Techno-Economic Project Report

on

Jaggery Processing dhmdhm

Prepared by

dfgadfh

sgsfdghm

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Chapter I

PROJECT HIGHLIGHTS

I. About the Promoter

Name	dfgadfh
Address	sgsfdghm
Educational Qualifications	dghmghm
Experience Experience	dvgbmsxghm
PAN No.	sbmdxm
Aadhar Card No.	sdhmsh
Constitution	Proprietary
Industry	Food Processing
Project Location	smsfhmh

II. Project Parameters

Product	Jaggery Processing
Product Type (if any)	dhmdhm
Processing Capacity tons per day	1
No. of Working Days	200

III. Financial Highlights

Cost of Land	600000
Cost of Building	0
Plant & Machinery	368000
Miscellaneous Fixed Assets	100000
Preliminary Expenses	100000
Pre-Operative Expenses	75000
Working Capital	30000
Total Project Cost	1273000
Own Contribution	33%
Term Loan	67%
Rate of Interest (In % per Annum)	14%
Repayment Period	8
Rate Per KG	13

Chapter II

ABOUT THE PROJECT

Jaggery is a traditional non-centrifugal sugarcane sugar consumed mostly in Asia and Africa. It is a concentrated product of sugarcane juice, without separation of the molasses and crystals. Appearance of jiggery may vary from golden brown to dark brown in color. It contains up to 50% sucrose, up to 20% invert sugars, and up to 20% moisture, with the remainder made up of other insoluble matter, such as wood ash, proteins, and bagasse fibers. Jaggery is mixed with other ingredients, such as peanuts, condensed milk, coconut, and white sugar, to produce several locally marketed and consumed delicacies.

Gur (Jaggery) is a natural, traditional sweetener made by the concentration of sugarcane juice. Gur is consumed mostly by the rural population in India which is a natural mixture of sugar and molasses's. Gur can be defining as a honey brown colored raw lump of sugar. It contains all the minerals and vitamins present in sugarcane juice and that is why it is known as healthiest sugar in the world. In some of the South American countries it is known as Panela. At the time of production of sugar it requires a mix up of chemicals like sulphur- dioxide, lime, phosphoric-acid, formic-acid and bleaching agents, and that is why all the contents of sugarcane cannot be found in sugar, where as Gur has all the contents and even the scientists have proved that all the essential vitamins and minerals are missing from sugar as compared to Gur. In Ayurvedic way of medicine it is used as medicine, blood purifier and also it prevents disorders of bile.

Jaggery, also called gul, is used as an ingredient in sweet and savory dishes across India, Pakistan, Bangladesh, Nepal, Sri Lanka as well as in Afghanistan and Iran. For example, a pinch of it is sometimes added to sambar, rasam, and other staples. Jaggery is added to lentil soups (dÄ•l) to add sweetness to balance the spicy, salty and sour components, particularly in Gujarati cuisine.

Maharashtra is the largest producer and consumer of jaggery - gud (in Hindi), "gul" (in Marathi); most vegetable dishes, curries, and dals contain it. This is specially used during Makar Sankranti for making a dessert called tilgul.

Technological Aspect / Technology Used in the Project

The proposed jaggery processing unit could have lower energy consumption & may be less capital intensive in nature. The said unit may use improved jiggery making systems those have higher thermal and mechanical efficiency.

There are many agricultural universities; ICAR recognized institutions in the country which have played a large role in developing improved jaggery processing units. Some of these institutes are IISR, Lucknow, CFTRI-Mysore, CIAE Bhopal etc. Such advanced technologies are deployed in the project.

Selection of Location : Proposed Project Site / Location Details

The proposed project may be located either near the sugarcane producing regions in India; or in the vicinity of the major markets (consumption centres) such as Mumbai, Kolkata, Chennai, Hyderabad and New Delhi.

Typically Commercially viable Unit Size

The typical commercially viable unit size may range from 0.5 tons per day onwards.

A typical Jaggery Processing Unit

Jaggery is very nutritious and healthy food. Making jaggery does not require special skills and large machinery and equipments. It is very easy to produce at small scale level.

Jaggery Making Process

* Initially the sugarcane is crushed into sugarcane crusher to get sugarcane juice.
* This is followed by sugarcane juice boiling in a boiling pan by firing under the boiling pan.
* For heat economy, efficient furnace is constructed in the ground.
* 3 to 4 boiling pans are arranged in line and flue gases pass under all the four boiling pans one after another and then escape through chimney.
* During the boiling, all impurities come on the surfaces which are removed by scumming.
* While boiling, the sugarcane juice gets concentrated and after evaporating almost all the water, pasty crystalline yellow substance is left in the boiling pan which becomes solid after cooling. This is JAGGERY.

