

Supply Chain of Agri. Commodities in India – A Study of Jaggery and Litchi



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Agri commodity supply chains are a network of market players through which the produce reaches the final consumers. Supply chains of two agri commodities Jaggery and Litchi are identified and the costs in the various channels are calculated. Market intermediaries play very important role in deciding the price of the agri produce and hence, the returns that the farmer gets. The constraints faced by farmers and market intermediaries vary according to the channel adopted and the length of the channel determines the cost involved and the efficiency of the channel.

Keywords: Farmers, Market Intermediaries, Market Channel, Channel Efficiency, Constraints

1. Introduction

Supply chain involves flow and movement of goods from the producers to the final consumers. The supply chains adopted for various agri commodities vary according to the nature of the produce, the distance from the final consumer, infrastructure facilities available and the level of coordination among supply chain partners. The supply chains of two agri commodities, Jaggery – a processed agri commodity and Litchi a highly perishable fruit have been studied to understand the supply chain channels adopted, the constraints faced by farmers and market intermediaries and the efficiency of the identified channels

Sugarcane is an important commercial crop in India and as much as 45 to 50 percent of sugarcane crop is processed annually into Jaggery or Khandsari. Litchi is an important sub-tropical evergreen fruit crop and 55 percent of production of Litchi is recorded in Bihar.

2. Methodology

To study the marketing channels of Litchi, Muzaffarpur district which stands first in Litchi area and production in Bihar was chosen. Data was collected from 60 farmers and 80 market intermediaries and for collecting the data for analyzing the marketing channels of Jaggery, Anakapalli region of Visakhapatnam district was purposively selected as it stands first in area under sugarcane cultivation in Andhra Pradesh. A total of 180 farmers and 15 Jaggery processing units were considered for collecting the data. Hence, multistage random sampling method was used to collect the data both for Jaggery and Litchi. Apart from simple descriptive statistics like averages and percentages, marketing efficiency was calculated using Acharya's and Shepeards method, whereas, Garrett Ranking Technique and Rank Based Quotient (RBQ) was used to rank the constraints.

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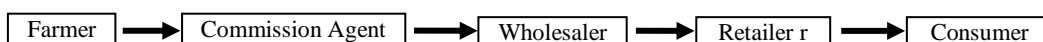
3. Results and Discussions

Marketing channels of Jaggery in the Study Area

The channels adopted for marketing of Jaggery are generally influenced by the factors like location of the growers, distance of the market centres, townships and processing units. Three marketing channels were identified in Jaggery marketing in the study area

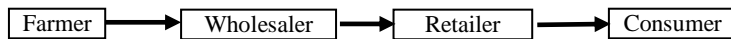
Channel - I

The channel I includes farmer, commission agent, wholesaler, retailer and consumer. In this channel commission agent procures Jaggery from farmer by providing credit for the cultivation of sugarcane prior to the harvesting season. Wholesalers purchase Jaggery from commission agents and then wholesalers sell Jaggery to retailers in bulk quantities. Retailers sell Jaggery to consumers in small quantities of 500 gm, 1kg and in multiples of 1 kg.

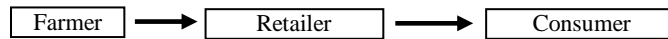


Channel – II

Channel II consists of farmer, wholesaler, retailer and consumer. In this channel, farmer directly sells Jaggery to wholesaler without the intervention of commission agent. The wholesaler looks after the grading and packaging of Jaggery in baskets or in gunny bags which holds a weight of 10 kg to 15 kg. They sell to the retailers and the retailers in turn sell to the consumers. But farmers face difficulties in this supply chain because the wholesalers are placed at distant places.

**Channel – III**

In this market channel, farmers are benefitted more when compared to the remaining channels. Retailers also reap more benefits when compared to the farmers as high margins are obtained by the retailers.



The costs incurred by various market intermediaries and the farmers at each stage in the supply chain of Jaggery under various marketing channels are analyzed and is presented in Table no.1.

