MODERNISATION OF AN EXISTING RICE MILL

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ABSTRACT:*In India rice is most important staple food. Rice is the end product of paddy after various production operations. The basic objective of a rice milling system is to remove the husk and the bran layers, and produce an edible, white rice kernel that is sufficiently milled and free of impurities. Due to the innovation of machineries, the new technology, has been adopting for converting paddy to rice in the name modernization. Modernization of rice mill yield more rice from it, and came with more competition between the rice mills. The Thrissur district paddy marketing and processing co operative society ltd is a paddy farmers co-operative society situated in Thrissur district in Kerala. Society has established a rice mill of 100 TPD capacity in 1994. To improve the current performance level of plant and capacity utilization this work proposes modernization of existing plant.*

1. INTRODUCTION

India is one of the world's largest producers of white rice and brown rice, accounting for 20% of all world rice production. Rice is India's preeminent crop, and is the staple food of the people. It is rich in genetic diversity with thousands of varieties grown throughout the world. It is one of the chief grains of India. Today, this unique grain helps sustain two-thirds of the world's population. It is life for thousands of millions of people. About four-fifths of the world's rice are produced by small-scale farmers and are consumed locally. India is one of the leading producers of this crop. Its Production has increased from 53.6 million tons in FY 1980 to 105.00 million tones in 2012-2013. It is grown in almost all the provinces of the country but more than 86 percent of the total production accounts for the States of Andhra Pradesh, West Bengal, Tamil Nadu, Uttar Pradesh, Bihar, Orissa, Madhya Pradesh, Punjab and Assam.

Rice production, processing and marketing constitute the biggest industry in the country. Indian rice milling industry is the oldest and largest agro-based industry. The Rice milling is a crucial step in post-production of rice. It is the process that helps in removal of hulls and bran's from paddy grains to produce polished rice. Rice milling in India is carried out in small and medium size rice mills. Most of the small size mills are huller mills. Other various types are Battery of Huller mills, Huller-cum-Sheller mills, Sheller mills and modern mills.

As many studies in the past have indicated that the overall supply of rice could be augmented substantially with additional conversion of paddy to rice through modernization of the existing paddy processing techniques. The study assumes immense relevance considering the fact that only about a half of total paddy production in the country is processed by the modern rice mills, while the other half is processed through hullers, shellers and huller-cum-shellers, which are generally considered inefficient as compared to the modern rice mills with lower conversion ratio. Rice milling industry in India has undergone different phases of technological transformations related to winning, parboiling and drying systems; although it lags far behind the countries like USA, UK, Germany, Japan, Taiwan, etc. There are only a few fully automatic plants in India (like in Karnal, Kalady, etc.) who have installed colour sortex machine imported from Japan, USA, UK, etc.

2. METHADOLOGY

2.1 CASE STUDY

THE THRISSUR DISTRICT PADDY MARKETING AND PROCESSING CO OPERATIVE SOCIETY LTD is a paddy farmers co-operative society having its jurdiction over the entire Thrissur district. The Thrissur district is one of the major rice zones in Kerala and is in third in the rank in respect of area of cultivation and production of paddy in the state. The society was established in 1993, the rice year of the Kerala as a supporting project for paddy development in the state with the initiative from Agriculture department and grant in aid from Govt. of Kerala.

The main aim of the society was to save the farmers from the exploitation of the middle men, millers and their agents in paddy marketing by ensuring remunerative price to the growers for their produce during the harvesting seasons. It also serves the interest of consumers by supplying good quality rice at reasonable prices.

The society is playing a pivotal role in procuring-paddy since its inception in 1993. From the first year working, the society has experienced that the procurement alone will not be adequate to step the exploitation. In the absence of processing units under their command, the procurement agents authorized by the Govt. have to depend again the middle men and millers or their agents for the disposal of the procured paddy. As a solution to this problem the Society has established a rice mill of 100 TPD capacity. The mill was the biggest rice mill plants in the state and first of its kind. Since 1994, the society with this processing plant became a balancing factor to maintain price of paddy and to ensure procurement discipline in the district in particular and in the state in general.

The society could achieve to enhance the procurement price of paddy in Thrissur district during harvesting season to a tune of Rs 1500 -2000 per M. T. than the ruling market rate since 1994 onwards. The effort of the society often increased price of paddy in neighboring Palakkad district also as an added advantage To safe guard the interest of consumers, the supply of quality rice at a price lower than the Rs. 1500-2000 per M. T (lower for packet rice in the market) was also ensured since 1995.

