Economic Analysis of Chemical Free jaggery in Kolhapur District of Maharashtra

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ABSTRACT

In India,Maharashtra stands second highest in production of sugarcane followed by Uttar Pradesh. As regards Maharashtra, about 0.96 million hectares of area with production of 57.04 million tons with productivity of 74 tonnes per hectare(2010-2011). Out of total production sugar in Maharashtra, Kolhapur region stands second highest contributing 14.98 percent and the sugar recovery is a bout 12.51 percent. In these study estimate the costs and returns of jaggery production and to estimate the value addition to Jaggery.

The data was collected for the year 2014-15 . The highest jaggery producing area Kolhapur district was purposively selected in which two tahsils panhala and karveer were selected randomly. Two villages was selected randomly from each tahsils on the basis of maximum number of units. From each village eight jagrrery producers were selected randomely. Total 16 jaggery units studied and made conculsion by using different statically tools. The per unit total investment was needed for the establishment at Rs.808509 jaggery processing units.

The per unit cost were estimated to Rs.3240745.98 for jaggery processing unit. The total cost of labour required for jaggery processing unit was Rs 580120.63 for 578.27 mandays respectively. The unskilled labour costs for operation like sugarcane cutting Rs180511.88. The labour cost on account of transportation of sugarcane from field to jaggery processing unit was Rs 106023.13, for cane crushing Rs72601.88, heating of juice Rs42039.06, transportation of residue Rs 37497.19 respectively.

The second component of skilled labour i.e. Adkari. The cost on *Adkar* was found less (Rs 98935).The most valuable factor in resource use structure was raw material or sugarcane which accounted for Rs2529437.50; also the share of fuel and electricity supply was 0.67 percent in total cost of production of jaggery. It i s also seen from table that very less amount of cost on account of material used was found (Rs108031.41). The total variable cost incase of jaggery production worked out to be Rs 679483.24 processing units.In the cost of Sugarcane was the (Rs.2529437.50) 77.77 percent jaggery processing units respectively. Labour, fuel and electricity charges were the other important items of cost accounting for17.84 percent and 0.66 percent respectively. The contribution of total fixed cost, in the total cost Rs.11571. was very major when it is compared with the variable cost. The percentage of fixed cost to the total cost was 0.36 percent to the Jaggery producers.The main component of fixed cost was land depreciation and interest on fixed capital.Where as raw material,labour cost and electricity charges incase of variable cost of jaggery production is the major items .

It was clear from the table that gross returns from Rs200873.01.TheB:C ratio for in case of jaggery production,gross returns were obtained Rs3774770.29 and net returns to Rs 522452.44.The estimated B:Cratio was 1.16. It can be revealed that per quintal cost of jaggery production was Rs 2834.31. Sugarcane cost and labour cost were the major items of total cost,contributing 77.77 percent and 17.84 percent,in jaggery production.The land value,depreciation and Interest on fixed capital more incase of jaggery.It is also noted from the table that the per quintal net returns from jaggery was Rs 455.30.The break-even point gives the size of business. The break even point of Jaggery iproduction it was337.97 qtls.in physical terms and Rs.1115300 in monitory terms.

Chow's test At overall level ,the regression coefficient incase of jaggery production only raw material (X1)is significant but labour cost(X3)is non-significant.The pooled regression taken for employing chow test and the result revealed that it is 5 percent level of significant (6.4243**).

It is observed that the return was increased to go value addition of the particular product . The farmer sale sugarcane and he received Rs 2204.34 and make sugar from sugar factory he received Rs 2414.34 (109.52%) and making jaggery he received Rs 2834.31 (128.57%).It is clearly observed that Jaggery making is profitable business.

Introduction

Sugarcane(*Saccharamofficinarum*)is important cash as well as sugar crop in the world.In sugarcane cultivation Brazil ranks first,India ranks second and also is an important commercial crop of the country occupying around 4.94 million hectares of land with an annual cane production of around 339.16 million tones,with producers of white sugar,seed and feed and jaggery are 70.70 percent,11.90 percent and 17.40 percent .

