



Fruit marketing, its efficiency and supply chain constraints in India: A case study

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ABSTRACT

Study investigated the agribusiness opportunities, marketing channels and marketing efficiency of different supply chain systems for two important fruit crops kinnow and aonla (Indian gooseberry) in Rajasthan. Two districts, viz. Sriganganagar and Jaipur, having highest area under cultivation of these crops in the state, were purposively selected. Information was collected from 120 farmers, 30 wholesalers (traders/Contractors) and 30 retailers during the year 2009–2011 for both the crops. Further 25% of sample households were again revisited during 2019–20 to find changes in marketing of these selected fruit crops. The producers' share in consumer's rupee was 32% and 28% for kinnow and aonla, respectively. The marketing efficiency index in dominant channel was 0.48 in kinnow and 0.38 in aonla. The most common and important constraint in marketing of fruits was cartelisation among traders. The imperfect market structure forces the farmers to enter into a forward contract that sets a minimum price, rather at the dissatisfaction of the farmer, as an insurance against possible lower price at later stages. Establishment of multi-fruit processing units in production area, development of infrastructure at major market centres, and establishing export value chain for kinnow and necessary support/incentives for orchard management for timely disposal of kinnow fruits are suggested as strategies to improve the marketing efficiency.

Keywords: Agribusiness, Contracts price spread, Marketing efficiency, Marketing constraints

Rajasthan state has vast potential for horticultural development as the agro-climatic conditions favours cultivation of a large number of horticultural crops throughout the year. During 2017-18, about 16.21 lakh ha (GoI 2018) area was reported to be under horticultural crops, against gross cropped area of 254.37 lakh ha in the state (Govt. of Rajasthan 2018). This includes 0.57 lakh ha under fruits. Marketing of fruits in the state depicts different features than food grains marketing, particularly with respect to the institutional arrangement. The fruits crops are mostly sold through contract system where farmer gives advance contracts before actual harvesting of crop (Sudha and Froukje 2006, Prasher *et al.* 2013) to reduce the price risk.

The inefficiencies of different nature creep into the marketing of perishable fruits. In the globalised world, remaining competitive is a daunting task for farming

community. Understanding the inefficiencies helps to revamp the system through better informed policy formulation. Fruits are subjected to high price variability, and this leads to farm income fluctuation, affecting the livelihood of the farmers. Price spread along the marketing channel is directly proportional to the number of market intermediaries involved. The present paper identifies different marketing channels of kinnow and aonla (Indian gooseberry) crops in Rajasthan and estimates the marketing efficiency in different supply chains. Both kinnow and aonla have significant area under production in the state, hence chosen for the present study.

MATERIALS AND METHODS

Jaipur and Sriganganagar districts of Rajasthan were selected purposively based on significant area under the selected fruit crops. Multistage stratified random sampling technique was adopted. Two tehsils Sriganganagar and Karanpur were selected for collecting detailed data from kinnow growers in Sriganganagar district. For aonla, Chomu tehsil in Jaipur district was selected as it has largest area as well as a well-established market for aonla. A sample of 120 farmers was selected for both the crops. Information was also collected from 30 wholesalers (traders/contractors) and 30 retailers for each of the crop studied, based on snowball sampling. The data was collected through a pre-tested survey schedule.

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The data related to production, constraints faced by the farmers, sale, marketing system etc. were collected during 2009–11. Information was also collected on price, marketing cost at different stages and marketing margin. The system of marketing was again studied during 2019–20 through focussed group discussions and telephonic interview of 25% farmers, wholesalers (traders/contractors) and retailers. Marketing channels through which produce was sold and their respective share were also identified.

Following techniques of data analysis were used:

- *Tabular analysis with descriptive statistics* : For analysing market cost, market margin, price spread, marketing efficiency
- *Liner Regression Analysis*: To identify the factors affecting marketing efficiency
- *Garrett's Ranking Technique*: To rank and prioritize the marketing constraints in stakeholders' perception. The percentage position of each rank is converted into scores by referring tables proposed by Garrett and Woodworth (1969).
- Producer's share in consumer's rupee (Ps) was calculated by using the formula suggested by Acharya and Agarwal (2005).