Process Description

The typical jaggery processing unit operations includes juice extraction, juice clarification, juice concentration by boiling, cooling of concentrated juice followed by moulding and storage.

Juice Extraction: this is the first step in jaggery making process. Juice extraction is done by crushing sugarcane. Three roller cane crushers (vertical/horizontal) are used to extract juice. Vertical three roller crusher has the juice recovery efficiency of 50% to 55%, whereas, the same for horizontal crusher is 55- 60%. Therefore, the horizontal three-roller crusher is preferable. This method is not practiced by the jaggery farmers due to more energy requirement for producing hot water and evaporation of this water during boiling process.

Juice Concentration and Clarification: The extracted juice is collected in a masonry settling tank and rested for few minutes for separation of light and heavy particles. The clear juice is drawn from a middle port of settling tank and transferred to an iron open boiling pan made to fill only 1/3rd of its capacity. In general, jaggery quality, storability and its acceptability depend on the clarity of the juice used in preparation.

The juice collected from settling tank is clarified during the boiling stage. It is mostly done by using lime (calcium hydroxide) Calcium acts as complexing agent and form scum, which is time to time removed during boiling. Addition of lime also improves the consistency of jaggery by increased crystallization of sucrose, but at the same

time it darkens the colour if added in excess.

Boiling is continued for 2â€“2.5 h, end point is judged by taking a small quantity of hot syrup from the pan, cooling it in cold water taken in a container, and finally shaping with finger. Shape formation indicates that the pan can be removed from the furnace.

Cooling and Moulding: After the juice is concentrated to 92Â° Brix it is taken out of fire. Hot syrup is worked out for some time and then let to solidify. For solidification, the contents are transferred to a wooden /aluminum moulds or earthenware pots. This serves both the purpose of cooling and moulding. The shape of solid jaggery may vary from small round balls to large lumps.

Jaggery is manufactured in different shapes, colour and texture and then marketed. Some of the forms in which Jaggery is available are solid jaggery, liquid jaggery and granular jaggery. Most of the jaggery is prepared in solid form 80% and the remaining 20% is prepared in liquid as well as granular form. Jaggery may be light golden, golden, dark golden, light brown or brown in colour. People from different region have different criteria for the best quality Jaggery.

Packaging and Storage: Jaggery is usually stored in earthen pots, metal drums, wooden boxes etc. However, the method of storage varies from region to region. Sometimes, heaps of jaggery is just kept covered with cane trash, bagasse, wheat straw, cotton seed, furnace ash, rice husk, etc. to protect the jaggery from ambient humidity, without using any container. Moisture content should not exceed 6% and be kept at a relative humidity of 43% to 61% for good keeping quality of jaggery.

Unhygienic Jaggery storage conditions result in change of colour, texture, taste, hardness, flavor and overall quality of jaggery. It is, therefore, important that the jaggery production and storage management should be given utmost care, keeping in view its large scale consumption by masses.

Chapter III

MARKETING FEASIBILITY

Global and Indian Overview of Jaggery

Jaggery is produced in 25 countries with a world annual production of 11.05 million tonnes (FAOSTAT). The manufacture is concentrated in Asia and South America, the major producers being India with 6.89 million tonnes. In India, nearly 30% to 35% of about 250 MT of sugarcane produced is crushed for Jaggery preparation (Indian Sugar).

Government Initiatives (in the context of the project)

Jaggery units initially offers base level cane price to farmers during beginning months of crushing season (Rs. 1600-1800 per tonne). Once, sugar mills start crushing and cane price declared by state government, it still offers cane prices below State Advised price (SAP) such as Rs. 2200-2500 per tonne.

Way Forward

Jaggery is unrefined natural sugar that is produced without adding any chemicals. More than 70% of the total world jaggery production is done in India. Jaggery is popularly known as the â€œmedicinal sugarâ€• and is nutritionally comparable with honey. It has been used as a sweetener in Ayurvedic Medicine for 3000 years. Indian Ayurvedic medicine considers jaggery to be beneficial in treating throat and lung infections. While refined sugar mainly consists of glucose and fructose, jaggery contains glucose and sucrose. But jaggery also has minerals and vitamins which lacks in the refined sugar. The mineral content of jaggery includes calcium, phosphorus, magnesium, potassium and iron and traces of zinc and copper. The vitamin content includes folic acid and B-complex vitamins. Thus, other than that it is a good source of energy, it also prevents rheumatic afflictions; prevents disorders of bile; helps in relieving fatigue, relaxation of muscles, nerves and blood vessels; maintains blood pressure and reduces water retention; increases hemoglobin level and prevents anemia.

