
Divergence of Prices and Horizontal and Vertical Integration of Supply Chain for Onion in Maharashtra: A Variety-wise Analysis

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ABSTRACT

There are generally wide fluctuations in the monthly prices of onion, which lead to seasonality and which cause a perpetual concern to producers. Added to this, fluctuations in annual prices, which are generally cyclical in nature, also affect the export performance. These facts make it necessary to understand the nature of these fluctuations and the present study is an attempt in this direction. It examines the divergence among farm harvest prices, wholesale prices, retail prices and export prices and horizontal and vertical integration of supply chain for various varieties of onion crop in the state of Maharashtra of India. The study showed highly profitable nature of onion crop cultivation since cultivation of onion generated 76.67 per cent per quintal net returns over per quintal variable cost during *kharif* season and 64.48 per cent per quintal net returns over per quintal variable cost during *rabi* season. The study also showed that the producer's share in consumer's rupee for onion varied from 49 per cent to 52 per cent in domestic market for various varieties, and this share in export channel varied from 30 per cent to 35 per cent. Further, the study revealed that onion prices remained at lower ebb during harvesting/peak period and high during lean period. One of the major factors responsible for lower share of producer in retail and export prices of onion was the higher cumulative marketing margins cornered by various market functionaries within the channel. The situation is unlikely to be altered unless various regulative measures are brought in place to check practices of these functionaries involved in the marketing of high value crops. The study emphasised upon the need to develop adequate post-harvest infrastructure facilities for high value crops in order to protect farmers from undue low prices for their produce. Public and private sector investment initiatives towards creation of adequate post-harvest infrastructure facilities will certainly boost horticulture crop production and marketing, both in domestic and export markets. One of the major recommendations of this study is in favour of the announcement of MSP for *rabi* onion, which has longer shelf life. The government support for *rabi* onion will not only protect the farmers but also the consumers.

Keywords: Price divergence, Trade, Value chain, Intermediaries, Export.

JEL: Q11, Q13, Q17.

I

INTRODUCTION

Horticultural commodities are subjected to high price volatility due to lack of storage, transportation and processing facilities, apart from weather and institutional risks. Weak supply chain and market inefficiencies also influence prices of these high value commodities. High price variability in case of primary products not only affects producers but also consumers, which in turn affect other sectors, resulting in high

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inflation in the economy (Chengappa *et al.*, 2012). The producers are also seen to be exposed to market risk due to lack of market intelligence regarding demand, supply and price prevailing in various market centres. Many researchers in the past have raised the issue of availability of adequate market intelligence system for agricultural commodities (Kalloo and Pandey, 2002; Singh *et al.*, 2004).

The efficiency of marketing of fruits and vegetables in India is always a matter of concern since inadequate market infrastructure coupled with lack of marketing efficiency not only lead to high and fluctuating consumer prices but also lower the share of producer in consumer prices (Gandhi and Namboodiri, 2002). Fruits and vegetables also show high proportion of wastage, quality deterioration due to high perishability and frequent mismatch between demand and supply not only spatially but also over time (Subbanarasiah, 1991; Singh, 1985).

There are generally wide fluctuations in the monthly prices of onion, which lead to seasonality and which cause a perpetual concern to producers. Fluctuations in annual prices, which are generally cyclical in nature, also affect the export performance. An increase in price of onion affects the consumer by way of increase in food consumption budget, while a decrease in onion prices below the cost of cultivation affects the producer (Chengappa *et al.*, 2012). In the light of this background, the study attempts to examine divergence among farm harvest prices, wholesale prices, retail prices and export prices and horizontal and vertical integration of supply chain for various varieties of onion crop in the state of Maharashtra of India.

II

DATABASE AND METHODOLOGY

The study was conducted in three districts belonging to Western Maharashtra region of India, which account for bulk of onion cultivation of India. Based on higher allocation of area under onion, the districts of Pune, Ahmednagar and Nasik were selected for primary data collection. From each of the selected sampled districts, one taluka was selected based on higher area allocation under the reference crop. A further stratification included selection of two villages from each taluka/district for canvassing the questionnaire. It was decided to select a sample of 25 farmers from each of the selected six sampled villages. Therefore, a complete enumeration of the six villages was done with a view to further categorise the farmers into small (less than 2 hectares), medium (2-4 hectares) and large (above 4 hectares). The probability proportion to sample size technique (PPS) was used for further selection of farmers under each of the land holding size category. The number of sampled farmers selected from six villages of Pune, Ahmednagar and Nasik districts encompassed 113 in small category, 25 in medium and 12 in large category with a sum of 150 farmers drawn from three selected districts. The agricultural year 2013-14 was considered as the reference period for data collection on relevant parameters.

