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An economic analysis of desiccated coconut production in major coconut growing regions of Karnataka

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India ranks third among all the coconut producing countries with an area of 1.903 million hectares and the annual production of 14,743.56 million nuts (Directorate of Economics and Statistics, 2007-08). Countries like Philippines and Indonesia outperform India in value addition and export of coconut in the country. Coconut is an important crop of south India, where it occupies an area of 1.743 million hectares accounting for 90 per cent of country's area. Among the coconut producing states, Karnataka ranks second in area (401.0 thousand hectares) and third in production (1625.0 million nuts). In Karnataka, Tumkur district is ranked first in both area (1, 10,937 hectares) and production (5,474.91 lakh nuts) of coconut followed by Hassan district with an area of 61,098 hectares and production of 2,536.83 lakh nuts of coconut.

Coconut Processing Sector in India is mainly confined to copra production, oil extraction, manufacture of coir and coir products and to a lesser extent the manufacture of Desiccated Coconut (DC). Desiccated coconut is one of the important derivatives of mature coconut kernel having good demand all over the world. Though India is leading producer of coconut, it does not figure in the list of leading exporting countries of DC (0.52 % contribution to total world exports). It warrants keen attention to be paid towards profitability of DC enterprise. Keeping this in view, a study was organized with objective of assessing the economic and financial performance of desiccated coconut units in Tumkur and Hassan districts of Karnataka.

The study is based on primary data related to financial year 2007-08 collected from all the 30 desiccated coconut units which are located in the two districts. Post classification of the whole population was done into small, medium and large sized units. The DC units with a capacity of less than 2.69 MT per day were considered as small units, units with 2.69 to 3.83 MT per day capacity were considered as medium units and those with more than 3.83 MT per day capacity were considered as large units. Analysis of capital investment and cost and returns was done by simple statistical analysis and by percentage analysis. The four components taken under investment were land, building, machinery and power installation. The tools of financial analysis used for examining the economic feasibility of the enterprise were business ratios, break-even analysis and investment analysis.

Study revealed that on an average Rs. 87.95 lakhs was needed to establish a DC unit. DC units were utilizing 79 per cent of their installed capacity. The pattern of investment on DC units (Table 1) indicated a direct relationship between the extent of capital investment and the size of the DC unit. Investment on building forms the major item because DC units need different types of buildings or halls for processing, storage of raw nuts, for deshelling and paring, for disintegration, drying, packing, and storage of final products. In addition to this, different types of machineries and equipments are required at different stages of processing. In the study area, large sized units are very well developed, equipped with advanced machineries and equipments. One of the studies done on DC firms in Kerala (Sudhahari and Mukundan, 1992) indicated that out of total capital investment the plant and machinery forms the major share because, they were using imported machineries, whereas, in our study area entrepreneurs were using outdated and second hand machines for DC production. So, investment on machinery forms the third major component of the investment (23.57 %) next to investment on land (24.74 %) and buildings (49.37 %).

Table 1. Pattern of capital investment in desiccated coconut (DC) units of different sizes (Rs. in lakh)

Sl. No.	Investment particulars	Size of the DC production units			Pooled
		Small	Medium	Large	
1	Land	11.50	31.61	32.85	21.76
		(27.41)	(25.63)	(21.17)	(24.74)
2	Building	17.25	63.33	82.13	43.42
		(41.11)	(51.35)	(52.93)	(49.37)
3	Machinery	12.03	25.84	36.59	20.73
		(28.67)	(20.96)	(23.58)	(23.57)
4	Power installation	1.18	2.54	3.61	2.04
		(2.81)	(2.06)	(2.32)	(2.32)
5	Total capital	41.97	123.32	155.17	87.95
	(1+2+3+4)	(100.00)	(100.00)	(100.00)	(100.00)

Note: Figures in the parentheses indicate per cent to total.

The total cost of processing one tonne of coconut is worked out. The structure of the variable cost (Table 2) clearly indicated that cost of raw material (Rs. 10850.00/tonne) was the most significant component (77.66 %) of the total cost. Next to raw material cost, interest on working capital (7.16 %) forms the other major cost item followed by labour wages (5.26 %). Wages paid to the labourers is on contract basis for deshelling and paring. Wage rate differs at different stages of processing (ranging from Rs.315 to Rs.380 for deshelling and paring of one tone coconuts, Rs.1 90 to Rs.230 for other activities like washing, sifting, and packing). Laborers are paid with bonus, festival holidays with wage and yearly holidays with wages in some DC units. These additional benefits are provided mainly by large DC units and to some extent by medium sized units. So, in large units per tonne labour wages is proportionately high (5.35 % as compared to 5.31 % and 5.21 % in medium and small sized units respectively), but is low in absolute terms (Rs.723 per tonne in large sized units as compared to Rs. 737.70 and Rs. 738.26 in medium and small sized units, respectively).These figures indicate that large sized DC units are more efficient in labour use and work turn out as compared to other categories.

