

89. PROFILE ON REPULPED WASTE PAPER

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I. SUMMARY

This profile envisages the establishment of a plant for the production of 90 tonnes of repulped waste paper per annum.

The present demand for the proposed product is estimated at 4,636 and it is projected to reach 67,055 tonnes by the year 2024.

The plant will create employment opportunities for 21 persons.

The total investment requirement is estimated at Birr 2.24 million, out of which Birr 958,450 is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 14% and a net present value (NPV) of Birr 457,229, discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Pulp is soft mass of especially wood fiber with destroyed shape of fibers by beating and making soft. Repulped waste paper is, therefore, a product made by repulping a used paper.

The product has high tensile bursting, tearing and double fold strength as compared to mill made paper and it does not turn brittle due to aging. It has also good texture for drawing and writing.

Despite its non-glazing appearance, repulped paper is found to be ideally suited for drawing paper, permanent document paper, exclusive greetings, filter paper and pads, file covers, duplicating papers, tissue paper, etc.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Paper production includes a range of products with very wide applications. Among these drawing paper, permanent document paper, filter paper, pads, file covers duplicating paper and tissue paper are produced from repulped paper.

The supply of paper to the Ethiopian market is presented in Table 3.1. As can be seen from the table, the countries demand for paper is mainly met through import. The three years supply i.e, 1988 - 2001 exhibit exceptional growth.

Table 3.1
PAPER SUPPLY IN TONNES

Year	Domestic	Import	Total
1998	7,489	20,313	27,802
1999	10,420	160,612	171,032
2000	5,143	413,432	418,575
2001	6,144	100,302	106,446
2002	7,719	31,216	38,935
2003	6,683	35,926	42,609
Total	43,598	761,801	805,397
Average	7266	126,967	134,233

Source:- CSA, NBA.

Table 3.1 reveals that during the past six years the annual average supply of paper was about 134,233 tonnes of which about 94% is from import. To determine the total present demand for different type of papers the average supply between 1998-2003 is taken as a base with annual growth of 4%. Accordingly current effective demand is estimated at about 140 thousand tonnes. From the total supply, 10% is assumed to be

the share of repulped waste paper, Hence the current effective demand for repulped waste paper is estimated at 14,000 tonnes.

2. Projected Demand

In modern times it is almost impossible to imagine life with out paper. Life in one or the other way depends on paper. Demand for repulped paper, in particular, is closely associated with population, urbanization and the social services. Generally, growth in paper consumption is considered to be related with expansion, education, social services, urbanization and growth in GDP. Considering those factors demand is estimated to grow by 5% per annum. The forecasted repulped paper demand is presented in Table 3.2.

Table 3.2
PROJECTED DEMAND FOR REPULPED PAPER (TONNES)

Year	Projected Demand
2005	14,700
2006	15,435
2007	16,207
2008	17,017
2009	17,867
2010	18,761
2011	19,699
2012	20,684
2013	21,718
2014	22,804
2015	23,945

3. Pricing and Distribution

The recommended ex-factory price of repulped paper is Birr 5 per kg. Distribution of the product will be handled through wholesalers and direct delivery.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The market study indicates that the unsatisfied demand for repulped waste paper is very high. However, in the present case, it is envisaged to establish a very small scale plant with annual capacity of 60 tonnes, assuming that the plant operates in two shifts a day and 300 days per annum. The working days are set by deducting Sundays and public holidays in a year and assuming that maintenance works will be carried out during off-production hours.

2. Production Programme

Considering the gradual growth of sales for the product and the time required to develop skills in operation, the capacity utilization rate is set at 75% and 85% for the first and second year, respectively. In the third year and thereafter, full capacity will be achieved.

IV. MATERIALS AND INPUTS

A. MATERIALS

The annual materials requirement of the plant is shown in Table 4.1.

Table 4.1

ANNUAL REQUIREMENT OF RAW MATERIALS

Description	Unit	Qty	Cost ('000 BIRR)		
			F.C	L.C	Total
Cotton/hoisery rags	tonnes	30	-	60.00	60.00
Waste Paper	tonnes	24	-	24.00	24.00
Agro-fibres (straw, bagasse...)	tonnes	14	-	10.29	10.29
Other additives (caustic soda, bleaching powder)	Lumpsum		8.544	12.89	21.434
Grand Total			8.544	107.18	115.724

As shown in Table 4.1 the major raw materials for the project are waste paper, cotton/hoisery rags and agro-fibres such as straw, bagasse etc. In addition some chemicals such as caustic soda and bleaching powder are required. By giving due consideration to the collection and availability of waste paper in the region a very small scale plant is selected.

The source of waste paper will be existing government and private institutions as well as manufacturing projects that are going to be implemented in the area of paper and paper converting works. In the medium term a number of projects that will be engaged in the production of exercise books, envelopes and paper bags, printing presses and the like are to be established in the region. Waste paper will be one of the by-products of these enterprises which is usually sold to other users. Hence, through making the necessary arrangement with these enterprises the supply of waste paper can be easily assured.

Cotton/hoisery rags can be collected from wastes to be produced by cotton ginning, cotton yarn and garment manufacturing plants. Agro fibres such as straw and bagasse can be easily collected from agricultural fields which is abundantly available in the region. Moreover, the project can collect wastes from enterprises engaged in wood works. Caustic Soda and bleaching powder could be bought in the local market or can be directly imported.

B. UTILITIES

Electricity and water are the major utilities required by the plant. The annual electricity and water requirement is 144,000 kWh and 12,000 m³, respectively. The total cost of electricity is estimated to be Birr 68,112, while that of water is estimated at Birr 24,000 per annum.

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

The main operations involved in the production process of the plant are preliminary treatment, beating, sheet formation, pressing, peeling and drying, calendaring and packing.