Chapter IV

FINANCIAL DETAILS

II. Project Parameters

Product	Dal Mill
Product Type (if any)	dhmdhm
Processing Capacity tons per day	1
No. of Working Days	200

A. PROJECT COST

Sr. No.	Title	Cost.
A1	Land	600000
A2	Building	0
A3	Plant & Machinery	368000
A4	Miscellaneous Fixed Assets	100000
A5	Preliminary Expenses	100000
A6	Pre-Operative Expenses	75000
A7	Working Capital	30000
	Total Project Cost	**1273000**

B. Means Of Finance

Sr. No.	Title	%	Cost
B1	Promoter's Contribution	33	420090
B2	Term Loan	67	852910
		Total means of finance	**1273000**

PROFITABILITY / WORKING RESULTS

Sr.No.	Particulars	Operating Years							
		1	2	3	4	5	6	7	8
(A) SALES									
1	Annual Capacity In Tons	200	200	200	200	200	200	200	200
2	Capacity Utilization in %	60	70	75	80	85	90	90	90
3	Annual Production	120	140	150	160	170	180	180	180
4	Unit Sale Price	13	13	13	13	13	13	13	13
5	Annual Sale	1560000	1820000	1950000	2080000	2210000	2340000	2340000	2340000
(A) COST OF MANUFACTURE									
6	Raw Material Consumed	717600	764400	799500	832000	884000	912600	912600	912600
7	Packing & Other Consumables	15000	93600	93600	93600	93600	78000	78000	78000
8	Utility Cost	62400	54600	58500	62400	66300	70200	70200	70200
9	Repairs & Maintenance	70000	73500	77175	81034	85086	89340	89340	89340
10	Labour Charges	156000	163800	175500	187200	198900	210600	210600	210600
11	Other Direct Cost	78000	91000	97500	104000	110500	93600	93600	93600
12	Inventory Add:Opening/Purchase	0	0	0	0	0	0	0	0
SUB TOTAL (6 to 12)		**1099000**	**1240900**	**1301775**	**1360234**	**1438386**	**1454340**	**1454340**	**1454340**
GROSS PROFIT		**461000**	**579100**	**648225**	**719766**	**771614**	**885660**	**885660**	**885660**
(C) ADMINISTRATIVE & SALES EXPENSE									
13	Administrative Charges	153860	131880	131880	131880	131880	131880	131880	131880
Operating Cost (B+C)		1252860	1372780	1433655	1492114	1570266	1586220	1586220	1586220
(D) EBDIT		**307140**	**447220**	**516345**	**587886**	**639734**	**753780**	**753780**	**753780**
14	Financial Expenses	119407.4	119407.4	119407.4	119407.4	119407.4	119407.4	119407.4	119407.4
15	Depreciation	55200	55200	55200	55200	55200	55200	55200	55200
(E) EBT		**132532.6**	**272612.6**	**341737.6**	**413278.6**	**465126.6**	**579172.6**	**579172.6**	**579172.6**
16	Provision for Tax	19880	40892	51261	61992	69769	86876	86876	86876
(F) EAT		**112652.6**	**231720.6**	**290476.6**	**351286.6**	**395357.6**	**492296.6**	**492296.6**	**492296.6**
17	Net Cash Accruals	112652.6	344373.2	634849.8	986136.4	1381494	1873790.6	2366087.2	2858383.8
18	Repayment	119407.4	119407.4	119407.4	119407.4	119407.4	119407.4	119407.4	119407.4

Projected Repayment Schedule

Year	1	2	3	4	5	6	7	8
Loan Outstanding	8.53	8.53	6.27	4.32	2.65	1.21	-0.03	-1.10
Gross Surplus	0	2.32	2.90	3.51	3.95	4.92	4.92	4.92
Principal	0	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Interest	0	1.19	0.88	0.60	0.37	0.17	-0.00	-0.15
Total Repayment	0	2.26	1.95	1.67	1.44	1.24	1.07	0.92
Net Surplus	0	0.06	0.96	1.84	2.51	3.68	3.86	4.01
DSCR	0	0.69	0.84	1.00	1.13	1.39	1.43	1.47

