Chapter 10.

OPERATION COST

Chapter 10. OPERATION COST

10.1 General

The following expenses are required for the operation of the pulp mill.

- Raw material (Jute cuttings)
- Auxiliary materials: Chemicals, utilities, sub-materials
- Manpower
- Plant overheads
- Repair and maintenance

The operation rate of the mill is, as described in Chapter 5, as follows:

o	First year:	76% (19,000 tons)
o	Second year:	92% (23,000 tons)
o	Third year and after:	96% (24,000 tons)

The following conditions are adopted when calculating the operation cost in each year:

1) The cost in 1986 is calculated based on that of 1981.

2) Escalation rate of manpower is assumed to be 10% p.a., and that of other items to be 7% p.a.

10.2 Raw Material

The price of the raw material (jute cuttings) is assumed to be USD109.4/ton, as described in Chapter 3. Since the quantity of the jute cuttings required for 1 ton of pulp product

is 1.92 tons, the quantity and cost of the jute cuttings required in each year are as follows:

	Requirement (ton)	Cost (USD1,000)
o First year	36,480	3,991
o Second year	44,160	4,831
o Third year and after	46,080	5,041

10.3 Auxiliary Materials

Other than the above main raw material (jute cuttings), the following materials are used in the operation of the mill; the industrial salt, limestone, other miscellaneous chemicals, natural gas as fuel, and consumables such as packing materials for the product, operating devices, etc. The unit consumption and prices are described in Chapter 8. With the assumption of price escalation of 7% p.a., the unit prices in 1986 are as follows:

	Unit	Unit consumption	Unit price at present (USD)	Expected unit price in 1986 (USD)
– Industrial salt	ton	0.12 ton	52.6	73.8
– Lime stone	ton	0.10 ton	73.7	103.4
– Chemicals	Pulp ton		1.71	2.4
– Natural gas	MMBTU	33 MMBTU	0.8	1.12
– Submaterials	Pulp ton		7	9.8

From the above data, the annual expenses for each material are as follows:

(Unit: USD1,000)

Item	First year	Second year	Third year and after
Industrial salt	168	204	213
Lime stone	196	238	248
Chemicals	46	55	58
Natural gas	702	850	887
Sub-materials	186	225	235
Total	1,298	1,572	1,641

10.4 Manpower

The required number of labour and personnel for this pulp mill is detailed in Chapter 8. They are divided here as follows:

- Direct personnel (622)
- Indirect personnel (186)

The direct personnel are the workers below the foreman class (Grade VI) in the production department, and the indirect personnel are the staffs in the management department other than the production department and personnel above Grade V.

Since the indirect personnel expenses are included in the overhead described below, only the personnel expenses for the direct personnel will be discussed here. The personnel expenses include the social security cost such as the health insurance, welfare pension insurance, and these costs are assumed to be 75% of the paid wage and salary. The direct personnel expenses are calculated as a fixed cost. The escalation rate of the manpower cost during recent six years from 1974/75 to 1980/81 indicated by Taka was 16%. Considering the annual change rate of 5% of the exchange rate of Taka against U.S. dollar, the escalation rate becomes 10.5% p.a. In this study escalation rate of 10% is used. This labour cost includes the basic wages and salaries, and fringe benefit.

When calculating the required direct personnel expenses from the above, the following is obtained.

(Unit: USD1,000)

	Expense at present	Expected expense
– Wage, salary	155	249
– Social security	116	187
Total	271	436

10.5 Plant Overheads

10.5.1 Personnel Expense

This expense is the personnel expenses for the indirect personnel and include 75% of the social security expense. The indirect personnel are the general manager and staffs in the management department, such as, personnel for personnel affiar, accounting, sales, purchase, technical, development, and maintenance, and the personnel above the assistant engineer (Grade V). The number of the indirect personnel is 186. Annual indirect personnel expenses are calculated here in the same way as the above section.

(Unit: USD1,000)

	Expense at present	Expected expense
– Wage, salary	79	127
– Social security	59	95
Total	138	222

10.5.2 Office Expense

This expense is the management expenses such as the cost of stationery, communication, travel. This will be USD140,000/year.

10.5.3 Insurance

This is the damage insurance on the fixed properties in the factory, and is 0.8% of the plant cost. Therefore, the expense is USD520,000/year.

10.5.4 Other Expense

Other than the above expenses, USD42,000 is necessary for the maintenance of the recreation facilities, houses, club house, etc.

10.5.5 Total Overhead Cost

The total overhead cost is as follows:

(Unit: USD1,000)

Personnel expense	222
Office expense	140
Insurance	520
General expense	42
Total	924

10.6 Repair and Maintenance

This expense is for the repair materials for the wear, corrosion, consumables, and spare parts for maintenance, and will be USD561,000/year.

10.7 Total Operating Cost

Variable Costs

(Unit: USD1,000)

Items	First year	Second year	Third year and after
Raw Materials	3,991	4,831	5,041
Auxiliary materials	1,298	1,572	1,641
Total	5,289	6,403	6,682

Fixed Costs

(Unit: USD1,000)

Labour Cost	436
Management cost of factory	924
Repair and maintenance cost	561
Total	1,921

Chapter 11.

FINANCIAL ANALYSIS

Chapter 11. FINANCIAL ANALYSIS

11.1 General

The Project will be financially analyzed in this chapter. That is, the expected revenue and expenditure in the Project will be analyzed and the financial soundness of the Project is to be assessed. In this financial analysis, it is defined that the Project would start operating in January 1986, and its economic life span is 15 years.

The Project is regarded as a business entity in this financial analysis. The method contrasts the total amount of the costs of construction, operation, etc. with the revenue by the products sale to calculate the profit and make the income statement, cash-flow statement, etc. The profitability of the Project is assessed by the calculation of the IRR (Internal Rate of Return) and the payout period and so on.

11.2 Main Assumptions for Financial Analysis

11.2.1 Basic Assumptions for Project

1) Project life

- o Construction period: Oct. 1982 – End of 1985
- o Operation period: 1986–2000 (15 years)

2) Plant capacity: 25,000 tons of annual production of Jute Pulp

3) Production rate

- o First year: 76% (19,000 tons)
- o Second year: 92% (23,000 tons)
- o Third – Last year: 96% (24,000 tons)

11.2.2 Base Price

1) Base price:
Estimated price in 1986 is used and it is assumed constant during the project life.

2) Exchange rate

- o 1 U.S. dollar (USD) = 19.0 taka
- o 1 U.S. dollar (USD) = 230 yen

11.2.3 Fund

The total capital required for the Project will be raised as described in Chapter 8, "Financing Plan". This plan is used in this financial analysis. The financing condition including short-term loan applied in case of shortage of funds during the operation period are listed below:

1) Raising method of total capital required

- o 40% is covered by equity (owned capital).
- o 60% is covered by long-term loan.

2) Conditions of long-term loan

- o Rate of interest: 11.5% p.a.
- o Debt repayment: 10 times/10 years, equal annual payment
- o Exemption period of principal repayment: 3 years after starting operation

3) Conditions of short-term loan

- o Rate of interest: 15.0% p.a.
- o Debt repayment: All debt is repaid in next year after borrowing.

Note: As a result of financial analysis, it was realized that short-term loan is not required after the mill started commercial operation.

11.2.4 Taxes

1) Corporation tax

The corporation tax rate is assumed to be 55% of the taxable income. However, the Project will be exempted from paying the corporation tax for the first eight years from the beginning of the operation. The accumulated loss can be carried over for six years.

2) Insurance and tax on property

The cost for insurance and tax on property became approx. 0.8% of the plant cost, according to the calculation based on the discussion on the Project with the counterpart in Bangladesh.

3) Import tariff

After discussion with the counterpart in Bangladesh, it was decided that the following three items would be applied to the Project as the import duty.

i)	Import tariff on machinery and equipments:	2.5%
ii)	Development tax:	1.0%
iii)	Import license fee:	3.0%
	Total	6.5%

The import duty of i) ranges from 25% to 150% depending on articles when they are imported in usual commercial activity. However, on the projects that are promoted by the government like this Project, the import tariff is only 2.5%–5.5% depending on the location where the plant is established.

If the main raw materials used in the plant are domestic products, the import tariff on the machinery and equipments is fixed to 2.5% form the national point of view. Since the raw materials used in this Project is the jute cuttings produced in Bangladesh, it was confirmed by the discussion with the counterpart during survey that the import tariff of 2.5% would be applied to this Project.

The development tax is collected from all the project investors, and used for the regional development from the national viewpoint.

The import license fee is paid by the project investors as the import permission fee to the government when the importers import articles.

The above three items correspond to the so-called import tax, and treated as the import tax together.

11.2.5 Depreciation

The depreciation condition was settled as follows by discussing with the counterpart in Bangladesh.

		Depreciation method	Salvage value
o	Machinery and equipment	15 year straight line method	0
o	Civil and buildings	15 year straight line method	0
o	Preoperation cost and interest during construction	5 year straight line method	0

11.2.6 Working Capital

1) Working capital (Operating period)

i) Current assets

- o Cash: Two months of fixed operating cost
- o Accounts receivable: One twelfth of annual sales revenue
- o Products inventory: One twelfth of annual sales revenue
- o Parts and materials inventories: Spare parts (for one year), jute cuttings, salt, limestone (for one month), chemicals and auxiliary materials (for three months).

ii) Current liabilities

- Accounts payable: Raw material and utilities cost for one month

2) Initial working capital

- Spare parts: Quantity required for one year operation
- Cash: Equivalent to the working capital excluding cost for spare parts required for first one year

11.3 Sales Plan

The sales plan shown in Table 11-1 was made as the assumption of this financial analysis.

Table 11-1. Sales Projection

		Project Year		
		Yr=1	Yr=2	Yrs=3–15
Production	(t/Y)	19,000	23,000	24,000
Onstream Factor	(%)	76	92	96
Sales – Domestic	(t/Y)	17,000	17,000	17,000
Sales – Export	(t/Y)	2,000	6,000	7,000
Selling Price – Domestic Selling Price – Export		828 USD/t		
Sales Revenue (1,000 USD/Y)		15,732	19,044	19,872

11.3.1 Production and Operation Rate

This project is to produce 25,000 tons of the jute pulp annually to substitute the pulp imported at present, and export a part of the pulp produced. The sales of planned output, 25,000 tons/year, will be achieved without difficulty as explained in Chapter 4. "Market and Demand".

As shown in Table 11.1, it is considered in this financial analysis that the operation rate will be able to keep at 76% in the first operation year, 92% in the second year, and 96% in the third year and after. These figures seem to be possible to achieve when considering the experienced operators and managerial staff who have actual operation experience of the pulp mill in Bangladesh, and the easy mobilization of the technical personnel in the operation and maintenance.

11.3.2 Sales Volume

1) Domestic sales

Four national pulp and paper mills and some small private paper mills are operating at present. It is forecasted that the amount of pulp required by these mills in the first operation year of this Project reach to 37,000 tons. The paper production in Bangladesh is not performed sufficiently now due to shortage of the domestic and imported pulp. Such being the case, 17,000 tons of pulp for domestic sales will be surely achieved.

2) Export

The volume of pulp which the neighbouring countries (India, Pakistan, Burma, Nepal, etc.) are importing annually is much more than 7,000 tons, and it is not difficult to export only 7,000 tons of the pulp every year in future when considering the economic development in these countries.

11.3.3 Selling Price

1) Domestic price

The selling price of the pulp in Bangladesh as of 1981 is USD 590/ton. The price of pulp in the international market has increased at the rate of 16.4% p.a. in the past 11 years from

1970 up to now. In the seven years after the oil crisis of 1973–1974 the prices increased relatively slowly and during that seven years the rate of price increase of pulp was 6.9% a year. Considering the above, the selling price has been assumed in this study to rise at the rate of 7% p.a. till 1986 when the operation will be started, as described in Section 7 of Chapter 4, and the ex-factory price in 1986 is assumed to be USD 828/ton. As the escalation rate is a very important figure for judging of the profitability, therefore, in assuming the escalation rate used in this study the price index in Bangladesh as well as transition of exchange rate of Taka against U.S. dollar have been taken into consideration.

i) Price index

From 1975, after the disorder period just after the independence of Bangladesh in 1971 and the international price increase period by the oil crisis in 1973–1974, the price index has increased somewhat moderately at the rate of 12.5% p.a.

ii) Exchange rate

The exchange rate of Taka against U.S. dollar has been wekened at the rate of 5% p.a. in the past six years after the unsteady periods.

The economics in Bangladesh should be treated as a part of the international economics, and it is not proper to employ the price index 12.5% based on the local currency as the escalation rate. Therefore, the composite rate is calculated from the price index and the exchange rate. This became 7.1% which is very close to the forecasted increase rate of selling price of the pulp. From the above reasons, 7% of the increase rate of the pulp price is applied.

2) Export price

As described in Chapter 4, projected export price of jute pulp produced in first operation year (1986) is USD 745/t. This price is about 90% of the domestic price. The Government of Bangladesh gives 10% of export amount of pulp as the export bounty to the exporter. It was confirmed during this survey that the export price in this project is also treated in the same way. Therefore, for the ex-factory price of the export oriented jute pulp, USD 828/t, same as domestic selling price, has been adopted.

11.4 Total Investment Cost

11.4.1 Total Investment Cost

The total investment cost detailed in Chapter 9 can be summarized as shown in Table 11-2 for the financial analysis.

Table 11-2. Total Investment Cost

Item	Cost 1,000 USD	Depreciation Method
Plant Cost		
o Equipment & Machinery	51,754	15 years Straight Line (Salvage Value: 0)
o Civil & Building	13,994	40 years Straight Line (Salvage Value: 0)
o Land Acquisition	137	Non Depreciable
Preoperation Cost	1,306	5 years Straight Line (Salvage Value: 0)
Interest During Construction	7,259	5 years Straight Line (Salvage Value: 0)
Initial Working Capital	4,258	Non Depreciable
Total Investment Cost	78,708	-

11.4.2 Expenditure Schedule

The total investment cost is distributed in each year of the construction period as shown in Table 11-3.

Table 11-3. Expenditure Schedule

(1,000 USD)

Item \ Year	-4 ('82)	-3 ('83)	-2 ('84)	-1 (.85)
Plant Cost				
o Equipment & Machinery	2,114	27,908	18,759	2,973
o Civil & Building	1,182	5,269	4,940	2,603
o Land Acquisition	137	-	-	-
Preoperation Cost	486	90	98	632
Interest During Construction	0	270	2,584	4,405
Initial Working Capital	0	0	0	4,258
Total	3,919	33,537	26,381	14,871

11.5 Operating Cost

11.5.1 Variable Cost

The raw material and utilities required to produce 1 ton of the finished product and each unit price forecasted for 1986 are shown in Table 11-4. These prices are quoted from Chapter 10. The prices on the market in 1981 are assumed to rise at the same rate as the escalation rate of the product, i.e. 7%. The variable cost in each operation year are shown in Table 11-5.

Table 11-4. Unit Consumption and Cost of Raw Material & Utilities

Raw Material/Utilities	Unit Consumption	Cost
(Raw Materials) o Jute Cuttings	1.92 t/t	109.4 USD/t
(Aux. Supplies/Utilities) o Salt o Limestone o Chemicals o Natural Gas o Aux. Supplies	 0.12 t/t 0.10 t/t - 33.0 MMBTU/t -	 73.8 USD/t 103.4 USD/t 2.40 USD/t 1.12 USD/MMBTU 9.8 USD/t

11.5.2 Fixed Cost

The fixed cost, excluding the depreciation and the interests on loan, are described below:

1) Operating labour cost

According to the labour cost described in Chapter 10.4, the cost of operating labour is calculated as follows:

Grade	Class	Nos.	Unit Manpower Cost (1986) (Taka/month)
VI	Worker	34	2,254
VII	Mechanical worker	46	1,832
VIII	Operator, welder	98	1,409
IX	Assistant operator	110	987
X	Peon, guard	334	845
	Total	662	——

2) Plant overhead

Overhead cost includes the personnel expenses of the staff in the administrative department of the factory and the managers in and above the work grade V, and the office expense, etc. These expenses become USD 924,000 in total in 1986.

i) Personnel expenses: USD 222,000

Grade	Class	Nos.	Unit Manpower Cost (1986) (Taka/month)
I	General manager	1	8,456
II	Chief engineer	1	8,456
III	Dept manager	2	7,046
IV	Officer	8	5,037
V	Assistant engineer	27	2,819
VI	Foreman	15	2,254
VII	Mechanical worker	38	1,832
VIII	Operator, welder	39	1,409
IX	Assistant operator	7	987
X	Peon, guard	48	845
	Total	186	----

ii) Office expenses (Office supplies, communication, business travel expenses): USD 140,000

iii) General expense:- USD 42,000

iv) Property taxes and Insurance premium on property: USD 520,000

3) Repair and maintenance cost

The repair and mainteannce expense for this projedt are added up to USD 561,000.

11.5.3 Summary of Operating Cost

The operating cost in each operation year is summarized in Table 11-5 (The depreciation and interest on loans are not included).

Table 11-5. Summary of Operating Cost

(1,000 USD)

Item \ Project Year		1 ('86)	2 ('87)	3–15 ('88–2000)
Variables	(Raw Material) Jute Cuttings	3,991	4,831	5,041
	(Utilities & Aux. Supplies)			
	o Salt	168	204	213
	o Limestone	196	238	248
	o Chemicals	46	55	58
	o Natural Gas	702	850	887
	o Aux. Supplies	186	225	235
	Total Variables	5,289	6,403	6,682
Fixed Operating Cost	Labour	436	436	436
	Plant Overhead	924	924	924
	Repair & Maintenance	561	561	561
	Total Fixed Operating Cost	1,921	1,921	1,921
Total Operating Cost		7,210	8,324	8,603

11.6 Financial Analysis – Result of Analysis

11.6.1 Analyzed Cases

The purpose of the financial analysis of this project is to find out various financial indicators with DCF method under the above mentioned definitions and assumptions. The financial analysis will be performed by calculating IRR in the following two cases.

1) IRROI (IRR On Investment)

The return on the capital invested in this project will be calcualted here. In IRROI case, all the capital invested are assumed to be covered by own funds so that the condition of the interest on loans and the change of the ratio of own funds may not cause a contradiction in the result of the calculation. The IRROI is calculated before and after the tax. This case is useful for comparison with the other project since it is not affected by the specific conditions of the projects such as conditions of loans, ratio of own funds, etc.

2) IRROE (IRR On Equity)

The return on the own funds invested will be calculated here. In this case, the specific conditions of this project planned in Bangladesh are much reflected.

11.6.2 Financial Statements

1) Financial statements

The result of this financial analysis is detailed in the output sheets by the computer that are attached to the end of this chapter. These sheets are as follows:

- Summary Sheet
- Income Statements
- Cash Flow Statements
- Balance Sheet
- Working Capital
- Detailed Operating Costs
- Financial Performance Indicators

When making a balance sheet, it is necessary to determine the distribution method of the cash flow obtained at the end of each operation year, apart from the assessment of the profitability by the cash flow basis. In this financial analysis, an example of expected balance sheets is made under the following dividend policy.

i) The profit after tax in each operation year is apportioned as investor's dividend.

ii) However, if the cash flow gained in each year is less than the above profit after tax and it cannot cover the amount of dividend, the amount equivalent to cash flow is apportioned.

iii) If the cumulative figures of profit after tax in Income Statement upto the year in question is negative, this dividend policy is not applied.

iv) Therefore, the cash flow after apportion in each operation year is entered on the balance sheet as the increase of cash on hand.

2) Summary of financial analysis

The summary of the result of the above financial analysis is shown in Table 11-6.

11.6.3 Financial Indicators in Case IRROE

As described before, the case of IRROE reflects well the financial conditions of the Project such as the capital structure and loan conditions, and represents the actual characteristics of financial status of this Project. The result of the financial analysis in case of IRROE is summarized in this section.

1) Analysis of production cost

The production cost excluding profit and tax figures is calcualted by adding the depreciation cost and the interests on loans to the operating cost described before. The production cost in each operation year is shown in Table 11-7.

2) Composition of selling price

The selling price of the pulp is assumed to be USD 828/ton (based on price in 1986). By selling of jute pulp at this price if is possible to gain the income to secure the profit and tax figures shown in Table 11-6.