In the pre-treatment unit, the cotton rags are cut into small bits with power operated rag choppers. In the case of agro fibres, the material, after chopping, is cooked in a small open digester with low percentage of alkali.

Cut and dusted rags are beaten to pulp stock in small power operated hollander beater, with or without bleaching. The material is washed by means of a washer drum followed by further beating. Addition of natural fillers/loadings and dyeing and sizing chemicals as required for the end product is also accomplished during beating.

Sheet formation is carried out by draining water from a dilute fiber mix through a fine screen and the mat thus formed is dried both by dewatering with rollers, drying on heated rolls, and smoothing with calendars. The calendared paper is hand sorted, edges trimmed with the help of power operated cutting machine and packed in suitable packets.

2. Source of Technology

The equipment required for the project can be acquired from the following company.

KAP WOO Co,

210 Sangni-dong, So-gu, Taegn

Tel: 053-552-2700

Fax : 053-552-2701

South Korea

B. ENGINEERING

1. Machinery and Equipment

The list of machinery and equipment required for the plant is given in Table 5.1. The cost of machinery and equipment is estimated to be Birr 958,454, out of which the foreign component accounts for Birr 814,686.

Table 5.1
LIST OF MACHINERY AND EQUIPMENT

Sr. No.	Description	Qty.
1	Open digester	1
2	Rag chopper	1
3	Beater	1
4	Hollander beater with drum washer, parallel lifting arrangement and all accessories	1
5	Auto kats with pair of moulds	2
6	Stock pump	1

2. Land, Building and Civil Works

The total land requirement of the plant including provision for open space is estimated to be 1,000 sq. meters. The value of land for a period of 70 years at the lease rate of Birr 1.50 per m² is estimated to be Birr 105,000. Requirement for total built-up area is 600 m². Total cost of building at the rate of Birr 1,200 per m² is estimated at Birr 720,000. Thus, the total investment cost of land, building and civil works assuming that the total land lease cost will be paid in advance will be Birr 825,000.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The envisaged project's manpower requirement is 21 persons. The list of manpower requirement of the plant and corresponding labour cost is indicated in Table 6.1.

Table 6.1.
MANPOWER REQUIREMENT AND LABOUR COST (IN BIRR)

Sr. No.	Manpower	No. of persons	Monthly Salary	Annual Salary
1	General Manager	1	1,500	18,000
2	Secretary	1	500	6,000
3	Production Supervisor	1	1,000	12,000
4	Accountant	1	600	7200
5	Cashier	1	400	4800
6	Store Keeper	1	400	4800
7	Skilled Workers (Operators and Technicians)	2	1200	1440
8	Unskilled Workers (Labourers)	6	960	11520
	Sub-total	14	6560	78720
	Employees' benefit (20% of Basic Salary)	-	1312	15,744
	Grand Total	-	7872	94464

B. TRAINING REQUIREMENT

The production supervisor and three shift leaders should be given on-the-job training for about two weeks during the erection and commissioning period, and the training cost is estimated at Birr 20,000.

VII. FINANCIAL ANALYSIS

The financial analysis of repuled waste paper project is based on the data provided in the previous chapters and the following assumptions:-

Construction period	2 years
Source of finance	30% equity
	70% loan
Tax holidays	3 years
Bank interest	10.5%
Discounted cash flow	10.5%
Repair and maintenance	5 % of Plant machinery and equipment
Accounts receivable	30 days
Raw material (local)	60 days
Raw material (import)	90 days
Work in progress	2 days
Finished products	30 days
Cash at hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total initial investment cost of the project including working capital is estimated at Birr 2.24 million, out of which about 36% will be required in foreign currency. Details are indicated in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST ('000 BIRR)

Sr. No.	Cost Items	Foreign Currency	Local Currency	Total
1	Land	-	175.00	175.00
2	Building and Civil Work	-	720.00	720.00
3	Plant Machinery and Equipment	814.68	143.77	958.45
4	Office Furniture and Equipment	-	25.00	25.00
5	Pre-production Expenditure*	-	325.27	325.27
	Total Investment Cost	814.68	1389.04	2203.72
6	Working Capital		36.84	36.84
	Grand Total	814.68	1425.88	2240.56

B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 660,850 (see Table 7.2). The material and utility cost accounts for 47 per cent, while repair and maintenance take 4.2 per cent of the production cost.

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- *Pre-production expenditure include interest during construction (Birr 295,271), (Birr 20,000) and cost of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

Table 7.2
ANNUAL PRODUCTION COST
(‘000 BIRR)

Items	Year			
	3	4	7	10
Raw Material and Inputs	130.59	147.47	173.59	173.59
Labour Direct	45.14	50.97	60.00	60.00
Utilities	103.95	117.38	138.17	138.17
Maintenance and repair	21.01	23.72	27.92	27.92
Factory overheads	15.05	16.99	20.00	20.00
Administration Overheads	30.09	33.98	40.00	40.00
Total operating costs	345.82	390.52	459.68	459.68
Depreciation	78.95	78.95	78.95	72.95
Cost of Finance	171.27	160.98	122.22	70.20
Total Production Cost	596.05	630.25	660.85	602.83

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as the percentage of net profit to total sales, net profit to equity (return on equity) and net profit plus interest to total investment (return on total investment) will show an increasing trend throughout the production life of the project.

The income statement and other profitability indicators show that the project is viable.

2. Break-even Analysis

The break-even point of the project is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales-Variable Cost}} = 20 \%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period. The project will fully recover the initial investment and working capital within 7 years time.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 14% and the net present value at 10.5% discount rate is Birr 457,230.

D. ECONOMIC BENEFITS

The project can create employment opportunities for 21 persons. In addition to supply of the domestic needs, the project will generate Birr 980,810 in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.