Marketing Efficiency: The marketing efficiency was calculated using Acharya's Modified Marketing Efficiency formula;

Acharya's Modified Marketing Efficiency (MME)

$$MME = FP / (MC + MM)$$

where, MME is modified measure of marketing efficiency; FP is price received by farmers; MC is marketing cost; MM is marketing margin;

Factors affecting marketing efficiency: Multiple linear regression analysis with following variables was carried out to know the effect of these variables on marketing efficiency. Following functional form was specified:

$$y = f(x_1, x_2, x_3, x_4, x_5)$$

where, y = Marketing efficiency (%); x_1 = Marketing cost (₹); x_2 = Marketing margin (₹); x_3 = Open market price (₹); x_4 = Volume of produce handled (kg); x_5 = Length of the market channel (No. of market intermediaries).

RESULTS AND DISCUSSION

Kinnow and aonla are important fruit crops grown in Rajasthan. The marketing pattern of both the crops was similar. Most of the farmers preferred forward contract of orchard to insure against risks in production and fluctuations in farm prices at the time of harvest.

Kinnow

Marketing channels: There were three important marketing channels through which kinnow were sold (Table 1). The marketing channel- I, viz. Producer – Contractor-Commission Agent (CA)/ Wholesaler – Retailer – Consumer was the most dominant, adopted by 71% farmers. However, with increasing processing plants in the district over years,

about 78% produce is marketed through channel I as found in recent survey conducted during 2019–20. In channel-II farmers directly brought produce in the *mandi* and sold it through commission agents, either in local or distant markets in Rajasthan or other states. Generally small/marginal farmers with low volume of produce are offered lower price by the contractors hence instead of selling through them, farmers bring their produce directly in market (*mandi*) at harvesting time and sell through open auction and fetch better price. In channel III producers sell the produce after grading and processing. The produce is either processed by farmers themselves at their processing plant or on payment basis at plants situated around Sriganganagar city. About 50% kinnow was processed (graded and waxed) and then sent to distant markets during 2009–11 but recent survey (2019–20) indicated that more than 70% kinnow produce is transported to distant market after processing. The processors cum contractors had share of about 60 % in the total procurement made on contract basis.

Table 1 Marketing channels in sale of kinnow and aonla

Particular	Supply chain	Quantity handled (q)	
		2009-11	2019-20
<i>Kinnow</i>			
Channel 1	a) Producer – Contractor-Commission Agent (CA)/ Wholesaler – Retailer – Consumer	22054 (71.10)	36149 (78.50)
	b) Producer – Contractor cum Processor- Commission Agent/ Wholesaler – Retailer – Consumer		
Channel 2	Producer – Commission Agent/ Wholesaler -Retailer – Consumer	4164 (13.43)	4605 (10.00)
Channel 3	Producer cum Processor- Commission Agent- Wholesaler – Retailer – Consumer	4798 (15.47)	5296 (11.50)
Total		31016 (100.00)	46050 (100.00)
<i>Aonla</i>			
Channel I	Producer – Contractor/ Trader – Commission agent -Retailer – Consumer	107136 (87.08)	124748 (78.00)
Channel II	Producer –Commission agent-Retailer- Consumer	2498 (2.03)	3450 (2.16)
Channel III	Producer – Contractor- Commission agent- Trader- Consumer (Processing Industry) (II grade aonla)	13392 (10.89)	31736 (19.84)
Total		123026 (100.0)	159934 (100.00)

Figures in parenthesis indicated percent to total quantity handled

Marketing cost: The produce to distant markets was transported after grading and waxing only; while in short and medium distance it was usually transported without waxing. Kinnow was packed in 10 kg cardboard boxes for transportation. The low grade kinnow was loaded loose in truck or packed in jute bags weighing about 25 kg each. Total marketing cost was about ₹ 807 per q in channel-I when sold to distant markets, as in case of places in South India, e.g. Bengaluru city in Karnataka. The cost was shared by contractors (65.30%), commission agents (3.72%) and retailers (30.98%). Producer had largest 54% share in marketing cost in channel II as he himself arranged its packing and transport up to market. The share of commission agent/wholesaler and retailers were 29% and 17%, respectively.

Price spread: The price received for a quintal of kinnow by farmer was about ₹ 882, for which the consumer paid ₹ 2,736 in (Channel I). Farmers' share in consumer rupee was found 32%. The margins earned by contractors, wholesalers and retailers were 8.5%, 5.3% and 24.5%, respectively. Prasher *et al.* (2013) in a study of litchi crop in Himachal Pradesh reported farmer's share of only 43.32% in consumer's rupee. Although producers' share in consumer rupee was more in channel II as produce was directly brought by farmers in regulated market for sale, this channel had smaller market share compared to channel I. In channel II both consumers and producers are in better

position compared to channel I. The channel II was mostly preferred by small orchard owners.