The Kerala State Civil Supplies Corporation Ltd have been the principal distributor of Matta rice produced in the society's modern rice mill. They sell the rice in their brand name " SABARI MATTA" throughout the state from their Supplycos and Maveli Stores. The Consumer Federation Ltd is also sharing the production for their sales through retail outlets. The rice produced by the Society is branded product of local farmers, who are mostly small and marginal. The rice is marketed in the brand name 'KARTHIKA' through own showrooms as well as authorized agents It is free from any form of adulteration, which is common in almost all other brands Of rice available 1n the market for sale in the state The society is supplying rice to Civil Supplies Corporation after quality test conducted by the Corporation.

2.2 DETAILS OF PRODUCTION PROCESS

Production process of par boiled rice is generally divided in to five sections namely
1 .Raw paddy cleaning section
2. Parboiling section
3. Drying section
4. Milling & Cleaning Section
5. Rice colour Sortex Section

2.3 PRODUCTION PROCESS

Raw paddy storage tank – raw Paddy cleaning section –Par Boiling section- Drying section-
Milling & Cleaning Section- Finished Rice Storage Tank- Boiled Rice Packing Section
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3. FINANCIAL ASSESMENT IN KARATHIKA RICE MILL

3.1 TREND ANALYSIS

Trend analysis is an important statistical tool for forecasting. Trend analysis is immensely helpful in making a comparative study of the financial statement for several years. Trend analysis is helpful for forecasting what is happening in future.

Trend analysis means analyzing general tendencies in each item of the financial statements on the basis of the data of the base sear. In short_ comparing the past data over a period of time with a base year is called trend analysis. Under this technique, information for number of years is taken up and one year is taken as the base year .Each item of the base year is taken as 100 and on that basis the percentage for other years is calculated.

The Time Series Analysis or Trend Analysis indicates of ratio indicates the direction of changes. The trend analysis is advocated to be studied in light of the following two factors.

- The rate of fixed expansion or secular trend in the growth of the business and
- The general price level.

Any increase sales statement may be because of two reasons, one may be the increase in volume of business and another is the variation in prices of the goods services.

For trend analysis, the use of index number is generally advocated. The procedure followed is to assign the number 100 to the items of each base year and to calculate percentage changes in each item of the other years in relation to the base year. This is known as "Trend-Percentage Method"

3.1.1 OBJECTIVES OF TREND ANALYSIS

- To find the trend or direction of movement over a period of time
- To have a better understanding of financial and profitability position.
- To make a comprehensive and comparative study of financial statements

Year	Loss from balance sheet	Trend (%)
2010-11	161368142.2	100
2011-12	177760708	110.1584895
2012-13	185466668	114.9338807
2013-14	185776387	115.1258139
2014-15	199146280	123.41115
2015-16	203656836	126.2063461

Fig:1-Trend Analysis

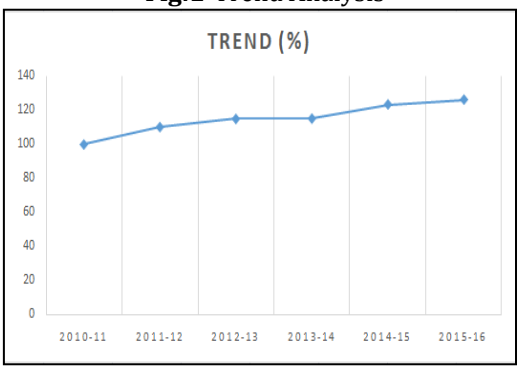

Fig-2:Trend Graph

3.2 HULLING AND MILLING RATIO FOR PADDY

One of the major indicators of the economics of a paddy processing units can be assigned to the hulling and the milling ratios of paddy. Hence, before we proceed further, it remains more than necessary to briefly describe the basic concepts relevant to the present study. If hulling to milling ratio is high then productivity is high and plant is economically more feasible.

Year	Total cost of paddy purchased	unit cost of paddy per Kg	Total paddy purchased (Kg)	Rice sold (Kg)	Hulling to milling rario(%)
2011-12	8313500	11.61	716063.73	411450.22	57.4600001
2012-13	51697515	17.11	3021479.54	1761824.72	58.31000001
2013-14	35135439	16.81	2090151.04	1211660.55	57.96999962
2014-15	3288153	13.84	237583.3	136943.01	57.63999827
2015-16	5142756	13.47	381793.39	215369.65	56.40999966

Fig-3:Hulling to Milling Ratio

4. INTERNAL SURVEY

In order to understand the performance of rice mill, an internal and external, interactive survey was conducted. For internal survey opinions of Top level management, and operational staff are taken to consideration. For external survey whole seller, retailer and customer reviews were considered. Following problems were understand from survey

