

# A Study on Post-Harvest Losses and Marketing of Potato in Prayagraj District of Uttar Pradesh

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**Abstract:-** The present research entitled "Study on Post-Harvest Losses and Marketing of Potato in Prayagraj District of Uttar Pradesh" was carried out during the year 2022-23 in the PRAYAGRAJ district of the Uttar Pradesh State. Potato figures among the principal cash crops in India and its marketing plays an important role in the farm economics of farmers of all scales. The main objective of the study is to analyse, socio economic characteristic of sample respondents, its economics of Potato marketing, post-harvest loss, price spread and constraints and marketing of Potato in Phulpur block is more potential for Potato production in comparison to other blocks. Out of the total villages of Phulpur blocks total 10 villages selected randomly. The major findings of this study revealed that the average literacy percentage was 71.00 percent. The average producer share in consumer price was Rs. 675.00/qtl and the price spread was Rs. 525.00/qtl. Sample for marketing efficiency in channel I was Rs. 2.29/qtl respectively. In channel II Producer share in consumer price was Rs. 705.25/qtl respectively. Price spread and Market efficiency Rs. 494.75/qtl and Rs. 2.41/qtl respectively. In channel III Producer share in consumer price was 702.25 percent respectively. Price spread and Market efficiency Rs. 497.75/qtl and Rs. 2.92/qtl respectively. Marketing and research conducted at the Central Potato Research Institute, Shimla, and experiences gained are also presented. These include a comprehensive farm-level study of Prayagraj District, Uttar Pradesh; the dynamics of seed potato marketing in Himachal Pradesh: price forecasting, a study of cold storage in Meerut District, Uttar Pradesh; and outlook surveys. Issues that merit future attention are improvement of crop statistics; studies on consumer behaviour, including the estimation of income elasticities of demand; assessment of marketing of seed potatoes and processed products; and techno-economic feasibility of potato exports.

**Keywords:-** Producer share in consumer price, Marketing efficiency, Price Spread, Post-harvest loss.

## I. INTRODUCTION

Potato (*Solanum tuberosum*) is the most important food crop of the world. Potato is a temperate crop grown under subtropical conditions in India. At present, production of Potato is 51.9 million tonnes from an area of 2.17 million ha during 2018-19, thus making India the second largest potato producer in the world after China. Potato is a crop which has always been the 'poor man's friend'. Potato is being cultivated in the country for the last more than 300

years. For vegetable purposes it has become one of the most popular crops in this country. Potato is the fourth major food crop after rice, wheat, and maize in the world. It produces high dry matter, balanced protein, and high calories/unit area/time. Potato tubers contain Vitamin C and Vitamin B. It provides carbohydrates, minerals, and fibre. The protein is as comparable to milk and egg. The crop is of short duration and fits well in intensive cropping system. India ranks third in area and second in production in the world. Uttar Pradesh and West Bengal are major potato producer states in the country. Potato Production increased from 1.54 million tonnes from an area of 0.234 million ha during 1949-50 to 2020. World total potato production in world was 376 million in 2021. (Source: FAO) Potatoes are an economical food; they provide a source of low-cost energy to the human diet. Potatoes are a rich source of starch, vitamins especially C and B1 and minerals. They contain 20.6 per cent carbohydrates, 2.1 per cent protein, 0.3 per cent fat, 1.1 per cent crude fibre and 0.9 per cent ash. They also contain a good amount of essential amino acids like leucine, tryptophan, and isoleucine etc. Potatoes are used for several industrial purposes such as to produce starch and alcohol. Potato starch (farina) is used in laundries and for sizing yarn in textile mills. Potatoes are also used to produce dextrin and glucose. As a food product itself, potatoes are converted into dried products such as 'potato chips', 'sliced' or 'shredded' potatoes. Potato is grown almost in all states of India. However, the major potato growing states are Gujarat, Maharashtra, Himachal Pradesh, Punjab, Uttar Pradesh, Madhya Pradesh, Karnataka, West Bengal, Bihar, and Assam. The current share of potato to agricultural GDP is 2.86% out of 1.32% cultivable area. On the contrary, the two principal food crops, rice, and wheat, contribute 18.25% and 8.22% of agricultural GDP, respectively from 31.19 and 20.56% cultivable area, respectively (FAOSTAT). Potatoes are frequently served whole or mashed as a cooked vegetable and are also ground into potato flour, used in baking and as a thickener for sauces. The tubers are highly digestible and supply vitamin C, protein, thiamine, and niacin.