The study also covered wholesalers, retailers and exporters of onion crop. In this study, 10 wholesalers and 10 retailers were selected from Pune. Apart from wholesalers and retailers, 10 exporters of onion were also selected from Pune and Mumbai. Separate questionnaires were used for the collection of data from farmers, wholesalers, retailers and exporters. The information collected from wholesalers, retailers and exporters of onion chiefly encompassed sources of their supply, their trade details with respect to average purchase price, sale price, markup, etc., and ranking of problems faced by them.

III

EMPIRICAL FINDINGS

The empirical findings of this investigation revolve around cropping pattern of sampled farmers, variety-wise area under onion crop on sampled farms, percentage profit for onion for major varieties, wholesale, retail and export trade details of onion along with price divergences at each level, and price spread in domestic and export markets for major varieties of onion evaluated through horizontal and vertical integration of supply chain.

Cropping Pattern of Onion Farmers

The cropping pattern of irrigated area differs from the cropping pattern of un-irrigated area. While high value commercial field crops are usually grown under irrigated conditions, low value subsistence crops find place under rainfed conditions. The information on area allocation under different crops grown under different seasons by the onion farmers is provided in Table 2.

All the categories of sampled onion farmers put together showed a net sown area of 224.51 hectares in *kharif* season, which encompassed 49.29 hectares of area under *kharif* onion, 69.18 hectares under bajra, 51.64 hectares under mung, and 54.40 hectares under other *kharif* crops like jowar, maize, tur, urad, groundnut, green pea, fodder crops, etc. (Table 1). The net sown area with all the sampled onion growing farmers put together was estimated at 196.04 hectares in *rabi* season, which encompassed 111.48 hectares under *rabi* onion, 45.08 hectares under jowar, 17.79 hectares under wheat, and 21.69 hectares under other *rabi* crops like maize, gram, groundnut, sunflower, potato, Lucerne, etc. The area under perennial crops with all the onion farmers put together was estimated at 55.69 hectares, which encompassed 33.68 hectares under pomegranate, and 22.00 hectares under other perennial crops like sugarcane, grape, etc.

Thus, onion crop predominated the cropping pattern of sampled farmers since the average category of farmer showed 22 per cent of net sown area under onion crop in *kharif* and as high as 57 per cent in *rabi* season. The area under onion crop as proportion of gross cropped area (GCA) was also high and the average category of onion farmers showed 10 per cent of GCA under onion crop in *kharif* and 23 per cent of GCA under onion crop in *rabi* season.

TABLE 1. CROPPING PATTERN OF ONION GROWING FARMERS – OVERALL SEASONS
(area in ha)

Category (1)	Area sown														
	Kharif season					Rabi season					Perennial crops				
	Onion (2)	Bajra (3)	Mung (4)	Others (5)	Total (6)	Onion (7)	Jowar (8)	Wheat (9)	Others (10)	Total (11)	Pomegranate (12)	Others (13)	Total (14)	G. Total (15)	
Small	33.10 (12.33)	42.06 (15.67)	29.07 (10.83)	22.53 (8.39)	126.76 (47.22)	74.23 (27.65)	20.45 (7.62)	8.79 (3.27)	13.47 (5.02)	116.94 (43.56)	17.87 (6.66)	6.88 (2.56)	24.75 (9.22)	268.44 (100.0)	
Medium	10.32 (9.87)	12.75 (12.19)	11.66 (11.14)	13.95 (13.33)	48.68 (46.52)	18.02 (17.22)	10.96 (10.48)	4.35 (4.16)	4.82 (4.61)	38.15 (36.46)	10.96 (10.48)	6.84 (6.54)	17.81 (17.02)	104.64 (100.0)	
Large	5.87 (5.69)	14.37 (13.93)	10.91 (10.58)	17.91 (17.37)	49.07 (47.57)	19.23 (18.64)	13.66 (13.25)	4.66 (4.51)	3.40 (3.30)	40.95 (39.70)	4.86 (4.71)	8.28 (8.03)	13.14 (12.74)	103.16 (100.0)	
Total	49.29 (10.35)	69.18 (14.53)	51.64 (10.84)	54.40 (11.42)	224.51 (47.14)	111.48 (23.41)	45.08 (9.47)	17.79 (3.74)	21.69 (4.55)	196.04 (41.16)	33.68 (7.07)	22.00 (4.62)	55.69 (11.69)	476.23 (100.0)	

Note: In Kharif Season, 'Others' include crops, viz., Jowar, Maize, Tur, Udid, Groundnut, Green Pea, Hulga, Moth Bean, Lucerne, Kadwal and Grass. In Rabi Season, 'Others' include crops, viz., Maize, Gram, groundnut, sunflower, potato, Kadwal, Lucerne, etc. Under Perennial crops, 'Others' include crops viz. Grape, Orange, Sugarcane, Chiku, and Mango.