Table 11-6. Summary of Financial Analyses

Item \ Case		IRROE	IRROI
Total Investment	MUSD	78,708	71,449
Project Funding			
Equity	MUSD	31,483	71,449
Debt	MUSD	47,225	-
Annual Revenues			
Average Annual	MUSD	19,541	19,541
Unit – USD/t		818.0	818.0
Profit Before Taxes			
Average Annual	MUSD	3,601	7,162
Income Taxes			
Average Annual	MUSD	1,618	1,917
Unit – USD/t		68.6	81.2
Net Profit			
Average Annual	MUSD	1,983	5,245
Unit – USD/t		84.0	222.3
Net Production Costs			
Average Annual	MUSD	15,940	12,379
Unit – USD/t		675.4	524.5
Cash Flow	MUSD		
Average Annual (after tax)		4,081	10,008
Average Annual (before tax)		5,700	11,926
IRR (after tax)	%	6.56	8.95
IRR (before tax)	%	9.55	10.54
Payout Period (after tax basis)	Years	12.3	6.7

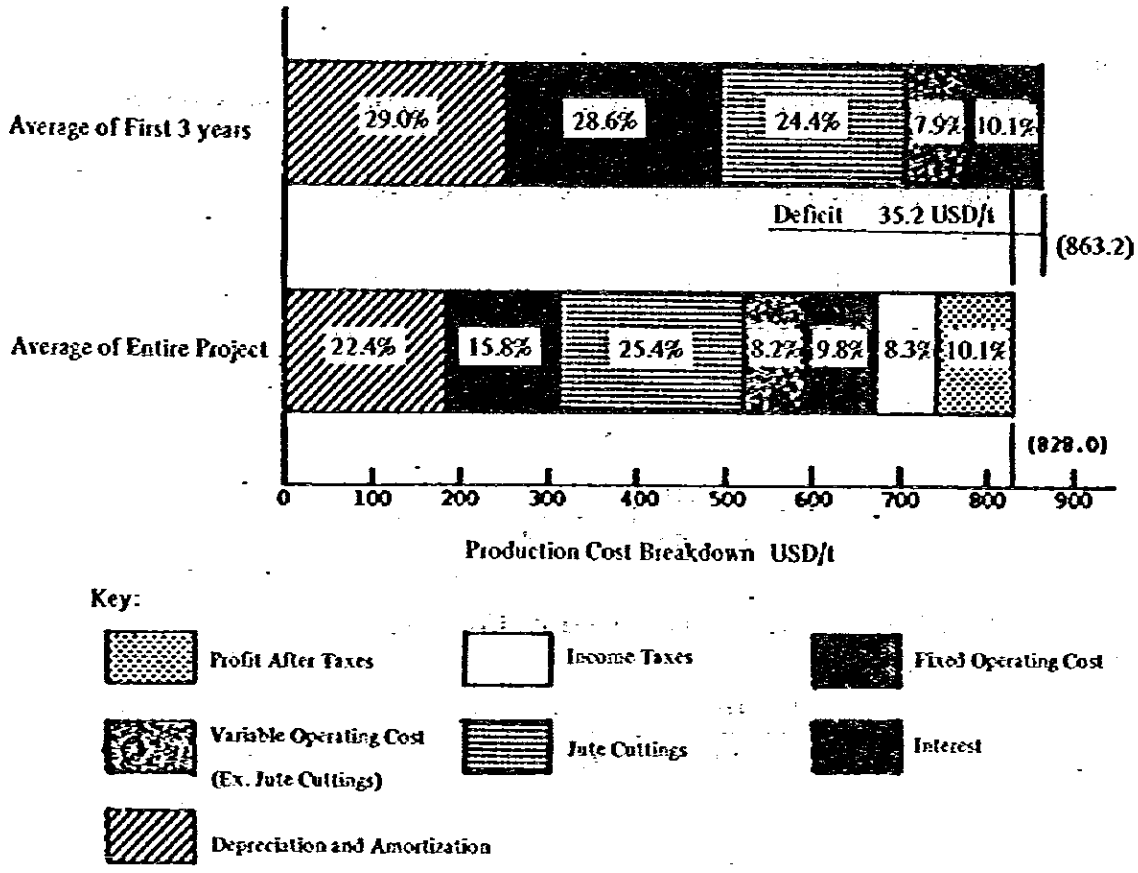
Table 11-7. Production Cost

(1,000 USD)

Year	Break-Down of Production Cost			Production Cost	
	Operating Cost	Depreciation	Interest	Annual	Unit (USD/t)
1	7,210	5,513	5,431	18,154	955.5
2	8,324	5,513	5,431	19,268	837.7
3	8,603	5,513	5,431	19,547	814.5
4	8,603	5,513	5,431	19,547	814.5
5	8,603	5,513	4,883	18,999	791.8
6	8,603	3,800	4,345	16,748	697.8
7	8,603	3,800	3,802	16,205	675.2
8	8,603	3,800	3,259	15,662	652.6
9	8,603	3,800	2,715	15,118	629.9
10	8,603	3,800	2,172	14,575	607.3
11	8,603	3,800	1,629	14,032	584.7
12	8,603	3,800	1,086	13,489	562.0
13	8,603	3,800	543	12,946	539.4
14	8,603	3,800	0	12,403	516.8
15	8,603	3,800	0	12,403	516.8
Average	8,491	4,371	3,078	15,940	675.4

The cash flow corresponds to the internal rate of return of 9.55% (before tax) and 6.56% (after tax). The composition of the selling price of the pulp is shown in Fig. 11-1.

Fig. 11-1. Production Cost Breakdown



3) Major financial indicators

The major financial indicators in case of IRROE in each operation year are shown in Table 11-8. Each indicators is obtained from the following formula:

i) Profit after Tax on Sales Revenue

Profit after tax (Net income after tax) / Sales Revenue

ii) Debt Service Coverage Ratio

(Net income after tax + Depreciation + Interest) / (Repayment + Interest)

iii) Profit B.E.P. (Break Even Point) – Capacity Utilization

$$\frac{f}{(r_0 - v_0)}$$

iv) Cash B.E.P. (Break Even Point) – Sales Price

$$\left[v + f + \frac{(R - D)}{(1 - g)}\right] \times \frac{1}{P}$$

v) Cash B.E.P. (Break Even Point) – Capacity Utilization

$$\left[f + \frac{(R - D)}{(1 - q)}\right] \times \frac{1}{r_0 - v_0}$$

f: Fixed Op. Cost + Depreciation + Interest

r_0: Sales Revenue at full capacity

v_0: Variable Op. Cost at full capacity

v: Variable Op. Cost at each project year

R: Repayment of L.T. debt

D: Depreciation

g: Tax Rate

P: Production Volume at each project year

Table 11-8. Major Financial Index (IRROE Case)

Project Year	Profit after Tax on Equity %	Profit after Tax on Sales Revenue %	Debt Service Coverage Ratio	Profit B.E.P. (Cap. Utilization) %	Cash B.E.P.	
					(Sales Price) USD/t	(Cap. Utilization) %
1	- 7.70	- 15.40	1.57	93.6	665.4	53.5
2	- 0.71	- 1.18	1.97	93.6	598.1	53.5
3	1.03	1.64	2.08	93.6	584.7	53.5
4	1.03	1.64	1.11	93.6	781.5	87.9
5	2.76	4.37	1.17	89.7	758.9	83.9
6	9.92	15.72	1.24	73.3	736.3	80.0
7	11.65	18.46	1.32	69.3	713.6	76.0
8	13.37	21.19	1.41	65.4	691.0	72.1
9	6.79	10.76	1.16	61.4	715.3	76.3
10	7.57	11.99	1.21	57.5	692.7	72.4
11	8.35	13.22	1.27	53.5	670.1	68.4
12	9.12	14.45	1.34	49.5	647.5	64.5
13	9.90	15.68	1.42	45.6	624.8	60.5
14	10.68	16.91	–	41.6	358.5	14.0
15	10.68	16.91	–	41.6	358.5	14.0
Average	6.30	10.14	1.22	68.2	639.8	62.0

11.6.4 Sensitivity Analysis

The effect on the profitability of the project by the change of conditions assumed in this financial analysis was analyzed.

1) Variable factors

The following changes of conditions (variable factors) and the variable value are determined.

i) Selling price of pulp:
Fluctuation of USD 828/t (base) ±10%.

ii) Total investment cost:
Fluctuation of USD 67,191,000 (base) ±10% (Interest during construction and initial working capital are not included).

iii) Interest on long-term debt:
Decrease of 2.5 and 5.0 points from 11.5% p.a. (base) (9.0% p.a. and 6.5% p.a.).

iv) Operating cost:
In case of that the total of fixed cost and variable costs (raw material, utilities, etc.), excluding the depreciation and interests, are increased by ±10%, and only the cost of the jute cuttings is fluctuated by ±10%.

11.6.5 Result of Sensitivity Analysis

The result of the sensitivity analysis is summarized in Table 11-9 and 11-10, and Fig. 11-2 and 11-3.

Table 11-9. Summary of Sensitivity Analyses (IRROI Case)

Financial Parameter: Selling Price of Jute Pulp

Item \ Variation		Percent Variation		
		-10%	(Base)	+10%
Pulp Sales Price	(USD/t)	745	828	911
(1) I.R.R. after Tax	(%)	6.72	8.95	11.04
(2) Payout Period	(Years)	8.06	6.69	5.75
(3) Net Profit (Average for 15 years)	(1,000 USD)	3,798	5,245	6,693
(4) Profit B.E.P. (Cap. Utilization)	(%)			
– 1st year		51.3	43.5	37.8
– Average for 15 years		49.8	42.3	36.7
(5) Cash B.E.P. (Cap. Utilization	(%)	16.47	14.0	12.2
(6) Cash Flow (Average for 15 years)	(1,000 USD)	8,543	10,008	11,473

Financial Parameter: Capital Cost

Item \ Variation		Percent Variation		
		-10%	(Base)	+10%
Total Capital Cost*	(1,000 USD)	64,588	71,449	78,310
(1) I.R.R. after Tax	(%)	10.31	8.95	7.79
(2) Payout Period	(Years)	6.1	6.69	7.33
(3) Net Profit (Average for 15 years)	(1,000 USD)	5,575	5,245	4,915
(4) Profit B.E.P. (Cap. Utilization)	(%)			
– 1st year		40.2	43.5	46.9
– Average for 15 years		39.1	42.3	45.5
(5) Cash B.E.P. (Sales Price)	(USD/t)			
– 1st year		376.8	379.5	382.3
– Average for 15 years		357.9	360.1	362.3
(6) Cash Flow (Average for 15 years)	(1,000 USD)	9,881	10,008	10,136

(*) Total Capital Cost includes Initial Working Capital

Financial Parameter: Operating Cost

Item \ Variation		-10%	Variation cuttings (-10%)	Base	Jute cuttings (+10%)	+10%
Direct Running Cost at full capacity	(1,000 USD)	7,744	8,099	8,603	9,107	9,461
(1) I.R.R. after Tax	(%)	9.89	9.50	8.95	8.39	7.98
(2) Payout Period	(Years)	6.24	6.42	6.69	6.99	7.23
(3) Net Profit (Average for 15 years)	(1,000 USD)	5,872	5,612	5,245	4,879	4,618
(4) Profit B.E.P. (Cap. Utilization)	(%)					
– 1st year		40.1	41.9	43.5	45.3	47.3
– Average for 15 years		38.9	40.7	42.3	44.0	46.0
(5) Cash B.E.P. (Sales Price)	(USD/t)					
– 1st year		341.6	358.5	379.5	400.5	417.4
– Average for 15 years	324.1	324.1	339.1	360.1	381.1	396.0
(6) Cash Flow (Average for 15 years)	(1,000 USD)	10,636	10,377	10,008	9,639	9,381

Table 11-10. Summary of Sensitivity Analyses (IRROE Case)

Financial Parameter: Selling Price of Jute Pulp

Item \ Variation		Percent Variation		
		-10%	(Base)	+10%
Pulp Sales Price	(USD/t)	745	828	911
(1) I.R.R. after Tax	(%)	2.32	6.56	11.08
(2) Payout Period	(Years)	14.46	12.30	6.39
(3) Net Profit (Average for 15 years)	(1,000 USD)	706	1,983	3,421
(4) Profit B.E.P. (Cap. Utilization)	(%)			
– 1st year		110.1	93.6	81.5
– Average for 15 years		80.2	68.2	59.3
(5) Cash B.E.P. (Cap. Utilization)	(%)			
– 1st year		62.9	53.5	46.6
– Average for 15 years		72.8	62.0	54.1
(6) Cash Flow (Average for 15 years)	(1,000 USD)	2,798	4,081	5,527

Financial Parameter: Capital Cost

Item \ Variation		Percent Variation		
		-10%	(Base)	+10%
Total Capital Cost*	(1,000 USD)	71,122	78,708	86,296
(1) I.R.R. after Tax	(%)	9.50	6.56	4.24
(2) Payout Period	(Years)	7.40	12.30	14.52
(3) Net Profit (Average for 15 years)	(1,000 USD)	2,628	1,983	1,403
(4) Profit B.E.P. (Cap. Utilization)	(%)			
– 1st year		85.4	93.6	101.8
– Average for 15 years		62.5	68.2	73.9
(5) Cash B.E.P. (Sales Price)	(USD/t)			
– 1st year		635.1	665.4	695.6
– Average for 15 years		610.8	639.8	668.7
(6) Cash Flow (Average for 15 years)	(1,000 USD)	4,525	4,081	3,704

(*) Total Capital Cost include Interest during Construction and INitial Working Capital.

Financial Parameter: Interest on Long Term Debt

Item \ Variation		Variation		
		(-)5 Points	(-) 2.5 Points	(Base)
Interest on L. T. Debt		6.5% p.a.	9.0% p.a.	11.5% p.a.
(1) I.R.R. after Tax	(%)	12.30	9.42	6.56
(2) Payout Period	(Years)	5.30	7.26	12.30
(3) Net Profit (Average for 15 years)	(1,000 USD)	3,469	2,739	1,983
(4) Profit B.E.P. (Cap. Utilization)	(%)			
– 1st year		70.9	82.1	93.6
– Average for 15 years		56.4	62.2	68.2
(5) Cash B.E.P. (Sales Price)	(USD/t)			
– 1st year		534.5	598.6	665.4
– Average for 15 years		570.3	604.4	639.8
(6) Cash Flow (Average for 15 years)	(1,000 USD)	5,482	4,795	4,081

Financial Parameter: Operation Cost

Item \ Variation		-10%	Variation cuttings (-10%)	Base	Jute cuttings (+10%)	+10%
Direct Running Cost at full capacity	(1,000 USD)	7,744	8,099	8,603	9,107	9,461
(1) I.R.R. after Tax	(%)	8.59	7.74	6.56	5.49	4.61
(2) Payout Period	(Years)	8.16	9.97	12.30	13.46	13.95
(3) Net Profit (Average for 15 years)	(1,000 USD)	2,609	2,348	1,983	1,630	1,395
(4) Profit B.E.P. (Cap. Utilization)	(%)					
– 1st year		87.8	90.2	93.6	97.3	100.1
– Average for 15 years		63.6	65.7	68.2	70.9	73.3
(5) Cash B.E.P. (Sales Price)	(USD/t)					
– 1st year		627.5	644.5	665.4	686.2	703.2
– Average for 15 years		603.9	618.9	639.8	660.6	675.7
(6) Cash Flow (Average for 15 years)	(1,000 USD)	4,708	4,447	4,081	3,718	3,493

Fig. 11-2. Summary of Sensitivity Analyses
(IRROI % to Variation of Financial Parameters)

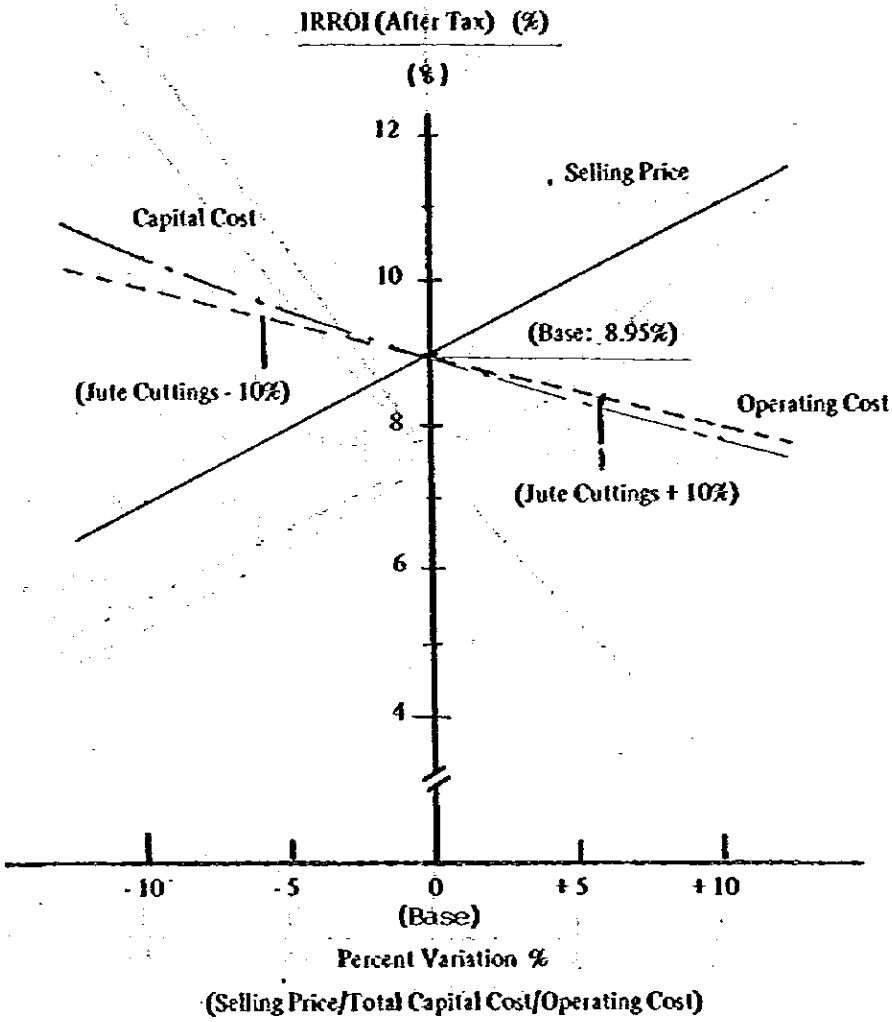
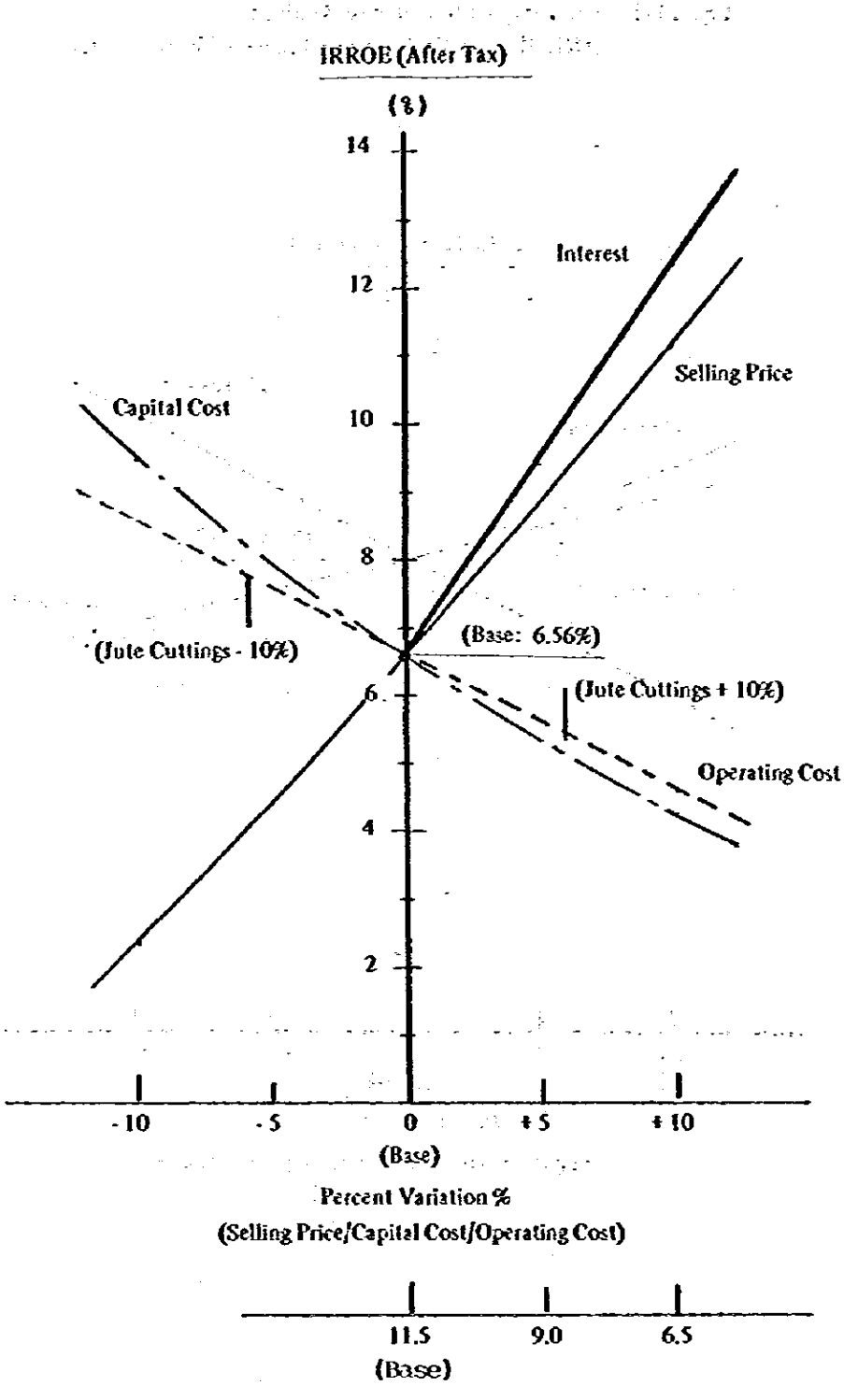


Fig. 11-3. Summary of Sensitivity Analyses
(IRROE % to Variation of Financial Parameters)



11.7 Assessment of Result of Financial Analysis

The expected profitability and financial ocndition in this project will be assessed here.