Marketing efficiency: The marketing efficiency of kinnow calculated using Acharya's modified measure of marketing efficiency was 0.48 and 1.06 in channel I and II, respectively (Table 2). It was higher in channel II as price received by farmers was higher and both marketing cost and marketing margin were lower than that in channel I. The repeat survey conducted during 2019–20 also showed similar findings.

Factors affecting marketing efficiency: The multiple linear regression analysis shows negative relationship of marketing efficiency with marketing cost and marketing margin (Table 3). The volume of produce had positive and significant relationship which shows that larger orchard owner with higher quantum of produce could better bargain for prices while small orchard owner face difficulty in giving advance contract and they were offered comparatively lower prices. Though open market prices had positive relationship with efficiency, it was insignificant.

Constraints in production and marketing: The constraints perceived by the farmers were analysed and ranked following Garret ranking technique. The most common and important constraint was the price- the contractors generally made a cartel and offered lower prices to farmers. Other constraints were lack of opportunity of processing facility nearby; inadequate market yard facility

Table 2 Measurement of marketing efficiency of kinnow and aonla

Particulars	Unit	Kinnow		Aonla	
		Channel I	Channel II	Channel I	Channel II
Retailer's sale price (RP)	₹/q	2736	1778	1600	1534
Total marketing costs (MC)	₹/q	807	279	247	171
Total margins of intermediaries (MM)	₹/q	1047	583	910	449
Price received by farmer (FP)	₹/q	882	916	443	914
Value added by the marketing system (1-4)	₹/q	1854	862	1158	620
Conventional method (E) (5 / 2)	Ratio	2.30	3.09	4.7	3.6
Acharya's method (MME) [4 / (2+3)]	Ratio	0.48	1.06	0.38	1.47

Table 3 Linear estimates of determinants of marketing efficiency of kinnow and aonla

Factors	Kinnow		Aonla	
	Coefficient	't' value	Coefficient	't' value
Constant	0.53***	3.84	0.76058***	23.93
Marketing cost (x1)	-0.00030***	-6.49	-0.00038*	-1.57
Marketing margin (x2)	-0.00008***	-3.68	-0.00048***	-8.657
Open market prices (x3)	0.00005 ^{NS}	0.89	0.00008***	5.807
Volume of the produce handled (x4)	0.00062***	3.08	0.00003***	2.637
Length of the market channel (No. of market intermediaries) (x5)	-0.00762**	-2.30	-0.00293 ^{NS}	-0.997
R ²	0.776		0.7598	
Adjusted R ²	0.767		0.7493	
No. of observation (N)	120		120	

***, **, * indicate significance at 1%, 5% and 10% level, respectively.

in the local market, contractor does not honouring the pre-harvest contract if market crashed, delay in payment by traders, non-vacating the field in time by the contractor, high transaction cost for small orchards, non-availability of quality planting material, high commission charges in other states, increased cost of hired labour, problem of spurious pesticides, and damage by blue bull.

Aonla (Indian gooseberry)

Marketing channels: There were three important marketing channels for aonla in Jaipur district (Table 1). The marketing channel-I was the most dominant accounting for about 87% share. The produce was sold mainly in Delhi market from where it was distributed all over India. In channel-II, farmers directly brought produce in the market wherein commission agents buy produce on behalf of traders in Rajasthan, Haryana and Punjab and this produce was sold through commission agents to retailers in respective markets. In channel I, traders take advance contract and harvest crop employing their own labour. The 1st grade produce was sold for preparation of *murabba* while II grade was purchased for preparing health products like *chawanpras* by certain companies, e.g. Dabur India and Patanjali yogpeeth at Haridwar etc. Small scale producers bring their produce for sale in local market (*Chomu mandi*, a market in the suburban region of Jaipur) as contractors don't take contract of their orchards. The produce sold in channel I and II was about 87 and 2% of produce while 11% was sold through channel III. A recent survey conducted in 2019–20 also indicated farmers' preference for channel I which handled 78 % of produce marketed. Due to spread of aonla processing industry during last decade, the share of channel III in the total marketed produce went up from 11 to 20%. The overall increase in the marketed quantity is about 30 % through all the three channels.

Marketing cost: It was observed that the grade I aonla was sent to the distant markets in card board boxes, while grade II aonla was filled in 50 kg capacity jute bags and transported mainly to processing industries situated around Delhi and UP state. The produce to Delhi market was mainly sent in card board boxes which cost higher than jute bags. The marketing cost in channel II was lower than channel I. In channel I, the total marketing cost was ₹ 247, of which 78% was shared by contractor/trader and 22% by retailers, whereas as in channel II, the total marketing cost of ₹ 170 and it was shared by producers and retailers in the proportion of 31:69.

