Okra Supply Chain: A Case Study of Vadodara City of Gujarat

ABSTRACT

This study was conducted in 2022 based on the following objectives: 1) to identify different marketing channels of okra in Vadodara city, 2) to estimate price spread of okra crop, and 3) to identify problems encountered by producers and intermediaries. The primary data were collected from 50 farmers, 15 wholesaler,15 retailer,6 commission agent,6 trader,3 private companies of Vadodara city total sample size is 95 while the secondary data were collected from different Private and Government publications to include Review Paper, Literature, and Journals. The following districts in Vadodara City such as Padra, Karjan, Waghodia, Aklav, and Savli talukas were the selected venues of the study. The respondents of the study were randomly selected such as the farmer, wholesalers, retailers and private companies from the above area. The descriptive research design was used for the research. Non-probability sampling method and convenience sampling technique was used. In channel I, very small proportion of the agricultural commodities which moved directly from producers to consumers. Channel II is the most common supply chain for okra during the period of June and July. Both Channel III & IV are working at rural level. Channel I has the best marketing efficiency out of these six marketing channels, but it is not realistic to sell all produce through this channel. However, channel V marketing efficiency is around 68% and is a practically feasible channel due to the lower number of intermediaries. Therefore, the lesser the number of intermediaries the higher will be the marketing efficiency. The most common problem encountered by farmers are lower price which can be solved by collectivism and contract farming.

Key Word – Supply Chain, Okra, Marketing Efficiency, Price Spread

1. INTRODUCTION

Due to India's diverse geography, there is a variety of fresh produce available. India produces the second-most fruits and vegetables worldwide, after China. In 2019–20, India produced 99.07 million metric tonnes of fruits and 191.77 million metric tonnes of vegetables on 10.35 million hectares of land. Fruits were cultivated on 6.66 million hectares of land. Okra is produced on 10548 thousand tonnes on 2531 thousand hectares (ha) of land (NHB,2020). The top developing nations for produce okra include India, Nigeria, Mali, Sudan, Pakistan, Ghana, Egypt, Benin, Saudi Arabia, Mexico, and Cameroon. Nigeria is the country with the second-highest production after India. India have the highest productivity (12.17 tons/ha), followed by Mali (11.71 tons/ha) (FAOSTAT,2019-2020). Okra is harvested throughout the year in Gujarat. Okra is farmed in Gujarat over an area of 85.15 thousand hectares (ha), with a total annual yield of 1019.42 thousand tonnes (NHB,2020-2021). Gujarat's main okra-producing regions are Surat, Vadodara, and Junagarh. Mangrol, Umarwada, Mandvi, Vyara, Valod, Mahuva, Palsana, Kamrej, Olpad, Nizer, Vadoli, and Unal are significant okra catchment areas in Surat. Major okra catchment areas in Vadodara include Padra, Karjan, Waghodia, Aklav, and Savli etc (MoA&FW,2020-2021). Unlike cereals the vegetables are highly perishable in nature and there movement in the supply chain need special attention. This special attention will make supply chain more efficient in terms of increase producer's share inconsumer's rupee (Deliya et al., 2013).The supply networks were mostly under the

hands of intermediaries. Poor post-harvest management led to poor crop quality and low export market pricing (Saikul et al., 2016).In last several years have seen increased research interest in supply chain management, which plays a vital effect in a firm's performance (Sharma and Chandrashekar, 2021). Research was conducted in order to recommend to farmers which marketing channel is ideal for selling okra and so increase farmer earnings.

The following objectives motivated for study's conduct:

- To identify different marketing channels of okra in Vadodara city
- To estimate price spread of okra crop
- To identify problems encountered by producers and intermediaries
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2. METHODS

To accomplish these objectives primary data collected from 50 farmers,15 wholesaler,15 retailer,6 commission agent,6 trader,3 private companies of Vadodara city total sample size is 95. Secondary data were collected from different Private and Government publications, Review Paper, Literature, Journals. The descriptive research design was used for the research. The convenience sampling technique and the non-probability sampling method were utilised.

