



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(8): 1925-1930
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www.thepharmajournal.com
Received: 01-05-2023
Accepted: 07-06-2023

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Post-harvest losses in retail fruit marketing in Konkan region of Maharashtra: An economic analysis

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Abstract

The study entitled Post-harvest losses in retail fruit marketing in Konkan region of Maharashtra: an economic analysis was undertaken to assess season wise availability, annual purchase, wastage, sale, cost and return of fruits. 45 fruit vendors from three tahsils of Ratnagiri district of south Konkan region selected for study. The result revealed that fruits Dates (dry), Orange, Kiwi, Pineapple, Banana, Pomegranate, Tender Coconut, Sweet lime, Sapota were available throughout the year. The percentage of average wastage in fruits at retailer level was 12.56 percent. The total cost incurred retail marketing was Rs. 1779835 and gross returns were Rs. 1952281 resulting into net income to the extent of Rs. 172446. The ratio of cost returns was 1:1.10.

Keywords: Konkan, losses, retail, fruit marketing, economic

Introduction

India is known as Fruit and vegetable basket of the world. It is second largest producer of overall fruits and vegetable production in the world, after China. In spite of being a major producer of fruit, the per capita availability of fruits is lower at 200 gm per day than the recommended level of 400 gms. One of the reasons attributed to lower availability is the larger quantity of post-harvest losses (18-20 percent FAO, 2021) that occurs at various stages of marketing. This makes adverse effect on income of producers as well as consumers. The objective of the present study was to assess the marketing of retail mango and other fruit and problems of vendors. The 45 fruit vendors from three tehsils of Ratnagiri district were interviewed through specially designed schedule during agricultural year 2022. It has been observed that the vendors purchase about 28 types of fruits, in a year and spare a relatively smaller amount each of the fruit according to their seasonal availability, which indicates their market awareness and appropriate knowledge of various fruits and their seasonal availability.

Materials and Methods

In present study 45 fruit vendors were interviewed from Chiplun, Dapoli and Khed cities in Ratnagiri district. Out of total sample maximum vendors (55.56%) were hand cart vendors followed by hired shops vendors (37.78%) and owned shop fruit Salers (6.67%). The owned shop fruit Salers were very small in number (3) hence they were excluded from study. Finally 21 Hand Cart vendors and 21 Hired shop owners were selected for study, consisting seven vendors of each type from each Tahasil. The data was collected for year 2022.

Season wise availability of fruits

The information regarding season wise availability of fruits sale in study area is depicted in the Table 1. It can be observed from table that apple was available throughout year, in which apple from Himachal Pradesh was sold during September to December, Similarly apple from Kashmir was sold during November and December. The imported apple was also reported to from USA, Turkey, Iran, Chilli and sold during January to August. Pear, Nashpati and Naka were available during September to December. The Dates (dry), Orange, Kiwi, Pineapple, Banana, Pomegranate, Tender Coconut, Sweet lime, Sapota were available throughout the year.

In case of mango it was observed that Totapuri, Dashhari, Lalbaug, Nilam, Badam, Payari and Alphonso were found to be sold in the study area. The Alphonso was sold during January to May. The Lalbaug and Badam were sold during

March to July. The Totapuri and Dashhari were found to be available during June to September. The Nilam was available during July to August and Payari was sold during March to May.

Table 1: Season wise availability of fruits in study area.

Sr. No.	Name of Fruit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Apple	*								*	*	*	*
												*	*
		*	*	*	*	*	*	*	*				
2	Pear									*	*	*	*
		*	*	*	*	*	*	*	*				
3	Nashpati									*	*	*	*
4	Grapes	*	*										
5	Grapes	*	*	*	*								*
6	Mango						*	*	*	*			
							*	*	*	*			
				*	*	*							
7	Dates (dry)	*	*	*	*	*	*	*	*	*	*	*	*
8	Dates fresh (Ola)							*	*	*			
9	Orange	*	*	*	*	*	*	*	*	*	*	*	*
10	Kiwi	*	*	*	*	*	*	*	*	*	*	*	*
11	Pineapple	*	*	*	*	*	*	*	*	*	*	*	*
12	Malta												
13	Sweet lime (Mosambi)	*	*	*	*	*	*	*	*	*	*	*	*
14	Naka									*	*	*	*
15	Cherry										*	*	*
16	Dragon fruit												
17	Sapota	*	*	*	*	*	*	*	*	*	*	*	*
				*	*	*							
18	Guava	*	*	*	*	*	*	*	*	*	*	*	*
19	Straw-berry	*	*										
20	Water-melon	*	*	*	*	*	*						*
21	Tender coconut	*	*	*	*	*	*	*	*	*	*	*	*
22	Muskmelon (Tarbuj)			*	*	*							
23	Ber (Chameli)	*	*										
24	Ber Pandharpuri	*	*										
25	Pomegranate	*	*	*	*	*	*	*	*	*	*	*	*
26	Alubukhar							*	*	*			
27	Banana Sonkeli	*	*	*	*	*	*	*	*	*	*	*	*
		*	*	*	*	*	*	*	*	*	*	*	*
28	Papaya	*	*	*	*	*	*	*	*	*	*	*	*