Area under Onion Crop – Variety-wise

The onion farmers were seen to cultivate large number of varieties of onion on their farms. The variety of onion cultivated during *kharif* and *rabi* seasons differed across various categories of farmers with the sole exception of some varieties. Estimates relating to variety-wise area under onion crop for different categories of onion farmers are provided in Table 2 (A) and (B).

Although the number of varieties of onion cultivated by farmers during *kharif* and *rabi* seasons were wide, the general trend showed major area allocation under Nasik Lal and Panchganga varieties of onion during *kharif* season and Fursungi and NashikLal varieties of onion during *rabi* season. Further, a critical evaluation of area allocation under various varieties of onion revealed that the onion farmers allocated much larger area under *rabi* season as against *kharif* season. This was mainly due to much longer shelf life of *rabi* onion. Due to better quality and longer shelf life, *rabi* onion fetches much higher price as against *kharif* onion.

The average category of onion farmers allocated 43 per cent of the total *kharif* onion cropped area under Nashik Lal variety and 36 per cent under Panchganga variety. Similarly, the average category of sampled onion farmers allocated 60 per cent of their total *rabi* onion cropped area under Fursungi variety and 19 per cent under Nashik Lal variety. Therefore, onion farmers showed high proportion of area only under couple of varieties during both *kharif* and *rabi* seasons. Due to significantly higher allocation of onion cropped area under Nasik Lal and Panchganga varieties in *kharif* season and Fursungi and Nasik Lal varieties in *rabi* season, the present investigation is confined to value chain analysis for these varieties of *kharif* and *rabi* onion.

Farmer's Percentage Profit for Onion

Based on field level survey, the estimates relating to proportion of profit involved in the cultivation of Nasik Lal and Panchganga varieties of onion in *kharif* season and Fursungi and Nasik Lal varieties of onion in *rabi* season for various categories of farmers are shown in Table 3.

The onion farming was found to be reasonably profitable proposition. The estimates showed that the return over variable cost (ROVC) for Nasik Lal variety of onion in *kharif* season varied significantly across land holding size categories, and variation was seen from Rs.361/qtl for medium category to Rs.480/qtl for small category with an average of Rs.456/qtl for the average category of farmers. In general, the average category of sampled onion farmers generated 91.44 per cent of per quintal net returns/profit over per quintal variable cost in the cultivation of Nasik Lal variety of onion in *kharif* season. As for Panchganga variety of onion grown during *kharif* season, the ROVC decreased with the increase in land holding size of sampled farmers with a decline in the same from Rs.398/qtl for small category to

TABLE 2 (A). AREA UNDER ONION CROP IN *KHARIF* SEASON – VARIETY-WISE

Category (1)	Variety-wise area under onion crop (ha)											
	Baju 258 (2)	Chandwad (3)	Fursungi (4)	Lonand (5)	Mahabij (6)	Malav (7)	N.53 (8)	Nashik Lal (9)	Pandhganga (10)	Prema (11)	Total (12)	
Small	0.40	-	2.95	-	-	0.40	2.23	17.57	8.74	0.81	33.10	
Medium	-	0.40	-	0.40	-	1.01	-	3.85	4.66	-	10.32	
Large	-	-	-	-	1.62	-	-	-	4.25	-	5.87	
Total	0.40	0.40	2.95	0.40	1.62	1.42	2.23	21.42	17.64	0.81	49.29	
					Share in total area (per cent)							
Small	1.21	-	8.91	-	-	1.21	6.74	53.08	26.40	2.45	100.0	
Medium	-	3.88	-	3.88	-	9.79	-	37.30	45.15	-	100.0	
Large	-	-	-	-	27.60	-	-	-	72.41	-	100.0	
Total	0.81	0.81	5.98	0.82	3.29	2.88	4.52	43.46	35.79	1.64	100.0	