## II. MATERIALS AND METHODS

### A. Selection of the district:

The state of Uttar Pradesh comprises of 75 districts. Out of which the present study was conducted in Prayagraj district of Uttar Pradesh. Prayagraj district was selected purposively based on marketing of potato and post-harvest losses.

**B. Selection of Block:**

There are 23 blocks in prayagraj district. Out of these "Phulpur" Block will be selected purposively for the study. The agro condition of the block is suitable for the potato cultivation. The production of potato in this block is higher.

**C. Selection of the villages:**

Phulpur block consist of 567 Villages. Out of which 10 villages namely, were selected based on highest number of potato farmer. A list of all villages which were under the commanded area i.e., the area from which potato is brought for sale in Prayagraj mandi is prepared.

**III. ANALYTICAL TOOLS**

**A. Marketing cost:**

Marketing Cost means, the reasonable costs associated with promoting, selling, packaging, transferring title and moving Joint Products to the customer and include direct costs and overhead costs.

$$\text{Marketing cost (MC)} = \frac{\Delta \text{TC}}{\Delta Q}$$

Where,

- Δ = Change
- TC = Total Cost Quantity
- Q = Quantity

$$\text{Marketing Efficiency} = \frac{\text{Consumer price}}{\text{Total marketing cost} + \text{marketing margin}}$$

**E. Price Spread:**

Price spread is defined as the difference between the price paid by consumers and the net price received by the producer for an equivalent quantity of farm produce. It is expressed as percentage of consumer's price.

$$\text{Price Spread} = \frac{(\text{Consumer price} - \text{Net Price of Producer}) \times 100}{\text{Consumer price}}$$

**F. Garrett Ranking:**

To know the acceptance of respondents and constraints in processing and marketing of Potato Garrett's ranking technique has been used. Basically, it gives the change of orders of constraints and advantages into numerical scores. The major advantage of this technique as compared to simple frequency distribution is that the constraints and advantages are arranged based on their importance from the point of view of respondents. Hence the same number of respondents on two or more constraints may have been given different rank (Kumar and Pandey, 1999).

**B. Marketable surplus:**

A Market Surplus occurs when there is excess supply- that is quantity supplied is greater than quantity demanded. In this situation, some producers won't be able to sell all their goods. This will induce them to lower their price to make their product more appealing.

$$\text{MS} = \text{P} - \text{C}$$

- Where,
- MS= Marketable surplus
- P = Total Production
- C = total requirements (family and farm)

**C. Marketing Margin:**

Margin is calculated by subtracting the net farm value equivalent of food sold at retail of the farm product from the retail price.

$$\text{Marketing margin} = \text{Product price} - \text{Raw Material}$$

**D. Marketing Efficiency:**

Market efficiency refers to the ability possessed by markets to include information that offers maximum possible opportunities for traders to buy and sell securities without incurring additional transaction costs. The concept of market efficiency is closely linked to the efficient market hypothesis (EMH).

Garrett's formula for converting ranks into per cent was given by:

$$\text{Percent position} = \frac{100 (R_{ij} - 0.5)}{N_j}$$

- Where,
- R<sub>ij</sub>= rank given for ith factor by jth individual
- N<sub>j</sub>= number of factors ranked by jth individual

**IV. RESULTS AND DISCUSSION**

The result is a presentation of the findings of the given study, purely based on the objective:

To find out Marketing Cost, Marketing Margin, Price Spread, Market Efficiency, different marketing channels, marketable surplus involved in study area.