2.1 Analytical Tools

Objective 2: To estimate price spread of okra crop

The Acharya approach was applied to determine the marketing efficiency of okra crop and the following formula was used to calculate the marketing expense:

C = Cf + Cm1+ Cm2+ Cm3+…….. + Cmi

where,

C = total expense for promoting the commodity

Cf =cost bear by the producer after the produce leaves the farm and before it is sold

Cmi = cost bear by the middleman's services during the purchase and selling of the product

Marketing Efficiency (Acharya's Method) = $\frac{NP_F}{MC+MM}$ (Acharya & Agrawal, 2011)

where,

NPF = Net cash received by farmer

MC = Total marketing expense

MM = total margin for marketing

Objective 3: To identify problems encountered by producers and intermediaries

It was done through Weighted Average Mean.

Weighted Average Mean= Total cumulative score/ Total no of respondent

3. RESULTS AND DISCUSSION

3.1 Results

Marketing Channels (MC): Agriculture goods are transported from producers to consumers via marketing channels.

Channel I reflected very small proportion of the agricultural commodities which moved directly from producers to consumers, while Channel II reflected the most common supply chain of okra in June and July.Both Channel III & IV are working at rural level. Big basket followed the marketing Channel V in the Vadodara area to continuously buy okra at the farm level. If okra is not accessible at the farm level, Bigbaket will use the VI Channel as alternative.

Table 1. Marketing channels of okra in Vadodara

Channel No.	Marketing Channels
MC* 1	Farmer – Consumer
MC 2	Farmer – APMC – Wholesaler – Retailer – Consumer
MC 3	Farmer – Commission Agent – Wholesaler – Retailer – Consumer
MC 4	Farmer – Commission Agent - APMC – Wholesaler – Retailer – Consumer
MC 5	Farmer – Collection Centre – Private Companies- Consumer
MC 6	Farmer – Vendor – Private Companies - Consumer

**MC = Marketing Channels*

Marketing Efficiency

Table 2. Marketing costs, margins and price spread of okra for channel I, II, III,IV

Marketing cost (Rs/qtl)	Channel I	Channel II	Channel III	Channel IV
Net price received by the producer	3600	1900	2060	2200
a) Operational Cost	900	900	900	1200
b) Commission	0	0	0	0
c) Post-Harvest Loss	1000	700	740	900
Total (a to c)	1900	1600	1640	2100
Commission agent Price	0	3500	3700	0
Cost incurred by local agent				
a) Operational Cost	0	0	100	0
b) Transportation Cost	0	0	50	0
c) Loss during handling	0	0	222	0
Total (a to c)	0	0	372	0
Commission agent Margin	0	300	928	0
Trader Price	0	3800	0	0
Cost incurred by Trader				
a) Operational Cost	0	80	0	0
b) Transportation Cost	0	70	0	0
c) Loss during handling	0	55	0	0
Total (a to c)	0	205	0	0
Trader Margin	0	495	0	0
APMC Price	0	4500	5000	4300
Wholesaler Price	0	4500	5000	4300
Cost Incurred by Wholesaler				
a) Operational Cost	0	50	25	100
b) APMC Fees	0	225	250	215
c) Transportation Cost	0	30	20	50
d) Loss during handling	0	45	20	100
Total (a to d)	0	350	315	465
Wholesaler Margin	0	150	185	785
Retailer Price	0	5000	5500	5550
Cost Incurred by retailer				
a) Operational Cost	0	40	40	40
b) Transportation Cost	0	150	150	150
c) Loss during handling	0	250	195	170
Total (a to c)	0	440	385	360

Retailer Margin	0	560	315	590
Consumer price	5500	6000	6200	6500
Total marketing cost	1900	2595	2712	2925
Total marketing margin	0	1505	1428	1375
Price Spread	1900	4100	4140	4300
Producers Share in Consumer's Rupee	65.45 %	31.66 %	33.22 %	33.84 %
Marketing efficiency (Acharya's Method)	189.47 %	46.34 %	49.75 %	51.16 %

These two-marketing channel V & VI for Okra followed by Private Companies inVadodara distribution center