Table No 1 Price Spread and Efficiency of Channel I, II and III Adopted for Jaggery

S. No	Particulars	Rs / qt of Jaggery	% Consumer's Price	Rs / qt of Jaggery	% Consumer's Price	Rs / qt of Jaggery	% Consumer's Price
		Channel - I		Channel - II		Channel - III	
	Net price received by the farmer	2823	78.55	2823	78.55	2823	84.93
A.	<i>Costs incurred by farmer</i>						
1.	Transportation charges	18	0.50	38	1.12	45	1.35
2.	Hamali charges	6.4	0.18	16.4	0.48	29.32	0.88
3.	Total cost incurred	24.4	0.68	54.4	1.60	74.32	2.24
4.	Selling price of farmer / purchase price of commission agent	2847.4	79.23	2877.4	84.53	2897.32	87.16
B.	<i>Cost incurred by commission agent</i>						
1.	Weighing charges	8.2	0.23				
2.	Transport charges	28.75	0.80	19.62	0.58	26.4	0.79
3.	Hamali charges	26.2	0.73	29.7	0.87	22.6	0.68
4.	Stitching of packing material	42.6	1.19				
5.	Market fee	8.7	0.24				
6.	Miscellaneous	9.25	0.26	8.3	0.24		
7.	Purchase price	2847.8	79.2	2877.4	84.53	2897.32	87.16
8.	Total cost incurred	2971.5	82.68	2935.02	86.22	2946.32	88.64
9.	Margin of commission agent	185.2	5.15				
10.	Selling price of commission agent / purchase price of wholesaler	3156.7	87.83	3070.02	90.19	3324.06	100.00
C.	<i>Costs incurred by wholesaler</i>						
1.	Transportation charges	19.62	0.55	14.5	0.43		
2.	Hamali charges	26.7	0.83	21.6	0.63		
3.	Miscellaneous	7.3	0.23				
4.	Purchase price	3156.7	87.83	3070.02	90.19		
5.	Total cost incurred	3210.32	89.32	3106.12	91.25		
6.	Margin of wholesaler	135.7	3.78				
7.	Selling price of wholesaler / purchase price of retailer	3346.02	93.10	3404.06	100.00		
D.	<i>Costs incurred by retailer</i>						

1.	Hamali charges	19.6	0.55			
2.	Transportation	13.5	0.38			
3.	Purchase price	3346.02	93.10			
4.	Total costs incurred	3379.12	94.02			
5.	Margin of retailer	214.94	5.98			
6.	<i>Selling price of retailer / purchase price of consumer</i>	3594.06	100			
	Total marketing cost	234.82		148.06		123.32
	Total marketing margin	535.84		432.94		377.74
	Price spread	771.06		526.66		501.06
	Marketing efficiency (Acharya approach)	3.66		4.86		5.63

The market efficiency of channel – I is 3.66, for channel – II it is 4.86 and for channel – III it is 5.63. Hence, channel – III is more efficient than the other two channels. Around 56 per cent of farmers prefer channel – I as commission agents provide loans to the farmers.

Constraints Perceived by Farmers in Processing and Marketing of Jaggery

Farmers take the sugar cane to the processing units and get it processed at these units at a cost and sell the Jaggery either to a commission agent or wholesaler. A very small percentage of farmers sell directly to the consumers. Farmers face many challenges in this process and the constraints faced by them are ranked in Table no.2.

Table No 2 Constraints Perceived by Farmers in Processing and Marketing of Jaggery

S. No	Constraints	Score	Garret Ranking
1.	High labour costs incurred in processing	69.00	I
2.	Fluctuation in Jaggery prices	65.44	II
3.	Forced sale due to repayment of loan	56.00	III
4.	Lack of transportation facilities	55.89	IV
5.	Untimely payment by the marketing channel members	55.56	V
6.	Lack of credit facility	52.56	VI
7.	Distress sale	51.67	VII
8.	Lack of storage facilities	47.22	VIII
9.	Defective and faulty weighing	45.33	IX
10.	High harvesting charges	44.00	X
11.	High commission charges	34.00	XI
12.	High transportation charges	32.22	XII

Major constraints faced by farmers are high labour costs, high fluctuations in Jaggery prices and their indebtedness to the commission agents, who force the farmers to sell at lower rate.

Constraints faced by market intermediaries and traders in marketing of Jaggery have been ranked in Table no. 3

Table No 3 Constraints Faced by Market Intermediaries and Traders in Marketing of Jaggery

S.No	Constraints	Score	Garret Ranking
1.	Fluctuation in Jaggery prices	82.41	I
2.	Failure by the farmers to pay in time	80.23	II
3.	Lack of transportation facilities	76.00	IV
4.	Lack of storage facilities	71.00	V

Fluctuation in Jaggery prices is constraint experienced both by the market intermediaries and farmers. The other constraints include lack of transportation facilities and proper storage facilities.

Marketing Channels of Litchi in the Study Area

Litchi in the study area is sold through four marketing channels. The channels for Litchi are

- **Channel I:** Producer – Pre-harvest contractor – Commission agent (cum wholesaler) – Retailer – consumer.
- **Channel II:** Producer – Village Trader – Wholesaler (local) – Commission agent (distant) – Wholesaler (distant) – Retailer (distant) – Consumer
- **Channel III:** Producer – Retailer – Consumer.
- **Channel IV:** Producer – Consumer.