**Channel I: Producer → Village merchant → Wholesaler → Retailer → Consumer**

Table 1: Marketing cost, Marketing margin and Price spread for channel I

	<b>Particulars</b>	<b>Costs (Rs/q)</b>	<b>Percent consumer price</b>
<b>Farmer</b>	Net price received by farmer	675.00	56.25
<b>Village Merchant</b>	Selling price of producer/ purchasing price of village merchant	675.00	56.25
	Gunny Bags	12.00	1.00
	Loading and unloading	6.00	0.5
	Transportation	8.00	0.62
	Mandi tax	4.00	0.33
	Commission	7.2	0.6
	Filling and stretching	6.00	0.50
	Miscellaneous	2.3	0.19
	Total marketing cost	45.50	3.8
	Marketing margin	70.00	5.83
<b>Wholesaler</b>	Selling price of village merchant/ purchasing price of wholesaler	790.5	65.87
	Loading and unloading	6.00	0.5
	Transportation	8.00	0.66
	Mandi tax	3.00	0.25
	Commission	4.00	0.33
	Storage	3.00	0.25
	Miscellaneous	2.5	0.20
	Total marketing cost	26.5	2.2
	Marketing margin	123.00	10.25
<b>Retailer</b>	Selling price of village merchant/ purchasing price of retailer	940.00	78.33
	Loading and unloading	6.00	0.75
	Transportation	10.00	0.83
	Mandi tax	4.00	0.33
	Commission	4.00	0.33
	Storage	3.00	0.25
	Total marketing cost	27.00	0.25
	Marketing margin	230	19.16
<b>Consumer</b>	Retailer price to consumer	1200.00	100.00
	Price spread	525.00	43.75

This table reveals that there were four intermediaries through which potato flows in this channel. Producer sold their produce to village merchant in market who in turn sold the produce to wholesaler and then wholesaler sold the potato to the retailer in the market and finally it reached to the consumer. The total marketing cost for village merchant includes loading and unloading, packing, transportation, filling and stretching, was 45.50 per quintal and the marketing margin of seller was 70. Total marketing cost for wholesaler which includes loading and unloading,

transportation was 26.5 per quintal and the retailers marketing costs was 27 per quintal. The marketing margins for village merchant, wholesaler and retailers were 70, 123 and 230 per quintal respectively this difference in marketing cost at village retailers occurred due to packaging and transportation cost.

**Channel II: Producer → Wholesaler → Retailer → Consumer**

Table 2: Marketing cost Marketing margin and Price spread for channel II

	<b>Particulars</b>	<b>Costs (R/q)</b>	<b>Per cent consumer price</b>
<b>Producer</b>	Gunny bags	12.00	1.00
	Loading and unloading	4.00	0.33
	Transportation	6.00	0.75
	Mandi tax	3.75	0.31
	Commission	3.00	0.25
	Filling and stretching	3.00	0.25
	Miscellaneous	3.00	0.25
	Total marketing cost	34.75	2.89
	Net price received by producer	705.25	58.77
	Selling price of village merchant/ purchasing price of wholesaler	740	61.6

Wholesaler	Loading and unloading	6.00	0.5
	Transportation	9.00	0.75
	Mandi tax	3.75	0.31
	Commission	4.00	0.33
	Storage	3.00	0.25
	Miscellaneous	2.50	0.21
	Total marketing cost	28.25	2.35
	Marketing margin	156.00	13.0
Retailer	Selling price of village merchant/ purchasing price of wholesaler	924.25	77.02
	Loading and unloading	6.00	0.50
	Transportation	10.00	0.83
	Mandi tax	3.75	0.31
	Commission	4.00	0.33
	Storage	3.00	0.25
	Total marketing cost	29.75	2.48
	Marketing margin	249.00	20.75
Consumer	Retailer price to consumer	1200.00	100.00
	Price spread	494.75	41.2