Table 3.Marketing costs, margins and price spread of okra for channel V,VI

Marketing cost (Rs/qtl)	Channel V	Channel VI
Net price received by the producer	2550	2500
a) Production Cost	1000	1000
b) Transportation Cost	150	300
c) Post Harvest Loss	900	900
Total (a to c)	2050	2200
padra Collection center price	4600	0
Cost incurred Padra collection center		
a) Operation cost	100	0
b) Loss during handling	90	0
Total (a to b)	190	0
Vendor Price	0	4700
Cost incurred by Vendor		
a) Operational Cost	0	100
b) Transportation Cost	0	80
c) Loss during handling	0	100
Total (a to c)	0	280
Vendor Margin	4790	520
Private Companies D.C. Vadodara price		5500
Cost incurred by D.C. Vadodara		
a) Transportation cost	50	0
b) Operation Cost	80	150
c) loading and unloading	30	0
d) Loss during handling	240	165
Total (a to d)	400	315
Private Companies D.C. Vadodara margin	1110	485
Consumer Price	6300	6300
Total marketing cost	2640	2795
Total marketing margin	1110	1005
Price Spread	3750	3800
Producers Share in Consumer's Rupee	40.47 %	39.68 %
Marketing efficiency (Acharya's Method)	68.00 %	65.78 %

Problems encountered by Producers and Intermediaries

The weighted average mean method is used to determine rank.

Table 4. Problems encountered by the farmers

Problem	Rank
Lower price	1
Location of selling unit far away	2
Inadequate transportation facility	3
Large No. of Intermediaries	4
Lack of storage/ cold storage facility	5
Delay in payment and sale proceeds	6
Lack of grading facility	7
Lack of market information	8
Lack of contracting agencies	9

Table 5. Problems encountered by Wholesalers

Problem	Rank
Lack of grading facility	1
Delay in payment and sale proceeds	2
Lack of storage/ cold storage facility	3
Large No. of Intermediaries	3
Perishability	3
Lack of market information	4
Lower price	4

Table 6. Problems encountered by Retailers

Problem	Rank
Large No. of Intermediaries	1
Lack of grading facility	2
Lower price	3
Perishability	3
Delay in payment and sale proceeds	4
Lack of storage/ cold storage facility	5
Lack of market information	6

Table 7. Problems encountered by private companies

Problem	Rank
Delay in payment and sale proceeds	1
Lack of storage/ cold storage facility	2
Inadequate transportation facility	2
Lack of market information	3
Lack of grading facility	3
Lower price	3

3.2 Discussion

3.2.1 Marketing Channels

Channel I reflected very small proportion of the agricultural commodities which moved directly from producers to consumers, while Channel II reflected the most common supply chain of okra in June and July. Both Channel III & IV are working at rural level. In channel III, the farmers sell their Okra to Commission agent at the village level. After grading the produced okra at the grading center in village, the Commission agent transports and sells it to the wholesalers in Vadodara market. The wholesalers sell it to the retailers before okra can reach to final consumers. In Channel IV, the farmers sell the Okra to Commission agent at the village level. The Commission agent transports and sell it in APMC without grading. The wholesalers purchased Okra from APMC and sell it to the retailers after grading before okra can reach to its final consumers. Big basket followed the marketing Channel V in the Vadodra area to continuously buy okra at the

farm level. If okra is not accessible at the farm level, Bigbaket will use the VI Channel as alternative.

3.2.2 Price Spread of Okra

Channel I has the best marketing efficiency out of these six marketing channels, but it is not realistic to sell all produce through this channel.The net price obtained by farmers is considerably greater in channels where food is sold directly to consumers or merchants (Baba & Wani,2010).However, channel V marketing efficiency is around 68% and is a practically feasible channel due to the lower number of intermediaries. As a result, the lower the number of middlemen, higher will be the marketing efficiency.the Producers share is inversely proportional to the number of middlemen (Baba & Wani,2010).

Marketing efficiency is inversely related to the price spread. The price spread is highest in channel IV, approximately 4300, followed by channel III and II, which are around 4140 and 4100, respectively. Around 3750 is seen in channel V.

Channel-I has the highest proportions of the producer's sharein consumer's rupee, followed by channels-V and VI. That is about 65.45%, 40.47% and 39.68% respectively.

3.2.3 Problems encountered by Producers and Intermediaries

Problems encountered by the farmers: Reflected in table no.4, the most common problem encountered by farmers are lower price which can be solved by collectivism and contract farming.

Problems encountered by Wholesalers: Reflected in table no.5, the most common problem encountered by wholesalers are lack of grading facility which could be work out by providing infrastructure-related schemes.Grading improves the self-life and quality of the okra, resulting in a better price earned by the wholesaler(Prakash, 2014).