Total marketing cost accounts for 4 percent of total cost. DC is marketed locally as well as in other states.

Table 2. Total cost of coconut processed in DC units of different size (Rs./tonne)

Sl. No.	Particulars	Size of the DC units						Pooled	
		Small		Medium		Large			
		Amount	%	Amount	%	Amount	%	Amount	%
A	**Variable Cost**								
1	Operational Cost								
a	Cost of raw material	10,990.00	77.49	10,815.00	77.87	10,500.00	77.76	10,850.00	77.66
b	Utilities	360.63	2.54	318.24	2.29	299.74	2.22	336.35	2.41
c	Repairs and maintenance	22.20	0.16	13.14	0.09	11.76	0.09	17.44	0.12
d	Office maintenance	10.54	0.07	5.71	0.04	4.06	0.03	7.85	0.06
e	Labour	738.26	5.21	737.70	5.31	722.97	5.35	735.52	5.26
f	Telephone charges	8.34	0.06	5.82	0.04	5.80	0.04	7.08	0.05
	Total operational cost	12,129.97	85.53	11,895.61	85.65	11,544.34	85.49	11,954.24	85.56
2	Marketing Cost								
a	Packing material cost	128.33	0.90	167.69	1.21	171.11	1.27	148.58	1.06
b	Sales tax (2%)	257.60	1.82	254.10	1.83	247.80	1.84	254.80	1.82
c	Commission charges	15.94	0.11	15.92	0.11	15.98	0.12	15.94	0.11
d	Transportation cost	128.80	0.91	127.05	0.91	185.85	1.38	127.40	0.99
	Total marketing cost	530.67	3.74	564.75	4.07	620.74	4.60	546.72	3.99
3	Total working Capital(1+2)	12,660.64	89.27	12,460.36	89.72	12,165.08	90.09	12,500.96	89.55
4	Interest on working Capital @ 8 % pa	1,012.85	7.14	996.83	7.18	968.25	7.21	1,000.08	7.16
	Total Variable cost(3+4)	13,673.49	96.41	13,457.19	96.89	13,138.29	97.29	13,501.04	96.71
B	**Fixed Cost**								
a	Depreciation	87.63	0.62	72.87	0.45	61.52	0.46	78.36	0.56
b	Opportunity cost of land	9.57	0.07	3.89	0.03	3.25	0.02	6.62	0.05
c	Salaries to permanent laborers	55.39	0.39	31.72	0.23	25.15	0.19	42.46	0.30
d	Insurance premium	11.75	0.08	7.06	0.05	6.95	0.05	9.39	0.07
e	License fee	31.68	0.22	13.44	0.10	9.92	0.07	21.98	0.16
f	Interest on fixed capital @ 12 % pa	312.58	2.20	302.43	1.67	258.77	1.92	300.23	2.15
	Total Fixed Cost	508.61	3.59	431.41	2.53	365.56	2.71	459.04	3.29
C	**Total cost (A+B)**	14,182.11	100	13,886.60	100	13,436.94	100	13,960.08	100

Note: 1) Paring is the outer brown portion (testa) of coconut kernel. Shell is hard covering of the kernel. Parings and shells are obtained as by products during DC production. 2) On an average 10 coconut yields 1 kg DC,18 to 25 kg parings,125 to 150 kg shell. 3) One tonne of coconut comprises of 1800 to 2400 number of coconut

Marketing of by products like shells and parings is limited to local market. Marketing cost involves transportation cost, commission charges, sales tax and cost of packing material. Sales tax (Rs.255 per tonne) constitutes a major component in marketing cost. Among the different categories of DC units, large units incur higher marketing cost per tonne (Rs. 621) because they are selling large proportion of their total output to other states which adds to marketing cost in the form of additional tax as well as transportation cost.