11.7.1 Profitability and Internal Rate of Return

When discussing the profitability of this project, the conditions of the long-term debt on capital investment will be taken up at first. It will be understood, if the cases of IRROE and IRROI are compared, that the cash flow condition is oppressed by the high interest (11.5% p.a.), relatively short term of repayment (10 years), and short exemption term of principal repayment.

	IRROI	IRROE
IRR (Before tax)	10.54%	9.55%
IRR (After tax)	8.95%	6.56%
Payout period	6.7 years	12.3 years
Average cash flow in each year	USD10,008,000	USD4,081,000

1) In case of IRROI

According to the profit and loss account in this case, the profit of USD4,460,000 can be gained in the first operation year (1986), and it is possible to collect the profit after tax of USD78,678,000 through the 15 years of the project life period. The shortage of funds will not occur through the operation years. IRROI is 10.54% before tax, and 8.95% after tax. This rate of return can be justified to proceed with the Project in view of payout period of 6.7 years, in addition to the consideration of the said profitability and cash flow status.

2) In case of IRROE

In this case, the ordinary loss of USD2,423,000 in the first operation year is conceivable and USD224,000 in the second year. However, these two years are within the exemption term of principal repayment, and there will be no problems in the fund flow. The fund position is postive through the project life period, and the short-term loan is not necessary, which shows a sound condition. The IRROE is 9.55% before tax, and 6.56% after tax. It is not so high. The reason for this is that it is greatly affected by the loan conditions that are assumed for this analysis. As explained in the sensitivity analysis, if the interest on the long-term loan is decreased

by 5 points to become 6.5% p.a., then IRROE is improved to 14.73% before tax and 12.30 % after tax.

Although this Project has essentially profitability and viability, the results of the financial analysis indicates little low IRROE due to severe loan conditions.

In the assessment of IRROE case in this Project, however, it is judged that this project has enough rate of return and profitability when stable fund position under the severe loan conditions is taken into consideration.

11.7.2 Forecasted Financial Condition

In case of IRROE, the total amount of dividend USD22.4 million that corresponds to the annual average dividend on equity 7.1% will be paid, and the cash on hand of USD25.0 million will be accumulated in the last year of the project. The ratio of own capital will be improved every year and it will be over 50% in the seventh operation year (1992). The liquidity ratio will be above 4, and the quick ratio will be above 3 through the project life period. The debt service coverage ratio will be 1.11–1.42 through the debt repayment term (1989–1998), and it is not high enough, but the debt will be repaid without much difficulty. If financing condition becomes more favorable than the one assumed in this financial analysis, the more favorable financial status will be assured.

11.7.3 Assessment of Sensitivity Analysis

1) Selling price of pulp

The change of the selling price of the products greatly affects the profitability. If the actual selling price exceeds the forecasted price by 10%, IRROI after tax will be increased by 2.09 points and become 11.04%, and IRROE will be increased by 4.52 points and become 11.08%. The selling price of the products is a quite changeable factor. However, more than 70% of the jute pulp is planned to be supplied to the domestic paper mills, and its price can be adjusted by some degrees from the viewpoint of the whole pulp and paper industry. Therefore, there is little possibility that the selling price will drop greatly below the expected value and that it affects the profitability of the project.

2) Total investment cost

If the total investment cost (construction and pre-operation cost excluding the initial working capital) exceeds the estimation by 10%, IRROI after tax will be 7.79% and IRROE 4.24%, and that will have influence on the profitability of the project, but it is not a fatal one. Furthermore, the reasonable contingency and escalation are taken into the estimated total investment cost, so that risk is small.

3) Interests on long-term debt

The conditions of th interests on the long-term debt will affect the profitability of this project most. IRROE and the payout period are summarized in Table 11-11 according to the change of the interest rate.

Table 11-11. IRROE, Payout Period

	Interest		
	(Base) 11.5% p.a.	9.0% p.a.	6.5% p.a.
IRROE before Tax	9.55%	12.14%	14.73%
IRROE after Tax	6.56%	9.42%	12.30%
Payout Period	12.30 Years	7.26 Years	5.30 Years

How the other financial indicators change depending on the decrease of the interest is shown in Table 11-10. If a favorable conditions are applied to the long-term debt, the IRR will be improved and the financial condition will be very sound. If the interest rate is 6.5% p.a., the total amount of the dividend of USD46.2 million (average annual dividend rate 10.2%) can be apportioned, and USD22.2 million of the cash on hand will be accumulated in the last year of the project. The debt service coverage ratio is at least 1.33, and that implies the financial soundness of this project in case when a low interest rate is available.

4) Operating cost

For the calculation of raw material, auxiliary supplies and utilities costs, the 7% of

escalation from the present market prices are adopted in the same way as the price forecast of the products. For the calculation of the manpower cost, the escalation of 10% a year is used. The possibility of a great rise of the operating cost is low, and the possibility of drop of the operating cost is high on the contrary. The decrease of operating cost by 10% will increase IRROI by 0.94 points after tax, and IRROE by 2.03 points.

The cost of jute cuttings reaches to 58.6% of the total operating cost, and its change affects the profitability greatly. If the market price of the jute cuttings in 1986 is lower than the forecasted price by 10%, IRROI after tax will be 9.50% and IRROE 7.74%.

11.7.4 Break Even Point (B.E.P.)

The various break even points (B.E.P.) will change according to the payment of the interest, repayment of the principal, and depreciation amount in each year. The break even points in case of IRROE are shown in Fig. 11-4. The figure shows that the break even point of the operation rate is above 80% in the first five operation years. The selling price and operation rate, which determine the break point of shortage of fund, are the highest in the starting year of debt repayment (the fourth year), and then decreases slowly. The B.E.P. of the selling price of the jute pulp in the fourth year, where the fund position is in the hardest condition, is USD781.5/ton, and the B.E.P. of the operation rate is 87.88%. The figure shows that the fund will not run short through the project life period, and the ordinary loss will occur in the first two years, but the ordinary profit will be provided through 13 years after that, and that implies the soundness on this project.

11.7.5 Total Assessment

1) When judging from the overall standpoints described above, the IRR is not so high, but the fund position and the financial condition is comparatively sound and the project can self-support.

2) The best way to improve the financial condition and to heighten the IRR of this project is to lower the inerest rate on debt, 11.5% p.a. If a more favorable condition of the loan is available, this project will be a very profitable one.

3) Considering the above result of the financial analysis and the expected economic effect in Bangladesh caused by performance of this project described in the following Chapter, this project is concluded to be feasible.

Fig. 11-4. Break Even Point (IRROE Case)
(Capacity Utilization, Selling Price)

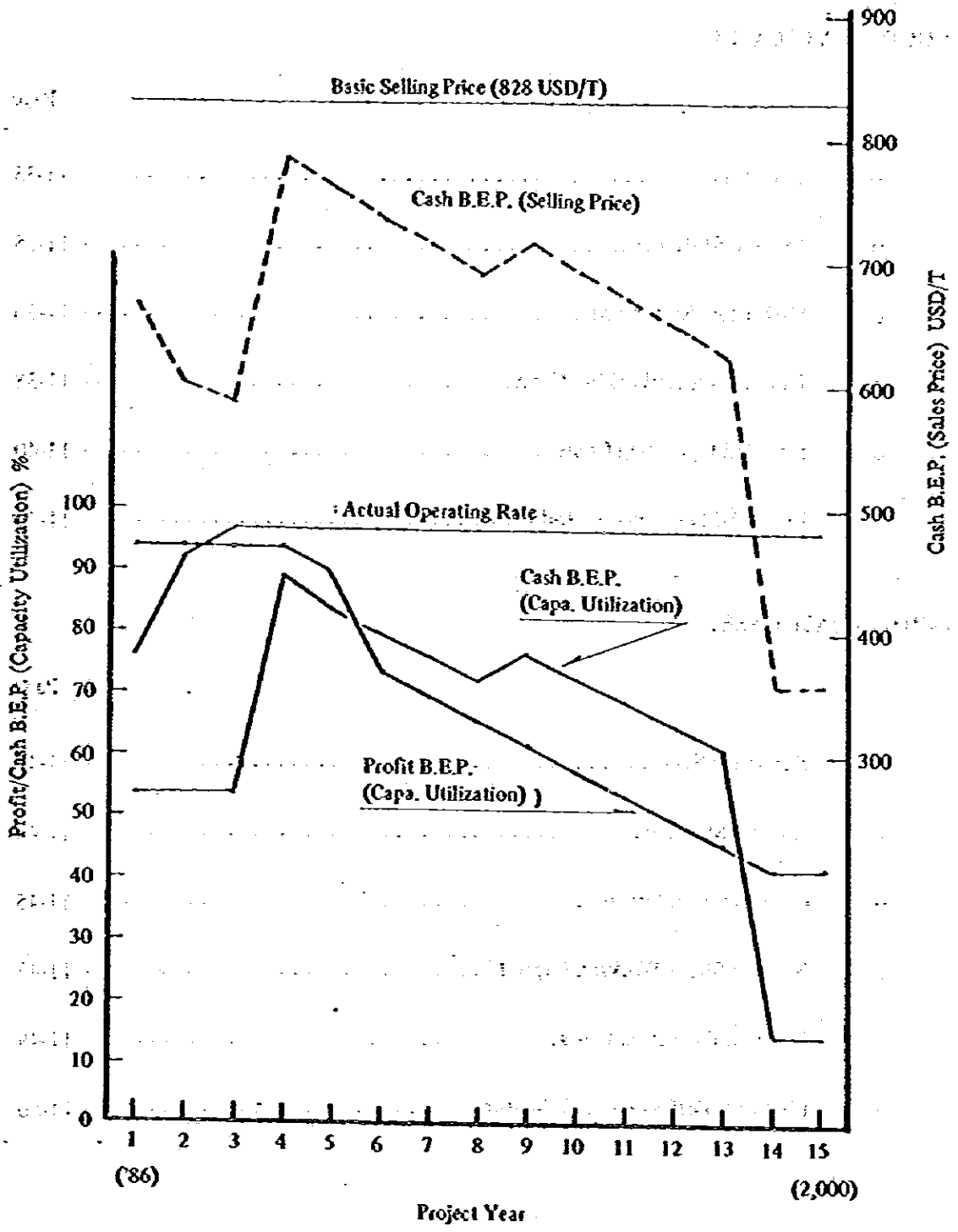


Table 11-12. Results of Financial Analyses (Computor Output Tables)

[IRROI – BASE CASE]

		Page
o	Summary	11-33
o	Income Statement	11-35
o	Cash Flow Statement	11-36
o	Balance Sheet/Working Capital	11-38
o	Detailed Operating Costs	11-40
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[IRROE – BASE CASE]

		Page
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o	Detailed Operating Costs	11-49
o	Financial Performance Indicators	11-50

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (IRRDI))

*** SUMMARY SHEET ***

1.INTERNAL RATE OF RETURN

1) IRRDI (BEFORE TAX) = 10.54 (%) 2) IRRDI (AFTER TAX) = 8.95 (%)

2.MAJOR PREMISES

1) METHODOLOGY ..DETERMINE IRR(%) BASED ON C.PRICE INPUT

2) PRODUCTION CAPACITY

JUTE-PULP 25000TON/YEAR

3) ONSTREAM FACTOR (%)

YR: 1	YR: 2	YR: 3	YR: 4	YR: 5	YR: 6	YR: 7	YR: 8	YR: 9	YR:10
76.00	92.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00

YR:11	YR:12	YR:13	YR:14	YR:15
96.00	96.00	96.00	96.00	96.00

4) TOTAL INVESTMENT 71449. (1000USD)

5) FINANCING STRUCTURE DEBT 0.00 (%). EQUITY 100.00 (%)

6) DEBT CONDITION

DEBT (A) : INTEREST 11.50 Y. ANNUAL 10 INSTALMENTS

7) DEPRECIATION/AMORTIZATION

EQUIP. & MACHINERY	STRAIGHT	15 YEARS,	0.00 % SALVAGE
CIVIL & BUILDING	STRAIGHT	40 YEARS,	0.00 % SALVAGE
LAND ACQUISITION	NON	0 YEARS,	0.00 % SALVAGE
PRE-OPERATION COSTS.I.D.C	STRAIGHT	5 YEARS	

8) TAX

RATE 55.00 % ON TAXABLE INCOME
GRACE PERIOD : 8 YEARS
LOSS CARRY FORWARD : 6 YEARS

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (TRADI))

... SUMMARY SHEET ...

3.SALES REVENUE

1) JUTE-PULP

		YR: 1	YR: 2	YR: 3	YR: 4	YR: 5	YR: 6	YR: 7	YR: 8	YR: 9	YR:10
PRODUCTION	(M.T/Y)	19.	23.	24.	24.	24.	24.	24.	24.	24.	24.
SALES PRICE	(USD/T)	828.00	828.00	828.00	828.00	828.00	828.00	828.00	828.00	828.00	828.00
SALES REVENUE	(1000USD)	15732.	19044.	19872.	19872.	19872.	19872.	19872.	19872.	19872.	19872.

		YR:11	YR:12	YR:13	YR:14	YR:15
PRODUCTION	(M.T/Y)	24.	24.	24.	24.	24.
SALES PRICE	(USD/T)	828.00	828.00	828.00	828.00	828.00
SALES REVENUE	(1000USD)	19872.	19872.	19872.	19872.	19872.

4.OPERATING COSTS

1)RAW MATERIALS	UNIT CONSUMP.		UNIT PRICE (IN 1986)		ESCALATION
JUTE CUTTINGS	1.920	(T/T)	109.400	(USD/T)	0.00 % P.A.

2)VARIABLE OPERATING COSTS	UNIT CONSUMP.		UNIT PRICE (IN 1986)		ESCALATION
SALT	0.120	(T/T)	73.800	(USD/T)	0.00 % P.A.
LIMESTONE	0.100	(T/T)	103.400	(USD/T)	0.00 % P.A.
MISC. CHEMICALS	1.000	(T/T)	2.400	(USD/L)	0.00 % P.A.
NATURAL GAS	33.000	(MMBTU/T)	1.120	(USD/MMBTU)	0.00 % P.A.
AUX. SUPPLIES	1.000	(T/T)	9.800	(USD/T)	0.00 % P.A.

3)OTHERS : SEE "DETAILED OPERATING COSTS"

(NOTE) TOTAL OPERATING COSTS ARE SUMMARIZED IN TABLES TITLED (DETAILED OPERATING COSTS), INCLUDING COSTS FOR FIXED CONVERSION.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (1980I))

*** INCOME STATEMENTS ***

(1000US$)

YEAR / YEAR	(1982) (-4)	(1983) (-3)	(1984) (-2)	(1985) (-1)	(1986) (1)	(1987) (2)	(1988) (3)	(1989) (4)	(1990) (5)	(1991) (6)
1.SALES REVENUE	0.	0.	0.	0.	15732.	19844.	19872.	19872.	19872.	19872.
2.OPERATING COSTS	0.	0.	0.	0.	7211.	8324.	8603.	8603.	8603.	8603.
3. RAW MATERIALS	0.	0.	0.	0.	3991.	4831.	5041.	5041.	5041.	5041.
4. VARIABLE OP. COSTS	0.	0.	0.	0.	1299.	1572.	1641.	1641.	1641.	1641.
5. FIXED OP. COSTS	0.	0.	0.	0.	1921.	1921.	1921.	1921.	1921.	1921.
6.CASH ING. B/INT..DEPR..TAX	0.	0.	0.	0.	8521.	10720.	11269.	11269.	11269.	11269.
7.DEPRECIATION/AMORTIZATION	0.	0.	0.	0.	4061.	4061.	4061.	4061.	4061.	3800.
8.INTEREST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
9. ON LONG-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
10. ON SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11.NET INCOME B/TAX	0.	0.	0.	0.	4460.	6658.	7208.	7208.	7208.	7469.
12.INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
13.NET INCOME A/TAX	0.	0.	0.	0.	4460.	6658.	7208.	7208.	7208.	7469.

YEAR / YEAR	(1992) (7)	(1993) (8)	(1994) (9)	(1995) (10)	(1996) (11)	(1997) (12)	(1998) (13)	(1999) (14)	(2000) (15)	TOTAL
1.SALES REVENUE	19872.	19872.	19872.	19872.	19872.	19872.	19872.	19872.	19872.	293112.
2.OPERATING COSTS	8603.	8603.	8603.	8603.	8603.	8603.	8603.	8603.	8603.	127370.
3. RAW MATERIALS	5041.	5041.	5041.	5041.	5041.	5041.	5041.	5041.	5041.	74357.
4. VARIABLE OP. COSTS	1641.	1641.	1641.	1641.	1641.	1641.	1641.	1641.	1641.	24198.
5. FIXED OP. COSTS	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.	28815.
6.CASH ING. B/INT..DEPR..TAX	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	165742.
7.DEPRECIATION/AMORTIZATION	3800.	3800.	3800.	3800.	3800.	3800.	3800.	3800.	3800.	58308.
8.INTEREST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
9. ON LONG-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
10. ON SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11.NET INCOME B/TAX	7469.	7469.	7469.	7469.	7469.	7469.	7469.	7469.	7469.	107434.
12.INCOME TAX	0.	0.	4108.	4108.	4108.	4108.	4108.	4108.	4108.	29756.
13.NET INCOME A/TAX	7469.	7469.	3361.	3361.	3361.	3361.	3361.	3361.	3361.	78678.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (INDOI))

... CASH FLOW STATEMENTS ...

(1000US$)

YEAR	(-4)	(-3)	(-2)	(-1)	(1)	(2)	(3)	(4)	(5)	(6)
1.SOURCE OF FUNDS										
2. CASH INC. B/INT.DOWN.TAX	0.	0.	0.	0.	8521.	10720.	11269.	11249.	11269.	11249.
3. PAID-IN SHARE CAPITAL	3919.	33267.	23797.	10466.	0.	0.	0.	0.	0.	0.
4. DEBT (LONG-TERM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5. DEBT (A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6. DEBT (SHORT-TERM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7. =TOTAL SOURCE OF FUNDS=	3919.	33267.	23797.	10466.	8521.	10720.	11269.	11269.	11269.	11269.
8.APPLICATION OF FUNDS										
9. CAPITAL INVESTMENT	3919.	33267.	23797.	10466.	0.	0.	0.	0.	0.	0.
10. FIXED INVESTMENT	3433.	32177.	23699.	9976.	0.	0.	0.	0.	0.	0.
11. EQUIP. & MACHINERY	2114.	27904.	18759.	2973.	0.	0.	0.	0.	0.	0.
12. CIVIL & BUILDING	1182.	3269.	4440.	2603.	0.	0.	0.	0.	0.	0.
13. LAND ACQUISITION	137.	0.	0.	0.	0.	0.	0.	0.	0.	0.
14. PRE-OPERATION COSTS	486.	90.	98.	632.	0.	0.	0.	0.	0.	0.
15. INT. DUR. CONSTRUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
16. INI. WORKING CAPITAL	0.	0.	0.	4258.	0.	0.	0.	0.	0.	0.
17. DEBT SERVICE PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
18. REPAYMENT (L-T A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
19. INTEREST (L-T A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
20. REPAYMENT (S-T)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21. INTEREST (S-T)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
22. INC. =REMAING CAPITAL	0.	0.	0.	0.	0.	548.	136.	0.	0.	0.
23. INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
24. DIVIDEND	0.	0.	0.	0.	4460.	6658.	7205.	7208.	7208.	7469.
25. =TOTAL APPLICAT. OF FUNDS	3919.	33267.	23797.	10466.	4460.	7206.	7344.	7208.	7208.	7469.
26.CASH INCREASE(OR DECREASE)	0.	0.	0.	0.	4061.	3514.	3925.	4061.	4061.	3800.
27.ABOVE CUMULATIVE	0.	0.	0.	0.	4061.	7575.	11500.	15561.	19622.	23423.
28.=CAPITAL =RETURN= DTNOR3	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
29.CASH FLOW ON INDOI(B/TAX)										
30. CASH FLOW	-3919.	-33267.	-23797.	-10466.	8521.	10172.	11133.	11269.	11269.	11269.
31. DISCOUNT FACTOR	1.00000	0.90463	0.81826	0.74022	0.66971	0.60584	0.54807	0.49580	0.44852	0.40574
32. DISCOUNTED CASH FLOW	-3919.	-30094.	-19475.	-7748.	5707.	6163.	6102.	5587.	5054.	4572.
33.CASH FLOW ON INDOI(A/TAX)										
34. CASH FLOW	-3919.	-33267.	-23797.	-10466.	8521.	10172.	11133.	11269.	11269.	11269.
35. DISCOUNT FACTOR	1.00000	0.91786	0.84247	0.77326	0.70975	0.65145	0.59794	0.54882	0.50374	0.46235
36. DISCOUNTED CASH FLOW	-3919.	-30534.	-20045.	-8093.	6048.	6626.	6657.	6183.	5677.	5211.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (INPUT))

*** CASH FLOW STATEMENTS ***

(1000'S).