Purchase of fruits

The information regarding annual per vendor purchase of fruits is given in table 2. It was observed from table 2 that the per vendor total annual purchase of all 27 types of fruits was Rs. 1649967. In case of mango the per vendor annual purchased quantity of Totapuri was 12.54 crates of 25 Kg each.

The mango variety "Dashhari" was purchased to the extent of 10.04 crates of 25.00 Kg each accounting to Rs. 18181.

The Lalbaug mango variety was also purchased about 16.10 crates of 20 Kg packings (Rs.31430). The 12.00 crates of 25.00 each, were estimated to be purchased in case of Nilam variety (Rs. 20651). The mango variety "Badam" was purchased to the extent of 11.94 crates of 20.00 Kg each. The Payari variety was purchased in two dozen boxes and 11.97 dozen were purchased at the rate of 218 per dozen (Rs. 2612). The 213.07 dozens of Alphonso variety of mango was purchased at average rate of Rs. 301 per Kg.

Table 2: Per Vender annual purchase of fruits by fruit vendors/ retailers.

Sr.No	Fruit Name	Packing (weight)	Unit	Qty	Rate (Rs.)	Purchase Amount (Rs.)	Percent
1	Apple	24.00	kg	15.02	2148	32269	1.96
		13.50	kg	39.75	1098	43600	2.64
		18.00	kg	63.99	2796	178916	10.84
2	Per	30.00	kg	8.09	3588	29024	1.76
		12.50	kg	16.12	2548	41078	2.49
3	Nashpati	15.00	kg	7.98	1033	7980	0.48
4	Grapes	10.00	kg	24.03	1295	29567	1.79
		15.00	kg	47.51	950	45181	2.74
5	Mango	25.00	kg	12.54	1748	21923	1.33
		25.00	kg	10.04	1811	18181	1.10

		20.00	kg	16.10	2328	31430	1.90
		25.00	kg	12.00	1721	20651	1.25
		20.00	kg	11.94	1558	18603	1.13
			DZ	11.97	218	2612	0.16
			DZ	213.07	301	64034	3.88
6	Dates (Dry)	50.00	kg	11.24	3999	44944	2.72
7	Dates fresh (Ola)	10.00	kg	12.04	951	10813	0.66
8	Orange	15.00	kg	52.73	1349	87259	5.29
9	Kiwi	18.00	kg	239.07	85	20345	1.23
10	Pineapple		DZ	12.05	749	9025	0.55
11	Malta	15.00	kg	11.94	1750	20894	1.27
12	Mosambi	18.00	kg	12.16	1249	15182	0.92
13	Naka	15.00	kg	8.53	1807	15416	0.93
14	Cherry	0.20	kg	60.74	349	21196	1.28
15	Dragon fruit		Nos.	241.82	85	20605	1.25
16	Sapota	10.00	kg	48.31	651	34561	2.09
		1.00	kg	120.53	42	5012	0.30
17	Guava	15.00	kg	48.01	825	39627	2.40
18	Strawberry	1.00	kg	480.16	208	99310	6.02
19	Watermelon	1.00	kg	5027.83	27	137059	8.31
20	Tender coconut		Nos.	3602.48	35	125979	7.64
21	Muskmelon (Tarbuj)	1.00	kg	65.28	45	2954	0.18
22	Ber (Chameli)	1.00	kg	185.32	41	7502	0.45
23	Ber Pandharpuri	1.00	kg	80.54	90	7216	0.44
24	Pomegranate	1.00	kg	481.04	92	44049	2.67
25	Alubukhar	4.00	kg	60.34	626	39725	2.41
26	Banana Sonkeli	10.00	kg	95.82	675	64697	3.92
		18.00	kg	365.24	451	164563	9.97
27	Papaya	15.00	kg	48.52	556	26989	1.64

The quantity of dates (dry) and dates (fresh) purchased was 11.24 bags of 50.00 Kg each and 12.04 cartoons of 10.00 Kg each, respectively. It was observed that the quantity of orange purchased in year was about 52.73 crates weighing 15.00 Kg each. The 239.07 containers of kiwi fruit was found to be purchased in a year.