In India,Maharashtra stands second highest in production of sugarcane followed by Uttar Pradesh. As regards Maharashtra, about 0.96 million hectares of area with production of 57.04 million tons with productivity of 74 tonnes per hectare(2010-2011). Out of total production sugar in Maharashtra,Kolhapur region stands second highest contributing 14.98 percent and the sugar recovery is a bout 12.51 percent (2011-12).India occupies first position in production of jaggery in the world. In financial year 2009-2010, total production of jaggery in India was around 80 lakh tones. Jaggery and Khandsari are the major agro processing industries found in rural sector of our country. It is recorded that 70 per cent of world's jaggery production is in India (Dwivedi,2010).The Maharashtra,state is the largest producer and consumer of jaggery.Jaggery is specially used during'Makar Sankrant'for making"*tilgul"*. In Maharashtra, about 11 to 12 percent sugarcane was being used for jaggery preparation during the year 2005-2006 and jaggery from Maharashtra is also well known for its quality,which has wide demand in international market.India is largest exporter of jaggery in the world.In India,only UttarPradesh and Maharashtra produce export quality jaggery because they have specialized centers for jaggery production.Jaggery is used as medicine for the patient suffering from jaundice, arthritis, kidney problems, jointpains etc.and also as lactogenic and cardiactonic. Jaggery is also used as part of animal feed mixtures and in tobacco curing.Jaggery has anayurvedic and nutritious value. Anutritive valueof jaggery is a rich source of Phosphorus,Calcium,Iron and Vitamin Bascompared to sugar. Sucrose 65-85(%), Glucose fructose 10-15 (%),Water 3-10(%) Protein 0.25(%) Calcium(0.40%) Phosphate(0.045%) Iron (11mg/100gm) Vitamin'B' (20mg/100gm), Copper(0.80mg/100gm). Jaggery isvery rich in iron, which helps to maintain the haemoglobin level in blood for prevent in ganaemia.

Objectives of the study

1. To study costs and returns of Jaggery production.

2. To estimate the value addition to Jaggery.

METHODOLOGY

The data was collected for the year 2014-15 . The highest jaggery producing area in Karveer district was purposively selected in which two tahsils Panhala and Karveer were selected randomly. Two villages were selected randomly from each tahsils on the basis of maximum number of units. From each village eight jaggery producers were selected randomely. Total 16 jaggery units studied and made conclusion by using different statically tools

Capital investment pattern of jaggery processing units

The initial investment pattern in jaggery production unit was estimated and is presented in Table 1. The space(land) was most important factor contributing i.e.Rs 409297(50.62percent) for establishing Jaggery units . The results also evealed that,initial investment on shedwashig was   Rs 84063(10.40 percent) .The investment on *Katta* was found to be Rs 56844 (7.03percent), on cane crusher Rs 44438(5.50 percent),on furnace Rs 42344 (5.24percent) on Roof Rs39281(4.86percent), on*Kahil*(boilingpan) Rs 35000(4.33percent) followed by investment on Generator machine Rs 23313 (2.88percent) respectively to the   Jaggery processing units.It could be seen from the bove discussion that a per unit total investment was needed for the establishment at Rs.808509 jaggery processing units.

Table1 Capital investment in establishment of jaggery processing units

Sr.No	Items	Jaggery unit	
		Number /units	Value(Rs.)
1.	Land(ha)	0.25	409297 (50.62)
2.	Shed	1	84063 (10.40)
3.	Furnace	1	42344 (5.24)
4.	*Katta*	1	56844 (7.03)
5.	Roof	1	39281 (4.86)
6.	*Vafa*	1	18875 (2.33)
7.	*Chimney*	1.56	20297 (2.51)
8.	Canecrusher	1	44438 (5.50)
9.	Generatormachine	1	23313 (2.88)
10.	Electricmotor	1	15688 (1.94)
11.	Juicestoragetank	1	3525 (0.44)
12.	Filterplates	1.41	402 (0.05)
13.	Ironscrapper	1.81	607
14.	Differentshapeofblock		
A	0.5Kg	13.43	179
B	1Kg	37.34	571
C	2Kg	29.69	513
D	5Kg	36.25	776
E	10Kg	27.65	772
F	*Vadisache*	0.25	102
G	*Modak*	1.06	19
15.	*Kahil*/boilingpan	1	35000
	Plasticpipes(ft)	1	1559
17.	Zarya	2.78	793
18.	Oil engine	0.15	2990
		1	3444
20.	*Hate*	3.91	1439
21.	*Bhare*	2.38	953 (0.12)
22.	Ash-spade	2.19	183 (0.02)
23.	Crates	1.09	244
			808509

(Figures in the parentheses are percentages to the total)

2) Resource use and cost incurred in jaggery production.