This table reveals that producer sold his produce to wholesaler from where wholesaler sold the produce to the retailers followed sold to consumer. It involving producer and wholesaler, retailer. The total marketing cost for producer which includes loading and unloading, packing, transportation, fling and stretching was 34.75 Rs per quintal and the total marketing cost for wholesaler which includes loading and unloading, transportation was 28.25 Rs per

quintal somewhat less as to producer. The marketing margins for wholesaler and retailers were 156Rs (13 per cent) and 249 Rs (20.75 per cent) per quintal respectively this difference in marketing cost at producer, wholesaler and retailers occurred due to packaging and transportation cost.

**Channel III: Producer → Retailer → Consumer**

Table 3: Marketing cost, Marketing margin and Price spread for channel III

	Particulars	Costs(R/q)	Per cent consumer price
Producer	Gunny bags	12.00	1.00
	Loading and unloading	4.00	0.33
	Transportation	6.00	0.75
	Mandi tax	3.75	0.31
	Commission	3.00	0.25
	Filling and stretching	3.00	0.25
	Miscellaneous	3.00	0.25
	Total marketing cost	34.75	2.89
	Net price received by producer	702.25	58.77
Retailer	Selling price of Producer/ purchasing price of Retailer	825	68.74
	Loading and unloading	6.00	0.50
	Transportation	9.00	0.75
	Mandi tax	4.20	0.35
	Commission	4.80	0.40
	Storage	3.00	0.25
	Miscellaneous	2.40	0.2
	Total marketing cost	29.40	2.45
	Marketing margin	345.60	28.75
Consumer	Retailer price to consumer	1200.00	100.00
	Price spread	497.75	41.48

This table reveals that there were two intermediaries through which producer sold their produce. Under channel III involving producer and retailer. The total marketing cost for producer which includes loading and unloading, packing transportation, fling and stretching was 34.75 per quintal. The marketing costs of retailers was 29.40 per quintal. The marketing margins of retailers were 345.60 per quintal respectively this difference in marketing cost at

producer and retailers occurred due to packaging and transportation cost.

**V. MARKETING EFFICIENCY**

The marketing efficiency of potato was calculated by different marketing parameters along different marketing-channels.

Table 4: Marketing efficiency

S.No.	Particulars	Unit	Channel I	Channel II	Channel III
1	Retailer's sale price (RP)	Rs/q	1200.00	1200.00	1200.00
2	Total marketing costs (MC)	Rs/q	99.00	65.00	64.15
3	Total margins of intermediaries (MM)	Rs/q	423.00	405.00	345.60
4	Price received by farmer (FP)	Rs/q	675.00	705.00	702.25
5	Marketing efficiency	Rs/q	2.29	2.41	2.92

## VI. CONCLUSION

In marketing of potato, the village merchant and other intermediators share in the consumer's rupee was higher. Therefore, growers should organize themselves on cooperative lines and sell directly to the wholesaler and consumer at the distant markets in order to increase their share. The post-harvest loss is high in case of small farmers compared to the other categories of farmers. The farmers cannot have the access to the potato digger, and the harvesting is mainly done manually. During manual harvesting, there are chances of cutting the produce and it takes time to complete the harvesting in time. Hence it causes physical loss. It is suggested that the small farmers should have facility of hiring the harvesting equipment like potato digger. In case of wholesalers and retailers, they transport the produce more than recommended to reduce per unit transportation cost of the produce. It causes serious damage of the produce due to pressing the output. At the cold storage level, things are different. Due to expectation of future price hike, they store produce more duration. But as the time increases the produce get lost due to shrinkage, weight loss, exposure to diseases when contacted with other affected produce etc. Government may be helpful in providing the transportation facility to bring the produce to mandi from small and marginal farmers and cost of transportation may be shared by farmers. As the government is also promoting e-marketing of agriculture there for farmers can also derive benefits by utilizing the timely information about prices for the crops.

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