The other fruits sold by retail vendors were Naka, Cherry, Dragon fruit, Sapota, Guva, Strawberry, Watermelon, Tender coconut, Muskmelon, Ber, Pomengranet, Alubukhar, Banana and Papaya. The total annual expenditure on purchase of all the fruits was Rs. 1649967 out of which maximum expenditure was incurred on purchase of imported apple. Rs.

178916, followed by Banana (Rs. 164563), Watermelon (Rs. 137059) and Tender coconut (Rs. 125979). It was concluded that the vendors purchase about 28 types of fruits, in a year and spare a relatively smaller amount each of the fruit according to their seasonal availability, which indicates their market awareness and appropriate knowledge of various fruits and their seasonal availability.

Wastage of fruits in retail marketing

The information regarding wastage of fruits in retail marketing is given in table No. 3

Table 3: Wastage of fruits in retail marketing

Sr. No.	Fruit Name	Unit	Quantity purchased	Wastage	Quantity Sold	Wastage (%)
1	Apple	kg	359.50	44.75	314.75	12.45
		kg	536.63	76.95	459.68	14.34
		kg	1151.82	125.57	1026.25	10.90
2	Per	kg	240.59	40.68	199.91	16.91
		kg	201.50	31.89	169.61	15.83
3	Nashpati	kg	119.70	15.96	103.74	13.33
4	Grapes	kg	240.30	12.02	228.29	5.00
5	Grapes	kg	712.65	147.05	565.60	20.63
6	Mango	kg	313.50	40.11	273.39	12.79
		kg	251.00	20.15	230.85	8.03
		kg	321.99	41.31	280.68	12.83
		kg	300.00	39.05	260.95	13.02
		kg	238.80	25.18	213.62	10.54
		DZ	11.97	0.97	11.00	8.10
		DZ	213.07	28.52	184.48	13.39
7	Dates fresh	kg	120.40	16.02	104.38	13.31
8	Orange	kg	790.95	156.33	634.62	19.76
9	Kiwi	kg	239.07	26.42	212.65	11.05
10	Pineapple	DZ	12.05	0.50	11.55	4.15
11	Malta	kg	179.10	35.82	143.28	20.00
12	Sweet lime	kg	218.88	50.18	168.70	22.93
13	Naka	kg	127.95	15.00	112.95	11.72

14	Cherry	kg	12.15	0.00	12.15	0.00
15	Dragon fruit	Nos	241.82	60.46	181.37	25.00
16	Sapota	kg	483.10	95.59	387.51	19.79
		kg	120.53	19.54	100.99	16.21
17	Guava	kg	720.15	111.02	609.13	15.42
18	Strawberry	kg	480.16	114.00	366.16	23.74
19	Watermelon	kg	5027.83	201.55	4826.28	4.01
20	Muskmelon (Tarbuj)	kg	65.28	15.14	50.14	23.19
21	Ber (Chameli)	kg	185.32	20.10	165.23	10.84
22	Ber Pandharpuri	kg	80.54	10.00	70.54	12.42
23	Pomegranate	kg	481.04	144.31	336.73	30.00
24	Alubukhar	kg	241.36	48.27	193.09	20.00
25	Banana Sonkeli	kg	958.24	75.22	883.02	7.85
	Banana	kg	6574.32	991.11	5583.21	15.08
26	Papaya	kg	727.80	30.08	697.72	4.13
		Total	23301.05	2926.81	20374.18	12.56
27	Tender coconut	Nos	3602.48	0.00	3600.00	0.00
28	Dates (Dry)	kg	562.00	0.00	550.91	0.00

It is observed from table that in case of tender coconut and dates (dry) there was no any wastage during retail marketing. It was revealed from table that out of total purchased quantity i.e. 23301.05 Kg the wastage of quantity was 2926.81 Kg and actual quantity sold was 20374.18. The percentage of average wastage in fruits at retailer level was 12.56 percent. Among the various fruits maximum wastage was found in case of Pomegranate (30%) followed by Dragon fruit (25%), Strawberry (23.74%), Muskmelon (23.19%), Grapes (20.63%), Alubukhar (20%), Sapota (19.79%), Orange (19.76%), Banana (15.08%) Pear (15.83%). It was concluded that the wastage in retail marketing is substantial (12.56%) and the ways means should be examined to reduce it so that

the net income of vendors could be increased.