TABLE 2 (B). AREA UNDER ONION CROP IN *RABI* SEASON – VARIETY-WISE

Category (1)	Variety-wise area under onion crop (ha)												
	Bhagwa (2)	Chandwad (3)	Fursungi (4)	Double Pati (4)	Fursungi (5)	Halwa (6)	Lasalgaon (7)	Mahabij (8)	N.53 (9)	Nashik Lal (10)	Pandhganga (11)	Simmor Ghavti (12)	Total (13)
Small	0.61	0.51	0.57	0.57	44.67	2.43	1.62	0.81	1.62	17.56	1.62	2.23	74.23
Medium	-	-	-	-	14.57	-	-	-	-	2.83	-	0.61	18.02
Large	-	-	-	-	14.37	-	-	-	-	0.81	4.05	-	19.23
Total	0.61	0.51	0.57	0.57	73.62	2.43	1.62	0.81	1.62	21.21	5.67	2.83	111.48
					Share in total area (per cent)								
Small	0.82	0.68	0.76	0.76	60.17	3.27	2.18	1.09	2.18	23.66	2.18	3.00	100.0
Medium	-	-	-	-	80.90	-	-	-	-	15.73	-	3.37	100.0
Large	-	-	-	-	74.74	-	-	-	-	4.21	-	-	100.0
Total	0.55	0.46	0.51	0.51	66.03	2.18	1.45	0.73	1.45	19.02	5.08	2.54	100.0

Rs.320/qtl for large category. The average ROVC for Panchganga variety of onion was estimated at Rs.367/qtl. The average proportion of per quintal profit over per quintal variable cost for Panchganga variety of onion in *kharif* season was estimated at 67.86 per cent, which stood at lower as against Nasik Lal variety.

TABLE 3. VARIETY-WISE PERCENTAGE PROFIT FOR KHARIF ONION- ESTIMATES BASED ON FIELD LEVEL SURVEY

Farm category (1)	Value of main product (Rs./qtl) (2)	Variable cost (Rs./qtl) (3)	ROVC (Rs./qtl) (4)	Per cent Profit* (ROVC/VC)*(100) (5)
<i>Kharif onion</i>				
Nasik Lal variety				
Small	953	473	480	101.57
Medium	971	610	361	59.11
Large	-	-	-	-
Average	955	499	456	91.44
Panchganga variety				
Small	908	510	398	78.06
Medium	953	613	339	55.28
Large	842	522	320	61.31
Average	907	540	367	67.86
<i>Rabi onion</i>				
Fursungi variety				
Small	1024	627	397	63.43
Medium	1063	651	412	63.41
Large	1048	700	347	49.60
Average	1034	646	388	60.00
Nasik Lal variety				
Small	1042	587	454	77.29
Medium	1133	562	572	101.73
Large	1268	641	626	97.69
Average	1058	586	472	80.62

Note: VC – Variable Cost; ROVC – Returns over Variable Cost; * - For computing farmer's percentage profit, only variable costs have been considered.

The ROVC for Fursungi variety of onion varied across land holding size categories, and variation was seen from Rs.347/qtl for large category to Rs.412/qtl for medium category with an average of Rs.388/qtl for the average category of farmers. The estimates also showed a decline in proportion of per quintal profit over per quintal variable cost for Fursungi variety. The average category of onion farmer was found to generate 60 per cent per quintal net returns/profit over per quintal variable cost in the cultivation of Fursungi variety of onion in *rabi* season.

The ROVC for Nasik Lal variety of onion in *rabi* season increased with the increase in land holding size of farmers with an increase from Rs.454/qtl for small category to Rs.626/qtl for large category. The average ROVC for Nasik Lal variety of onion grown during *rabi* season was estimated at Rs.472/qtl. The proportion of per quintal profit over per quintal variable cost for Nasik Lal variety of onion cultivated in *rabi* season varied significantly across land holding size categories. It varied from 77.29 per cent for small category to 101.73 for medium category of sampled farmers. The average proportion of per quintal profit over per quintal variable cost for Nasik

Lal variety of onion cultivated in *rabi* season was estimated at 80.62 per cent, which stood at higher as against Fursungi variety of onion. In general, both *kharif* and *rabi* onion showed reasonable margins of profit over variable cost on per quintal basis.

Price Divergence and Trade Details of Market Functionaries

The estimates relating to wholesale trade details, retail trade details and export trade details for Nasik Lal, Panchganga and Fursungi varieties of onion are brought out in Table 4. The overall average monthly quantity of onion traded by a wholesaler was estimated at 1,130 quintals for Nasik Lal variety, 1,905 quintals for Panchganga variety and 719 quintals for Fursungi variety. The quantum of wholesale trade of Nasik Lal variety of onion was found to be the highest in the month of December and lowest in June.

