3	6,480
	Supervisor	180	1	2,160	2	4,320	2	4,320	2	4,320	2	4,320	2	4,320
5. Aseptic Packing	Skilled Labourers	135	2	3,240	4	6,480	4	9,720	4	9,720	4	9,720	4	9,720
	Unskilled Labourers	60	2	1,440	4	2,880	4	3,420	4	3,420	4	3,420	4	3,420
6. Butter Production	Supervisor	180	1	2,160	2	4,320	3	6,480	3	6,480	3	6,480	3	6,480
	Skilled Labourers	135	2	3,240	4	6,480	4	9,720	4	9,720	4	9,720	4	9,720
	Unskilled Labourers	60	2	1,440	4	2,880	4	3,420	4	3,420	4	3,420	4	3,420
7. Cheese Production	Supervisor	180	1	2,160	2	4,320	3	6,480	3	6,480	3	6,480	3	6,480
	Skilled Labours	135	2	3,240	4	6,480	4	9,720	4	9,720	4	9,720	4	9,720
	Unskilled Labours	60	2	1,440	4	2,880	4	3,420	4	3,420	4	3,420	4	3,420
8. Laboratory	Supervisor	3,680	1	44,160	-	-	-	-	-	-	-	-	-	-
	International Staff													
9. Store	Supervisor	180	1	2,160	1	2,160	1	2,160	1	2,160	1	2,160	1	2,160
	Skilled Labourers	135	2	3,240	4	6,480	4	9,720	4	9,720	4	9,720	4	9,720
	Unskilled Labourers	60	2	1,440	4	2,880	4	3,420	4	3,420	4	3,420	4	3,420
	Store Keeper	135	1	1,620	2	3,240	3	4,860	3	4,860	3	4,860	3	4,860
10. Auxiliary and Maintenance Operations	Asst. Store Keeper	90	1	1,080	2	2,160	3	3,240	3	3,240	3	3,240	3	3,240
	Unskilled Labourers	60	4	2,880	8	5,760	10	7,200	10	7,200	10	7,200	10	7,200
	Boiler Operator	135	1	1,620	2	3,240	3	4,860	3	4,860	3	4,860	3	4,860
	Electricians	135	1	1,620	2	3,240	3	4,860	3	4,860	3	4,860	3	4,860
Fitters	Fitters	135	2	3,240	4	6,480	5	8,100	5	8,100	5	8,100	5	8,100
	Unskilled Labourers	60	2	1,440	4	2,880	5	3,600	5	3,600	5	3,600	5	3,600
TOTAL			2	95,760	47	222,240	83	132,360	117	175,540				

4-7 Operating Costs

Operating costs comprise: (i) material costs, and (ii) overhead costs. Cost calculations have been done on the following assumptions:

a) Material Costs

i) Raw Milk Purchase @LE 0.20/litre

ii) Packing Materials

U.H.T. Milk @LE 0.40/litre

Butter @LE 0.08/kg

White Cheese @LE 0.07/kg

iii) Chemicals, Salt and Rennet for White Cheese

@LE 0.007/kg

b) Overhead Costs

i) Permanent Labour and Managerial Costs

See Table F-4-3 Permanent Management & Labour Costs

ii) Temporary Labour Costs

See Table F-4-4 Gross Cash Flow at Financial Prices

4-8 Productions, Incomes, Costs and Gross Cash Flows

See Table F-4-4 Gross Cash Flow at Financial Prices

4-9 Project Financial Cost and Return

See Table F-4-5 Financial Internal Rate of Return (Case x).