The study indicates that nearly 65 per cent of the Litchi growers prefer channel I and this channel is more popular and convenient to the farmers. Though channel IV is most efficient, very few producers prefer to sell directly to consumers. The marketing costs, margins received by market intermediaries and efficiency of marketing channels adopted for Litchi have been calculated and are depicted in Table no: 4.

Table No 4 Price Spread and Efficiency of Channel – I, II, III and IV Adopted for Litchi

S. No	Particulars	Rs / Qt	% of Consumer's Price	Rs / Qt	% of Consumer's Price	Rs / Qt	% of Consumer's Price	Rs / Qt	% of Consumer's Price
		Channel - I		Channel – II		Channel – III		Channel - IV	
1.	Net price received by producer / Contractors purchase price	1400	36.21	1400	12.89	1400	43.42	1400	70.23
	Cost incurred by producer / preharvest contractor / local trader	214	5.54	264.85	2.44	263.75	8.18	187.88	9.42
	A. Watch and ward	10	0.26	10	0.09	10	0.31	10	0.50
	B. Picking, grading, filling etc	45	1.16	46	0.42	44	1.36	55.43	2.78
	C. Container cost (gunny bag)	5	0.13	11	0.10	15	0.46	12	0.60
	D. Transportation cost	22	0.57	-	-	27.33	0.85	20	1.03
	E. Loading / unloading charge	6	0.16	-	-	14.15	0.44	-	-
	F. Commission @ 10 per cent to the mediator	84	2.17	140	1.29	-	-	-	-
	G. Miscellaneous charges	42	1.09	57.85	0.53	357.16	11.07	90.45	4.53
	Margin of contractor	250	6.47	485.64	4.47	-	-	405.50	20.34
2.	Wholesaler (local) purchase price	1864	48.21	2150.49	19.81	-	-	-	-
	Cost incurred by Wholesaler	282.88	7.32	653.97	6.02	-	-	-	-
	A. Market fee @ 2 percent	37.28	0.96	43	0.40	-	-	-	-
	B. Transportation cost	52	1.34	162.34	1.50	-	-	-	-
	C. Packing material / container cost	23	0.59	45.5	0.42	-	-	-	-
	D. Spoilage / wastage	44.33	1.15	152.59	1.41	-	-	-	-
	E. Loading / unloading charge	-	-	64.79	0.60	-	-	-	-
	F. Commission @ 6 percent	111.84	2.89	56.75	1.19	-	-	-	-
	G. Miscellaneous charges	66.43, 1.72	1.72	56.72	0.52	-	-	-	-
	Margin of wholesaler (local)	406.27	10.51	564.53	5.20	-	-	-	-
3.	Wholesaler (distant) purchase price			3368.99	31.03	-	-	-	-
	Cost incurred by wholesaler (distant)	--		1799.27	16.57	-	-	-	-
	A. Transport cost	--		390.78	3.60	-	-	-	-
	B. Cost of bag	--		76.26	0.70	-	-	-	-
	C. Spoilage / Wastage	--		735.15	6.77	-	-	-	-
	D. Commission @ 6 percent	--		336.89	3.10	-	-	-	-
	E. Loading / unloading charge	--		74.55	0.69	-	-	-	-
	F. Miscellaneous charges	--		185.64	1.71	-	-	-	-
	Margin of Wholesaler (distant)	--		1600.37	14.75	-	-	-	-

	Producer, Wholesaler sale price / Retailer purchase price	2553.17	66.04	6768.63	62.34	2020.91	62.68	-	--
	Cost incurred by retailer	417.79	10.81	2289.01	21.08	532.48	16.51	-	--
4.	A. Market fee @ 2 per cent	51.06	1.32	135.37	1.25	40.41	1.25	-	--
	B. Transport cost	66.12	1.71	124.35	1.15	79.75	2.47	-	--
	C. Cost of bag	25.32	0.65	106.77	0.98	25	0.77	-	--
	D. Spoilage / wastage	49.38	1.28	1075.26	9.90	92.73	2.88	-	--
	E. Commission @ 8 per cent	153.18	3.96	541.49	4.99	121.25	3.76	-	--
	F. Miscellaneous charges	72.73	1.88	305.77	2.82	173.34	5.38	-	--
	G. Retailer margin	895	23.15	1800.64	16.58	670.69	20.80	-	--
	Retailer sale price / Consumer purchase price	3866.27	100	10858.28	100.00	3224.08	100	1993.38	100
	Price Spread	2466.27		9458.28				1824.08	

The efficiency of channel – I which is mostly adopted for Litchi is 0.74 which is more than channel- II, but less than channel – III and IV. However, farmers adopt this channel as the pre harvest contractor gives required finance to the farmers in advance for their various farm operations and also because pre harvest contractor takes the produce from farm gate. Hence, the risk perceived by the farmers in this channel is less, compared to other channels.