YEAR	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	TOTAL
1.SOURCE OF FUNDS										
2. CASH INC. W/INT.DEPR.TAX	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	165742.
3. PAID-IN SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	71449.
4. DEBT (LONG-TERM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
5. DEBT (A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6. DEBT (SHORT-TERM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7. =TOTAL SOURCE OF FUNDS=	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	237191.
8.APPLICATION OF FUNDS										
9. CAPITAL INVESTMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	71449.
10. FIXED INVESTMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	65985.
11. EQUIP. & MACHINERY	0.	0.	0.	0.	0.	0.	0.	0.	0.	51754.
12. CIVIL & BUILDING	0.	0.	0.	0.	0.	0.	0.	0.	0.	13996.
13. LAND ACQUISITION	0.	0.	0.	0.	0.	0.	0.	0.	0.	237.
14. PRE-OPERATION COSTS	0.	0.	0.	0.	0.	0.	0.	0.	0.	1304.
15. INT. DUR. CONSTRUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
16. INT. WORKING CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	4259.
17. DEBT SERVICE PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
18. REPAYMENT (L-T A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
19. INTEREST (L-T A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
20. REPAYMENT (S-T)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21. INTEREST (S-T)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
22. INC. WORKING CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	694.
23. INCOME TAX PAYMENT	0.	0.	4108.	4108.	4108.	4108.	4108.	4108.	4108.	29796.
24. DIVIDEND	7469.	7469.	3361.	3361.	3361.	3361.	3361.	3361.	3361.	78679.
25. =TOTAL APPLICAT. OF FUNDS=	7469.	7469.	7469.	7469.	7469.	7469.	7469.	7469.	7469.	179567.
26.CASH INCREASE(OR DECREASE)	3800.	3800.	3800.	3800.	3800.	3800.	3800.	3800.	3800.	57624.
27.ABOVE CUMULATIVE	27223.	31023.	34823.	38623.	42423.	46223.	50024.	53823.	57624.	0.
28.=CAPITAL RETURN= OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	13825.	13825.
29.CASH FLOW ON INVST(B/TAX)										
30. CASH FLOW	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	25095.	107434.
31. DISCOUNT FACTOR	0.36709	0.33204	0.30038	0.27173	0.24582	0.22237	0.20117	0.18194	0.16462	0.00000
32. DISCOUNTED CASH FLOW	4136.	3742.	3385.	3062.	2770.	2506.	2267.	2051.	4131.	0.
33.CASH FLOW ON INVST(A/TAX)										
34. CASH FLOW	11269.	11269.	7161.	7161.	7161.	7161.	7161.	7161.	20986.	78678.
35. DISCOUNT FACTOR	0.42438	0.39693	0.37112	0.37816	0.30121	0.27646	0.25376	0.23291	0.21378	0.00000
36. DISCOUNTED CASH FLOW	4783.	4390.	2960.	2350.	2157.	1980.	1817.	1668.	4486.	0.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (1%ROI))

*** BALANCE SHEET ***

(1000USD)

YEAR	(-4)	(-3)	(-2)	(-1)	(1)	(2)	(3)	(4)	(5)	(6)
1.ASSETS	3919.	37186.	60983.	71449.	71850.	71942.	72006.	72006.	72006.	72006.
2. CASH FROM OPERATION	0.	0.	0.	0.	400.	7972.	13200.	19161.	19622.	23422.
3. CURRENT ASSETS	0.	0.	0.	4258.	4699.	5339.	5499.	5499.	5499.	5499.
4. NET FIXED ASSETS	3919.	37186.	60983.	67191.	63130.	59968.	55007.	50944.	46584.	43084.
5. INVESTMENTS	3919.	37186.	60983.	67191.	67191.	67191.	67191.	67191.	67191.	67191.
6. EQUIP. & MACHINERY	2114.	30022.	49791.	51754.	51754.	51754.	51754.	51754.	51754.	51754.
7. CIVIL & BUILDING	1187.	6491.	11391.	13994.	13994.	13994.	13994.	13994.	13994.	13994.
8. LAND ACQUISITION	137.	137.	137.	137.	137.	137.	137.	137.	137.	137.
9. PRE-OPERATION COSTS	480.	576.	674.	1306.	1306.	1306.	1306.	1306.	1306.	1306.
10. INT. DUR. CONSTN.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11. LESS ACCM. DEPR.&AMORT	0.	0.	0.	0.	4061.	8123.	12184.	16245.	20307.	24107.
12.LIABILITIES	0.	0.	0.	0.	441.	534.	557.	557.	557.	557.
13. CURRENT LIABILITIES	0.	0.	0.	0.	441.	534.	557.	557.	557.	557.
14. FIXED LIABILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
15. LONG-TERM DEBT (A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
16.EQUITY	3919.	37186.	60983.	71449.	71449.	71449.	71449.	71449.	71449.	71449.
17. SHARE CAPITAL	3919.	37186.	60983.	71449.	71449.	71449.	71449.	71449.	71449.	71449.
18. RETAINED EARNING	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

*** WORKING CAPITAL ***

(1000USD)

YEAR	(-4)	(-3)	(-2)	(-1)	(1)	(2)	(3)	(4)	(5)	(6)
1.CURRENT ASSETS	0.	0.	0.	4258.	4699.	5339.	5499.	5499.	5499.	5499.
2. CASH	0.	0.	0.	2923.	320.	320.	320.	320.	320.	320.
3. ACCOUNTS RECEIVABLE	0.	0.	0.	0.	1311.	1587.	1654.	1656.	1656.	1656.
4. SPARE PARTS	0.	0.	0.	1335.	1335.	1335.	1335.	1335.	1335.	1335.
5. INVENTORY	0.	0.	0.	0.	1733.	2097.	2188.	2188.	2188.	2188.
6. PRODUCTS	0.	0.	0.	0.	1311.	1587.	1654.	1656.	1656.	1656.
7. MATERIALS	0.	0.	0.	0.	421.	510.	532.	532.	532.	532.
8. OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
9.CURRENT LIABILITIES	0.	0.	0.	0.	441.	534.	557.	557.	557.	557.
10. ACCOUNTS PAYABLE	0.	0.	0.	0.	441.	534.	557.	557.	557.	557.
11. CURRENT PORTION OF DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
12. LONG-TERM DEBT (A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
13. SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
14.W.C.(EX. CURR. PORT. DEBT)	0.	0.	0.	4258.	4258.	4806.	4942.	4942.	4942.	4942.
15.INCREASE WORKING CAPITAL	0.	0.	0.	4258.	0.	548.	136.	0.	0.	0.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (IN401))

*** BALANCE SHEET ***

(1000USD)

YEAR	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1.ASSETS	72006.	72006.	72006.	72006.	72006.	72006.	72006.	72006.	72006.
2. CASH FROM OPERATION	27683.	31083.	34923.	38623.	42423.	46223.	50023.	53823.	57623.
3. CURRENT-ASSETS	5499.	5499.	5499.	5499.	5499.	5499.	5499.	5499.	5499.
4. NET FIXED ASSETS	39284.	35484.	31684.	27884.	24084.	20284.	16483.	12683.	8883.
5. INVESTMENTS	67191.	67191.	67191.	67191.	67191.	67191.	67191.	67191.	67191.
6. EQUIP. & MACHINERY	51754.	51754.	51754.	51754.	51754.	51754.	51754.	51754.	51754.
7. CIVIL & BUILDING	13994.	13994.	13994.	13994.	13994.	13994.	13994.	13994.	13994.
8. LAND ACQUISITION	137.	137.	137.	137.	137.	137.	137.	137.	137.
9. PRE-OPERATION COSTS	1306.	1306.	1306.	1306.	1306.	1306.	1306.	1306.	1306.
10. INT. DUR. CONSTN.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11. LESS ACCM. DEPN. AMONT	27907.	31707.	35507.	39307.	43107.	46907.	50708.	54508.	58308.
12.LIABILITIES	557.	557.	557.	557.	557.	557.	557.	557.	557.
13. CURRENT LIABILITIES	557.	557.	557.	557.	557.	557.	557.	557.	557.
14. FIXED LIABILITIES	0.	0.	0.	0.	0.	0.	0.	0.	0.
15. LONG-TERM DEBT (A)	0.	0.	0.	0.	0.	0.	0.	0.	0.
16.EQUITY	71449.	71449.	71449.	71449.	71449.	71449.	71449.	71449.	71449.
17. SHARE CAPITAL	71449.	71449.	71449.	71449.	71449.	71449.	71449.	71449.	71449.
18. RETAINED EARNING	0.	0.	0.	0.	0.	0.	0.	0.	0.

*** WORKING CAPITAL ***

(1000USD)

YEAR	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1.CURRENT ASSETS	5499.	5499.	5499.	5499.	5499.	5499.	5499.	5499.	5499.
2. CASH	320.	320.	320.	320.	320.	320.	320.	320.	320.
3. ACCOUNTS RECEIVABLE	1656.	1656.	1656.	1656.	1656.	1656.	1656.	1656.	1656.
4. SPARE PARTS	1339.	1339.	1339.	1339.	1339.	1339.	1339.	1339.	1339.
5. INVENTORY	2186.	2186.	2186.	2186.	2186.	2186.	2186.	2186.	2186.
6. PRODUCTS	1656.	1656.	1656.	1656.	1656.	1656.	1656.	1656.	1656.
7. MATERIALS	532.	532.	532.	532.	532.	532.	532.	532.	532.
8. OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.
9.CURRENT LIABILITIES	557.	557.	557.	557.	557.	557.	557.	557.	557.
10. ACCOUNTS PAYABLE	557.	557.	557.	557.	557.	557.	557.	557.	557.
11. CURRENT PORTION OF DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.
12. LONG-TERM DEBT (A)	0.	0.	0.	0.	0.	0.	0.	0.	0.
13. SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.
14.W.C.(5A. CURR. PORT. DEBT)	4942.	4942.	4942.	4942.	4942.	4942.	4942.	4942.	4942.
15.INCREASE WORKING CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.

BANGLADESH JUTE&PULP MILL PROJECT
(BASE CASE (1HADI))

... DETAILED OPERATING COSTS ...

(1000US$)

YEAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.RAW MATERIALS	3441.	4831.	5041.	5041.	5041.	5041.	5041.	5041.	5041.	5041.
2. JUTE CUTTINGS	3441.	4831.	5041.	5041.	5041.	5041.	5041.	5041.	5041.	5041.
3.VARIABLE OPERATING COSTS	1299.	1572.	1641.	1641.	1641.	1641.	1641.	1641.	1641.	1641.
4. SALT	169.	204.	213.	213.	213.	213.	213.	213.	213.	213.
5. LIMESTONE	196.	239.	248.	248.	248.	248.	248.	248.	248.	248.
6. MISC. CHEMICALS	46.	55.	58.	58.	58.	58.	58.	58.	58.	58.
7. NATURAL GAS	702.	850.	887.	887.	887.	887.	887.	887.	887.	887.
8. AUX. SUPPLIES	186.	225.	235.	235.	235.	235.	235.	235.	235.	235.
9.FIXED OPERATING COSTS	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.
10. LABOUR	436.	436.	436.	436.	436.	436.	436.	436.	436.	436.
11. PLANT OVERHEAD	924.	924.	924.	924.	924.	924.	924.	924.	924.	924.
12. REPAIR & MAINTENANCE	561.	561.	561.	561.	561.	561.	561.	561.	561.	561.
13.TOTAL OPERATING COSTS	7211.	8324.	8603.	8603.	8603.	8603.	8603.	8603.	8603.	8603.
14.UNIT OPERATING COSTS(M.AV)	338.	362.	358.	358.	358.	358.	358.	358.	358.	358.

YEAR	(11)	(12)	(13)	(14)	(15)	TOTAL
1.RAW MATERIALS	5041.	5041.	5041.	5041.	5041.	74357.
2. JUTE CUTTINGS	5041.	5041.	5041.	5041.	5041.	74357.
3.VARIABLE OPERATING COSTS	1641.	1641.	1641.	1641.	1641.	24195.
4. SALT	213.	213.	213.	213.	213.	3139.
5. LIMESTONE	248.	248.	248.	248.	248.	3660.
6. MISC. CHEMICALS	58.	58.	58.	58.	58.	850.
7. NATURAL GAS	887.	887.	887.	887.	887.	13084.
8. AUX. SUPPLIES	235.	235.	235.	235.	235.	3469.
9.FIXED OPERATING COSTS	1921.	1921.	1921.	1921.	1921.	28819.
10. LABOUR	436.	436.	436.	436.	436.	6540.
11. PLANT OVERHEAD	924.	924.	924.	924.	924.	13860.
12. REPAIR & MAINTENANCE	561.	561.	561.	561.	561.	8415.
13.TOTAL OPERATING COSTS	8603.	8603.	8603.	8603.	8603.	127372.
14.UNIT OPERATING COSTS(M.AV)	358.	358.	358.	358.	358.	360.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (IR=DI))

*** FINANCIAL PERFORMANCE INDICATORS *** (1000US$)

YEAR	(-4)	(-3)	(-2)	(-1)	(1)	(2)	(3)	(4)	(5)	(6)
1.LONG-TERM DEBT/EQUITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.CURRENT RATIO	0.00	0.00	0.00	0.00	19.47	24.20	30.25	37.82	47.12	51.94
3.QUICK RATIO	0.00	0.00	0.00	0.00	12.91	17.77	24.20	31.50	38.79	45.41
4.DEBT SERVICE COVERAGE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.RETURN B/TAX ON EQUITY (%)	0.00	0.00	0.00	0.00	6.24	9.32	10.09	10.09	10.09	10.45
6.RETURN A/TAX ON EQUITY (%)	0.00	0.00	0.00	0.00	6.24	9.32	10.09	10.09	10.09	10.45
7.RETURN A/TAX ON SALES (%)	0.00	0.00	0.00	0.00	28.35	34.96	36.27	36.27	36.27	37.59
8.PAYBACK PERIOD	-3919.	-37166.	-60983.	-71449.	-62927.	-52756.	-41623.	-30353.	-19044.	-7815.
9.PROFIT B.E.P. CAP. UTIL(%)	0.00	0.00	0.00	0.00	43.54	43.54	43.54	43.54	43.54	41.64
10.CASH B.E.P. SALES PRICE(D)	0.00	0.00	0.00	0.00	379.51	361.93	358.45	358.45	358.45	358.45
11.CASH B.E.P. CAP. UTIL(%)	0.00	0.00	0.00	0.00	13.98	13.98	13.98	13.98	13.98	13.98

YEAR	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1.LONG-TERM DEBT/EQUITY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.CURRENT RATIO	58.77	65.59	72.42	79.24	86.07	92.89	99.71	106.54	113.36
3.QUICK RATIO	52.44	59.26	66.09	72.91	79.74	86.56	93.39	100.21	107.04
4.DEBT SERVICE COVERAGE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.RETURN B/TAX ON EQUITY (%)	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45	10.45
6.RETURN A/TAX ON EQUITY (%)	10.45	10.45	4.70	4.70	4.70	4.70	4.70	4.70	4.70
7.RETURN A/TAX ON SALES (%)	37.59	37.59	16.91	16.91	16.91	16.91	16.91	16.91	16.91
8.PAYBACK PERIOD	3453.	14724.	21995.	29046.	36208.	43369.	50530.	57691.	78678.
9.PROFIT B.E.P. CAP. UTIL(%)	41.64	41.64	41.64	41.64	41.64	41.64	41.64	41.64	41.64
10.CASH B.E.P. SALES PRICE(D)	358.45	358.45	358.45	358.45	358.45	358.45	358.45	358.45	358.45
11.CASH B.E.P. CAP. UTIL(%)	13.98	13.98	13.98	13.98	13.98	13.98	13.98	13.98	13.98

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (IRR@0))

... SUMMARY SHEET ...

1.INTERNAL RATE OF RETURN

1) IRR@E (BEFORE TAX) = 9.55 (%) 2) IRR@E (AFTER TAX) = 6.56 (%)

2.MAJOR PREMISES

1) METHODOLOGY ..DETERMINE_IRR(%)_BASED_ON_A_PRICE_INPUT

2) PRODUCTION CAPACITY

JUTE-PULP 25000TON/YEAR

3) ONSTREAM FACTOR (%)

YR# 1	YR# 2	YR# 3	YR# 4	YR# 5	YR# 6	YR# 7	YR# 8	YR# 9	YR#10
76.00	92.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00	96.00

YR#11	YR#12	YR#13	YR#14	YR#15
96.00	96.00	96.00	96.00	96.00

4) TOTAL INVESTMENT 78708. (1000USD)

5) FINANCING STRUCTURE DEBT 60.00 (%). EQUITY 40.00 (%)

6) DEBT CONDITION

DEBT (A) : INTEREST 11.50 %. ANNUAL 10 INSTALMENTS

7) DEPRECIATION/AMORTIZATION

EQUIP. & MACHINERY	STRAIGHT	15 YEARS.	0.00 % SALVAGE
CIVIL & BUILDING	STRAIGHT	40 YEARS.	0.00 % SALVAGE
LAND ACQUISITION	NON	0 YEARS.	0.00 % SALVAGE
PRE-OPERATION COSTS.I.D.C	STRAIGHT	5 YEARS	

8) TAX

RATE 55.00 % ON TAXABLE INCOME
GRACE PERIOD : 8 YEARS
LOSS CARRY FORWARD : 6 YEARS

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (1MAR85))

*** SUMMARY SHEET ***

3.SALES REVENUE

1) JUTE-PULP

		YR: 1	YR: 2	YR: 3	YR: 4	YR: 5	YR: 6	YR: 7	YR: 8	YR: 9	YR:10
PRODUCTION	(M.T/Y)	19.	23.	24.	24.	24.	24.	24.	24.	24.	24.
SALES PRICE	(USD/T)	828.00	828.00	828.00	828.00	828.00	828.00	828.00	828.00	828.00	828.00
SALES REVENUE	(1000USD)	15732.	19044.	19872.	19872.	19872.	19872.	19872.	19872.	19872.	19872.

		YR:11	YR:12	YR:13	YR:14	YR:15
PRODUCTION	(M.T/Y)	24.	24.	24.	24.	24.
SALES PRICE	(USD/T)	828.00	828.00	828.00	828.00	828.00
SALES REVENUE	(1000USD)	19872.	19872.	19872.	19872.	19872.

4.OPERATING COSTS

1)RAW MATERIALS

	UNIT CONSUMP.		UNIT PRICE (IN 1986)		ESCALATION
JUTE CUTTINGS	1.970	(T/T)	100.600	(USD/T)	0.00 % P.A.

2)VARIABLE OPERATING COSTS

	UNIT CONSUMP.		UNIT PRICE (IN 1986)		ESCALATION
SALT	0.120	(T/T)	75.000	(USD/T)	0.00 % P.A.
LIMESTONE	0.100	(T/T)	103.400	(USD/T)	0.00 % P.A.
MISC. CHEMICALS	1.000	(T/T)	2.900	(USD/T)	0.00 % P.A.
NATURAL GAS	35.000	(MMBTU/T)	1.120	(USD/MMBTU)	0.00 % P.A.
AUX. SUPPLIES	1.000	(T/T)	9.400	(USD/T)	0.00 % P.A.

3)OTHERS : SEE "DETAILED OPERATING COSTS"

(NOTE) TOTAL OPERATING COSTS ARE SUMMARIZED IN TABLES TITLED (DETAILED OPERATING COSTS), INCLUDING COSTS FOR MIXED CONVERSION.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (IRR06))

... INCOME STATEMENTS ... (1000USD)

YEAR / YEAR	(1982) (-4)	(1983) (-3)	(1984) (-2)	(1985) (-1)	(1986) (1)	(1987) (2)	(1988) (3)	(1989) (4)	(1990) (5)	(1991) (6)
1.SALES REVENUE	0.	0.	0.	0.	15732.	19044.	19872.	19872.	19872.	19872.
2.OPERATING COSTS	0.	0.	0.	0.	7211.	8324.	8603.	8603.	8603.	8603.
3. RAW MATERIALS	0.	0.	0.	0.	3991.	4831.	5041.	5041.	5041.	5041.
4. VARIABLE OP. COSTS	0.	0.	0.	0.	1299.	1572.	1641.	1641.	1641.	1641.
5. FIXED OP. COSTS	0.	0.	0.	0.	1921.	1921.	1921.	1921.	1921.	1921.
6.CASH INC. B/INT..DEPR..TAX	0.	0.	0.	0.	8521.	10720.	11269.	11269.	11269.	11269.
7.DEPRECIATION/AMORTIZATION	0.	0.	0.	0.	5513.	5513.	5512.	5513.	5513.	3900.
8.INTEREST	0.	0.	0.	0.	5431.	5431.	5431.	5431.	4859.	4345.
9. ON LONG-TERM DEBT	0.	0.	0.	0.	5431.	5431.	5431.	5431.	4859.	4345.
10. ON SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11.NET INCOME B/TAX	0.	0.	0.	0.	-2423.	-224.	328.	328.	897.	3124.
12.INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
13.NET INCOME A/TAX	0.	0.	0.	0.	-2423.	-224.	328.	328.	897.	3124.