Sale of fruits

The information regarding annual sale of fruits by retail fruit Salers is given in table. 4.

It was observed from table that the total sale receipt received from fruit sale was Rs. 1952281. Out of which maximum income Rs. 300062 (15.37%) was received from apples. Out of total income from apples, the imported apples accounted maximum 64 percent followed by Kashmir apples 20.60 percent and Himachal apple 15.01 percent. The banana ranked second in sale receipts. The total sale from banana was Rs. 244174 (12.51%).

Table 4: Annual Sale of fruits by vendors/retailers.

Sr. no	Fruit Name	Unit	Qty	Rate	Amount	Percent
1	Apple	kg	314.75	143	45059	2.31
		kg	459.68	134	61822	3.17
		kg	1026.25	188	193181	9.90
2	Per	kg	199.91	161	32231	1.65
		kg	169.61	241	40851	2.09
3	Nashpati	kg	103.74	126	13099	0.67
4	Grapes	kg	228.29	177	40315	2.07
5	Grapes	kg	565.60	105	59297	3.04
6	Mango	kg	273.39	100	27339	1.40
		kg	230.85	100	23085	1.18
		kg	280.68	147	41329	2.12
		kg	260.95	101	26419	1.35
		kg	213.62	125	26703	1.37
		DZ	11.00	352	3877	0.20
		DZ	184.48	357	65951	3.38
7	Dates (Dry)	kg	550.91	121	66914	3.43
8	Dates fresh (Ola)	kg	104.38	127	13259	0.68
9	Orange	kg	634.62	136	86485	4.43
10	Kiwi	kg	212.65	119	25320	1.30
11	Pineapple	DZ	11.55	1104	12750	0.65
12	Malta	kg	143.28	191	27405	1.40
13	Sweet lime	kg	168.70	118	19966	1.02
14	Naka	kg	112.95	150	16984	0.87
15	Cherry	kg	12.15	403	4894	0.25
16	Dragon fruit	Nos	181.37	110	19954	1.02
17	Sapota	kg	387.51	105	40657	2.08
		kg	100.99	90	9045	0.46
18	Guava	kg	609.13	91	55565	2.85
19	Strawberry	kg	366.16	305	111706	5.72
20	Watermelon	kg	4826.28	35	166941	8.55
21	Tender coconut	Nos	3600.00	49	177768	9.11
22	Muskmelon (Tarbuj)	kg	50.14	76	3825	0.20

23	Ber (Chameli)	kg	165.23	70	11626	0.60
24	Ber (Pandharpuri)	kg	70.54	121	8537	0.44
25	Pomegranate	kg	336.73	145	48910	2.51
26	Alubukhar	kg	193.09	210	40471	2.07
27	Banana	DZ	1151.00	60	69083	3.54
		DZ	3403.80	51	175091	8.97
28	Papaya	kg	697.72	55	38570	1.98
	Total				1952281	100

The mango ranked second income earning fruit for retailer. The total sale of mango fruit was estimated to Rs. 214702 (11.00 %). Amongst the mango varieties maximum sale (30.72%) was in case of Alphonso mango, followed by Lalbaug (19.25 %), Totapuri (12.73%) and Nilam (12.30%). Amongst the fruits, other than a Mango, Alphonso and Banana the sale was maximum in case of Tender coconut Rs. 1177768 (9.11%) followed by Watermelon Rs. 166941 (8.55%), Strawberry Rs. 111706 (5.72%), Grapes (black + green) Rs. 99612 (5.10%), Dates (dry) Rs.66914 (3.43%) and Pear (Himachal plus imported) Rs. 73082 (3.74 %), Sapota Rs. 249701 (2.55%). Amongst total 28 types of fruits. It was concluded that the, Apple, Banana, Mango, Tender coconut, Watermelon, Orange, Sapota, Grapes were fruits in which sale was found to be higher extent than other fruits.

