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RESEARCH PAPER

An Analysis of Post-harvest Losses of Onion in Haryana

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ABSTRACT

A study was undertaken to examine the nature and extent of post-harvest losses in onion supply chain in Haryana during the period 2019-20. A total sample size of 200 onion growers, 20 wholesalers and 20 retailers were taken from both the districts. The study revealed that the highest post-harvest losses were estimated at the farm level in both the districts as well as at overall level i.e. Haryana. The losses at farm level, wholesaler and retailer level were 6.91 (54.67%), 2.57 (20.35%) and 3.16 (24.97%) kg per quintal, respectively in Ambala district. Maximum losses were found to occur due to rotted and undersized bulbs. In Mewat district, the losses at farm level, wholesaler and retailer level were 7.45 (52.64%), 2.86 (20.24%) and 3.84 (27.12%) kg per quintal, respectively. Maximum post-harvest losses in Mewat district were found to occur due to transportation at farm level. In Haryana, the losses at farm level, wholesaler and retailer level were 7.18 (53.58%), 2.72 (20.29%) and 3.50 (26.11%) kg per quintal, respectively. Maximum post-harvest losses in Haryana were found to occur due to rotted and undersized bubs.

HIGHLIGHTS

- Two districts namely Ambala and Mewat were chosen for the study as these districts had the highest area under onion.
- Out of farm, wholesale and retail level, maximum post-harvest losses were recorded at farm level in both the districts.
- Maximum post-harvest losses for the state were found for found due to rotted and undersized bulbs.

Keywords: Ambala, Farmer, Mewat, Onion, Post-harvest losses, Retailer, Wholesaler

India has the advantage of varied agro-climatic conditions and vast geographical area which facilitate to grow a variety of fruits and vegetables (Goyal and Goyal, 2022). Vegetables production in the country was 188284 thousand MT during the year 2019-20 which is around 58.77 per cent of the total horticultural production (Indiastat.com, 2019-20).

Onion has less perishability in comparison to other vegetables as it can tolerate rough handling and long distance shipments. Unlike other vegetables it can be stored by ordinary methods for considerable period even under the unfavorable weather conditions, so that it can be later disposed off when the prices become favorable. It has a longer disposal period in the market. Thus, if marketing and storage is done, better prices can be fetched at some later period. But majority of the farmers tries to sell their produce immediately after harvest in the fear of spoilage, improper storage facility and fall in future prices. As a result, the wholesaler or commission agent takes the advantage of glut period and purchases the produce at very lower prices. As soon as this period passes, there starts the rapid increase in prices which leads to the dissatisfaction in both the producers and consumers. Moreover the information on losses and storage is not well predicted by market intelligence.

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In India post- harvest losses has been accounted as one of the major problems in most of the vegetables including onion. Due to poor post-harvest management techniques, 15-20 percent produce of the total production is wasted (Goyal *et al*. 2020). The losses occur because of poor transportation facilities, lack of know-how, poor management and improper market facilities or due to careless handling of the produce by farmers, market intermediaries and consumers (Gauraha and Thakur, 2008 and Singh *et al*. 2008). The well managed post-harvest practices/activities result in higher yields and ultimately increased profits to producers. It is therefore, important that the post-harvest practices be given as much attention as production practices. Hence, there is a need to quantify the post harvest losses at different stages of marketing *i.e.* from the point of production to point of consumption in physical as well as monetary terms.

METHODOLOGY

The study was carried out in the Mewat and Ambala district of Haryana during 2019-20 as these districts had the highest area under onion. The methodology for collection of primary data involved structured interview schedule using personal interview method. Multistage stage sampling was adopted: At first stage, only highest onion producing two districts were selected in state. At second stage, two blocks from each selected district i.e. Nagina and Firojpur Jhirka from Mewat district and Shahjadpur and Naraingarh from Ambala district were selected on the basis of highest area under onion in each block. At third stage, 50 onion growers were selected purposively from each block to collect the first hand information. Thus, a total sample of two hundred onion growers from four blocks was drawn from district. Also a sample of 10 wholesalers and 10 retailers dealing in onion from each district were selected randomly for obtaining the information pertaining to the post-harvest losses. Different types of losses at different stages of marketing and storage time periods i.e. up to 2 months, 2- 4 months and 4-6 months were valued according to the prevailing market price of onion during that period. Simple averages and percentages were worked out and presented in tabular form.