Table F-4-4 MILK PROCESSING PLANT - GROSS CASH FLOW AT FINANCIAL PRICES

Calendar year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Factory year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
PHISICAL OUTPUT															
UHT Milk-40%(million)		3.12	5.73	8.03	10.96	14.61	18.26	21.92	25.57	29.22	32.88	38.36	43.84	54.80	65.76
Butter -20%(tons)		60.23	110.70	155.03	211.65	282.23	352.73	423.30	493.80	564.38	635.03	740.85	846.68	1,058.33	1,270.00
White cheese -40%(tons)		461.56	848.40	1,188.11	1,622.09	2,162.97	2,703.28	3,244.17	3,784.48	4,325.37	4,866.83	5,677.87	6,488.92	8,111.00	9,733.09
INCOME (Ex-Factory) (LE '000)															
UHT Milk @LE 0.40/liter		1,248.0	2,292.0	3,212.0	4,384.0	5,844.0	7,304.0	8,768.0	10,228.0	11,688.0	13,152.0	15,344.0	17,536.0	21,920.0	26,304.0
Butter @LE 3,000/ton		180.7	332.1	465.1	635.0	846.7	1,058.2	1,270.0	1,481.4	1,693.1	1,905.1	2,222.6	2,540.0	3,175.0	3,810.0
White Cheese @LE 1,500/ton		692.3	1,272.6	1,782.2	2,433.1	3,244.5	4,054.9	4,866.3	5,676.7	6,488.1	7,300.2	8,516.8	9,733.4	12,166.5	14,599.6
TOTAL INCOME (LE '000)		2,121.0	3,896.7	5,459.3	7,452.1	9,935.2	12,417.1	14,904.3	17,386.1	19,869.2	22,357.3	26,083.4	29,809.4	37,261.5	44,713.6
MILK PURCHASE															
Million litres		7.80	14.33	20.07	27.40	36.53	45.66	54.80	63.93	73.06	82.20	95.90	109.60	137.00	164.40
Thousand tons		8.03	14.76	20.67	28.22	37.63	47.03	56.44	65.84	75.25	84.67	98.78	112.89	141.11	169.33
PURCHASE OF FRESH MILK (A) @LE 0.20/l (x)															
		1,560.0	2,866.0	4,014.0	5,480.0	7,306.0	9,132.0	10,960.0	12,786.0	14,612.0	16,440.0	19,180.0	21,920.0	27,400.0	32,880.0
@LE 0.25/l (y)															
		1,950.0	3,582.5	5,017.5	6,850.0	9,132.5	11,415.0	13,700.0	15,982.5	18,265.0	20,550.0	23,975.0	27,400.0	34,250.0	41,100.0
Packaging Materials															
UHT Milk @LE 0.04/		124.8	229.2	321.2	438.4	584.4	730.4	876.8	1,022.8	1,168.8	1,315.2	1,534.4	1,753.6	2,192.0	2,630.4
Butter @LE 0.08/kg		4.8	8.9	12.4	16.9	22.6	28.2	33.9	39.5	45.2	50.8	59.3	67.7	84.7	101.6
White Cheese @LE 0.07/kg		32.3	59.4	83.2	113.5	151.4	189.2	227.1	264.9	302.8	340.7	397.5	454.2	567.8	681.3
Sub. Total B		161.9	297.5	416.8	568.8	758.4	947.8	1,137.8	1,327.2	1,516.8	1,706.7	1,991.2	2,275.5	2,844.5	3,413.3
OVERHEAD COST(C) (LE'000)															
Perm. Labour/Managerial		82.3	82.3	82.3	82.3	132.4	132.4	132.4	175.5	175.5	175.5	175.5	175.5	175.5	175.5
International Staff Cost		95.8	139.9	139.9	139.9	-	-	-	-	-	-	-	-	-	-
Temporary Labour		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Machinery Repairs @5.0% of capital cost		148.7	148.7	148.7	148.7	297.3	297.3	297.3	446.0	446.0	446.0	446.0	446.0	446.0	446.0
Building Reparis @2.0% " "		24.5	31.6	31.6	31.6	69.0	69.0	69.0	91.9	91.9	91.9	91.9	91.9	91.9	91.9
Vehicles		1.0	7.3	15.7	27.7	29.3	35.0	40.7	48.0	51.0	54.0	57.7	60.0	63.0	66.0
General Insurance															
@LE 4.5/ LE1,000 capital value		20.0	20.5	20.5	20.5	43.8	43.8	43.8	62.5	62.5	62.5	62.5	62.5	62.5	62.5
Misc. Cost @LE 0.01/l purchased		78.0	143.3	200.7	274.0	365.3	470.3	548.0	639.3	730.6	822.0	959.0	1,096.0	1,370.0	1,644.0
Sub. Total C		96.8	500.7	582.0	651.4	937.1	1,047.8	1,131.2	1,463.2	1,557.5	1,651.9	1,817.6	1,981.9	2,258.9	2,560.9
TOTAL COSTS (A+B+C+) (x)		96.8	2,222.6	3,745.5	5,082.2	9,001.5	11,127.6	13,229.0	15,576.4	17,686.3	19,798.6	22,988.8	26,177.4	32,503.4	38,854.2
(y)		96.8	2,612.6	4,462.0	6,085.7	10,828.0	13,410.6	15,969.0	18,772.9	21,339.3	23,908.6	27,783.8	31,657.4	39,353.4	47,074.2
GROSS CASH FLOW (x)		(96.8)	(101.6)	151.2	377.1	690.0	933.7	1,289.5	1,675.3	1,809.7	2,182.9	2,558.7	3,094.6	3,632.0	4,758.1
(y)		(96.8)	(491.6)	(565.3)	(626.4)	(680.0)	(892.8)	(993.5)	(1,064.7)	(1,386.8)	(1,470.1)	(1,551.3)	(1,700.4)	(1,848.0)	(2,091.9)