YEAR / YEAR	(1992) (7)	(1993) (8)	(1994) (9)	(1995) (10)	(1996) (11)	(1997) (12)	(1998) (13)	(1999) (14)	(2000) (15)	TOTAL
1.SALES REVENUE	19872.	19872.	19872.	19872.	19872.	19872.	19872.	19872.	19872.	293112.
2.OPERATING COSTS	8603.	8603.	8603.	8603.	8603.	8603.	8603.	8603.	8603.	127370.
3. RAW MATERIALS	5041.	5041.	5041.	5041.	5041.	5041.	5041.	5041.	5041.	74397.
4. VARIABLE OP. COSTS	1641.	1641.	1641.	1641.	1641.	1641.	1641.	1641.	1641.	24195.
5. FIXED OP. COSTS	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.	28815.
6.CASH INC. B/INT..DEPR..TAX	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	165742.
7.DEPRECIATION/AMORTIZATION	3900.	3900.	3900.	3900.	3900.	3900.	3900.	3900.	3900.	69367.
8.INTEREST	3902.	3259.	2715.	2172.	1629.	1086.	543.	0.	0.	40167.
9. ON LONG-TERM DEBT	3902.	3259.	2715.	2172.	1629.	1086.	543.	0.	0.	40167.
10. ON SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11.NET INCOME B/TAX	3464.	4211.	4753.	5297.	5840.	6383.	6926.	7469.	7469.	56212.
12.INCOME TAX	0.	0.	2615.	2913.	3212.	3511.	3809.	4108.	4108.	24376.
13.NET INCOME A/TAX	3464.	4211.	2139.	2384.	2628.	2872.	3117.	3361.	3361.	29736.

*** BANGLADESH JUTE-PULP MILL PROJECT ***
(BASE CASE (THRDH))

*** CASH FLOW STATEMENTS ***

(1000USD)

YEAR	(-4)	(-3)	(-2)	(-1)	(1)	(2)	(3)	(4)	(5)	(6)
1.SOURCE OF FUNDS										
2. CASH INC. P/(NI,DEPR,TAX	0.	0.	0.	0.	8521.	10720.	11269.	11269.	11269.	11269.
3. PAID-IN SHARE CAPITAL	1568.	13415.	10953.	5949.	0.	0.	0.	0.	0.	0.
4. DEBT (LONG-TERM)	2351.	20122.	15824.	8922.	0.	0.	0.	0.	0.	0.
5. DEBT (A)	2351.	20122.	15824.	8922.	0.	0.	0.	0.	0.	0.
6. DEBT (SHORT-TERM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7. *TOTAL SOURCE OF FUNDS*	3919.	33537.	26781.	14871.	8521.	10720.	11269.	11269.	11269.	11269.
8.APPLICATION OF FUNDS										
9. CAPITAL INVESTMENT	3919.	33537.	26781.	14871.	0.	0.	0.	0.	0.	0.
10. FIXED INVESTMENT	3433.	33177.	26094.	5576.	0.	0.	0.	0.	0.	0.
11. EQUIP. & MACHINERY	2114.	27900.	18754.	2973.	0.	0.	0.	0.	0.	0.
12. CIVIL & BUILDING	1192.	5269.	7340.	2603.	0.	0.	0.	0.	0.	0.
13. LAND ACQUISITION	127.	8.	0.	0.	0.	0.	0.	0.	0.	0.
14. PRE-OPERATION COSTS	486.	90.	98.	632.	0.	0.	0.	0.	0.	0.
15. INT. DUR. CONSTRUCTION	0.	270.	589.	4405.	0.	0.	0.	0.	0.	0.
16. INI. WORKING CAPITAL	0.	0.	0.	4259.	0.	0.	0.	0.	0.	0.
17. DEBT SERVICE PAYMENT	0.	0.	0.	0.	5431.	5431.	5431.	10152.	9610.	9047.
18. REPAYMENT (L-T A)	0.	0.	0.	0.	0.	0.	0.	4723.	4722.	4723.
19. INTEREST (L-T A)	0.	0.	0.	0.	5431.	5431.	5431.	5429.	4888.	4324.
20. REPAYMENT (S-T)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21. INTEREST (S-T)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
22. INC. WORKING CAPITAL	0.	0.	0.	0.	0.	548.	136.	0.	0.	0.
23. INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
24. DIVIDEND	0.	0.	0.	0.	0.	0.	0.	0.	0.	1072.
25. *TOTAL APPLICAT. OF FUND*	3919.	33537.	26781.	14871.	5431.	5979.	5567.	10152.	9610.	10119.
26.CASH INCREASE(OR DECREASE)	0.	0.	0.	0.	3090.	4741.	5702.	1117.	1659.	1129.
27.ABOVE CUMULATIVE	0.	0.	0.	0.	3090.	7831.	13533.	14649.	16308.	17437.
28.W.CAPITAL RETURN, OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
29.CASH FLOW ON IRR(B/TAX)										
30. CASH FLOW	-1568.	-13415.	-10553.	-5949.	3090.	4741.	5702.	1116.	1659.	2202.
31. DISCOUNT FACTOR	1.00000	0.91279	0.83319	0.76052	0.69420	0.63365	0.57840	0.52795	0.48191	0.43988
32. DISCOUNTED CASH FLOW	-1568.	-12245.	-8792.	-4524.	2145.	3004.	3298.	589.	799.	969.
33.CASH FLOW ON IRR(A/TAX)										
34. CASH FLOW	-1568.	-13415.	-10553.	-5949.	3090.	4741.	5702.	1116.	1659.	2202.
35. DISCOUNT FACTOR	1.00000	0.93846	0.88071	0.82651	0.77564	0.72791	0.68313	0.64109	0.60162	0.56460
36. DISCOUNTED CASH FLOW	-1568.	-12589.	-9294.	-4916.	2397.	3451.	3895.	715.	998.	1243.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (IRR0E))

*** CASH FLOW STATEMENTS ***

(1000US$)

YEAR	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	TOTAL
1.SOURCE OF FUNDS										
2. CASH INC. B/INT.DEPR.TAX	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	165742.
3. PAID-IN SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	31483.
4. DEBT (LONG-TERM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	47225.
5. DEBT (A)	0.	0.	0.	0.	0.	0.	0.	0.	0.	47225.
6. DEBT (SHORT-TERM)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
7. =TOTAL SOURCE OF FUNDS=	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	11269.	244450.
8.APPLICATION OF FUNDS										
9. CAPITAL INVESTMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	78706.
10. FIXED INVESTMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	63485.
11. EQUIP. & MACHINERY	0.	0.	0.	0.	0.	0.	0.	0.	0.	51754.
12. CIVIL & BUILDING	0.	0.	0.	0.	0.	0.	0.	0.	0.	13994.
13. LAND ACQUISITION	0.	0.	0.	0.	0.	0.	0.	0.	0.	137.
14. PRE-OPERATION COSTS	0.	0.	0.	0.	0.	0.	0.	0.	0.	1304.
15. INT. DUR. CONSTRUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	7280.
16. INI. WORKING CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	4259.
17. DEBT SERVICE PAYMENT	8524.	7931.	7438.	6895.	6352.	5809.	5266.	0.	0.	93389.
18. REPAYMENT (L-T A)	4723.	4723.	4723.	4723.	4723.	4723.	4723.	0.	0.	47225.
19. INTEREST (L-T A)	3802.	3259.	2715.	2172.	1629.	1086.	543.	0.	0.	46163.
20. REPAYMENT (S-T)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21. INTEREST (S-T)	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
22. INC. WORKING CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	684.
23. INCOME TAX PAYMENT	0.	0.	2615.	2913.	3212.	3511.	3809.	4108.	4108.	24276.
24. DIVIDEND	2745.	3268.	1217.	1461.	1706.	1950.	2194.	3361.	3361.	22357.
25. =TOTAL APPLICAT. OF FUND=	11269.	11269.	11269.	11269.	11269.	11269.	11269.	7469.	7469.	219413.
26.CASH INCREASE(OR DECREASE)	0.	0.	0.	0.	0.	0.	0.	3800.	3800.	25037.
27.ABOVE CUMULATIVE	17437.	17437.	17437.	17437.	17437.	17437.	17437.	21237.	25037.	0.
28.=CAPITAL RETURN. OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	13825.	13825.
29.CASH FLOW ON IRR0E(B/TAX)										
30. CASH FLOW	2745.	3268.	3831.	4374.	4918.	5461.	6004.	11269.	25095.	56012.
31. DISCOUNT FACTOR	0.40152	0.36691	0.33454	0.30537	0.27874	0.25443	0.23224	0.21199	0.19350	0.00000
32. DISCOUNTED CASH FLOW	1102.	1205.	1282.	1336.	1371.	1389.	1394.	2389.	4856.	0.
33.CASH FLOW ON IRR0E(A/TAX)										
34. CASH FLOW	2745.	3268.	1217.	1461.	1706.	1950.	2194.	7161.	20996.	29736.
35. DISCOUNT FACTOR	0.52985	0.49725	0.46665	0.43793	0.41098	0.38569	0.36195	0.33968	0.31877	0.00000
36. DISCOUNTED CASH FLOW	1455.	1625.	568.	640.	701.	752.	794.	2433.	6690.	0.

BANGLADESH JUTE-PULP MILL PROJECT

(BASE CASE (INNOV))

... BALANCE SHEET ...

(1000USD)

YEAR	(-4)	(-3)	(-2)	(-1)	(1)	(2)	(3)	(4)	(5)	(6)
1.ASSETS	3919.	37496.	63838.	78708.	76726.	76595.	74943.	72544.	69492.	66020.
2. CASH FROM OPERATION	0.	0.	0.	0.	3098.	7331.	13322.	14089.	16302.	17332.
3. CURRENT ASSETS	0.	0.	0.	4258.	4699.	5339.	5499.	5499.	5499.	5499.
4. NET FIXED ASSETS	3919.	37496.	63838.	74451.	68937.	63424.	57911.	52398.	46884.	41371.
5. INVESTMENTS	3919.	37496.	63838.	74451.	74451.	74451.	74451.	74451.	74451.	74451.
6. EQUIP. & MACHINERY	2114.	30022.	48781.	51794.	51794.	51794.	51794.	51794.	51794.	51794.
7. CIVIL & BUILDING	1182.	6451.	11341.	13994.	13994.	13994.	13994.	13994.	13994.	13994.
8. LAND ACQUISITION	137.	137.	137.	137.	137.	137.	137.	137.	137.	137.
9. PRE-OPERATION COSTS	486.	676.	674.	1306.	1306.	1306.	1306.	1306.	1306.	1306.
10. INI. DUR. CONSTN.	0.	270.	2953.	7260.	7260.	7260.	7260.	7260.	7260.	7260.
11. LESS ACCM. DEPN.&AMORT	0.	0.	0.	0.	5513.	11027.	16540.	22053.	27566.	31366.
12.LIABILITIES	2351.	22474.	38303.	47225.	47666.	47799.	47782.	43059.	34337.	23614.
13. CURRENT LIABILITIES	0.	0.	0.	0.	441.	534.	5279.	5279.	5279.	5279.
14. FIXED LIABILITIES	2351.	22474.	38303.	47225.	47225.	47225.	42503.	37780.	33058.	28335.
15. LONG-TERM DEBT (A)	2351.	22474.	38303.	47225.	47225.	47225.	42503.	37780.	33058.	28335.
16.EQUITY	1568.	14983.	25535.	31483.	29061.	28836.	29161.	29486.	30359.	32406.
17. SHARE CAPITAL	1568.	14983.	25535.	31483.	31483.	31483.	31483.	31483.	31483.	31483.
18. RETAINED EARNING	0.	0.	0.	0.	-2422.	-2647.	-2322.	-1997.	-1124.	922.

... WORKING CAPITAL ...

(1000USD)

YEAR	(-4)	(-3)	(-2)	(-1)	(1)	(2)	(3)	(4)	(5)	(6)
1.CURRENT ASSETS	0.	0.	0.	4258.	4699.	5339.	5499.	5499.	5499.	5499.
2. CASH	0.	0.	0.	2923.	320.	320.	320.	320.	320.	320.
3. ACCOUNTS RECEIVABLE	0.	0.	0.	0.	1311.	1947.	1656.	1656.	1656.	1656.
4. SPARE PARTS	0.	0.	0.	1335.	1335.	1335.	1335.	1335.	1335.	1335.
5. INVENTORY	0.	0.	0.	0.	1732.	2097.	2188.	2188.	2188.	2188.
6. PRODUCTS	0.	0.	0.	0.	1311.	1947.	1656.	1656.	1656.	1656.
7. MATERIALS	0.	0.	0.	0.	421.	150.	532.	532.	532.	532.
8. OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
9.CURRENT LIABILITIES	0.	0.	0.	0.	441.	534.	5279.	5279.	5279.	5279.
10. ACCOUNTS PAYABLE	0.	0.	0.	0.	441.	534.	557.	557.	557.	557.
11. CURRENT MONTION OF DEBT	0.	0.	0.	0.	0.	0.	4722.	4722.	4722.	4722.
12. LONG-TERM DEBT (A)	0.	0.	0.	0.	0.	0.	4722.	4722.	4722.	4722.
13. SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
14.W.C.(EX. CUR. MONT. DEBT)	0.	0.	0.	4258.	4258.	4806.	4942.	4942.	4942.	4942.
15.INCREASE WORKING CAPITAL	0.	0.	0.	4258.	0.	548.	136.	0.	0.	0.

* * * BANGLADESH JUTE-BUILD MILL PROJECT * * *
(BASE CASE (1980C))

*** BALANCE SHEET ***

(1000USD)

YEAR	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1.ASSETS	49820.	59420.	54420.	50420.	47020.	43219.	39419.	39419.	39419.
2. CASH FROM OPERATION	17437.	17437.	17437.	17437.	17437.	17437.	17437.	21237.	25037.
3. CURRENT ASSETS	5499.	5499.	5499.	5499.	5499.	5499.	5499.	5499.	5499.
4. NET FIXED ASSETS	39284.	29484.	21684.	27884.	24084.	20284.	16483.	12683.	8883.
5. INVESTMENTS	74451.	74451.	74451.	74451.	74451.	74451.	74451.	74451.	74451.
6. EQUIP. & MACHINERY	51754.	51754.	51754.	51754.	51754.	51754.	51754.	51754.	51754.
7. CIVIL & BUILDING	13994.	13994.	13994.	13994.	13994.	13994.	13994.	13994.	13994.
8. LAND ACQUISITION	137.	137.	137.	137.	137.	137.	137.	137.	137.
9. PRE-OPERATION COSTS	1306.	1306.	1306.	1306.	1306.	1306.	1306.	1306.	1306.
10. INT. DUR. CONSTN.	7260.	7260.	7260.	7260.	7260.	7260.	7260.	7260.	7260.
11. LESS ACCM. DEPN.&AMORT	59167.	59067.	42767.	46567.	50367.	54167.	57967.	61767.	65567.
12.LIABILITIES	49492.	44169.	19447.	14724.	10002.	5279.	557.	557.	557.
13. CURRENT LIABILITIES	5279.	5279.	5279.	5279.	5279.	5279.	557.	557.	557.
14. FIXED LIABILITIES	23613.	14890.	14168.	9445.	4723.	0.	0.	0.	0.
15. LONG-TERM DEBT (A)	22613.	13890.	14168.	9445.	4723.	0.	0.	0.	0.
16.EQUITY	29328.	24251.	29173.	36095.	37018.	37940.	38863.	38863.	38863.
17. SHARE CAPITAL	31483.	31483.	31483.	31483.	31483.	31483.	31483.	31483.	31483.
18. RETAINED EARNING	1845.	2767.	3690.	4612.	5534.	6457.	7379.	7379.	7379.

*** WORKING CAPITAL ***

(1000USD)

YEAR	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1.CURRENT ASSETS	5499.	5499.	5499.	5499.	5499.	5499.	5499.	5499.	5499.
2. CASH	320.	320.	320.	320.	320.	320.	320.	320.	320.
3. ACCOUNTS RECEIVABLE	1656.	1656.	1656.	1656.	1656.	1656.	1656.	1656.	1656.
4. SPARE PARTS	1339.	1339.	1339.	1339.	1339.	1339.	1339.	1339.	1339.
5. INVENTORY	2184.	2184.	2184.	2184.	2184.	2184.	2184.	2184.	2184.
6. PRODUCTS	1656.	1656.	1656.	1656.	1656.	1656.	1656.	1656.	1656.
7. MATERIALS	532.	532.	532.	532.	532.	532.	532.	532.	532.
8. OTHERS	0.	0.	0.	0.	0.	0.	0.	0.	0.
9.CURRENT LIABILITIES	5279.	5279.	5279.	5279.	5279.	5279.	557.	557.	557.
10. ACCOUNTS PAYABLE	557.	557.	557.	557.	557.	557.	557.	557.	557.
11. CURRENT PORTION OF DEBT	4723.	4723.	4723.	4723.	4723.	4723.	0.	0.	0.
12. LONG-TERM DEBT (A)	4723.	4723.	4723.	4723.	4723.	4723.	0.	0.	0.
13. SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.
14.NWC(EX. CURR. PORT. DEBT)	4942.	4942.	4942.	4942.	4942.	4942.	4942.	4942.	4942.
15.INCREASE WORKING CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (IRMDC))

... DETAILED OPERATING COSTS ...

(1000 MT)

YEAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.RAW MATERIALS	3991.	4431.	5041.	5041.	5041.	5041.	5041.	5041.	5041.	5041.
2. JUTE CUTTINGS	3491.	4031.	5041.	5041.	5041.	5041.	5041.	5041.	5041.	5041.
3.VARIABLE OPERATING COSTS	1299.	1572.	1641.	1641.	1641.	1641.	1641.	1641.	1641.	1641.
4. SALT	168.	204.	213.	213.	213.	213.	213.	213.	213.	213.
5. LIMESTONE	196.	238.	248.	248.	248.	248.	248.	248.	248.	248.
6. MISC. CHEMICALS	46.	55.	58.	58.	58.	58.	58.	58.	58.	58.
7. NATURAL GAS	702.	850.	887.	887.	887.	887.	887.	887.	887.	887.
8. AUX. SUPPLIES	186.	225.	235.	235.	235.	235.	235.	235.	235.	235.
9.FIXED OPERATING COSTS	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.	1921.
10. LABOUR	436.	436.	436.	436.	436.	436.	436.	436.	436.	436.
11. PLANT OVERHEAD	924.	924.	924.	924.	924.	924.	924.	924.	924.	924.
12. REPAIR & MAINTENANCE	561.	561.	561.	561.	561.	561.	561.	561.	561.	561.
13.TOTAL OPERATING COSTS	7211.	8024.	8603.	8603.	8603.	8603.	8603.	8603.	8603.	8603.
14.UNIT OPERATING COSTS($/MT)	360.	362.	358.	358.	358.	358.	358.	358.	358.	358.

YEAR	(11)	(12)	(13)	(14)	(15)	TOTAL
1.RAW MATERIALS	5041.	5041.	5041.	5041.	5041.	74357.
2. JUTE CUTTINGS	5041.	5041.	5041.	5041.	5041.	74357.
3.VARIABLE OPERATING COSTS	1641.	1641.	1641.	1641.	1641.	24195.
4. SALT	213.	213.	213.	213.	213.	3135.
5. LIMESTONE	248.	248.	248.	248.	248.	3660.
6. MISC. CHEMICALS	58.	58.	58.	58.	58.	850.
7. NATURAL GAS	887.	887.	887.	887.	887.	13084.
8. AUX. SUPPLIES	235.	235.	235.	235.	235.	3469.
9.FIXED OPERATING COSTS	1921.	1921.	1921.	1921.	1921.	28819.
10. LABOUR	436.	436.	436.	436.	436.	6540.
11. PLANT OVERHEAD	924.	924.	924.	924.	924.	13860.
12. REPAIR & MAINTENANCE	561.	561.	561.	561.	561.	8419.
13.TOTAL OPERATING COSTS	8603.	8603.	8603.	8603.	8603.	127370.
14.UNIT OPERATING COSTS($/MT)	358.	358.	358.	358.	358.	360.

* * * BANGLADESH JUTE-PULP MILL PROJECT * * *
(BASE CASE (1980C))

*** FINANCIAL PERFORMANCE INDICATORS ***

(1000USD).