The information on per unit per season resource use and their cost in jaggery making is worked out and presented inTable 2.The per   unit cost were estimated to Rs.3240745.98 for   jaggery processing unit. The total cost of labour required for jaggery processing unit was Rs 580120.63 for 578.27 mandays respectively. The unskilled labour costs for operation like sugarcane cutting Rs180511.88. The labour cost on account of transportation of sugarcane from field to jaggery processing unit was Rs 106023.13, for cane crushing Rs72601.88, heating of juice Rs42039.06, transportation of residue Rs 37497.19 respectively.

Table.2 Average category wise resource use and cost incurred on jaggery processing unit.

N0. Sr.	Particulars	jaggery processing unit	
		Quantity	Value(Rs.)
A	Rawmaterial		
1.	Sugarcane used (tons)	1011.78	2529437.50
B	Labour cost		
1	Sugarcane cutting(man days)	704.05	180511.88 (5.57)
2	Sugarcane transportation(man days)	341.53	106023.13 (3.27)
3	Crushing(days)	357.84	72601.88 (2.24)
4	Juice heating(man days)	207.78	42039.06 (1.30)
5	*Gulvi*(days)	124.06	42512.50 (1.31)
6	Transportationofresidue(man days)	336.09	37497.19 (1.16)
7	*Adkari* (man days)	500.56	98935 (3.05)
	Total(mandays)	2571.93	580120.63 (17.90)
C	Chemicals		
1	HydrousPowder(kg)	456.36	75845.31 (2.34)
2	Phosphoric Acid(ml)	159.54	13782.43 (0.43)
	Total		89627.74 (2.77)
D	Clarifying agents		
1	Lime(kg)	230.85	6108.55 (0.19)
2	*Bhendi* Powder(kg)	5.81	5774.06 (0.18)
3	Edible Oil(kg)	30.23	2225.94 (0.07)
4	Milk powder(kg)	27.98	3454.12 (0.11)
5	Milk(lit.)	26.28	841 (0.03)
	Total		18403.67 (0.57)
	ChemicalsandClarifyingagents (C+D)		108031.41
E	Fuel and electricity		
1.	Diesel (lit.)	94.43	5194.34 (0.16)
2.	Electricity		16365.23 (0.50)
	Total	124.06	21559.57 (0.67)
E	*Khadi cloths*	-	1596.88 (0.05)
	Grand total		3240745.98 (100.00)

(Figures in the parentheses are percentages to the total)

The second component of skilled labour i.e. Adkari. The cost on *Adkar* was found less (Rs 98935).The most valuable factor in resource use structure was raw material or sugarcane which accounted for Rs2529437.50; also the share of fuel and electricity supply was 0.67 percent in total cost of production of jaggery. It i s also seen from table that very less amount of cost on account of material used was found (Rs108031.41).Among individual contribution of chemicals used incase of inorganic jaggery highest contribution was made by hydrous powder Rs75845.31 followed by phosphoric acid Rs13782.43, lime Rs 6108.55,*bhendi* powder Rs 5774.06,milk powder Rs3454.12 and edible oil Rs2225.94.

3 Cost and returns from jaggery production.

Cost of jaggery processing.

The costs incurred in jaggery production it could be seen from the Table3 that the total variable cost incase of jaggery production workedout to be Rs 679483.24 processing units.In ,the cost of Sugarcane was the (Rs.2529437.50) 77.77 percent jaggery processing units respectively. Labour,fuel and electricity charges were the other important items of cost accounting for17.84 percent and 0.66 percent respectively. The contribution of total fixed cost,in the total cost Rs.11571. was very major when it is compared with the variable cost.The percentage of fixed cost to the total cost was 0.36 percent to the

Table 3   The category wise per season pattern of costs and returns from jaggery production