Cost and returns

The information about cost incurred and returns received in retail marketing of fruits is depicted in table 5.

It was observed from table the total cost incurred retail marketing was Rs. 1779835 and gross returns were Rs. 1952281 resulting into net income to the extent of Rs. 172446. The ratio of cost returns was 1:1.10. Amongst the total cost in retail fruit marketing business maximum cost was incurred for purchase of fruits Rs. 1649967 (92.70%) followed by labour charges Rs. 91635 (5.15%). The total variable cost was 1771495 (99.53%) and total fixed cost was Rs. 8340 (0.47%). It was concluded that retail fruit marketing is remunerative business.

Table 5: Cost incurred and returns received by vendor /retailer in marketing of fruits in study area.

Sr. No	Particulars	RS.	Percent
Variable cost			
1	Cost of fruits	1649967	92.70
2	Tax, Nagar Parishad, Nagar Panchayat	1230	0.07
3	Labour charges (305.45 days)	91635	5.15
4	Electricity, battery etc	1352	0.08
5	Fuel, local transport	12250	0.69
6	Weights and measures validation	1128	0.06
7	working capital	1757563	98.75
8	Interest on working capital	13933	0.78
	Total variable cost	1771495	99.53
Fixed cost			
1	Interest on fixed capital (crates, vehicle, racks, cart)	6914	0.39
2	Depreciation	1426	0.08
3	Total fixed cost	8340	0.47
C	Total cost	1779835	100.00
D	Gross income	1952281	
E	Net income	172446	
	Ratio of cost returns	1:10	

Reduction of income due to fruit wastage

An attempt has been made to work out the wastage of fruits in retail marketing.

The information regarding reduction of income due to fruit wastage is presented in table 6.

Table 6: Annual reduction of income of retailers/vendors due to fruit wastage.

Sr. No	Particulars	Unit	Rs./percent
A	Value of purchased fruits	RS	1649967
B	Value of sold fruits	RS	1952281
C	Value of wastage fruits	RS	307789
	Total B+C	RS	2260070
D	Percentage of reduction in income due to fruit wastage	Percent	13.62

It was observed from table that the value of purchased fruit was Rs. 1649967 and value of actually fruits sold was estimated to Rs. 1952281. The value of wastage of fruits as per selling rates was worked out to Rs. 307789, if we assume there is no wastage of fruits then the total income earned would have been Rs. 2260070. However, as there a fruit wastage is about 12.56 percent of total quantity of fruits, the

actual reduction of income was worked out to 13.62 percent, which need to be reduced to maximum possible extent.

Problems and suggestions

The information regarding problems in retail marketing and suggestions from fruit vendors is given are table 7.

Table 7: Problems faced by retailers /vendors in marketing of fruits and their suggestions

Sr. No.	Particulars	Nos.	Percent (%)
Problems			
1	Unavailability of permanent fruit market	38	90.48
2	No bank CC and finance is difficult	11	26.19
3	supply from cold storage at later stage	28	66.67
4	More wastage of fruits	42	100.00
5	More wastage due to more handling of fruits (vendor)	20	47.62
Suggestions			
1	Fruit Mandi, or permanent market place at ground floor	39	92.86
2	Customized portable light weight, ventilated racks or some Moulded structures is essential.	4	9.52

The 100 percent vendors opined the problem of wastage of fruits in retail marketing. The other problems opined by the fruit vendors were supply of fruit from cold storage at later stage of total of fruit preservation period (66.67%). The 47.62 percent vendors also said that fruit wastage is mainly due to more handling of fruits. The 26.19 percent vendors opined the difficulty in getting finance from bank and or getting cash credit from the bank. It was concluded that the fruit wastage is major problem of fruit and it need to be addressed.

The suggestions given by the fruit vendors were permanent place of marketing and requirement of customized racks. The maximum (92.86 %) fruit vendors opined that a fruit mandi and or permanent market places at various parts of cities at ground floor need to be provided for fruit selling. It will facilitate for less handling of fruits and ultimately reduction of fruit wastage which will in turn increase net income in retail fruit marketing. The 9.52 percent vendors also opined for requirement of customized portable light, weight, ventilated racks or some molded structure is essential for proper display of fruits which will also help for reduction of fruit wastage.

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