YEAR	(-4)	(-3)	(-2)	(-1)	(1)	(2)	(3)	(4)	(5)	(6)
1.LONG-TERM DEBT/EQUITY	1.50	1.50	1.50	1.50	1.63	1.64	1.46	1.28	1.09	0.87
2.CURRENT RATIO	0.00	0.00	0.00	0.00	17.67	24.63	3.41	3.82	4.13	5.36
3.QUICK RATIO	0.00	0.00	0.00	0.00	10.71	15.25	2.94	3.15	3.44	3.68
4.DEBT SERVICE COVERAGE	0.00	0.00	0.00	0.00	1.57	1.97	2.08	1.11	1.17	1.24
5.RETURN B/TAX ON EQUITY (%)	0.00	0.00	0.00	0.00	-7.70	-0.71	1.03	1.03	2.76	9.92
6.RETURN A/TAX ON EQUITY (%)	0.00	0.00	0.00	0.00	-7.70	-0.71	1.03	1.03	2.76	9.92
7.RETURN A/TAX ON SALES (%)	0.00	0.00	0.00	0.00	-15.40	-1.18	1.64	1.64	4.37	15.72
8.PAYBACK PERIOD	-1568.	-14983.	-25535.	-31483.	-28393.	-23652.	-17950.	-16834.	-15175.	-12973.
9.PROFIT B.E.P. CAP. UTIL(%)	0.00	0.00	0.00	0.00	93.63	93.63	93.63	93.63	89.68	73.26
10.CASH B.E.P. SALES PRICE(D)	0.00	0.00	0.00	0.00	462.25	509.05	584.72	781.50	754.89	756.25
11.CASH B.E.P. CAP. UTIL(%)	0.00	0.00	0.00	0.00	53.51	53.51	53.51	87.98	83.93	79.97

YEAR	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1.LONG-TERM DEBT/EQUITY	0.71	0.55	0.40	0.26	0.13	0.00	0.00	0.00	0.00
2.CURRENT RATIO	4.34	4.34	4.34	4.34	4.34	4.34	41.19	48.02	54.84
3.QUICK RATIO	3.68	3.68	3.68	3.68	3.68	3.68	34.87	41.09	46.51
4.DEBT SERVICE COVERAGE	1.22	1.41	1.16	1.21	1.27	1.34	1.42	0.00	0.00
5.RETURN B/TAX ON EQUITY (%)	11.65	13.37	15.10	16.82	18.55	20.27	22.00	23.72	23.72
6.RETURN A/TAX ON EQUITY (%)	11.65	13.37	6.79	7.57	8.35	9.12	9.90	10.68	10.68
7.RETURN A/TAX ON SALES (%)	18.46	21.19	10.76	11.99	13.22	14.45	15.68	16.91	16.91
8.PAYBACK PERIOD	-10227.	-6939.	-3723.	-4261.	-2556.	-606.	1588.	8750.	29736.
9.PROFIT B.E.P. CAP. UTIL(%)	69.81	65.33	61.40	57.45	53.50	49.54	45.59	41.64	41.64
10.CASH B.E.P. SALES PRICE(D)	713.62	690.98	715.33	692.71	670.08	647.45	624.82	358.45	358.45
11.CASH B.E.P. CAP. UTIL(%)	76.02	72.07	76.32	72.37	68.41	64.46	60.51	13.98	13.98

Chapter 12.

ECONOMIC ANALYSIS

Chapter 12. ECONOMIC ANALYSIS

12.1 General

Jute and rice are the two largest products in Bangladesh, and activity of the jute and relative industries affect the economics in Bangladesh greatly. However, the share of the jute fibers and the jute products of Bangladesh in the international market has been lowered, and that is oppressing the economy of this country. This is caused by the appearance of the chemical fibers, which substitute the jute, and the hard competition with the jute products from India, China, etc. In this circumstance, Bangladesh is planning the production of pulp from jute to develop a new field for the jute. The plan has been taken into the Second Five Year Plan (1980/1–1985/6). In this economic analysis, the economic effect expected from the performance of this Project for the jute pulp production will be assessed.

12.2 Economic Benefits by the Project

The economic benefit by this project will be divided into the direct benefit and the indirect one, and each benefit will be assessed separately.

12.2.1 Direct Benefit

The direct benefit by this project lay its importance in the economic value of the jute pulp produced by this Project. It will substitute the pulp currently imported, and answer the increase of local demand for the pulp in the future. That will save the important foreign currency. Furthermore, the surplus pulp after satisfying the domestic demand will be exported to the neighboring countries to get the foreign currency. In this economic analysis, the amount of foreign currency saved by substitution for imported pulp and the foreign currency earned by the export will be assessed as the direct benefits in Section 4.

12.2.2 Indirect Benefit

The following are considered as the indirect benefit of this Project.

1) Increase of employment

Various types of workers will be employed during the construction of this jute pulp mill, and about 800 workers will be employed by the mill after the completion of the construction to be engaged in the production. The increase of the employment is one of the indirect benefits of this Project.

2) Economic effect to community

By performing this Project, the distribution of the construction materials, products, and raw materials will be activated through the construction and operation period. The existence of this mill accelerates the various small commercial activities.

3) Extended effect to related industries

The paper mills in Bangladesh will be guaranteed the quantity and price of the raw material by this Project and they will be able to operate steadily. The demand for the construction materials required for the construction of this mill and the domestic goods to maintain the operation will be increased. The performance of this Project will give Bangladesh many indirect benefit in addition to the above items. However, it is difficult to assess these benefit quantitatively, and the assessment tends to be rather subjective. If these benefit are not calculated correctly, the economic effect by this Project may be overestimated. Therefore, the economic IRR will be calculated in this economic analysis without doing any quantitative assessment of these indirect benefits.

12.3 Economic Cost

As the economic cost, the initial investment cost for the performance of this Project and the production cost must be considered.

12.3.1 Initial Investment Cost for Implementation of the Project

The construction cost for mill, pre-operation cost, operating cost will be necessary as the initial cost for the implementation of this Project. The economic value of these costs will be calculated by separating the domestic and foreign currency, considering the premium for the economic value.

12.3.2 Production Cost

As the production cost of the jute pulp, the cost of the natural resources consumed, labour, and other costs are required.

1) Cost of natural resources consumed

The jute cuttings, natural gas, and salt necessary for production of chlorine and alkali are consumed as the natural resources. These costs must be calculated considering the premium of their economic value.

2) Cost of labour

The labour cost in the production cost is composed of the cost for workers, the personnel expenses in the management cost of the mill and maintenance cost. These expenses must be divided into the skilled workers and unskilled workers, then analyzed economically considering their economic value.

3) Other costs for production

Other than above, there will be costs of various chemicals used in the jute pulp production, the cost of materials in the auxilairy supplies and materials in management/maintenance expense of the mill.

12.4 Economic IRR of the Project

After the calculation of the above economic benefit and the costs, the economic IRR (EIRR) will be calculated in this section.

12.4.1 Assumption of Basic Scheme

To understand the economic effects by the performance of this Project correctly, it is necessary to consider the demand and supply of the pulp in and after 1986 in case of that this Project is not performed. The Scheme I and Scheme II are forecasted as the pulp balance in case of the Project will be performed or not. These are shown in Fig. 12-1 and Fig. 12-2. These are also represented in Tables 12-1 and 12-2.

i) Scheme I: Pulp balance when this Project is performed.

Table 12-1. Pulp Balance (Scheme I)

Pulp Supply		Application	
Pulp	Ton/Y	Paper	Ton/Y
BCIC Project	24,000	News Print	50,000
SPPM	25,000	Printing/Writing	43,500
Others	76,500	Sack Kraft	10,000
		Private Ind.	10,000
		(Pulp Export)	12,000
Total	125,500	Total	125,500

Although the capacity of the pulp production in this Project is 25,000 tons/year, actual production has been assumed to be 24,000 tons corresponding to the normal operation rate, 96%, in the financial analysis of the former chapter. Therefore, 24,000 tons/year will be also used in this economic analysis.

ii) Scheme II: Pulp balance when this project is not performed.

Table 12-2. Pulp Balance (Scheme II)

Pulp Supply		Application	
Pulp	Ton/Y	Paper	Ton/Y
Pulp Import	12,000	News Print	50,000
SPPM	25,000	Printing/Writing	43,500
Others	76,500	Sack Kraft	10,000
		Private Ind.	10,000
Total	113,500	Total	113,500

12.4.2 Direct Benefit

The direct benefit by this Project are substitute value of the imported pulp and the foreign currency earnings by the exported pulp.

1) Substitute value of imported pulp

The price of the imported pulp in 1986 is estimated to be USD800–900/ton. In this economic analysis, the price of USD828/ton, which is used in the fianncial analysis, is used and its direct economic benefit is calculated after the consideration of the premium of the economic value.

2) Foreign currency earnings by exported pulp

The export price of pulp produced in this mill in 1986 is estimated USD745/ton, which is 10% lower than the domestic selling price (USD828/ton) as described in Section 3 of Chapter 11. The economic benefit by the pulp exporting is calculated by adding the premium of economic value to the above value. The export promotional subsidy can be taken into the transfer item.

The above 1) and 2) are the direct benefit of this Project and summarized in the table below.

Table 12-3. Economic Benefit

(1,000 USD)

Project Year	Economic Benefit						Total
	Import Substitue			Export Sales			
	(USD/T)	(T/Y)	(Benefit)	(USD/T)	(T/Y)	(Benefit)	
Yr. 1 ('86)	828x1.3	12,000	12,917	745x1.3	7,000	6,780	19,697
Yr. 2 ('87)	828x1.3	12,000	12,917	745x1.3	11,000	10,654	23,571
Yr. 3 ('88)	828x1.3	12,000	12,917	745x1.3	12,000	11,622	24,539
Onward	828x1.3	12,000	12,917	745x1.3	12,000	11,622	24,539

(Note) Foreign exchange premium: 0.30

Fig. 12-1. Pulp Balance (Scheme I: New Mill Installation – Yes)

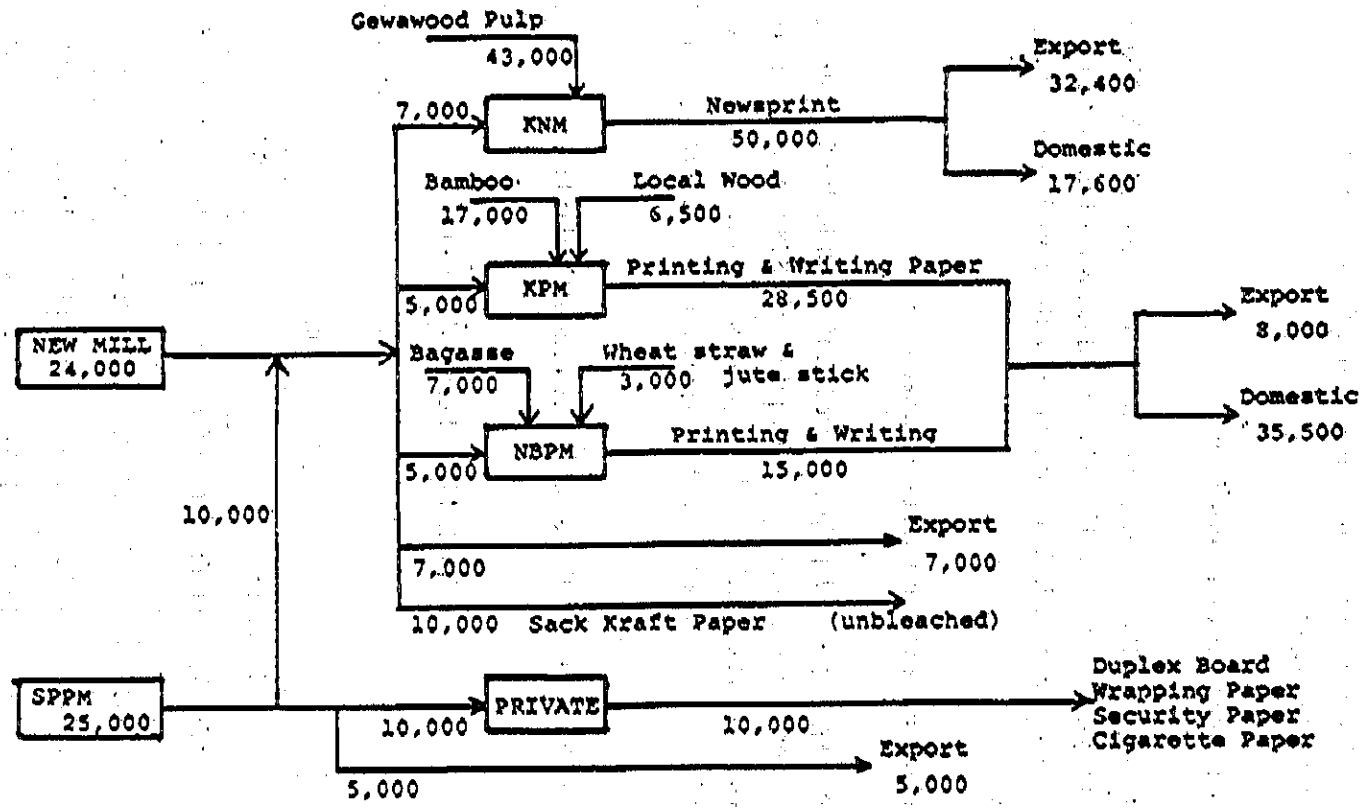
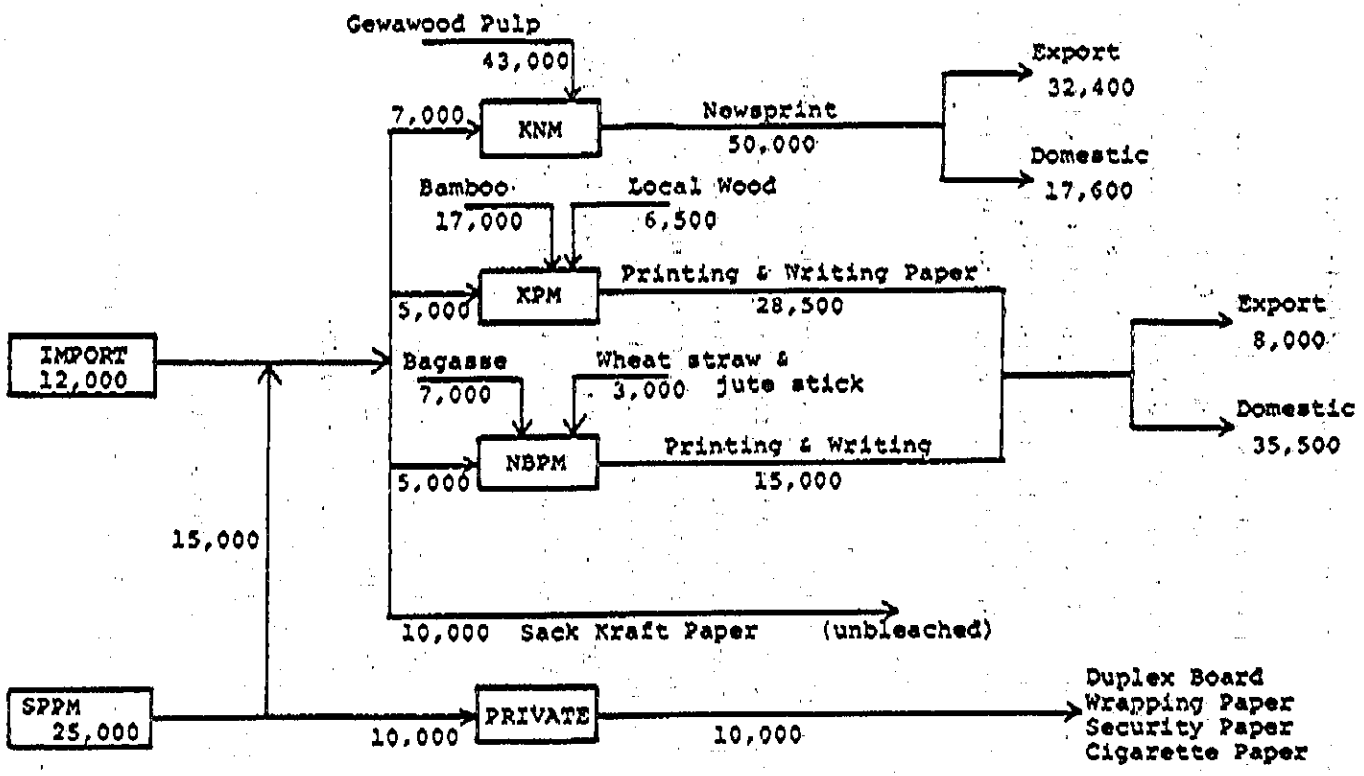


Fig. 12-2. Pulp Balance (Scheme II: New Mill Installation – No)



12.4.3 Economic Cost

1) Initial investment cost for performance of the Project

The total investment and costs in each construction year, which are described in Section 4 of Chapter 11, are resummarized in Table 12-5 for the economic analysis. The costs are divided into domestic and foreign currency, and the domestic currency costs are divided into the cost of the skilled labours, unskilled labours, and domestic materials. Each cost item is converted into the economic cost using the value of national parameter that was determined in the discussion with the counterpart of Bangladesh. The initial working capital is assumed as the local currency not considering any premium for the convenience to perform this economic analysis.

2) Production expense

As described before, the economic value of the cost of the natural resources, labour, and others will be calcualted as the cost for production. The calculation method is as follows; The transfer items (property tax, insurance on the property, social insurance) are excluded from each cost shown in Section 5 of Chapter 11 "Operating Cost", and the rest of the costs are divided into the domestic and foreign currency, and the domestic currency is divided into the skilled labours, unskilled labours, and domestic resources/materials, then their economic values are calculated. The used values of national parameter (premium of economic value) are as follows:

- Foreign exchange premium = 0.30
- Skilled labour premium = 0.50
- Unskilled labour premium = (-)1.00
- Jute cuttings: (-)0.20
- Natural gas: 1.50
- Other domestic materials: 0.00

The calculated operating costs are shown in Table 12-6.

12.4.4 Calculation of Economic Internal Rate of Return (EIRR)

EIRR during the economic life span is calculated using the above economic benefit and costs, and shown in Table 12-7. In this calculation sheet, the economic cash flow and EIRR in case of that the price of the import pulp and export price of the jute pulp are changed by ±10%, other than the basic case.

Table 12-4 shows the economic benefit in each case.

Table 12-4. Economic Benefit

(1,000 USD)

Case	Import Substitute (USD/T)	Export Price (USD/T)	Economic Benefit		
			Yr:1	Yr:2	Yr:3-15
Base Case	828x1.3	745x1.3	19,697	23,571	24,539
Plus 10%	911x1.3 (+10%)	820x1.3 (+10%)	21,674	25,938	27,004
Minus 10%	745x1.3 (-10%)	671x1.3 (-10%)	17,728	21,217	22,090

Table 12-5. Economic Capital Cost

(1,000 USD)

	Financial Projection				Economic Capital Cost			
	Project Year				Project Year			
	-4	-3	-2	-1	-4	-3	-2	-1
Local Currency Cost	1,067	2,209	2,712	6,222	716	1,583	1,512	5,399
o Skilled labour	(347)	(666)	(659)	(531)	(521)	(999)	(989)	(797)
o Unskilled labour	(525)	(959)	(1,530)	(1,089)	(0)	(0)	(0)	(0)
o Domestic material	(195)	(584)	(532)	(344)	(195)	(584)	(523)	(344)
o Initial Working Capital	-	-	-	(4,258)	-	-	-	(4,258)
Foreign Exchange Cost	2,715	29,121	19,909	4,153	3,530	37,857	25,882	5,399
				Total annual (1,000 USD)	4,246	39,440	27,394	10,798
				Total Economic Capital Cost (1,000 USD)	81,878			

(Note)

1. Financial and Economic capital costs exclude the expenses for Land acquisition and Import duties as these are considered Transferable costs.
2. Value of National Parameters:
   - o Foreign exchange premium = 0.30
   - o Unskilled labour premium = (-)1.00
   - o Skilled labour premium = 0.50

Table 12-6. Estimated Annual Operating Costs

(1,000 USD)

Item		Basis		Project Year			
		Financial Projections	Premium	1 ('86)	2 ('87)	3 ('88)	Onward
(A) Local Currency Cost	1) Jute Cuttings	@ 109.4 USD/T x 1.92 T/T	(-) 0.2	3,193	3,865	4,033	4,033
	2) Natural Gas	@ 1.12 USD/MMBTU x 33 MMBTU/T	1.5	1,756	2,125	2,218	2,218
	3) Salt	@ 73.8 USD/T x 0.12 T/T	0.0	168	204	213	213
	4) Labour	o Skilled labour 189 MUSD	0.5	284	284	284	284
		o Unskilled labour 247 MUSD	(-)1.0	0	0	0	0
	5) Plant Overhead	o Skilled labour 193 MUSD	0.5	290	290	290	290
		o Unskilled labour 30 MUSD	(-)1.0	0	0	0	0
	Total in 1,000 USD	—		5,691	6,768	7,038	7,038
(B) Foreign Exchange Cost	1) Chemicals	@ 12.74 USD/T (Limestone & Others)	0.3	315	381	397	397
	2) Maintenance	o Foreign Exch. Materials 561 MUSD	0.3	729	729	729	729
	3) Plant Overhead	o Foreign Exch. Materials 140 MUSD	0.3	182	182	182	182
	4) Auxiliary Supplies	@ 9.8 USD/T (Packing Materials & OPS)	0.3	242	293	306	306
	Total in 1,000 USD	—		1,468	1,585	1,614	1,614
(A) + (B)	Economic Cost (1,000 USD)	—	—	7,159	8,353	8,652	8,652

Table 12-7. Project Economic Return

(1,000 USD)

Year	Economic Cost[1]			Economic Benefit[2]			Economic Cash Flow[3]		
	Capital Cost	Operating Cost	Total	Base Case	(Plus 10%)	(Minus 10%)	Base Case	(Plus 10%)	(Minus 10%)
-4 (1982)	4,246	-	4,246	-	-	-	-4,246	-4,246	-4,246
-3 (1983)	39,440	-	39,440	-	-	-	-39,440	-39,440	-39,440
-2 (1984)	27,394	-	27,394	-	-	-	-27,394	-27,394	-27,394
-1 (1985)	10,798	-	10,798	-	-	-	-10,798	-10,798	-10,798
1 (1986)	-	7,159	7,159	19,697	21,674	17,728	12,538	14,515	10,569
2 (1987)	548[3]	8,353	8,901	23,571	25,938	21,217	14,670	17,037	12,316
3 (1988)	136[3]	8,652	8,788	24,539	27,004	22,090	15,751	18,216	13,302
4 (1989) – 14 (1999)	-	8,652	8,652	24,539	27,004	22,090	15,887	18,352	13,438
15 (2000)	-4,942[3]	8,652	3,710	24,539	27,004	22,090	20,829	23,294	18,380

Economic Internal Rate of Return (EIRR)

	Import Substitute	Export Sales	EIRR
Base Case	828 USD/T	745 USD/T	13.18%
(Plus 10% Case)	911 USD/T	820 USD/T	15.40%
(Minus 10% Case)	745 USD/T	671 USD/T	10.77%

(Note)

1) See Table 12-5 and Table 12-6.
2) See Table 12-4.
3) Increase of Working capital and Working capital return.