RESULTS AND DISCUSSION

Estimation of the post-harvest losses at different stages of marketing and storage of onion in Ambala

At farm level

The data presented in Table 1 depicts the post-harvest losses estimated at different stages in Ambala district. Post-harvest losses estimated at farm level were 6.91 kg per quintal which came out to be 54.67 per cent of total post-harvest losses. The maximum post-harvest losses were due to rotted and undersized bulb i.e. 1.64 kg per quintal contributing to 12.96 per cent of total post-harvest losses followed by doublers and bolters (1.38 kg/qtl, 10.90%), drying (1.04 kg/qtl, 8.22%), harvesting injuries (0.94 kg/qtl, 7.41%), and de topping (0.32kg/qtl, 2.49%). Losses due to transportation were only 1.63 per cent of total post-harvest losses. Low losses due to transportation may be due to the fact that most of the farmers sold their produce in the local markets which is near to their farms. The storage losses were worked out to be 1.40 kg per quintal i.e. 11.08 per cent of total post-harvest losses.

At wholesaler and retailer level

The total post-harvest losses occurred at the wholesaler level were 2.57 kg per quintal which came out to be 20.35 per cent of total post-harvest losses. The losses during transportation and storage at wholesaler level were 0.29 (2.31%) and 0.80 (6.31%) kg per quintal, respectively. Maximum losses at wholesaler level were due to improper handling of produce followed by losses due to storage, rotting and transportation. The total post-harvest losses incurred at the retailers' level were 3.16 (24.97%) kg per quintal. The losses at retailer level due to transportation, moisture and rain, rotting, multiple handling losses and storage accounted to 5.46, 7.78, 4.08, 4.09 and 3.56 per cent of total post- harvest losses, respectively. Maximum losses at retailers' level occurred due to moisture and rain followed by transportation across all the categories of sample respondents.

Total post-harvest losses

Highest post-harvest losses were estimated at the farm level which accounted for 6.91 kg per quintal

i.e. 54.67 percent of the total post-harvest followed by retailer level 3.16 kg per quintal (24.97%) and wholesaler level 2.57 kg per quintal (20.35%). The total storage losses at all levels were worked out to be 2.65 kg per quintal which is 20.95 per cent of total post-harvest losses. Similar results were also generated by Sharma (2016) in Jaipur district of Rajasthan and Gathambiri *et al.* (2021) in sub-counties of Kenya.

Estimation of the post-harvest losses at different stages of marketing and storage of onion in Mewat district

At farm level

Post-harvest losses at different stages of marketing in Mewat district are shown in Table 1. Losses estimated at farm level were 7.45 kg per quintal i.e. 52.64 per cent of total post-harvest losses. The maximum losses at farm level in Mewat district were recorded in transportation (14.22%) followed by rotted and undersized bulbs (13.78%) and drying (9.64%). The reason for the high losses in transportation is that maximum of the sample farmers took their produce to Azadpur market which is quite far from their farm. There were no storage losses in Mewat as all the sampled farmers sold their produce immediately after harvest.

At wholesaler and retailer level

The total post-harvest losses occurred at wholesaler level were 2.86 kg per quintal which came out to be 20.24 per cent of total post-harvest losses. The losses during transportation and storage at wholesaler level were 0.36 and 0.84 kg per quintal, respectively. The losses due to rotting and improper handling accounted to 5.40 and 6.32 per cent of the total post-harvest losses. Maximum losses at wholesaler level occurred due to improper handling of produce followed by losses due to storage, rotting and transportation.

The total post-harvest losses incurred at the retailers' level were 3.84 (27.12%) kg per quintal. The post-harvest losses at retailers' level due to moisture and rain/bad weather were highest which were worked out to be 1.24 (8.78%)kg per quintal. The losses due to transportation, rotting, multiple handling and storage were 0.88 (6.22%) kg per quintal, 0.69 (4.90%) kg per quintal, 0.56 (3.94%) kg per quintal and 0.46 (3.27%) kg per quintal.

Total post-harvest losses

The losses at farm level, wholesaler and retailer level were 7.45 (52.64%), 2.86 (20.24%) and 3.84 (27.12%) kg per quintal, respectively. None of the farmers stored onion in Mewat district. The total storage losses at wholesaler and retailer level were worked out to be 1.30 kg per quintal which is 9.18 per cent of total post-harvest losses. These findings are similar to the results obtained by Sudhakar *et al.* (2014) in Cuttack district of Odisha, Amarnath and Velmurugan (2015) in Tamil Nadu and Sharma (2016) in Jaipur district of Rajasthan.

Estimation of the post-harvest losses at different stages of marketing and storage of onion in Haryana

At farm level

The data presented in Table 1 depicts the post-harvest losses estimated at different stages in Haryana. Post-harvest losses estimated at farm level were 7.18 kg per quintal which came out to be 53.58 per cent of total post-harvest losses. For all the sample farmers taken together i.e. for Haryana state, maximum post-harvest losses were due to rotted and undersized bulb i.e. 1.79 kg per quintal contributing to 13.39 per cent of total post-harvest losses followed by drying (1.20 kg/qtl, 8.97%), doublers and bolters (1.17 kg/qtl, 8.75%), harvesting injuries (0.82 kg/qtl, 6.12%), storage (0.70 kg/qtl, 5.22%), etc. Losses due to transportation were 8.28 per cent of total post-harvest losses. The storage losses were worked out to be 0.70 kg per quintal i.e. 5.22 per cent of total post-harvest losses.