Table F-4-5

MILK PROCESSING PLANT - FINANCIAL INTERNAL RATE OF RETURN (Case X)

Calendar Year	Factory Year	Gross Cash Flow	Buildings	Plant & Equipment	Installation Spare Parts	Architect Fee Supervision	Staff Housing	Vehicles	Average Additional Annual Working Capital (1)	Total Investment incl. 10% Contingency	Net Cash Flow
1992	1	(96.8)	1,045.0	2,930.9	911.0	112.5	178.8	222.3		5,940.6	(6,037.4)
1993	2	(101.6)					357.2		48.6	446.4	(548.0)
1994	3	151.2							89.3	98.2	53.0
1995	4	377.1							125.0	137.5	239.6
1996	5	690.0	1,045.0	2,905.9	911.0	88.7	274.6	333.3	170.6	6,302.0	(5,612.0)
1997	6	933.7						222.3	227.5	494.8	438.9
1998	7	1,289.5							284.3	312.7	976.8
1999	8	1,675.3	1,045.0	2,438.2	911.0	88.7	99.6	370.3	341.3	5,823.5	(4,148.2)
2000	9	1,809.7									1,809.7
2001	10	2,182.9						333.3		366.6	1,816.3
2002	11	2,558.7		2,930.9				222.3		3,468.5	(909.8)
2003	12	3,094.6									3,094.6
2004	13	3,632.0						370.3		407.3	3,224.7
2005	14	4,758.1									4,758.1
2006	15	5,859.4		2,905.9				333.3		3,563.1	2,296.3
2007	16							222.3		244.5	5,614.9
2008	17										5,859.4
2009	18			2,438.2				370.3		3,089.9	2,769.5
2010	19										5,859.4
2011	20							333.3		366.6	5,492.8
2012	21			2,930.9				222.3		3,468.5	2,390.9
2013	22										5,859.4
2014	23							370.3		407.3	5,452.1
2015	24										5,859.4
2016	25			2,905.9				333.3		3,563.1	2,296.3
2017	26							222.3		244.5	5,614.9
2018	27										5,859.4
2019	28			2,438.2				370.3		3,089.4	2,770.0
2020	29										5,859.4 (2)
2021	30							333.3		366.6	7,746.1
Terminal Value			783.8				182.9		1,286.6		

(1) Average annual working capital is estimated as 30% of total operating costs

(2) Includes terminal value

5. Slaughter House

5-1 Introduction

The South and North Hussinia Valley and the South Port Said Area for which feasibility study for agricultural development is being conducted through the Japanese Government's technical assistance is proposed as one of the prominent cattle raising centres in the country. According to the animal husbandry development plans, some 50,000 head of cattle are expected to be delivered for slaughtering in a year, after about 20 years of the project construction. Therefore, establishment of a slaughter house capable of disposing of this amount of cattle is recommended at an appropriate site in the North Hussinia/South Port Said Project area.