There was significant difference in wholesaler's purchase and sale price for Nasik Lal variety of onion. The percentage mark-up for a wholesaler for Nasik Lal variety of onion was estimated at 25.91 per cent, which varied from 18.63 per cent in July to 32.41 per cent in March, showing significant variation. The wholesaler's purchase and sale price also differed significantly for Panchganga variety of onion. The average percentage mark-up for a wholesaler for Panchganga variety of onion was estimated at 26.47 per cent, which did not vary much across various months. The average percentage mark-up for a wholesaler for Fursungi variety of onion varied significantly across various months, and, on an average, it was estimated at 25.72 per cent.

The estimates also showed that the overall average monthly quantity of onion traded by a retailer was 8.83 quintals for Nasik Lal variety, 3.90 quintals for Panchganga variety and 5.16 quintals for Fursungi variety.

The estimates also showed that the overall average monthly quantity of onion traded by a retailer was 8.83 quintals for Nasik Lal variety, 3.90 quintals for Panchganga variety and 5.16 quintals for Fursungi variety. Further, while the average purchase price of Nasik Lal variety of onion for a retailer was estimated at Rs.1555/qtl, the average sale price for the same stood at Rs.1980/qtl. Therefore, the average percentage mark-up for a retailer for Nasik Lal variety of onion turned out to be 27.40 per cent, which varied from 19.30 per cent in November to 34.24 per cent in July, showing significant variation in percentage mark-up for a retailer across months. The average percentage mark-up for a retailer for Panchganga variety of onion was estimated at 27.69 per cent, which varied significantly across various months. As for Fursungi variety, the average percentage mark-up for a retailer for Fursungi variety of onion was worked out at 26.44 per cent, which also varied significantly across various months.

The estimates showed that the overall average monthly quantity of onion traded by an exporter was 790.10 quintals for Nasik Lal variety, 641.67 quintals for Panchganga variety and 408.00 quintals for Fursungi variety.

TABLE 4. VARIETY-WISE AND OVERALL WHOLESALE, RETAIL AND EXPORT TRADE DETAILS OF ONION: 2013-14

Month (1)	Wholesale trade details						Retail trade details						Export trade details					
	Average price (Rs./qt) at which purchased (PP) (2)	Average qty sold (qt.) per wholesaler (3)	Average sale price (Rs./qt) (4)	Mark-up (SP-PP) (5)	Percentage mark-up [SP-PP]/PP*100 (6)	Average price (Rs./qt) at which purchased (PP) (7)	Average qty sold (qt.) per retailer (8)	Average sale price (Rs./qt) (9)	Mark-up (SP-PP) (10)	Percentage mark-up [SP-PP]/PP*100 (11)	Average price (Rs./qt) at which purchased (PP) (12)	Average qty sold (qt.) per exporter (13)	Average sale price (Rs./qt) (14)	Mark-up (SP-PP) (15)	Percentage mark-up [SP-PP]/PP*100 (16)			
January	1233	526.67	1583	350	28.38	1492	8.93	1884	393	26.31	1325	1123.33	2073	748	56.47			
February	1250	2050.00	1585	335	26.76	1717	8.13	2249	532	30.99	2000	872.50	3049	1049	52.46			
March	1450	205.00	1920	470	32.41	1517	10.73	1920	404	26.62	1931	637.50	3044	1113	57.63			
April	1250	2100.00	1581	331	26.44	1500	9.25	1831	331	22.03	1875	550.00	2960	1085	57.88			
May	1083	1153.33	1322	239	22.06	1717	12.33	2292	575	33.51	2125	510.00	3464	1339	63.01			
June	1000	95.00	1203	203	20.25	1367	8.20	1741	374	27.35	1750	440.00	2459	709	40.51			
July	1200	1140.00	1424	224	18.63	1517	6.93	2036	519	34.24	2100	420.00	3444	1344	64.00			
August	1100	1420.00	1389	289	26.24	1550	4.75	1914	364	23.48	2525	895.00	3916	1391	55.10			
September	1115	1615.00	1402	287	25.70	1550	3.60	1958	408	26.34	2220	447.50	3561	1341	60.39			
October	1700	577.50	2072	372	21.88	1750	9.73	2258	508	29.05	2717	880.00	4234	1518	55.86			
November	1700	533.33	2207	507	29.80	1483	10.67	1770	286	19.30	2084	873.75	3222	1138	54.57			
December	1525	1850.00	1983	458	30.00	1475	9.73	1834	359	24.33	1889	1028.57	2853	964	51.00			
Average	1277	1129.69	1608	331	25.91	1555	8.83	1980	426	27.40	1991	790.10	3097	1106	55.54			
January	-	-	-	-	-	1400	2.00	1778	378	27.00	1100	625.00	1733	633	57.50			
September	1200	146.67	1516	316	26.36	1200	8.00	1608	408	34.00	-	-	-	-	-			
October	1270	1926.00	1575	305	24.02	1800	3.00	2322	522	29.00	2950	650.00	4815	1865	63.22			
November	1113	2700.00	1436	323	29.05	1400	3.50	1680	280	20.00	-	-	-	-	-			
December	1033	2566.67	1322	288	27.90	1400	3.00	1806	406	29.00	1750	650.00	2668	918	52.43			
Average	1167	1904.67	1475	309	26.47	1440	3.90	1839	399	27.69	1933	641.67	3072	1138	58.88			
January	1050	161.67	1355	305	29.08	1463	4.90	1960	497	33.99	1200	150.00	1980	780	65.00			
February	-	-	-	-	-	1550	3.93	2022	472	30.43	2100	597.50	3236	1136	54.08			
March	1250	996.50	1584	334	26.72	1583	4.30	1965	381	24.08	2133	773.33	3190	1057	49.53			
April	1300	1215.00	1613	313	24.06	1670	6.98	2102	432	25.86	1733	316.67	2555	822	47.40			
June	1133	1020.00	1371	238	21.00	1650	4.00	2041	391	23.72	1733	233.33	2586	853	49.19			
July	1125	550.00	1378	253	22.49	1483	4.60	1933	449	30.28	2167	216.67	3264	1098	50.66			
October	1200	140.00	1440	240	20.00	1500	7.00	1980	480	32.00	-	-	-	-	-			
November	1300	160.00	1707	407	31.33	1475	5.90	1792	317	21.47	-	-	-	-	-			
Average	1207	719.41	1518	310	25.72	1568	5.16	1983	415	26.44	1980	408.00	2951	971	49.06			