Problems encountered by Retailers: Reflected in table no.6, the most common problem encountered by retailers are large no. of intermediaries it could be solved by providing general B2B platforms.

Problems encountered by private companies: Reflected in Table 7, the most common problems encountered by the private companies are delays in paymentand sale proceeds, which could be solved by providing early payment discounts and establishing an efficient centralized system.

3. CONCLUSION

Due to the high okra cultivation, a number of private companies have opened collecting centres around Padra and Karjan talukas. Most farmers in the Vadodara district follow chemical farming, and the majority of them cultivate the Radhika variety of okra due to its high yield and disease resistance power. Farmers in the Vadodara district have an average of four years of okra farming expertise. Channel I reflected very small proportion of the agricultural commodities which moved directly from producers to consumers, while Channel II reflected the most common supply chain of okra in June and July.Both Channel III & IV are working at rural level. Big basket followed the marketing Channel V in the Vadodara area to continuously buy okra at the farm level. If okra is not accessible at the farm level, Bigbaket will use the VI Channel as alternative. Out of these six marketing channels, Channel I has the best marketing efficiency, but it is not realistic to sell all produce through this channel. However, channel V marketing efficiency is around 68% and is a practically feasible channel due to the lower number of intermediaries. So it is concluded that lesser the number of intermediaries higher will be the marketing efficiency. In Vadodara district farmers encountered lower price problem which can be solved by collectivism and contract farming; wholesalers have an issue of grading facilities which could be work out by providing infrastructure-related schemes; Retailers encountered problems like large number of intermediaries and it could be solved by providing B2B platforms whereas private companies encountered problem like delay in payment and sale proceeds which could be solved by providing early payment discount and by establishing an efficient centralized system respectively.

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COMPETING INTERESTS

"Authors have declared that no competing interests exist.".

AUTHORS' CONTRIBUTIONS

The work was carried out in collaboration between all authors. Author Sahil Gondaliya is the main author of this work. He along with the author Snehal Mishra designed this study. Authors Sahil Gondaliya, Montu Bhatiya, and VishalVaghasiyahave done survey and analysis. Author Sahil Gondaliya wrote the draft of the manuscript.Author Navin Venkat helped in the making of results and discussions. Author Snehal Mishra checked the draft manuscript and made the final manuscript. Author DenishZalavadiya managed the literature searches. All authors read and approved the final manuscript.

REFERENCES

1. **Acharya, S. S., & Agrawal, N. L. (2011).** Agricultural marketing in India (Fifth Edition). New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.
2. **Baba, S., & Wani, M. (2010).** Marketed Surplus and Price Spread of Vegetables In Kashmir Valley. Agricultural Economics Research Review, 23,115-127.
3. **Deliya, M., Thakor, C., & Parmar, B. (2013).** Differentiator In Marketing of Fresh Fruits and Vegetables From Supply Chain Management Perspective. National Monthly Refereed Journal of Reasearch In Commerce & Management, 1(3), 40-57.
4. **Food And Agriculture Organization of The United Nations. (2022, June 15).** Retrieved From Faostat: Https://Www.Fao.Org/Faostat/En/#Home
5. **Ministry of Agriculture & Farmers' Welfare. (2022, June 17).** Retrieved From Department of Agriculture & Farmers' Welfare: Https://Agricoop.Nic.In/En
6. **Ministry of Agriculture & Farmers' Welfare. (2022, June 15).** Retrieved From National Horticulture Board: Https://Www.Nhb.Gov.In/
7. **Prakash, K. (2014).** An Analysis of Supply Chain of Tomato From Farm To Retail Outlets For Spencers Retail Outlets In Bangalore City. International Journal of Commerce And Business Management, 7(2), 243-250.
8. **Saikul, I., Faruq, N., Chowdhury, M., Shahjahan, M., & Kabir, K. (2015).** Value Chain Analysis of Exportable Okra (Abelmoschus Esculentus L.) From Bangladesh. A Scientific Journal of Krishi Foundation, 1(13), 133-139.
9. **Sharma, M., & Chandrashekar, H. (2021).** Analysis of Supply Chain Management of Fruits and Vegetables In Mysore District. Gorteria Journal, 34(2), 120-122.