5-2 Expected Number of Cattle for Slaughtering

According to the livestock raising plans proposed for these two project areas, cattle for slaughtering are expected as follows:

<u>Project Year</u>	<u>North Hussinia/ South Port Said</u>	<u>South Hussinia</u>	<u>Total (heads)</u>
7	-	3,000	3,000
8	-	8,100	8,100
9	-	9,000	9,000
10	6,700	12,500	19,200
11	5,700	12,500	18,200
12	5,500	14,400	19,600
13	7,300	16,700	24,000
14	8,100	17,100	25,200
15	11,500	18,100	29,600
16	17,900	18,600	36,500
17	20,200	17,700	37,900
18	28,400	17,200	45,600
19	29,400	17,200	46,600
20	32,200	17,200	49,400
21	32,400	17,200	49,600

5-3 Slaughter House Throughput

The proposed slaughter house has a capacity of 150 head./day which at full development would be required to operate for about 330 days a year to deal with the expected number of cattle ready for slaughtering. The flow chart and layout of the slaughter house is shown in Fig. F-5-1.

5-4 Location

Among the important considerations called for selecting the slaughter house are a good road system to handle up to 150 head of cattle, an electrical power supply, a supply of fresh water (around 2 tons per head of cattle to be slaughtered), etc. Thus it is believed appropriate to locate it close to the sugar beet factory.

5-5 Buildings, Equipment and Operation

The slaughter house building will occupy some 4,000 square metres in which all the essential facilities such as stunning room, conveyer systems for animal dressing, skinning as well as refrigeration, cutting and delivery will be properly accommodated. The main building will also have a basement for treating viscera (intestines). Cattle destined for slaughtering will be kept in a cattle-yard about 510 squaremetres in size.

The important machinery, equipment and facilities will comprise:

Machinery and Equipment

- Dissection
- Treatment of intestines
- Meat inspection

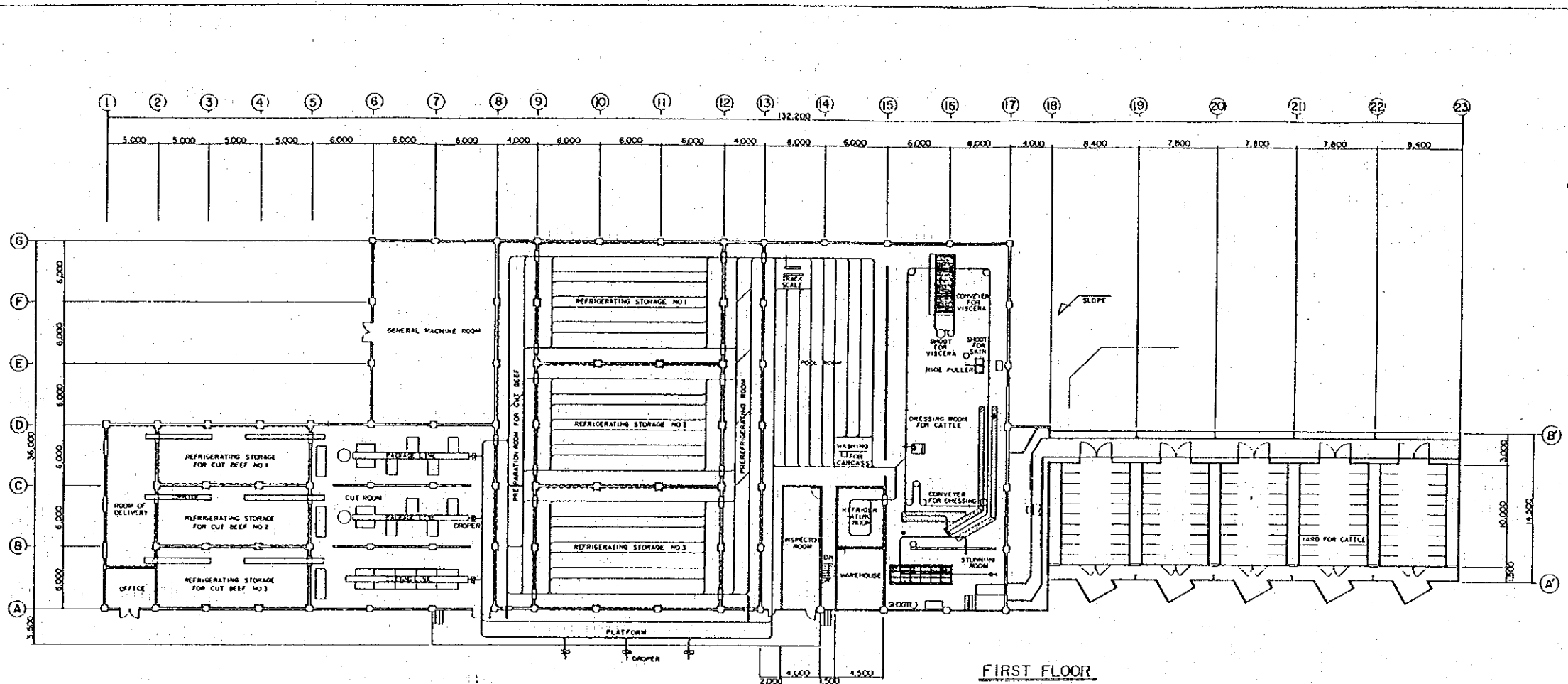
Refrigeration

Water Supply, Air-conditioning and Drainage

Boiler

Septic Tank

Waste Disposal Furnace



Room	Area (m ²)	Room	Area (m ²)
Stunning Room	72.0	Treating Room of Viscera	392.0
Dressing Room	360.0	Treating Room for Dirt	36.0
Yard for Cattle	582.9	Treating Room for Skin	24.0
Inspection Room	72.0	Boil Room	16.0
Pool Room	330.0	Refrigerating Room	48.0
Refrigerating Storage	27.0	Frozen Room	24.0
Ware House	27.0		
Inspector Room	48.0	<u>Sub-total</u>	<u>540.0</u>
Prerefrigerating Room	144.0		
Refrigerating Storage No.1 - No.3	648.0	<u>Total</u>	<u>4,027.9</u>
Preparation Room for Cut Beef	144.0		
General Machine Room	216.0		
Treating Room for Cut Beef	324.0		
Refrigerating Room for Cut Beef No.1 - No.3	270.0		
Preparation Room for Delivery	70.0		
Office	20.0		
Plat Form	133.0		
<u>Sub-total</u>	<u>3,487.9</u>		

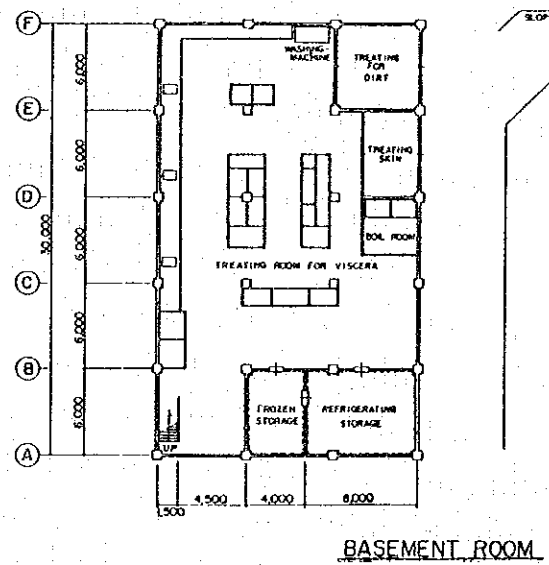


Figure F-5-1
Layout of the Slaughter House

REFERENCE NO.	
DRAWING NO.	
DATE	
SCALE	

5-6 Staffing Requirements

The proposed staffing for the slaughter house at the full development stage is set out below.

Table F-5-1 PROPOSED STAFFING AT FULL DEVELOPMENT

<u>Position/Title</u>	<u>Recommended Annual Gross Salary (LE)</u>	<u>Number Required</u>	<u>Permanent Staff Costs (LE)</u>
General Manager	14,160	1	14,160
Works Manager	10,200	1	10,200
Accountant	10,200	1	10,200
Personnel Manager	8,880	1	8,880
Mechanical Engineer	8,880	1	8,880
Electrical Engineer	8,880	1	8,880
Process Operators	1,680	50	84,000
Technician (Mech.)	1,800	1	1,800
Technician (Elect.)	1,920	1	1,920
Veterinarians	8,880	3	26,640
Chief Clerk	4,440	1	4,440
Clerks	1,320	5	6,600
Typists	1,440	2	2,880
Drivers	1,260	4	5,040
Watchmen	720	4	2,880
TOTAL PERMANENT STAFF		<u>77</u>	<u>197,400</u>
TOTAL TEMPORARY STAFF:		As required	

5-7 Capital Costs

The estimated cost of machinery, equipment and facilities is based on a typical combination of them for slaughtering 150 heads/day. The building costs follow the current construction cost in the project area.