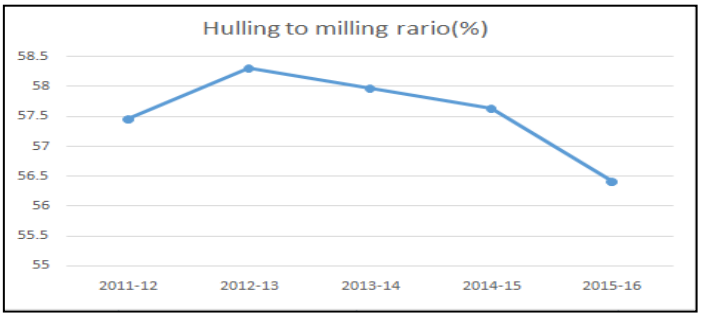

Fig-4:Hulling to milling ratio Graph

4.1 TOP LEVEL MANAGEMENT

- Government policy: Reduction of subsidy
- Insufficient paddy availability mill was not able to utilize full plant capacity
- High loan interest
- Contribution to market is less than 10%
- Un availability of raw paddy

4.2 OPERATIONAL STAFFS

- Proper energy management systems and practices were not installed
- Ageing of machinery
- No proper maintenance activity
- Less productivity
- Un availability of raw paddy

4.3 CUSTOMER(whole seller, retailer, consumer)

- Low quality
- Bad appearance
- Unavailability of product in market

5. CONCLUSTION

From trend analysis, hulling to milling ratio analysis, and survey reasons for poor performance of existing plant were analyzed. Modernization of current plant was suggested to improve the performances (productivity, quality of rice and competitiveness in market).

6. DETAILS OF SUGESTED MODDERNIZATION

6.1 PRODUCTION CAPACITY (PER ANNUM) :

- Rice Mill Plant 100 ton/ day capacity

6.2 ENERGY CONSERVATION:

Suitable efficient electrical motors should be used in machines with suitable shunt capacitors

6.3 PROPOSED PLANT AND MACHINARY

Sl no	DESCRIPTION	QTY	COST(In lakhs)
1	Raw paddy cleaning section		
	• Paddy cleaner with Elevators	1	4.30
	• Paddy de stoner with vibro motor	2	4.00
	• Elevators	1	6.00
2	Par boiling unit	1	38.12
	• 40 tons par boiling unit including bucket elevator, storage bind, base structure, soaking tank, and belt conveyors		
3	Drying unit(40 M.T)	1	40.33
	• 40 tons drier unit including bucket elevators, paddy drier, centrifugal blower, steam heat exchanger, and other accessories		
4	Boiling unit		
	• 4000 kg/hr evaporation capacity horizontal multi tubular 3 pass wet pack, Fluidized over feed smoke tube package boiler	1	32.40
	• Chimney and flue gas ducting		
	• Steam lining and other boiler fitting	1	14.50 15.00
5	Milling section		
	• Paddy cleaner	1	4.80
	• De stoner with vibro motors	1	4.20
	• Pneumatic rubbler roll sheller	1	4.04
	• Husk aspirator	1	1.72
	• Paddy separator	1	5.98
	• Polisher with blower and magnetic separator	3	20.74
	• Silky polisher with blower, air lock, magnetic separator		
	• Rice plan shifter	2	12.67
	• Rice grader	1	2.61
	• Elevators	2	6.22
		14	20.61
6	Rice storage tank(50M.T)	2	12.00
7	Rice sortex section		
	• Sortex machine	1	43.00
	• Bucket elevator	1	1.200
	• Compressor	1	5.30
	• Air drier for compressor	1	2.25
	• Pre filter, fine filter, carbon filter.		0.56
	• Air receiver		0.50
	• Cabin for sortex machine	1	6.00
	• 50M.T sortex storage tank	2	5.00
	Total cost		315.85

6.4 WORKING CAPITAL (PER MONTH)

(A)PERSONNEL

Sl. no	Description	Nos.	Salary	Total (Rs)
a	ADMINISTRATION			
	Manager	1	50000	50000
	Accountant	1	30000	30000
	Clerk	3	15000	45000
	Peon	1	10000	10000
	Security staff	2	12000	24000
	Marketing Executive	3	30000	90000
	Mill Engineer	1	45000	45000
b	PRODUCTION			
	Supervisor	3	30000	90000
	Machine operators	12	20000	240000
	Skilled worker	13	15000	192000
	Semi skilled worker	16	12000	195000
			Total	1011000
	Salary + benefits @ 20% of salary			1213200

(B) RAW MATERIALS (PER YEAR)

ITEM	Qty in M.T	Rate (Rs)	Amount (Rs)
Paddy	2400	15000	360000000

YEAR	CAPACITY UTILISATION	AMOUNT(Lakes)
I	75%	2700
II	80%	2880
III	85%	3060
IV	85%	3060

(C)UTILITIES (PER YEAR)