At wholesaler and retailer level

The total post-harvest losses occurred at wholesaler level, was 2.72 kg per quintal which came out to be 20.29 per cent of total post-harvest losses. The losses during transportation at wholesaler level were 0.33 (2.45%) kg per quintal and storage losses were 0.82 (6.12%) kg per quintal. The losses due to rotting were 0.72 kg per quintal (5.36%) whereas handling loss were 0.85 kg per quintal (6.37%). Maximum losses at wholesaler level were due to improper

Table 1: Post-harvest losses of onion at different stages of marketing and storage in Ambala and Mewat district

Sl. No.	Particulars	Ambala		Mewat		Overall (Haryana)	
		Quantity	Percent Losses	Quantity	Percent Losses	Quantity	Percent Losses
1	**Farm level losses**						
(i)	Harvesting injuries	0.94	7.41	0.70	4.96	0.82	6.12
(ii)	De topping	0.32	2.49	0.46	3.24	0.39	2.89
(iii)	Drying	1.04	8.22	1.36	9.64	1.20	8.97
(iv)	Doublers and bolters	1.38	10.90	0.97	6.83	1.17	8.75
(v)	Rotted and undersized bulbs	1.64	12.96	1.95	13.78	1.79	13.39
(vi)	Transportation	0.21	1.63	2.01	14.22	1.11	8.28
(vii)	Storage losses	1.40	11.08	—	—	0.70	5.22
	(a) Up to 2 months	0.27	2.11	—	—	0.13	1.00
	(b) 2-4 months	0.91	7.22	—	—	0.46	3.40
	(c) 4-6 months	0.22	1.73	—	—	0.11	0.82
	Total	6.91	54.67	7.45	52.64	7.18	53.58
2	**Wholesaler level losses**						
(i)	Transportation	0.29	2.31	0.36	2.57	0.33	2.45
(ii)	Rotting	0.67	5.31	0.76	5.40	0.72	5.36
(iii)	Handling losses	0.81	6.42	0.89	6.32	0.85	6.37
(iv)	Storage losses	0.80	6.31	0.84	5.95	0.82	6.12
	Total	2.57	20.35	2.86	20.24	2.72	20.29
3	**Retailer level losses**						
(i)	Transportation	0.69	5.46	0.88	6.22	0.79	5.86
(ii)	Moisture and rain	0.98	7.78	1.24	8.78	1.11	8.31
(iii)	Rotting	0.52	4.08	0.69	4.90	0.60	4.51
(iv)	Multiple handling losses	0.52	4.09	0.56	3.94	0.54	4.01
(v)	Storage losses	0.45	3.56	0.46	3.27	0.46	3.41
	Total	3.16	24.97	3.84	27.12	3.50	26.11
	Overall total	12.64	100.00	14.16	100.00	13.40	100.00

handling of produce followed by losses due to storage, rotting and transportation.

The total post-harvest losses incurred at the retailers' level were 3.50 (26.11%) kg per quintal. For all the farmers as whole, losses at retailer level due to transportation, moisture and rain, rotting, multiple handling losses and storage accounted to 5.86, 8.31, 4.51, 4.01 and 3.41 per cent of total post- harvest losses, respectively. Maximum losses at retailers' level occurred due to moisture and rain followed by transportation across all the categories of sample respondents.

Total post-harvest losses

Highest post-harvest losses were estimated at the farm level which accounted for 53.58 per cent of the total post-harvest losses. The losses at wholesaler level accounted for 20.29 per cent and at retailer level accounted for 26.11 per cent of total post-harvest losses. The storage losses were 1.98 kg per quintal which is 14.78 per cent of total post-harvest losses. Maximum losses were found due to rotted and undersized bulbs. Similar results were also generated by Sharma (2016) in Jaipur district of Rajasthan and Gathambiri *et al.* (2021) in sub-counties of Kenya.

CONCLUSION

Highest post-harvest losses were estimated at the farm level in both the districts as well as at overall level i.e. Haryana. The losses at farm level, wholesaler and retailer level were 6.91 (54.67%), 2.57 (20.35%) and 3.16 (24.97%) kg per quintal, respectively in Ambala district. Maximum losses were found to occur due to rotted and undersized bulbs. In Mewat

district, the losses at farm level, wholesaler and retailer level were 7.45 (52.64%), 2.86 (20.24%) and 3.84 (27.12%) kg per quintal, respectively. Maximum post-harvest losses in Mewat district were found to occur due to transportation at farm level. In Haryana, the losses at farm level, wholesaler and retailer level were 7.18 (53.58%), 2.72 (20.29%) and 3.50 (26.11%) kg per quintal, respectively. Maximum post-harvest losses in Haryana were found to occur due to rotted and undersized bubs.

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