Table F-5-2 Capital Cost of a 150 Head/Day Slaughter House

	(LE '000)
A. Machinery and Equipment	2,000
B. Refrigeration	300
C. Water Supply, Air-conditioning and Drainage	1,650
D. Boiler	270

	(LE '000)
E. Septic Tank	1,500
F. Waste Disposal Furnace	350
G. Miscellaneous Others	<u>80</u>
	6,150
Transport and Clearing @ 20%	<u>1,230</u>
TOTAL COST OF EQUIPMENT	7,380
Installation and spare parts @ 25%	<u>1,845</u>
	<u><u>9,225</u></u>

Building Costs

Foundation and external works	275
Building approx. 4,000 m ²	920
Staff Housing	<u>490</u>
TOTAL BUILDING COSTS	1,685
Architect's fee and supervision @ 8%	<u>134.8</u>
	<u><u>1,819.8</u></u>

Phasing of capital costs for staff vehicles and accommodation would depend on the actual performance of the proposed slaughter house.

5-8 Operating Costs

Estimated annual operation costs at full development are as follows:

	(LE '000)
Permanent staff cost	197.4
Temporary labour	40.0
Fuel oil	330.0
Electricity	86.4
General supplies	350.0
Administration	40.0
Insurance	29.5
Maintenance of equipment	36.4
Building repairs	<u>32.4</u>
	<u><u>1,142.3</u></u>

6. Organization and Management

6-1 Introduction

In order to raise the project returns to compensate for the very high investment in reclamation, irrigation works and infrastructure, a number of crops requiring processing and/or specialist marketing have been introduced under the project. Without provision of these facilities, there would be no opportunities to introduce sugar beet, tomatoes or milk production on the scale envisaged.

6-2 Co-ordination of the Processing Development

A sugar beet factory and a milk factory are proposed in addition to a vegetable (tomatoes) processing industry. Since it is unlikely that any commercial investor would be interested to invest in more than one of these specialized activities, it is assumed that several separate developments would be established and financed either by private Egyptian capital, Government funds or joint ventures.

For the success of the project as a whole, the processing factories need to come on stream in phase with the planned agricultural and livestock production. While the farmers would need a guarantee that their produce would be purchased, the processing companies would require a similar guarantee that the raw materials would be supplied at the right time and in right quality and quantity.

To meet with these essential requirements, it is proposed that an Agro-Industrial Development Board be formed on which all the General Managers of the various processing factories would be represented, together with the investors and interested Government Ministries, under the aegis of the Project Management and Operation Authorities.

6-3 Processing Factories

a. The Sugar Beet Factory

It would be run by a Factory General Manager, wholly responsible to the Sugar Factory Board of Directors for the successful operation of the plant. The Factory would buy all the settlers' beet in the village through agricultural co-operative society on a weight basis (at LE 20/ton, although the growers would be responsible for arranging the transport of their beet to the factory in accordance with agreed weekly quotas, and payment of the cost of haulage.

b. The Tomato Paste Factory

This factory would process all tomatoes to be produced in the project area over a 170 day harvesting period (summer and winter). It would be run as an autonomous unit under its own Factory Manager who would be responsible to the General Manager for all day-to-day operations. The material tomatoes will be collected and delivered to the factory through the vegetable growers co-operative society.

c. The Milk Factory

This would purchase and collect milk produced by the settlers at the village milking centers which are located at the livestock growers co-operative's service points in all the satellite villages. The factory would have its own transport in terms of necessary number of milk tankers.

A set of Bulk coolers at each milk's center would cost approx. LE.9,000.