Designation	Rate (Rs)
Electricity 782.56 KWH	20486779.2

YEAR	CAPACITY UTILISATION	AMOUNT(Rs)
I	75%	15365084.40
II	80%	16389423.36
III	85%	17413762.32
IV	85%	17413762.32

(D)CONSUMABLE STORES FOR YEAR

Sl no	Particulars	Qty	Rate (Rs)	AMOUNT (Lakes)
1	Jute bags 10kg Capacity bag 25kg Capacity bag 75kg Capacity bag	 5460000.00 156000.00 83200.00	 10.00 18.00 18.00	 54.60 28.08 14.98
2	Grease and lubricants			0.70
3	Belts			1.80
4	Needles			0.28
5	Diesel for Diesel generator set			6.80
6	Stitching yam			1.20
	TOTAL			108.48

YEAR	CAPACITY UTILISATION	AMOUNT(Lakes)
I	75%	81.36
II	80%	86.78
III	85%	92.20
IV	85%	92.20

(E)OTHER EXPENSES

S no	Description	Amount(Lakes)
I	Printing and stationer	0.75
II	packing	1.50
III	Insurance	2.75
IV	Miscellaneous expenditures	4.00
V	Repair & maintenance	27.20
	Total	36.20

6.4.1 TOTAL WORKING CAPITAL FOR FIRST YEAR

A	PERSONNEL	145.58
B	RAW MATERIAL	2700.00
C	RAW MATERIALS (PER YEAR)	153.65
D	CONSUMABLE STORES	81.36
E	OTHER EXPENSES	36.20
	TOLAL	3116.79 lakhs

6.4.2 TOTAL WORKING CAPITAL SECOND ONE YEAR

A	PERSONNEL	145.58
B	RAW MATERIAL	2880.00
C	RAW MATERIALS (PER YEAR)	168.89
D	CONSUMABLE STORES	86.78
E	OTHER EXPENSES	36.20
	TOLAL	3317.45 lakhs

6.4.3 TOTAL WORKING CAPITAL FOR THIRD YEAR

A	PERSONNEL	145.58
B	RAW MATERIAL	3060
C	RAW MATERIALS (PER YEAR)	174.13
D	CONSUMABLE STORES	92.20
E	OTHER EXPENSES	36.20
	TOTAL	3508.11 lakhs

6.5 TOTAL CAPITAL INVESTMENT:

A) Fixed capital invested	Rs 31585000
B) Total working capital	Rs 311679000
TOTAL	Rs 343264000

7. FINANCIAL ANALYSIS

7.1 COST OF PRODUCTION (FIRST YEAR)

S.No	Particulars	Amount(RS)
1	total working capital	350811000/-
2	Depreciation on machinery and equipment @ 10%	7933360/-
Total:		358744360

7.2 TURNOVER (PER ANNUM):

PHASED MANUFATURING PROGRAM

YEAR	ITEM	%	QTY	CAPACITY UTILISATION	ACTUAL PRODUCTION	RATE(Rs)	ANNUAL SALES (LAKHS)
I	a)Boiled rice(65%yield) • 10 kg bags • 25 kg bags • 75 kg bags b)Broken rice(5%yield) c)Rice bran(5%yield)	 35 25 40 	 546000 156000 83200 1200M.T	 75% 	 409500 117000 62400 900	 330.00 800.00 2250.00 25000.00	 1351.35 936.00 1404.00 225.00

			1680M.T		1260	18000.00 TOTAL	226.80 4143.15
II	a)Boiled rice(65%yield) • 10 kg bags • 25 kg bags • 75 kg bags b) Broken rice(5%yield) c) Rice bran(5%yield)	 35 25 40	 546000 156000 83200 1200M.T 1680M.T	 80%	 436800 124800 66560 960 1344	 330.00 800.00 2250.00 25000.00 18000.00 TOTAL	 1441.44 998.40 1497.00 240.00 241.92 4419.36
III	a) Boiled rice(65%yield) • 10 kg bags • 25 kg bags • 75 kg bags b) Broken rice(5%yield) c) Rice bran(5%yield)	 35 25 40	 546000 156000 83200 1200M.T 1680M.T	 85%	 464100 132600 70720 120 1428	 330.00 800.00 2250.00 25000.00 18000.00 TOTAL	 1531.53 1060.80 1591.20 255.00 257.04 4695.54

7.3 NET PROFIT (FIRST YEAR)

A) Turn Over	B) Cost of Production	Profit(A – B)
414315000	358744360	55570640

7.4. Rate of Return on total capital investment

a)Profit	b)Total capital Investment	Internal rate of return(A/B)×100
55570640	343264000	16.19%

7.5. BREAK EVEN ANALYSIS(FIRST YEAR)

Breakeven point = fixed cost/(sales-variable cost)

Sales value =441936000
Fixed cost =14680000
Variable cost =353665823

Breakeven point =16.63%

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