Interest on fixed capital (Rs.300 per tonne) forms next major component of total cost due to the fact of higher investment on establishment of units (Rs.41.97 lakhs, Rs.123.32 lakhs and Rs.155.17 lakhs in case of small, medium and large units, respectively). When compared to large and medium sized units, small units pay higher interest amount of fixed capital per tonne (Rs.313) because of low capacity utilization. Fixed cost per tonne is marginally higher in small sized units followed by medium sized units compared to large sized units due to higher interest amount on fixed capital (Rs.313, Rs.302 and Rs.259, respectively), depreciation cost (Rs.88, Rs.73 and Rs.62, respectively), salaries to permanent employees (Rs.55, Rs. 32 and Rs.25, respectively), license fee (Rs.32, Rs.13 and Rs.10, respectively) and other expenditure like opportunity cost of land, insurance premium. Though establishment cost is high in case of large sized units, fixed cost per tonne is low (Rs.366). This is because of economies of large scale production and better utilization of processing capacity (62.99 %, 87.87 % and 82.80 % of installed capacity in small, medium sized and large sized units, respectively).

DC is the main product of processing coconut and hence constitutes the major component of gross returns. By products obtained in DC production are parings and shells. Gross returns realized per tonne is more in small sized units (Rs.14,732) compared to medium (Rs. 14,560) and large sized (Rs.14, 293) units. It is because, small sized units sell their product whenever price of product is high, whereas, in case of medium and large sized units selling of product is on contract basis at a particular price. Net returns realized per tonne are high in large processing units (Rs.550, Rs.671 and Rs.789 in case of small, medium and large sized DC units respectively) (Table 3). The higher net returns among large sized DC units were mainly due to the economies of large scale production. The quantity processed by them (7,760 tonnes) was nearly four times higher than that of the small sized units (1,808 tonnes) and one and half times higher than medium sized units (5,078 tonnes).

Table 3. Returns from DC units of different sizes

Sl. No.	Particulars	Size of the DC unit			Pooled
		Small	Medium	Large	
1	Quantity of Coconut processed(t/year)	1,807.86	5,078.10	7,759.72	3,889.91
2	Quantity of DC obtained(t)	379.65	1,066.40	1,629.54	816.88
3	Quantity of by-product obtained(t)				
	a) Parings	81.62	229.28	350.35	175.63
	b) Shell	522.02	1,466.30	2,240.62	1,123.21
	Total (t)	603.64	1,695.58	2,590.97	1298.84
4	Price of DC realized (Rs./t)	12,880.00	12,705.00	12,390.00	12,740.00
5	Price of Parings realized(Rs./t)	1,062.53	1,061.03	1,065.54	1,062.53
6	Price of shell realized(Rs./t)	789.25	794.06	837.38	798.88
7	Value of main product (lakh Rs.)	233.96	645.65	961.43	492.43
8	Value of by-product (lakh Rs.)				
	a) Parings	19.24	53.90	82.69	41.37
	b) Shell	14.13	40.25	65.90	31.46
	Total (lakh Rs.)	33.36	94.15	148.59	72.83
9	Gross returns (lakh Rs.)	267.32	739.80	1,110.02	565.26
	Per tonne coconut processed(Rs.)	14,731.78	14,560.09	14,292.92	14,601.41
10	Total cost (lakh Rs.)	256.39	739.38	1,042.66	543.03
	Total cost per tonne of coconut processed (Rs.)	14,182.11	13,886.60	13,436.94	13,960.08
11	Net returns (lakh Rs.)	9.94	34.10	61.23	24.51
	Net returns per tonne coconut processed (Rs.)	549.67	671.49	789.07	630.18

The business ratios were worked out to assess the cost efficiencies and profitability of different categories of DC units. The profitability ratios were relatively higher in large sized DC units compared to small and medium sized units (Table 4) which indicates higher net returns (net profit to total assets ratio of 0.24, 0.28 and 0.39 in case of small, medium and large sized units, respectively) mainly due to higher productivity of assets. Return per rupee of investment in all the units hover around the pooled average.

The working capital turnover ratio was 1.08 in small and medium categories of DC units, however, the fixed asset turnover ratio was considerably higher in large sized DC units (7.15) compared to small (6.37) and medium (6.00) sized DC units indicating higher efficiency of fixed assets employed in large sized DC units. This also indicates that the small sized DC units were not using their fixed assets efficiently.