Notes: 1) Estimates based on empirical study; 2) SP – Sale price; PP – Purchase price.

The average purchase price for Nasik Lal variety of onion for an exporter was estimated at Rs.1991/qtl, whereas average sale price for the same stood at Rs.3097. Thus, the average percentage mark-up for an exporter of Nasik Lal variety of onion was worked out at 55.54 per cent, which varied significantly across months. The average purchase and sale prices of Panchganga variety of onion for an exporter were the highest in the month of October and lowest in January. The average purchase price for Panchganga variety of onion for an exporter was estimated at Rs.1933/qtl, whereas average sale price for the same stood at Rs.3072/qtl. Therefore, the average percentage mark-up for an exporter of Panchganga variety of onion was estimated at 58.88 per cent. The average purchase price for Fursungi variety of onion for an exporter was estimated at Rs.1980/qtl, whereas average sale price for the same stood at Rs.2951/qtl. The average percentage mark-up for an exporter of Fursungi variety of onion was, therefore, estimated at 49.06 per cent, which varied significantly across months.

The foregoing observations clearly underscore the fact that the average percentage mark-up increased steadily from wholesaler to retailer and from retailer to exporter for various varieties of onion. The exporter's average percentage mark-up was nearly two folds as against wholesaler's and retailer's average percentage mark-up, especially for Nasik Lal and Panchganga varieties of onion. Thus, price divergence was at much higher ebb at the export level as against wholesale and retail level. The cumulative effect of price divergence at wholesale, retail and export level obviously translates into lower share of producer in retail price in domestic market and in the export price in export channel.

Horizontal and Vertical Integration of Supply Chain

The onion farmers diverted their produce in the domestic market through regulated market (to the wholesaler) and in the export market through wholesaler and exporters. Therefore, two marketing channels for onion were prevalent in the study area.

Channel I: Farmer – Wholesaler – Retailer – Consumer

Channel II: Farmer – Wholesaler – Exporter

The price spread of onion in domestic market encompassing marketing cost and margins of various intermediaries for Nasik Lal and Panchganga varieties of *kharif* onion and Fursungi and Nasik Lal varieties of *rabi* onion is brought out in Table 5. In case of onion, there is significant expense borne by the farmer on account of losses, particularly in *kharif* season, apart from bearing other expenses relating to transportation, storage, etc.