Price spread: The price received by the farmers for a quintal of aonla was more than double in channel II (₹ 914) compared to channel I (₹ 442), whereas final price paid by the consumers were ₹ 1600 and ₹ 1534 in channel I and channel II, respectively. It was due to the fact that farmers in channel I gave advance contract for their produce to reduce the risk, which was much lower than the market price at the time of actual sale. As the farmers in channel II directly brought their produce for sale they took advantage of hike in prices and fetched better prices compared to

channel I. Farmers' share in consumer rupee was found higher in channel II.

Marketing efficiency: Acharya's modified measure of marketing efficiency was 0.38 and 1.47 in channel I and II, respectively (Table 2). It was higher in channel II as price received by farmers was higher and both marketing cost and marketing margin were lower than channel I. Though marketing efficiency in channel II was higher, its market share in total quantum of aonla sold was lower as the local regulated fruit and vegetable market (*Chomu*) was not well developed for marketing of large quantity of this fruit.

Factors affecting marketing efficiency: The regression analysis showed negative and significant relationship of marketing efficiency with marketing cost and marketing margin (Table 3). The volume of produce, an indicator of scale economy, had positive and significant relationship which shows that larger orchard owner with higher quantum of produce could better bargain for prices while small orchard owner face difficulty in giving advance contract and they were offered comparatively lower prices. The increasing numbers of market intermediaries raises the marketing margin; hence it affected marketing efficiency negatively. Though open market prices had positive relationship with efficiency, it was insignificant. This clearly points to the dissociation of the open market prices on the forward contract price, as maximum farmers entered into advance contracts. While the farmers were getting insulated against the production and price risks, the return to risk is perhaps skewed against the farmers, as could be gauged from the margin of the contractors over the contract price.

Constraints in production and marketing: Aonla, like kinnow, is a semi perishable fruit and it can remain unspoiled in the field maximum for seven days after harvesting. To minimise the price risk, farmers prefer forward contract where price of aonla is predetermined. The major constraints as revealed by Garrets ranking were: lower price offered by the contractors due to cartel formed by them, inadequate processing facilities nearby, high transaction costs for small orchards, contractors not honouring pre-harvest contract if market crash, avoidance of open auction method of purchase by the traders and encroachment of traders on platforms reserved for farmers at the market yard, in that order.

Strategies to enhance marketing efficiency of fruits would vary according to nature of produce and kind of marketing facilities in a particular region. Both kinnow and aonla are important fruit crops of Rajasthan, however more than 50% produce of both the fruits was transported outside state for further processing or for direct consumption. To enhance marketing efficiency following suggestions and strategies emerged from the focussed discussion with different stakeholders under study.

- Support for establishing multi-fruit processing units in production area. Choudhary *et al.* (2015) has also recommended institutional innovations for value chain governance in favour of small holders for malta orange in Uttarakhand.
- Development of kinnow and aonla *mandi* with all the

required facilities for outside traders. Popularizing modern agricultural implements used in kinnow/ aonla cultivation.

- Declaring major production centres as production hubs (as in case of Sriganaganagar for kinnow) and targeting the hubs with better technical and marketing facilities.
- Support of nursery development for ensuring quality planting and seed material.
- Encouraging small fruit growers to form cooperatives/ producer groups for easy disposal of produce and better bargaining. Formation of pineapple growers' marketing cooperatives for augmenting farm income has also been recommended in a study of pineapple fruit in West Bengal (Das *et al.* 2016). The cooperatives of grape grower in Maharashtra, Mahagrapes, could provide an effective marketing platform for small cultivators (Roy and Thorat 2008, Narrod *et al.* 2009, Som *et al.* 2016). The alternative marketing channels like contract farming and farmers producer companies helps in realising better prices and minimise losses due to distress sale in certain occasions (Bhanot *et al.* 2021).
- Refining the forward contract mechanisms ensuring the interest of the farmers, with better institutionalisation and legal commitments. Promotion of cold storage facilities and more incentives to use the cold storage receipts as a financial instrument for the farmers could be useful steps in this direction.

It warrants steps to reduce the influence of the intermediaries. Further, creating awareness on the importance of value creation and value capturing, and sensitizing actors in the agricultural value chain is recommended for strong linkage between agribusiness and farmers to enhance their income (Chengappa 2017).

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