7. Financing

7-1 Sugar Beet

Factory size	-	6000 tons/day
Capital costs (Factory years 1 - 5)	-	LE 84.5 million
Foreign exchange	-	LE 68.0 million (US\$85.0 million)

a. Factory Capacity

This Sugar Beet Factory will share its material beet with another Sugar Beet Factory of the same capacity in the South Hussinia in processing all the beet produced in the combined area of the North and South Hussinia. The Sugar Beet Factory in the North Hussinia would process upto 600,400 tons per year.

b. Capital Cost

The phasing of the initial capital investment would be as follows:

<u>Year</u>	<u>Factory Year</u>	<u>Total (LE million)</u>
1993	1	7.8
1994	2	22.8
1995	3	33.0
1996	4	17.4
1997	5	3.5
	Total:	<u>84.5</u>

These figures include working capital, vehicles and staff accommodation as well as the factory investment. Major equipment replacement would occur in factory years 12, 19 and 24. The foreign exchange component would be LE 68.0 million.

c. Operating Costs

The estimated annual factory operating costs are as follows:

	Factory Year (LE millions)		
	4	8	12+
Sugar beet purchase	1.5	11.0	12.0
Campaign operating costs	0.9	5.4	5.9
Overhead costs	1.0	1.8	1.8
Total:	3.4	18.2	19.7

d. Production

Assuming the sugar content to be 17% and the thick juice purity after evaporation to be 90.0, the production of white sugar, molasses and pulp would be as follows:

	Factory Year ('000 tons)		
	4	8	12+
White sugar	11.2	81.6	89.4
Molasses	4.5	32.8	35.9
Molassed pulp	1.5	11.0	15.0
Unmolassed pulp	3.9	28.0	28.8

e. Returns

It is expected that when capital costs are included, a rate of return of 18.9% would be obtained. The net cash flow would become positive in factory year 5.

Input-output calculation has been made on the assumption that no Government price controls would apply in input subsidies as long as the factory was internationally financed. As for the outputs, sugar price was equated to that for raw sugar f.o.b. Carribean forecast by international agencies for 2000/05; molasses has been valued using the same raw sugar price but for export. The dried pulp has been valued at a price equivalent to the domestic price of livestock feed having a comparable feed values.

7-2 Tomatoes

Factory size	-	75,000 tons/year
Capital costs (Factory years 1 - 5)	-	LE. 9.02 million
Foreign Exchange	-	LE. 5.41 million (US\$6.76 million)

a. Factory Capacity

An entire quantity of tomatoes expected to be produced in the project area at full development would be processed by this factory into tomato paste for export. The proposed processing plant would have 3 lines each processing 6 - 7 tons of tomatoes per hour or 150 tons per day. Working 3 shifts for 170 days, it would process 75,000 tons of tomatoes in a year. It is planned initially to produce triple strength (38 - 40% tomato solids) tomato paste for reprocessing for the export market. Given tomatoes with a 6.0% dry matter content, the total waste of 15 percent for trimming, grading, seeds and other coarse material, the yield of triple strength tomato paste is approximately 127 kg. per ton of fresh tomatoes. At full development about 9530 tons of triple strength tomato paste would be produced from 75000 tons of fresh tomatoes.

b. Capital Costs

The initial investment required during the first five years would be LE 9.12 million split as follows:

	Factory (LE '000)					Total
	1	2	3	4	5	
Building	1210.5	-	-	-	-	1210.5
Plant and Equipment	712.7	-	671.7	-	671.7	2056.1
Staff Housing	472.3	69.8	204.9	-	190.8	937.8
Vehicles	34.4	-	-	-	34.4	68.8
Installation/Spares	71.1	-	71.1	-	71.1	213.3
Architects Fees/ Supervision	32.3	-	32.3	-	32.3	96.9
Working Capital	-	403.8	746.0	1117.2	1444.1	3711.1
10% Contingencies	253.3	47.4	172.6	111.7	244.4	829.5
Total:	2786.6	521.0	1898.6	1228.9	2688.8	9124.0

c. Operating Costs

Tomatoes are assumed to be purchased at LE 80/ton; total operating costs would be LE 1.35 million in factory year 2, rising to LE 8.87 million in factory year 9.

d. Production and Returns

At full development in factory year 9, the plant would produce 9530 tons of triple strength tomato paste. Assuming an average sale price of LE 1,200 per ton ex-factory, the gross income would increase from LE 4.6 million in year 4 to LE 11.4 million in year 9. On the basis of the above estimate, the internal rate of return would be 20.7%.