The sale prices of onion for farmers were worked out at Rs.1206/qtl for *kharif* Nasik Lal variety, Rs.1167/qtl for *kharif* Panchganga variety, Rs.1207/qtl for *rabi* Fursungi variety and Rs.1347/qtl for *rabi* Nasik Lal variety. The farmer's share in retail price/consumer's purchase price of onion was estimated at 49.65 per cent for

TABLE 5. PRICE SPREAD FOR ONION IN DOMESTIC MARKET: 2013-14

Sr. No. (1)	Particulars (2)	<i>Kharif</i> onion				<i>Rabi</i> onion			
		Nasik Lal		Panchganga		Fursungi		Nasik Lal	
		Rs./qtl (3)	Per cent share in consumer's rupee (4)	Rs./qtl (5)	Per cent share in consumer's rupee (6)	Rs./qtl (7)	Per cent share in consumer's rupee (8)	Rs./qtl (9)	Per cent share in consumer's rupee (10)
(A)	Net price received by the farmer	955.00	49.65	907.00	49.33	1034.00	52.16	1058.00	50.50
	Expenses borne by the farmer	123.00	6.40	130.00	7.07	146.73	7.40	140.24	6.69
	Expenses towards losses borne by farmer	128.25	6.67	129.67	7.05	26.41	1.33	148.63	7.09
(B)	Wholesaler's purchase price/ Farmer's sale price	1206.25	62.72	1166.67	63.45	1207.14	60.89	1346.87	64.29
	Expenses borne by the wholesaler	60.72	3.16	60.72	3.30	60.72	3.06	60.72	2.90
	Wholesaler's net margin	253.48	13.18	212.61	11.56	300.11	15.14	215.13	10.27
(C)	Retailer's purchase price/ Wholesaler's sale price	1520.45	79.06	1440.00	78.31	1567.97	79.09	1622.72	77.46
	Expenses borne by the retailer	36.00	1.87	36.00	1.96	36.00	1.82	36.00	1.72
	Retailer's net margin	366.83	19.07	362.80	19.73	378.55	19.09	436.19	20.82
(D)	Consumer's purchase price/ Retailer's sale price	1923.28	100.00	1838.80	100.00	1982.52	100.00	2094.91	100.00

kharif Nasik Lal variety, 49.33 per cent for *kharif* Panchganga variety, 52.16 per cent for *rabi* Fursungi variety and 50.50 per cent for *rabi* Nasik Lal variety, showing not much variation in producer's share in consumer rupee for various varieties of onion grown during *kharif* and *rabi* season.

It is to be noted that *kharif* onion generally shows relatively larger loss of quantity during various handling, transportation, storage operations as against *rabi* onion, which is of much better quality with higher shelf life. The higher loss for *rabi* Nasik Lal variety is mainly due to the fact that it is actually late *kharif* onion, though treated as *rabi* onion.

The net margin of wholesaler of onion in consumer's price turned out to be 13.18 per cent for *kharif* Nasik Lal variety, 11.56 per cent for *kharif* Panchganga variety, 15.14 per cent for *rabi* Fursungi variety and 10.27 per cent for *rabi* Nasik Lal variety. On the other hand, the net margins of retailer of onion in consumer's price were

worked out at 19.07 per cent for *kharif* Nasik Lal variety, 19.73 per cent for *kharif* Panchganga variety, 19.09 per cent for *rabi* Fursungi variety and 20.82 per cent for *rabi* Nasik Lal variety. Thus, the retailer's margin was much higher as against wholesaler's margin for various varieties of onion.

The intermediaries involved in the marketing of produce in domestic and export market differ. While presence of retailers is seen in domestic market, the exporters predominantly appear in export channel. The exporters of onion generally buy their produce from the wholesalers. The price spread of onion in export channel encompassing marketing cost and margins of wholesalers and exporters, and expenses borne by the farmer for Nasik Lal and Panchganga varieties of *kharif* onion and Fursungi and Nasik Lal varieties of *rabi* onion is brought out in Table 6.