Project Financial Parameters

ECONOMIC INDICATORS

Pay-back period : 7 to 8 Years

Average DSCR : 0.99

Financial Ratios

PROFITABILITY / WORKING RESULTS

Particulars	Operating Years							
	1	2	3	4	5	6	7	8
1)Return On Investment(ROI)								
EAT to Capital Employed	8.85%	18.20%	22.82%	27.60%	31.06%	38.67%	38.67%	38.67%
2)Internal Rate of Return (IRR)								
EAT to Net Worth	51.08%							
3)Consumables to Sales	70.45%	68.18%	66.76%	65.40%	65.09%	62.15%	62.15%	62.15%
4)EBT to Sales (N.P. Ratio)	8.50%	14.98%	17.53%	19.87%	21.05%	24.75%	24.75%	24.75%
5)Operating Ratio	80.31%	75.43%	73.52%	71.74%	71.05%	67.79%	67.79%	67.79%

Product	Jaggery Processing
Processing Capacity tons per day	1
No. of Working Days	200
Cost of Project	1273000
Term Loan	852910
Own Contribution	420090
Rate of Interest (In % per Annum)	14
Repayment Period	8
Debt to Equity Ratio	
DSCR (Average)	0.99
Project IRR (In %)	51.08

Chapter V

SWOT ANALYSIS

Strengths

* Availability of sufficient raw material
* Utilization of family labour: Jaggery processors capable of supplementing labour requirement through family labour for crushing work preferred jaggery processing.
* Quicker payments: Quicker repayment than sugar factories is also acting as strength of jaggery industry.
* Large employment potential: Jaggery processing units have been considered as small scale and village industry. These units have ample potentiality to generate employment in the rural areas.
* Higher profits
* Suitability of sugarcane varieties: Availability of suitable sugarcane varieties for jaggery production, (Co 62175, Co 7804, Co 8371 and Co 86032), suitability of the varieties in the area, high productivity, and ability to withstand the water stress during the dry spell encourage farmers to go for jaggery production.
* Requirement of less technical labour
* Easy to store
* Traditional knowledge of jaggery processing with the local people.
* A large consumer base and an annual demand growth of about 15% pushing industrial conglomerates to expand their agricultural products portfolio with branded commodities such as rice, pulses and even jaggery.

Weaknesses

* Need of substantial working capital: It is observed that most of the small farmers do not have sufficient capital to invest on crushers, pans, etc. and working capital like raw material, labour and other variable costs.
* Irregular electricity supply: Irregular electricity supply may result in non-continuous working of the processing unit.
* Labour scarcity
* Lack of efficient equipments
* Excessive use of chemicals
* Lack of storage facilities
* Lack of techno-commercial information

Opportunities

* Large domestic market ensures consistent demand of jaggery.
* Increasing demand for jaggery in view of growing health awareness.

* Improvements in production technologies.
* Increasing area under sugarcane.
* New varieties of sugarcane for jaggery production.
* Demand for organically produced jaggery in the domestic market.
* Mechanization of processing.
* Development of value added products such as flavoured jaggery.
* Demand in international markets: India has one of such healthy sweetener, jaggery and contributes more than 70% to the production of the world. It is being exported to many countries like, Bangladesh, UK, Canada, Chili, Egypt, Fizzy, Iran, Iraq, Kuwait, Malaysia, Nepal and USA.

Threats

* Competition from the imports.
* Price fluctuation in raw materials
* Competition from sugar industry
* Lack of marketing facilities
* Loss of manpower to other industries: Loss of trained manpower to other industries and other industries is posing a serious threat to the jaggery industry.
* Lack of financial credit facilities: Lack of timely and adequate credit from credit institutions led farmers to go for loans from commission agents.
* Pre harvest contracts: Lack of financial credit results in pre-harvest contracts and exploitation of the farmers.
* High commission charges: it is observed that commission agents may charge higher commission when the produce was disposed through suitable marketing channels.
* Lack of technical and commercial research
* Lack of institutional support to provide benefits: Jaggery making as cottage industry, being operated at decentralized level in unorganized rural sectors needs institutional support for quality jaggery production, handling, storage, management and higher returns at low cost.

Chapter VI

CONCLUSIONS AND RECOMMEDNATIONS

As stated earlier, pulses occupy an important place in human nutrition due to their high protein content than cereal grains. In the Indian context, considering the dietary regime pulsed do have an important place. Since majority of Indians are vegetarians, they depend largely on grain legumes (pulses) for their dietary protein. Legumes contribute a major portion of lysine in the vegetarian diet. They are also a fairly good source of vitamins like thiamine, machine, riboflavin and much needed iron.

In view of the above and increasing population and demand for food grains, we foresee a good scope for pulses. The said project seems to be technically and financially feasible.