7-3 Milk

Factory size - 465 tons/day
Capital Cost
(Factory years 1 - 8) - LE 19.6 million
Foreign Exchange - LE 16.0 million (US\$20.0 million)

a. Factory Capacity

Raw milk available for processing builds up rather slowly from 8,030 tons in 1992 to 170,000 tons in 2005 when animal husbandry plan would arrive at full development stage. To avoid capacity under-utilization, the plant will start with 1 line capable to process 75,000 litres per 8 hours and, as milk delivery increase, two more lines will be added, one by one, within 8 years since its inauguration. All the 3 lines will start working on 2 shifts, the first line since F/Y 12, the second line since F/Y 13, and the third line since F/Y 15. The plant would reach full development in F/Y 15 when 170,000 tons of milk could be processed into 65.76 million litres of UHT milk, 1,270 tons of butter and 9,733 tons of white cheese.

b. Capital Cost

The initial investment required during the first 8 years, during which the plant would be fully equipped for full operation, is estimated at LE 19.6 million split as follows:

	Factory Year (LE '000)								Total
	1	2	3	4	5	6	7	8	
Buildings	1045.0	-	-	-	1045.0	-	-	1045.0	3135.0
Plant & Equipm't	2930.9	-	-	-	2905.0	-	-	2438.2	8275.0
Staff Housing	178.8	357.2	-	-	274.6	-	-	99.6	910.2
Vehicles	222.3	-	-	-	333.3	222.3	-	370.3	1148.2
Installation/ Spare Parts	911.0	-	-	-	911.0	-	-	911.0	2733.0
Architect's Fee/ Supervision	112.5	-	-	-	88.7	-	-	88.7	289.9
Working Capital	-	48.6	89.3	125.0	170.6	227.5	284.3	341.3	1286.6
10% Contingency	540.0	40.6	8.9	12.5	572.9	45.0	28.4	529.4	1777.7
Total:	5940.5	446.4	98.2	137.5	6302.0	494.8	312.7	5823.5	19555.6

c. Operating Costs

All the processing returns are sensitive to the price paid to the farmer for the raw materials. Although the farm-gate price of raw milk is assumed at LE 0.25/litre, the proposed milk processing plant, as a business-venture, cannot afford to pay this-much price. The adequate purchasing price of raw milk is LE 0.20/litre as will be known from Table F-A-6: Milk Processing Plant - Gross Cash Flow at Financial Prices which is included in Milk Processing part of the Study.

Total operating costs would be LE 3.4 million and overhead cost is estimated at LE 2.6 million at full development in Factory Year 15.

d. Production and Returns

In Factory Year 15, the plant would produce 65.8 million litres of UHT milk, 1,270 tons of butter and 3,733 tons of white cheese. Assuming ex-factory prices of these products at LE 0.40/litre, LE 3000/ton and LE 1500/ton for UHT milk, butter and white cheese respectively, the gross income would increase from LE 14.9 million

in Year 8 to LE 44.7 million in Year 15. On the basis of the above estimate, the internal rate of return would be 12.2%.

7-4 Staff Schedule

Legend for Staffing Schedule

a. House Type and Cost

<u>Type</u>	<u>Category/</u>	<u>House LE</u>	<u>Furniture LE</u>	<u>Total LE</u>
A1	M	37840	6160	44000
A2	M/SK	28000	5800	33800
A3	M/C/SK	20500	4200	24700
B1	C/SK	10700	2200	12900
B2	SK/L	7400	1400	8800
B3	SK/L	3900	800	4700
C1	SK/L	1000	220	1220

b. Vehicle Type and Cost

<u>Type</u>	<u>LE</u>	<u>Operating Cost (annual)</u>
C1	4960	500
C2 and Pool Cars (P)	4300	480
Pick-ups (PU)	3640	440

c. Replacement

House and Furniture: 2% per annum
 Vehicles: every 5 years
 Equipment: every 10 years

NOTE

Category:

- M : Managerial
- C : Clerical
- SK: Skilled
- L : Labour