Sr. No.	Particulars		Jaggery producer	
			Units required	Cost(Rs.)
1	Land	ha.	0.24	4722.66 (0.15)
2	Depreciation of Building	-	-	1876.30 (0.06)
3	Interest on Fixed capital	-	-	4972.92 (0.15)
	Total fixed cost	**-**	**-**	**11571.87 (0.36)**
4	Sugarcane cost	Tons	1011.78	2529437.50 (77.77)
5	Total chemicals and clarifying agents cost	-	-	108031.41 (3.32)
6	Total labourcost	-	-	580120.63 (17.84)
7	Fuel and electricity charges	-	-	21559.57 (0.66)
8	Khadi cloths	-	-	1596.88 (0.05)
	Total variable cost	**-**	**-**	**3240745.98 (99.64)**
	Total cost	-	-	3252317.85
	Returns	-	-	-
1	Crushing days	-	124.06	-
2	Jaggery produced	ton	114.74	3774770.29
3	Net returns	-	-	522452.44
4	B:Cratio	-	-	1.16
5	Per kg cost of jaggery (Rs.)	-	-	28.40
6	Recovery %	-	-	11.39

(Figures in the parentheses are percentages to the total)

Jaggery producers.The main component of fixed cost was land depreciation and interest on fixed capital.Where as raw material,labour cost and electricity charges incase of variable cost of jaggery production is the major items .

To sum up it concluded that jaggery production the major items of production cost were raw material cost(sugarcane),labour cost and cost on account of chemicals with exception in less chemical and clarifying agents used inorganic jaggery.

Returns from jaggery production

Per unit per season gross returns from jaggery production were calculated and presented in table   It was clear from the table that gross returns from Rs200873.01.TheB:C ratio for In case of jaggery production,gross returns were obtained Rs3774770.29 and net returns to Rs

522452.44.The estimated B:Cratio was 1.16..

Per quintal cost and returns from jaggery production

From theTable,4 it can be revealed that per quintal cost of jaggery production was Rs 2834.31.

Table 4   Per quintal cost a nd returns from jaggery production

Sr. No.	Particulars	jaggery production cost	
		Cost	Percent to total
1	Sugarcane cost	2204.34	77.77
2	Chemicals and Clarifying agents	94.15	3.32
3	Labour charges	505.56	17.84
4	Khadi cloths	1.39	0.05
5	Fuel and electricity charges	18.79	0.66
6	Landvalue	4.12	0.15
7	Depreciation	1.64	0.06
8	Interest on Fixed capital	4.33	0.15
1	Totalcost	2834.31	100.00
1	Total returns	3289.61	-
2	Net returns	455.30	-
3	B:Cratio	1.16	-

(Figures in the parentheses are percentages to the total)

Sugarcane cost and labour cost were the major items of total cost, contributing 77.77 percent and 17.84 percent,in jaggery production.The land value,depreciation and Interest on fixed capital more incase of jaggery.It is also noted from the table that the per quintal net returns from jaggery was Rs 455.30.

5   Break-even analysis

The break-even point was worked out for the estimating the minimum quantity of jaggery that should be produced in order to have no profit no loss in the business.The Break-even point for sample jaggery producers was calculated and presented inTable 5.

Table 5 Break-even analysis

Sr. No.	Particulars	jaggery
1	In Physical terms (qtls)	337.97
2	In Monitory terms (Rs)	1115300

The break-even point gives the size of business.It is observed from the table for inorganic jaggery it was337.97 qtls.in physical terms and Rs.1115300 in monitory terms. It is indicated that minimum quantity of jaggery,each category have to producet o equal costs and returns.The time period Required for achieving the break-even level of output was relatively longer for jaggery units(146days)Chow's test At overall level,it can be revealed from the table independent variable viz.,raw material (X_1), labour $(X_2)$and chemical cost(X_3)explained the variation in the net price per quintal of extent of 88 percent, which is 92 percent for jaggery,respectively.At overall level The regression coefficient incase of jaggery production only raw material $(X_1)$is significant but la bour cost$(X_3)$is non-significant.The pooled regression taken for employing chow test and the resul t revealed that it is 5 percent level of significant (6.4243**).

Value chain analysis -

Sr.No	Sugarcane	Sugar	Jaggary
1 price (Q)	2204.34	2204.34	2204.34
2 Cost		210.00	629.97
3 Sale price	2204.34	2414.34	2834.31
4 percent increase	(100)	(109.52)	(128.57)

I t is observed that the return was increased to go value addition of the particular product . The farmer sale sugarcane and he received Rs 2204.34 and make sugar from sugar factory he received Rs 2414.34 (109.52%) and making jaggery he received Rs 2234.31 (128.57%).It is clearly observed that jiggery making is profitable business.

Conculsions:

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