EIRR in each case are as follows:

Case	EIRR
Base case	13.18%
(Plus 10% case)	15.40%
(Minus 10% case)	10.77%

The financial rate of return in IRROI before tax is 10.54% and in IRROI after tax is 8.95%, which means that economic rate of return of the Project is higher than the financial rate of return. This implies that the foreign currency saved by this Project and obtained by exporting the jute pulp will greatly contribute to the economy of Bangladesh. Even when the price of the pulp will not rise much, and the substitute cost of the import pulp and the export price of the jute pulp are lower than the expected amount by10%, and the economic benefit is decreased, EIRR is still above 10%, and the economic effect of this Project is still high. Therefore, the implementation of this Project is recommended considering the results of the above economic analysis.

12.5 Impact of the Project on Foreign Exchange Balance

The following study is made regarding the expected impact of the Project on the foreign exchange balance in Bangladesh.

12.5.1 Provisions

1) Total investment cost

Total investment cost prescribed in the economic analysis is divided into foreign exchange portion and local currency portion as shown in Table 12-8. It is assumed tentatively that required foreign exchange will be borrowed at the interest rate of 4.0% p.a.

Table 12-8. Capital Cost and Expenditure Schedule

(1,000 USD)

	Project Year				
	-4	-3	-2	-1	Total
Plant Cost	3,433	33,177	23,699	5,576	65,885
o Foreign Exchange	(2,351)	(29,044)	(19,825)	(3,679)	(54,899)
o Local Currency	(1,082)	(4,133)	(3,874)	(1,897)	(10,986)
Preoperation Cost	486	90	98	632	1,306
o Foreign Exchange	(364)	(77)	(84)	(474)	(999)
o Local Currency	(122)	(13)	(14)	(158)	(307)
Initial Working Capital	0	0	0	4,258	4,258
o Foreign Exchange	(-)	(-)	(-)	(1,409)	(1,409)
o Local Currency	(-)	(-)	(-)	(2,849)	(2,849)
Interest during Construction	0	109	1,278	2,125	3,512
o Foreign Exchange	(-)	(109)	(1,278)	(2,125)	(3,512)
Total Capital Cost	3,919	33,376	25,075	12,591	74,961
o Foreign Exchange	(2,715)	(29,230)	(21,187)	(7,687)	(60,819)
o Local Currency	(1,204)	(4,146)	(3,888)	(4,904)	(14,142)

2) Foreign currency earnings and savings

Foreign currency earnings and savings expected by the implementation of this Project is shown in Table 12-9.

Table 12-9. Foreign Currency Input

(1,000 USD)

Project Year	Foreign Currency Input						
	Import Substitute			Export Sales			Total
	(USD/T)	(T/Y)	(Input)	(USD/T)	(T/Y)	(Input)	
Yr. 1 ('86)	828	12,000	9,936	745	7,000	5,215	15,151
Yr. 2 ('87)	828	12,000	9,936	745	11,000	8,195	18,131
Yr. 3 ('88)	838	12,000	9,936	745	12,000	8,940	18,876
Onward	828	12,000	9,936	745	12,000	8,940	18,876

3) Payment by foreign currency

After operation is started, expense to be made by foreign currency consists of a part of operating cost and long term loan repayment.

i) Operating cost

Foreign currency portion of operating cost is shown in Table 12-10.

Table 12-10. Operating Cost (F. Exchange Portion)

(1,000 USD)

Item	Basis	Project Year			
	Financial Projections	1 ('86)	2 ('87)	3 ('88)	Onward
1) Chemicals	o 12.74 USD/T (Limestone & others)	242	293	306	306
2) Maintenance	o Foreign Exch. Materials 561 MUSD	561	561	561	561
3) Plant Overhead	o Foreign Exch. Materials 140 MUSD	140	140	140	140
4) Aux. Supplies	o 9.8 USD/T (Packing Materails & OPS)	186	225	235	235
Total in 1,000 USD	–	1,129	1,219	1,242	1,242

ii) Long term loan repayment

Payable principal and interest of long term loan repayment is to be calculated in the following conditions.

- o Interest: 4.0% p.a.
- o Principal repayment: 10 annual equal installments
- o Grace period: 3 years after operation

12.5.2 Foreign Currency Balance

On the basis of the previous provisions, expected foreign currency earnings from implementation of this project is shown in Table 12-11. In the table, foreign currency input comprises the following three items:

i) Foreign currency earnings from jute pulp export
ii) Substitution of imported pulp by jute pulp production
iii) Long term loan introduced by total project finance

Outflow of foreign currency comprises the following three items:

i) Required capital to be paid by foreign currency
ii) Operating cost to be paid by foreign currency
iii) Payable principal and interest of long term loan

According to the calculated foreign currency input, this Project brings about USD339 million of foreign currency earnings and savings throughout the construction and operation period. Payment of foreign currency, in the meanwhile, is USD159 million. Therefore, the implementation of this Project will accumulate the foreign exchange equivalent to USD180 million and thus greatly contribute to Bangladesh economy.

Table 12-11. Net Foreign Currency Earnings

(1,000 USD)

Year	Foreign Currency Input (1)		Foreign Currency Output				Net Foreign Currency Flow	
	Sales and Import Substitute	Loan Finance	Capital Cost	Operating Cost	Debt Service Payment	Total (2)	Balance (1) - (2)	Cumulation
-4 (1982)	-	2,715	2,715	-	-	2,715	0	0
-3 (1983)	-	29,230	29,121	-	109	29,230	0	0
-2 (1984)	-	21,187	19,909	-	1,278	21,187	0	0
-1 (1985)	-	7,687	5,562	-	2,125	7,687	0	0
1 (1986)	15,151	-	-	1,129	2,433	3,562	11,589	11,589
2 (1987)	18,131	-	16	1,219	2,433	3,668	14,463	26,052
3 (1988)	18,876	-	4	1,242	2,433	3,679	15,197	41,249
4 (1989)	18,876	-	-	1,242	8,515	9,757	9,119	50,368
5 (1990)	18,876	-	-	1,242	8,272	9,514	9,362	59,730
6 (1991)	18,876	-	-	1,242	8,028	9,270	9,606	69,336
7 (1992)	18,876	-	-	1,242	7,785	9,027	9,849	79,185
8 (1993)	18,876	-	-	1,242	7,542	8,784	10,092	89,277
9 (1994)	18,876	-	-	1,242	7,299	8,541	10,335	99,612
10 (1995)	18,876	-	-	1,242	7,055	8,297	10,579	110,191
11 (1996)	18,876	-	-	1,242	6,812	8,054	10,822	121,013
12 (1997)	18,876	-	-	1,242	6,569	7,811	11,065	132,078
13 (1998)	18,876	-	-	1,242	6,325	7,567	11,309	143,387
14 (1999)	18,876	-	-	1,242	-	1,242	17,634	161,021
15 (2000)	18,876	-	(-1,249)	1,242	-	-187	19,063	180,084
Total	278,670	60,819	55,898	18,494	85,013	159,405	180,084	-

Chapter 13.

RECOMMENDATIONS

Chapter 13. RECOMMENDATIONS

In order to implement the present Project smoothly, the following items are recommended to be carried out.

1. Implementation of the present Project enables to save a large sum of foreign exchange and, at the same time, to obtain foreign currency. Therefore, the present Project should be implemented as early as possible.

   For this purpose, it is necessary to work out the project implementation plan as soon as possible and to begin the activities for raising the fund required.

2. To make the financial status of the present Project more stable, it is most advisable to endeavour to attain long-term loan of soft conditions.

3. Detailed soil investigation including boring test of the mill site should be carried out soon after the implementation of this Project has been decided.

APPENDICES

Appendix I-1. ITINERARY

September 1981

19	(Sat.)	–	Lv. Tokyo – Av. Bangkok
20	(Sun.)	–	Lv. Bangkok – Av. Dacca
21	(Mon.)	–	Visit to Japanese Embassy, JICA and BCIC
22	(Tue.)	–	Meeting with BCIC
		–	Visit to SPPM
23	(Wed.)	–	Survey the jute pulping process at SPPM
		–	Market survey at Dacca
24	(Thu.)	–	Meeting with BCIC
		–	Jute field survey
		–	Survey the jute pulping process at SPPM
25	(Fri.)	–	Site investigation at Ashuganj
		–	Meeting with BCIC
26	(Sat.)	–	Survey the same above
27	(Sun.)	–	Team internal meeting
28	(Mon.)	–	Visit to KPM
		–	Meeting with BCIC
29	(Tue.)	–	Visit to Ministry of Industry and Ministry of Jute
30	(Wed.)	–	Visit to Bangladesh Council of Science and Industrial Research
		–	Meeting with BCIC
		–	Site investigation at Ashuganj

October 1981

1 (Thu.)	–	Visit to Bangladesh Jute Mill Corporation and Minsitry of Jute
	–	Meeting with BCIC
	–	Site investigation at Ashuganj
2 (Fri.)	–	Visit to Bangladesh Jute Research Institute
	–	Meeting with BCIC
	–	Site investigation at Ashuganj
3 (Sat.)	–	Visit to Narayanganj Jute Center and Adamjee Jute Mill
	–	Visit to Planning Commission and External Resources Division
4 (Sun.)	–	Meeting with BCIC
	–	Site investigation at Ashuganj
5 (Mon.)	–	Visit and submitting Interim Report to BCIC
	–	Visit to Japanese Embassy and JICA
	–	Site investigation at Ashuganj
6 (Tue.)	–	Lv. Dacca – Av. Bangkok
7 (Wed.)	–	Lv. Bangkok – Av. Tokyo

Appendix I-2. MEMBERS OF JAPANESE STUDY TEAM

Name	Field
Dr. Shigeo Ueki	Team Leader
Mr. Hirotake Tomita	Project Engineer
Mr. Yoshihisa Endo	Industrial Engineer
Mr. Masahiro Ariga	Technologist
Mr. Shigeki Haginouchi	Process Engineer
Mr. Keisuke Takamura	Civil Engineer
Mr. Nobuo Ishii	Industrial Economist

Appendix I-3. MEMBERS OF THE BANGLADESH TEAM REPRESENTATIVES

Mr. A.K.M. Musharaf Hossain	Chairman	BCIC
Dr. A.K.M. Shamsul Huq	Director (PIR)	BCIC
Mr. A.R. Bhuiyan	Executive Director (PIRP)	BCIC
Mr. Alauddin Sheikh	Sr. General Manager (Production)	BCIC
Dr. S.Y. Farooq	General Manager (Planning)	BCIC
Mr. A. Shakoor	Chief Engineer (Construction)	BCIC
Mr. Atiqur Rahman	General Manager (PSU)	BCIC
Mr. M.A. Samad	Deputy General Manager (PIRP)	BCIC
Mr. A. Rashid Khan	Deputy General Manager (PIRP)	BCIC
Mr. A. Wadud	Manager (Planning)	BCIC
Mrs. Sukritisaha	Assistant Manager (Planning)	BCIC
Mr. Eshaque	General Manager	KPM
Captain Esha Hoq	Deputy General Manager (Production)	KPM
Mr. N.H. Mia	Add. Chief Manager (BRR)	KPM
Dr. A. Rahman	Executive Director	SPPM
Mr. Amiruddin	Chief Operation Manager	SPPM
Mr. A.B. Khan	Deputy General Manager	SPPM
Mr. Quamrul Zaman	Superintendent (Q.C.-PIRD)	BCIC
Mr. Mahmud Hossain	Mechanical Superintendent	SPPM

Appendix II. COMPARATIVE STUDY OF BLEACH SEQUENCE & CHEMICAL PREPARATION PLANT

1. General

The highest quality of jute bleached pulp will be theoretically obtained by bleaching of CEDED Sequence which is suggested by BCIC. But adoption of this system in addition to the costly electrolysis plant which produce caustic soda and chlorine locally unavailable in Bangladesh, is not economically favourable because of high initial investment.

If project PVC plant shall have been completed by 1986, it will be able to supply their excess caustic soda and chlorine to this planned pulp mill. In this case, the electrolysis plant will not become necessary.

In other words, bleaching system of CEDED sequence could be adopted without electrolysis plant.

According to the consideration of the above, comparative study of bleach sequence and chemical preparation plant is given in the following section.

2. Comparative Study

As the design base for bleach sequence and chemical preparation plant, the following three (3) cases are considered:

Each case is comparatively investigated from economical point of view.

Plan A: Bleach Sequence CEH & Electrolysis Plant to produce 11 T/D of caustic soda. Electric power consumption 5,000 kW to be produced by self-generation (Base case).

Plan B: Bleach sequence CEDED & Electrolysis plant to produce 5 T/D of caustic soda and Kesting plant to produce 800 kg/D of chlorine dioxide. Electric power consumption 4,400 kW to be produced by Self-Generation.

Table A II-1. Comparative Study of Bleach Sequence & Chemical Preparation

Plan		A	B	C
Description		Bleach Sequence C-E-H 11–9 T/D Electrolysis Plant 5,000 kW Self Generation	Bleach Sequene C-E-D-E-D 5–4 T/D Electrolysis Plant 800 kg/D Kesting Plant 4,400 kW Self Generation	Bleach Sequence C-E-D-E-D No electrolysis plant 800 kg/D Kesting Plant 3,800 kW Self Generation
Initial Investment		13.1 million US$	16.4 million US$	11.1 million US$
Operation Cost Factor				
1. Chemicals Consumption		NaCl: 9 T/D	NaCl: 4 T/D HCl: Nil	NaOH: 5 T/D Cl_2: 4 T/D NaCl & HCl: Nil
2. Natural Gas Consumption		3,150 Nm^3/Hr	2,770 Nm^3/Hr	2,400 Nm^3/Hr
3. Man-Power		90 operators	90 operators	50 operators
4. Consumables & Maintenance		196,500 US$/Y	246,000 US$/Y	166,500 US$/Y
Cost Difference from Plan A	Total Initial Investment		Plus 3.3 million US$ 4.1% up	Minus 2.0 million US$ 2.5% down
	Total Operation Cost		Minus 116,000 US$ at 1986 1.6% down	Plus 371,000 US$ at 1986 5.1% up
IRROI		8.95%	8.55%	8.75%
IRROE		6.59%	5.87%	6.39%

Plan C: Bleach Sequence CEDED & Kesting plant to produce 800 kg/D of chlorine dioxide.
Electric power consumption 3,800 kW to be produced by Self-Generation.
Caustic soda to be purchased from the planned PVC plant.

Remarks: Purchasing price of caustic soda and chlorine are based on the actual cost in SPPM.

3. Conclusion

Plan A planned in this report gives most favourable IRR.

Plan B using CEDED instead of CEH of bleach sequence gives least favourable because of its large initial investment as mentioned in section 1.

Plan C is a little inferior to plan A. Bleaching system of CEDED sequence can be adopted subject to the implementation of PVC plant and exclusion of electrolysis plant.

Appendix III. COMPARATIVE STUDY OF POWER PLANT

1. General

In general, either self-power generation or purchased electric power is used for operation of a pulp plant, selection of which shall be decided from the following viewpoints:

1. Self-power generation

   1) Availability of fuel
   2) Quality and cost of fuel to be supplied.
   3) Availability of skilled operators of power plant

2. Purchased electric power

   1) Availability of electric power from outside
   2) Quality and cost of electricity to be purchased.
   3) Availability of skilled operators of supplying power station

3. Economic evaluation for power system

   As a result of a survey by JICA it has been found that there is no major problem related to the above 1-1), 2), 3) and 2-1), 2), 3).
   Therefore, the selection of power system will be made by way of the following economic evaluation.

2. Comparative Study

In economic evaluation on electric power for pulp plant, the following three cases can be considered:

Plan A: All electric power to be consumed in the pulp plant is supplied by self-power generation. (Base case)

Plan B: Self-power generation and purchased electric power are combined; Self-

Table A III-1. Comparative Study of Power Plant

Plan		A	B	C
Description		5,000 kW Self Generation No electric power to be purchased.	Minimum Capacity of Self Generation to meet the demand of process steam. 20 T/Hr Power Boiler 1,200 kW Turbine Generator 3,600 kW Sub-Station	No electric power to be self-generated. 18 T/Hr Boiler for Process Steam 4,700 kW Sub-Station
Initial Investment		4.6 million US$	1.4 million US$	0.3 million US$
Operation Cost Factor				
1. Purchased Electric Power		0	3,600 kW	4,700 kW
2. Natural Gas Consumption		3,150 Nm^3/Hr	1,200 Nm^3/Hr	800 Nm^3/Hr
3. Man-Power		86 operators	43 operators	21 operators
4. Consumables & Maintenance		69,000 US$/Y	21,000 US$/Y	4,500 US$/Y
Cost Difference from Plan A	Total Initial Investment		Minus 3.2 million US$ 4.0% down	Minus 4.3 million US$ 5.4% down
	Total Operation Cost		Plus 1,066,000 US$/Y at 1986 14.7% up	Plus 1,417,000 US$/Y at 1986 19.6% up
IRROI		8.95%	8.20%	7.75%
IRROE		6.56%	5.01%	4.54%

power generating capacity is designed to meet the demand of process steam and the remaining necessary electric power is purchased from outside.

Plan C: All electric power to be consumed in the pulp plant is purchased from outside.

3. Conclusion

As shown in the proceding table, Plan A is the most economical chiefly because of the availability of cheap natural gas as fuel.

Even if national policy encourages the utilization of purchased electric power, jugding from this economic evaluation, plan B can be selected as the next to most suitable. Plan C is least favourablly evaluated owing to its high operation cost.

Appendix IV. SELECTION OF CONSTRUCTION METHOD

1. General

To implement this project, three construction methods of the plant are considered. They are barge mount method, semi-barge mount method and conventional method.

The concept of barge mount method and of semi-barge mount method will be clarified; the former is such a method of construction that whole plant facilities, equipment and machinery are fully mounted on the barge, whereas the latter is that main process equipment is mounted on barge but auxiliary process equipment is installed on shore. The barge mount method is well adopted for crude oil rig, for instance, where no on-shore equipment is accepted to utilize.

In case of pulp plant, many facilities occupy spaces to the great extent such as chemical plant, warehouse, water supply and effluent treatment. Hence, it is not practicable to mount all facilities on barge.

Therefore, the discussion is concentrated on the selection of semi-barge method or conventional method.

After considering the regional feature, the construction period and the plant quality, the semi-barge mount method was selected. This selection was made based on the technical consideration and the calculation of the profitability which are described below.

2. Technical Consideration

(1) Outline of the conventional method and semi-barge mount method

There is no difference between the two methods regarding the process and equipment. The big differences are in the stage from the manufacture to the completion of the plant. Those are as follows:

- Manufacture;

The stage of manufacture in the conventional method is the period from the comple-

tion of each part or unit for the equipment to their assembly and no load test in the factories where those components were completed. In the semi-barge mount method, on the other hand, the corresponding period continues until the entire process machinery and equipment are assembled, installed, and tested without load but as an integrated system, before leaving the shipyard.