TABLE 6. PRICE SPREAD FOR ONION IN EXPORT MARKET: 2013-14

Sr. No.		<i>(per cent)</i>									
		<i>Kharif</i> onion					<i>Rabi</i> onion				
		Nasik Lal		Panchganga		Nasik Lal		Panchganga			
Particulars	Per cent share in consumer's		Per cent share in consumer's		Per cent share in consumer's		Per cent share in consumer's				
	Rs./qtl	rupee	Rs./qtl	rupee	Rs./qtl	rupee	Rs./qtl	rupee			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
(A)	Net price received by the farmer	955.00	30.86	907.00	29.53	1034.00	35.03	1058.00	34.11		
	Expenses borne by the farmer	123.00	3.97	130.00	4.23	146.73	4.97	140.24	4.52		
	Expenses towards losses borne by farmer	128.25	4.14	129.67	4.22	26.41	0.89	148.63	4.79		
(B)	Wholesaler's purchase price/ Farmer's sale price	1206.25	38.97	1166.67	37.98	1207.14	40.90	1346.87	43.42		
	Expenses borne by the wholesaler	60.72	1.96	60.72	1.98	60.72	2.06	60.72	1.96		
	Wholesaler's net margin	728.74	23.55	705.94	22.98	712.14	24.13	569.49	18.36		
(C)	Exporter's purchase price/ Wholesaler's sale price	1995.71	64.48	1933.33	62.94	1980.00	67.09	1977.08	63.74		
	Expenses borne by the exporter	580.50	18.76	580.50	18.90	580.50	19.67	580.50	18.71		
	Exporter's net margin	518.88	16.76	557.84	18.16	390.90	13.24	544.27	17.55		
(D)	Export price	3095.09	100.00	3071.67	100.00	2951.40	100.00	3101.85	100.00		

It could be readily discerned from Table 6 that the net sale price received by the farmer in the export trade did not differ for various varieties of onion in the domestic and export markets. However, the farmer's share in export price reduced for all the

varieties of onion due to higher export price as against retail price of onion in domestic market.

The farmer's share in export price of onion was estimated at 30.86 per cent for *kharif* Nasik Lal variety, 29.53 per cent for *kharif* Panchganga variety, 35.03 per cent for *rabi* Fursungi variety and 34.11 per cent for *rabi* Nasik Lal variety, showing higher share of farmer in export price for *rabi* as against *kharif* onion. It is to be noted that the wholesaler's sale price of onion for retailer in domestic market and exporter in export market differed significantly and turned out to be higher in export market due to better quality of produce diverted to exporter as against retailer. Generally, retailer buys lower quality of produce from wholesaler, which fetches lower price in the domestic market. On the other hand, the exporter buys the best quality of produce from wholesaler in order to meet international standards.

The shares of net margin of wholesaler in export price of onion were estimated at 23.55 per cent for *kharif* Nasik Lal variety, 22.98 per cent for *kharif* Panchganga variety, 24.13 per cent for *rabi* Fursungi variety and 18.36 per cent for *rabi* Nasik Lal variety. The shares of net margins of exporter in export price of onion were worked out at 16.76 per cent for *kharif* Nasik Lal variety, 18.16 per cent for *kharif* Panchganga variety, 13.24 per cent for *rabi* Fursungi variety and 17.55 per cent for *rabi* Nasik Lal variety. Thus, in the export trade of onion, the shares of net margins of wholesalers were even higher than exporters.

Thus, the producer's share in consumer's rupee varied from 49 per cent to 52 per cent in the domestic market for various varieties of onion, and this share in the export channel for the same varied from 30 per cent to 35 per cent. The lower share of farmer in export price as against retail price in domestic market was due to higher export price. The higher export price in export channel for onion was in turn due to better quality of produce diverted in the export channel, which fetched better prices.

IV

CONCLUSION AND RECOMMENDATIONS

The study showed highly profitable nature of onion crop cultivation since cultivation of onion generated 76.67 per cent per quintal net returns over per quintal variable cost for *kharif* season and 64.48 per cent per quintal net returns over per quintal variable cost for *rabi* season. The study also showed that the producer's share in consumer's rupee for onion varied from 49 per cent to 52 per cent in the domestic market for various varieties, and this share in export channel varied from 30 per cent to 35 per cent. Further, the study revealed that onion prices remained at lower ebb during harvesting/peak period and high during lean period. One of the major factors responsible for lower share of producer in retail and export prices of onion was the higher cumulative marketing margins cornered by various market functionaries within the channel. The situation is unlikely to be altered unless various regulative

measures are brought in place to check practices of these functionaries involved in the marketing of high value crops.

Introduction of appropriate market regulatory framework to check the practices of various market functionaries involved in the marketing of high value crops will lead to reduced marketing margins for them, resulting in higher share of producer in retail and export price. In fact, most of the farmers preferred to dispose of their produce immediately after harvest, which resulted in low prices on offer. The study emphasised upon the need to develop adequate post-harvest infrastructural facilities for high value crops in order to protect farmers from undue low prices for their produce. Public and private sector investment initiatives towards creation of adequate post-harvest infrastructural facilities will certainly boost horticultural crop production and marketing, both in the domestic and export markets. One of the major recommendations of this study is in favour of announcement of minimum support price (MSP) for *rabi* onion, which has longer shelf life. The government support for *rabi* onion will not only protect the farmers but also the consumers.

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