Table 4. Business ratios in DC production

Sl. No.	Particulars	Size of the DC unit			Pooled
		Small	Medium	Large	
1	**Profitability Ratios**				
	a) Net profit to total assets	0.24	0.28	0.39	0.28
	b) Net profit to total sales (%)	3.72	4.61	5.52	4.34
	c) Return per rupee of investment	1.04	1.05	1.06	1.04
2	Turnover Ratios				
	a) Working capital turnover	1.08	1.08	1.09	1.08
	b) Fixed asset turnover	6.37	6.00	7.15	6.43
3	**Efficiency Ratio**				
	a) Gross Ratio (%)	95.91	95.33	94.40	95.21
	b) Operating Ratio (%)	92.47	92.37	91.85	92.23

The efficiency ratio analysis revealed that gross ratio is less in large DC units (94.40 %) compared to small (95.91%) and medium sized units (95.33%). Around 95 per cent of the returns obtained by the DC producing firms are absorbed by the cost of production (Rs.13, 960.08 per tonne). So, a return earned over and above the total expenditure is low (Rs.630 per tonne) such that it does not attract many entrepreneurs into this industry. Thus, there is a need to increase the returns from DC production by way of reducing the cost of processing through improving the labour skills by providing training, installation of cost effective machines, and thereby improving the quality of DC produced and adhering to the international quality standards to improve the export competitiveness of this product. There is no much difference in operating ratios (90 per cent) in all categories of DC units as expenditure on raw material alone accounts for nearly 80 per cent of the total cost.

The quantity of coconut required to be processed to reach break-even point is 1,606.15 tonnes in large sized DC units, whereas it was 1210.09 tonnes in case of medium and 776.75 tonnes in case of small sized DC units (Table 5). All categories of units are processing

Table 5. Break-even point in DC production

Particulars	Small	Medium	Large	Pooled
Fixed Cost per year (Rs./year)	8,22,022.72	13,34,607.92	18,54,508.53	11,52,644.51
Average variable cost per tonne of coconut processed (Rs./t)	13,673.49	13,457.19	13,138.29	13,512.19
Average price per tonne of coconut processed (Rs.)	14,731.78	14,560.09	14,292.92	14,601.41
Break-even point (Annual basis) in tonnes	776.75	1,210.09	1,606.15	1,058.23

Table 6. Investment indicators for DC production

Sl. No	Project indicators	Size of the processing units			
		Small	Medium	Large	Pooled
1	PBP (years)	3.7	3.5	2.4	3.1
2	NPW @ 12% (lakh Rs.)	41.83	139.57	334.22	123.14
3	BCR @ 12%	1.02	1.03	1.04	1.03
4	IRR (%)	27.26	28.79	42.59	32.49

above the breakeven level indicating that they are running along profitable stream.

The investment made in the establishment of DC unit was recovered within a short period of 2.4 years in case of large sized DC units whereas in case of small and medium sized units it was 3.7 years and 3.5 years, respectively (Table 6). Payback period (PBP) is less in large sized DC units because of higher returns per tonne realized (Table 3) .It is clear from table that as the size of the DC units increases, net returns generated per tonne increases thereby reducing the PBP.

The discounted measures such as IRR, BCR and NPW, considering a life span of 20 years and a discount rate of 12 per cent, consistently indicated that the investment in DC production is economically viable. In case of pooled units the IRR worked out to 32.49 per cent which was nearly three times higher than the opportunity cost of 12 per cent. An NPW of Rs. 123.14 lakhs and a BCR of 1.03 unequivocally supported investment in DC units.

NPV, BCR and IRR of large sized DC units were estimated to be Rs. 334.22 lakhs, 1.04 and 42.59 % respectively. This was higher than those of medium sized units (Rs.139.57 lakhs, 1.03 and 28.79 % respectively) and small sized units (Rs.41.83 lakhs, 1.02 and 27.26 % respectively).These results indicate that DC units of all sizes are economically viable. However, economic viability improves with the size of the unit.

Conclusion

It could be seen that in spite of the profitability of desiccated coconut industry, the capacity utilisation was low. Ensuring timely availability of raw material and labour will address the problem of under utilization of installed capacity. The DC entrepreneurs have to be educated regarding modernization of the processing units and thereby increasing the production efficiency and improve the economies of scale to make DC price competitive both in domestic and international market. Creating awareness about

availability and advantages of DC has to be taken up to widen the domestic market for DC. Investment on DC units is economically viable and economic viability improves with size of the units. Credit availability on easy terms has to be ensured to establish large sized DC units and to ensure higher working capital requirement of DC production.

References

Sudhahari, B. and Mukundan, K. 1992. Economics of desiccated coconut industry with special reference to Kozhikode and Kannur districts in Kerala. *Indian Coconut Journal* **23**(6): 12-16.

Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India, 2007-08.

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