In the semi-barge mount method, the above mentioned works are carried out using well equipped faciliteis and well trained and skilled workers, and all work performed in the shipyard is subjected to a thoroughly planned and implemented quality control system and a strict testing and inspection system.

— Transportation;

In the conventional method, limitations in transportation will impose restrictions to the permissible sizes of the components that can be shipped in assembled form. Dozen of shipments in a large number of relatively small component assemblies will increase problems in transportation (eg: missing part/damages, etc.), in terms of securing the necessary customs clearance, inland transportation, and storage at the site. In the semi-barge mount method, all the machinery and the equipment are installed on one barge and the plant is completed as package, then transported to the site as one unit. Therefore, the above problems will be drastically reduced.

— Installation and Works at the Site;

The machinery and equipment are shipped and installed according to the construction schedule in the conventional method. Therefore, during the installation works, there will be various problems as well as the above customs clearance, transportation, and storage because of the severe climate at the site, difficulty in collecting skilled workers, uncertainity in obtaining the construction machinery and materials, incomplete process control at the site, etc.

There are works at the site in case of the semi-barge mount method. Those are construction works for the equipment installed on the ground by the ordinary way, setting of the barge on the foundation on the site, connecting works between the equipment on the barge and the ones on the ground. However, if compared with the works in the conventional method, the quantity and difficulty are much less. There-

fore, the factors of delay of the construction schedule or the causes of the less effeciency of the works in the site can be removed.

(2) Comparative Evaluation between the Conventional Method and the Semi-Barge Mount Method;

The semi-barge mount method is superior to the conventional method in the following points:

- Short construction period
- Assured quality of plant
- Smooth test run and operation

As for the construction period, if the semi-barge mount method is employed, it takes 36 months from the contract to the complete installation and 3 months to test the plant as described in Chapter 8 of the main report. That is, it takes 39 months to start the operation. On the other hand, it takes 48 months after the contract if the conventional method is employed. The difference of the construction periods between the two methods is 9 months. Furthermore, if the semi-barge mount method is applied, not only the construction period can be shortened, but the delay factors in the construction schedule in case of the conventional method can be removed: the plant can be delivered smoothly because of the simple customs clearance procedure; the inland transportation can be decreased; furthermore opportunity of loss or damage during the transportation and storage is decreased.

In the semi-barge mount method, the high quality of the plant can be attained since the latest quality control system, enough skilled workers, well equipped facilities and strict standards for the test and inspection, and high technical administrative ability can be available in the shipyard before shipping to the site. As an example of the project by the conventional method, the damage caused by the uneven subsidence of the land and foundation is reported, but this problem will not appear in the semi-barge mount method.

As explained above, if the semi-barge mount method is employed, since the delay factors of the construction schedule are removed and the construction period is shortened and the high quality of the plant is gained, the problems during the high quality of the plant is gained, the problems during the test run and operation can be minimized and the operation can be started smoothly, and therefore the plant can reach the expected full operation earlier.

The starting date of the operation and the operation rate in each year by the two methods are forecasted as follows, assuming the date of contract on October 1, 1982;

– Possible starting date of operation

By conventional method	October, 1986
By barge mount method	January, 1986

– Operation rate in each year

	Conventional method	Semi-barge mount method
1986	70% x 3/12	76%
1987	76%	92%
1988	90%	96%
1989 and after	96%	96%

It is possible to start the operation by the semi-barge mount method earlier than the conventional method, as shown above, and it is also possible to reach the full operation earlier.

The total capital cost by the semi-barge mount system will be approximately $5.48 million cheaper than by the conventional method which improves the profitability of the project as indicated in the next section "calculation of profitability".

(3) Cost Comparisons

Summary of cost comparison as well as IRR is mentioned in Table A IV-1.

Table A IV-1. Comparison of Capital and Operation Costs between Semi-Barge Mount and Conventional Construction Methods

(1,000 USD)

Item		Barge-mount	Conventional
A.	Capital cost		
	Machinery and equipment	46,317	44,247
	Inland transportation	491	848
	Equipment erection	4,946	8,450
	Civil and building	13,994	14,478
	Land acquisition	137	137
	Preoperation cost	1,306	1,374
	Interest during construction	7,259	10,293
	Initial working capital	4,258	4,358
	Total Capital Cost	78,708	84,185
B.	Operation Cost (as 96% production)		
	Variable cost	6,682	6,682
	Fixed cost	1,921	1,958
	Total Operation Cost	8,603	8,640
C.	IRR		
	IRROI after tax	8.95	7.61
	IRROI before tax	10.54	9.35
	IRROE after tax	6.56	4.08
	IRROE before tax	9.55	7.36

3. Calculation of Profitability

3.1 Purpose of Calculation

This report is made assuming the semi-barge mount method is employed as the construction method of the plant. The reason for this is that the semi-barge mount method was judged to be superior to the conventional construction method in many points. In this section, the profitability will be calculated to prove that the semi-barge mount method is superior in the profitability as well as in the technical characteristics; the required capital cost and construction period will be assumed; the internal rate of return (IRR) will be calculated; and it will be compared with the IRR by the semi-barge mount method.

3.2 Assumptions of Calculation

If the conventional method is employed, the construction period will be delayed and the required capital cost will be increased. Accordingly, the main assumptions stated in the main report (Section 2 to 5 of Chapter 11) are modified in this calcualtion as follows. The other conditions are not modified.

1) Project period

- o Construction period: September, 1982 – September, 1986
- o Operation period: October, 1986 – September, 2001 (15 years)

2) Onstream factor and sales projection

The construction period in case of the conventional method will be four years, and the operation will start on October 1, 1986. The sales projection in Table A IV-2 is as assumed according to the above starting data of the operation and the yearly onstream factor. The prices are based on the forecasted market price in 1986 in the same way as the main report.

Table A IV-2. Sales Projection

	Project Year				
	Yr=1 ('86)	Yr=2 ('87)	Yr-3 ('88)	Yr=4–15 ('89–2000)	Yr=16 (2001)
Production (t/Y)	4,375	19,000	22,500	24,000	18,000
Onstream Factor ... (%)	70x3/12	76	90	96	96x9/12
Sales – Domestic (t/Y)	4,375	17,000	17,000	17,000	17,000
Sales – Export (t/Y)	0	2,000	5,500	7,000	1,000
Sales Price – Domestic			828 USD/t		
Sales Price – Export					
Sales Revenue (1,000 USD/t)	3,623	15,732	18,630	19,872	14,904

3) Total required capital

The total required capital cost necessary to the conventional method are shown in Table A IV-3. Table A IV-4 shows the amount of the expenditure and financing plan in each construction year.

Table A IV-3. Capital Cost

Item	Cost 1,000 USD	Depreciation Method
Plant Cost		
o Equipment & Machinery	53,545	15 years Straight Line (Salvage Value: 0)
o Civil & Building	14,478	40 years Straight Line (Salvage Value: 0)
o Land Acquisition	137	Non Depreciable
Preoperation Cost	1,374	5 years Straight Line (Salvage Value: 0)
Interest During Construction	10,293	5 years Straight Line (Salvage Value: 0)
Initial Working Capital	4,358	Non Depreciable
Total Capital Cost	84,185	–

Table A IV-4. Expenditure Schedule/Financing Plan

(1,000 USD)

Item \ Year	-4 ('82)	-3 ('83)	-2 ('84)	-1 ('85)	1 ('86)
Plant Cost					
o Equipment & Machinery	2,186	28,873	8,913	8,810	4,763
o Civil & Building	1,222	5,451	3,914	2,562	1,329
o Land Acquisition	137	-	-	-	-
Preoperation Cost	486	90	74	86	638
Interest During Construction	0	278	2,672	3,764	3,597
Initial Working Capital	0	0	0	0	4,358
Total	4,031	34,692	15,573	15,204	14,685
(Financing Plan)					
Paid-in Share Capital (40%)	1,612	13,877	6,229	6,082	5,874
Long-Term Debt (60%)	2,419	20,815	9,344	9,122	8,811

4) Operating Cost

The operating cost in case of the conventional method is summarized in Table A IV-5. The basic units and the unit prices of the variable expenses are the same as the conditions stated in Section 5 of Chapter 11 in the main report, and the variable expenses are calculated according to the quantity of production in each operation year. The fixed expenses includes the property tax, insurance and maintenance expense which will increase as the cost of the plant increases, and calculated considering the number of operation months in the first operation year (3 months) and the last year (9 months).

Table A IV-5. Summary of Operating Cost

Item \ Project Year		1 ('86)	2 ('87)	3 ('88)	4–15 ('89–2000)	16 (2001)
Variables	(Raw Material) Jute Cuttings	919	3,991	4,726	5,041	3,781
	(Utilities & Aux. Supplies)					
	o Salt	39	168	199	213	159
	o Limestone	45	196	233	248	186
	o Chemicals	11	46	54	58	43
	o Natural Gas	162	702	832	887	665
	o Aux. Supplies	43	186	221	235	176
	Total Variables	1,219	5,289	6,265	6,682	5,010
Fixed Op. Cost	Labour	109	436	436	436	327
	Plant Overhead	236	942	942	942	707
	Repair & Maintenance	145	580	580	580	435
	Total Fixed Operating Cost	490	1,958	1,958	1,958	1,469
Total Operating Cost		1,709	7,247	8,223	8,640	6,479

5) Other Conditions

The profitability in case of the conventional method is calculated under the same conditions as the semi-barge mount method stated in the main report as principle. However, the following conditions must be taken into consideration in view of the fact that the construction period is delayed and the required capital cost is increased.

i) Repayment of long-term debt

At the end of September, 1986, when the construction is completed, the interests during the construction period will be paid to start the repayment from the principal of the long-term debt. Therefore, the principal and interests will be repaid at the end of September in each operation year.

ii) Depreciation

The depreciation will starts from October 1, 1986. Therefore, the depreciation amount in the first operation year is the amount for three months.

iii) Operating cost

Before starting the operation (October 1, 1986), the operating cost required in the second operation year (US$4,358,000) (Initial Working Capital) is prepared. The exchange for the spare parts, US$1,430,000 must be prepared, too.

3.3 Profitability in case of Conventional Method

The profitability in case of the conventional method will be calculated in the following two cases hereinafter.

i) In Case of IRROI

The investment cost for the project is assumed to be covered by own, and IRROI against the investment cost is calculated.

ii) In case of IRROE

The investment cost for the proejct is assumed to be covered by own capital (40%) and the long-term debt (60%). The conditions of the long-term debt is reflected and IRROE against the own capital is calculated.

The calculation result of the profitability in each case is shown in Table A IV-7 and A IV-8. The summary of calculation result in each case is compared with the barge mounted method in Table A IV-6.

As seen from Table A IV-6, the total investment cost is increased by 6.96% (US$5,477,000) compared with the barge mount method. The details are as follows:

	Increased amount (USD1,000)	%
o Plant cost	2,275	(41.6)
o Preoperation cost	68	(1.2)
o Interest during construction	3,034	(55.4)
o Initial working capital	100	(1.8)
Total	5,477	(100.0)

Mainly because of the increased amount, the profitability in case of the conventional method is lower than the barge mount method. IRROI after tax is 7.61% (semi-barge mount method: 8.95%), and IRROE is 4.08% (semi-barge mount method: 6.56%). The profitability is lowered, because the interests during the construction is increased and the returning point of capital is delayed as the construction is delayed. Therefore, semi-barge mount method is superior to the conventional method in the profitability, and judged to be a proper method as the construction method of this Project.

4. Conclusion

The construction method to be employed to this Project has been discussed in this Appendix IV from the technical point and profitability. In addition to the superiority of the semi-barge mount method in the technical point described in Section 2, it has been proved that the semi-barge mount method is superior to the conventional method in the profitability. Judging from the above result, the semi-barge mount method should be employed to this Project.

Table A IV-6. Summary of Financial Analyses

Item \ Case		Semi-barge Mounted Method		Conventional Method	
		IRROE	IRROI	IRROE	IRROI
Total Investment	MUSD	78,708	71,449	84,185	73,892
Project Funding					
Equity	MUSD	31,483	71,449	33,674	73,892
Debt	MUSD	47,225	-	50,511	-
Annual Revenues					
Average Annual	MUSD	19,541	19,541	19,424	19,424
Unit – USD/MeT		828.0	828.0	828.0	828.0
Profit Before Taxes					
Average Annual	MUSD	3,601	7,162	2,933	6,911
Income Taxes					
Average Annual	MUSD	1,618	1,917	1,627	2,074
Unit – USD/MeT		68.6	81.2	69.4	88.4
Net Profit					
Average Annual	MUSD	1,983	5,245	1,306	4,837
Unit – USD/MeT		84.0	222.3	55.6	206.2
Net Production Costs					
Average Annual	MUSD	15,940	12,379	16,491	12,513
Unit – USD/MeT		675.4	524.5	703.0	533.4
Cash Flow					
Average Annual (after tax)	MUSD	4,081	10,008	3,542	9,754
Average Annual (before tax)	MUSD	5,700	11,926	5,169	11,828
IRR (after tax)	%	6.56	8.95	4.08	7.61
IRR (before tax)	%	9.55	10.54	7.36	9.35
Payout Period (after tax basis)	Years	12.3	6.7	14.3	7.0

Table A IV-7. Financial Calculation Table (IRROI)

(1,000 USD)

Item \ Year	-4 ('82)	-3 ('83)	-2 ('84)	-1 ('85)	1 ('86)	2 ('87)	3 ('88)	4 ('89)	5 ('90)	6 ('91)	7 ('92)	8 ('93)	9 ('94)	10 ('95)	11 ('96)	12 ('97)	13 ('98)	14 ('99)	15 ('2000)	16 ('2001)	Total	
Sales Revenue	-	-	-	-	3,623	15,732	18,630	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	14,904	291,353	
Operating Cost	-	-	-	-	1,709	7,247	8,223	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	6,479	127,338	
Depreciation / Amortization	-	-	-	-	1,052	4,206	4,206	4,206	4,206	4,138	3,932	3,932	3,932	3,932	3,932	3,932	3,932	3,932	3,932	2,949	60,351	
Net Income B/Tax	-	-	-	-	862	4,279	6,201	7,026	7,026	7,094	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	5,476	103,664	
Income Tax	-	-	-	-	0	0	0	0	0	0	0	0	4,015	4,015	4,015	4,015	4,015	4,015	4,015	3,012	31,117	
Net Income A/Tax	-	-	-	-	862	4,279	6,201	7,026	7,026	7,094	7,300	7,300	3,285	3,285	3,285	3,285	3,285	3,285	3,285	2,464	72,547	
Investment	4,031	34,414	12,901	11,458	11,088	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	73,892	
W.C. Increase / Salvage Value	-	-	-	-	-	-	478	207	-	-	-	-	-	-	-	-	-	-	-	(-14,092)	(-33,407)	IRR (%)
Cash Flow (A/Tax)	-4,031	-34,414	-12,901	-11,458	-9,174	8,485	9,929	11,025	11,232	11,232	11,232	11,232	7,219	7,219	7,219	7,219	7,219	7,219	7,219	19,505	72,413	7.61
Cash Flow (B/Tax)	-4,031	-34,414	-12,901	-11,458	-9,174	8,485	9,929	11,025	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	22,517	103,530	9.35

Table A IV-8. Financial Calculation Table (IRROE)

(1,000 USD)

Item \ Year	-4 ('82)	-3 ('83)	-2 ('84)	-1 ('85)	1 ('86)	2 ('87)	3 ('88)	4 ('89)	5 ('90)	6 ('91)	7 ('92)	8 ('93)	9 ('94)	10 ('95)	11 ('96)	12 ('97)	13 ('98)	14 ('99)	15 (2000)	16 (2100)	Total	
Sales Revenue	-	-	-	-	3,623	15,732	18,630	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	19,872	14,904	291,353	
Operating Cost	-	-	-	-	1,709	7,247	8,223	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	8,640	6,479	127,338	
Depreciation / Amortization	-	-	-	-	1,566	6,265	6,265	6,265	6,265	5,682	3,932	3,932	3,932	3,932	3,932	3,932	3,932	3,932	3,932	2,949	70,645	
Interest	-	-	-	-	-	5,809	5,809	5,809	5,809	5,228	4,647	4,066	3,485	2,904	2,324	1,743	1,162	581	-	-	49,376	
Net Income B/Tax	-	-	-	-	348	-3,589	-1,667	-842	-842	232	2,653	3,234	3,815	4,396	4,976	5,557	6,138	6,719	7,300	5,476	43,994	
Income Tax	-	-	-	-	0	0	0	0	0	0	0	0	2,098	2,418	2,737	3,056	3,376	3,695	4,015	3,012	24,407	
Net Income A/Tax	-	-	-	-	348	-3,589	-1,667	-842	-842	322	2,653	3,234	1,717	1,978	2,239	2,501	2,762	3,024	3,285	2,464	19,587	
Paid-in Share Capital	1,612	13,877	6,229	6,082	5,874	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33,674	
Repayment of Debt	-	-	-	-	-	-	-	-	5,051	5,051	5,051	5,051	5,051	5,051	5,051	5,051	5,051	5,051	-	-	50,510	
W.C. Increase / Salvage Value	-	-	-	-	-	-	478	207	-	-	-	-	-	-	-	-	-	-	-	(-14,092)	(-13,407)	IRR (%)
Cash Flow (A/Tax)	-1,612	-13,877	-6,229	-6,082	-3,960	2,676	4,120	5,216	372	953	1,534	2,115	598	859	1,120	1,382	1,643	1,905	7,217	19,505	19,455	4.08
Cash Flow (B/Tax)	-1,612	-13,877	-6,229	-6,082	-3,960	2,676	4,120	5,216	372	953	1,534	2,115	2,696	3,277	3,857	4,438	5,019	5,600	11,232	22,517	43,862	7.36

Appendix V. SELECTION OF MILL LOCATION

The several possible locations have been examined in this main report (Chapter 6) holding in view the national policy of decentralizing the country's industrial activities.

Table A V-1 compares the seven alternative sites considering the factors determining the choice of a mill site.

Table A V-2 shows the rough estimate and comparison of the investment and operating cost for the three alternative sites.

Table A V-1. Comparison of Selected Sites

Factors	Proposed Sites							W
	Ashuganj Region			NA	MY	RA	SI	
	AS_1	AS_2	AS_3					
Jute cuttings supply	C	C	B	A	D	D	D	3
Natural gas supply	A	A	A	B	D	D	D	3
Decentralization of industry	B	B	B	D	A	A	A	3
Raw material diversification	B	B	A	D	B	B	B	3
Future expansion	B	B	B	D	B	B	B	3
Industrial congestion	D	B	B	C	B	B	B	2
Water supply	B	B	A	B	B	B	B	3
Effluent disposal	C	C	C	D	C	C	C	2
Pulp transportation	B	B	B	B	D	D	D	2
Land availability	A	B	B	D	B	B	B	2
Chemical supply	A	A	A	C	D	D	D	2
Plant transportation	B	B	C	A	C	D	D	2
Power supply	A	A	A	B	C	D	D	1
Climatic conditions	B	B	B	B	B	B	B	1
Living conditions	B	B	B	B	B	B	B	1
Labour supply	C	C	C	B	D	D	D	1
Infrastructure	A	B	A	B	B	B	B	3
Earth filling	C	B	C	B	B	B	B	3
Results of Evaluation	78	80	87	55	56	53	53	

Legend:

AS_1: AFCC area
AS_2: Char Latpur
AS_3: Bhairab Bazar
NA: Narayanganj
MY: Mymensing
RA: Rangpur
SI: Sirajganj
W: Weight of Factor

Marks:

A: 3
B: 2
C: 1
D: 0

Table A V-2. Comparison of Investment and Operation Cost for the Alternative Sites

A. Investment Cost

(in million USD)

Item	Ashuganj	Rangpur	Sirajganj
1. Land acquisition	0.14	0.10	0.12
2. Machinery and equipment	51.14	51.14	51.14
3. Inland transportation	0.60	0.90	0.70
4. Civil and building	14.00	14.00	14.00
5. Infrastructure	–	1.00	0.50
6. Pre-operation cost	1.30	1.30	1.30
7. Interest during construction	7.26	7.26	7.26
8. Initial working capital	4.26	4.26	4.26
Total Project Cost	78.70	79.96	79.28

B. Operation Cost

(at 96% operation in thousand USD)

Item	Ashuganj	Rangpur	Sirajganj
1. Jute cuttings	5,041	5,545	5,041
2. Chemicals and supplies	754	830	754
3. Fuel	887	5,000	5,000
4. Labour cost	436	436	436
5. Overheads	924	924	924
6. Repair and maintenance	561	561	561
Total Operation Cost	8,603	13,296	12,716

C. IRROI after Tax

Ashuganj: 8.95%
Rangpur: 4.00%
Sirajganj: 4.50%

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