Marketing Constraints of Litchi in the Study Area

The marketing constraints faced by market intermediaries in supply chain of Litchi in the study area are ranked using RBQ method and shown in Table no. 5

Table No 5 Marketing Constraints of Litchi in the Study Area

S. No	Constraints	Rank										R.B.Q.	Overall rank
		I	II	III	IV	V	VI	VII	VIII	IX	X		
1.	Lack of organized marketing	0	7	31	46	4	19	7	8	13	5	59.64	VI
2.	Lack of credit facility	0	0	0	8	3	4	32	39	32	22	30.36	VIII
3.	Perish ability of fruits	125	15	0	0	0	0	0	0	0	0	98.93	I
4.	Lack of market information	0	2	32	36	45	16	5	4	0	0	64.57	IV
5.	High transportation cost for distant markets	2	7	2	8	4	19	31	46	13	8	40.71	VII
6.	Unorganized production	0	5	4	2	2	4	17	19	50	33	27.21	IX
7.	Lack of marketing infrastructure	0	15	19	21	18	46	9	6	4	2	59.71	V
8.	Labour shortage during harvest	0	13	32	31	21	23	18	1	1	0	64.86	III
9.	Lack of cold storage facilities	8	75	27	13	9	5	3	0	3	0	82.36	II
10.	Price fluctuation	0	0	1	1	1	2	12	18	35	70	19.50	X

High perish ability of the fruit and lack of cold storage facilities to store the produce are major constraints faced by the market intermediaries and farmers in Litchi supply chain. Lack of information regarding the prices prevailing in distant markets and labour shortage and high cost of labour are other constraints faced by market intermediaries in the supply chain of Litchi.

4. Conclusion

The supply chains of agri. Commodities include many market intermediaries, who help the produce reach the consumers, however, due to lack of proper coordination and transparency the cost escalate and there is a wide difference in the price received by the farmer and the price which the consumer's pay. Though the direct sale by the farmer to the consumer is more profitable to the farmer and more beneficial to the consumers, this channel is adopted by only very few farmers, as they lack access to the final consumer. Another major factor which influences the farmers to sell to market intermediaries is the finance that is provided by these market intermediaries to the farmers. Hence, requirement for finance, risk bearing ability of farmers and access to final consumers play a major role in the choice of agri. marketing channels and efficiency of agri supply chains.

5. References

1. Azad, M. P., Kaushik, D. C and Singh, S. K. 1989. Processing and marketing of Sugarcane products in Uttar Pradesh. *Indian Journal of Agricultural Economics*. 44(3): 322.

2. Dwivedi Kumar Amit. 2010. An empirical study on Gur (Jaggery) industry. *Indian Institute of Management Ahmedabad Research and Publications*.1-19.
3. Narasimha Pusappa, K. 2013. Economics of sugarcane cultivation in Andhra Pradesh. *Ph.D Thesis*. Andhra University, Visakhapatnam.
4. Rao Rama, I. V. Y and Sunil Kumar Babu, G. 2012. An economic analysis of production and marketing of Jaggery in Andhra Pradesh. *Indian Journal of Agricultural Marketing*. 26(2): 54-63.
5. Singh, T. R and Kishore, R. 1998. An enquiry into disposal pattern and marketing of Sugarcane and its product (Gur) in Sitapur district of Uttar Pradesh. *The Bihar Journal of Agricultural Marketing*. 6(1): 101-107.
6. Anchal, D and Sharma, V.K. 2009. Price spread of litchi in Punjab. *Indian Journal of Agricultural Marketing*. 23(2): 157-161.
7. Gondalia, V.K and Patel, G.N. 2007. Marketing of aonla (*Emblica officinalis* G.) in Gujarat.
8. *Indian Journal of Agricultural Marketing*. 21(2): 114-124.
9. Imtiyaz, H and Soni, P. 2013. Supply Chain Analysis of Fresh Guava (A Case Study)
10. *International Journal of Management Business Research*. 3(4): 373-382.
11. Kumar, V., Purbey, A.K and Anal, D. 2015. Losses in litchi at various stages of supply chain and changes in fruit quality parameters. *Crop Protection*. 79: 97-104.