ISSN Print: 2664-844X
ISSN Online: 2664-8458
NAAS Rating: 4.97
IJAFS 2025; 7(6): 06-08
www.agriculturaljournals.com
Received: 21-03-2025
Accepted: 23-04-2025

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A study on marketing of potato (Rajendra-1) in Barabanki district of Uttar Pradesh

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DOI: https://www.doi.org/10.33545/2664844X.2025.v7.i6a.431

Abstract
India, being the second-largest producer of potatoes globally, witnesses a considerable share of its agricultural output emerging from Uttar Pradesh. Barabanki, a district in this state, plays a pivotal role in the production of the Rajendra-1 variety of potato. Despite its production potential and nutritional significance, the marketing structure for potatoes in this district remains underdeveloped and inefficient. This study explores the marketing channels, evaluates the socio-economic profile of the farmers, quantifies post-harvest losses, and investigates the constraints faced by potato growers in the district. The methodology includes a multistage sampling of 120 respondents from Dewa block and analytical tools such as percentage analysis, Garrett Ranking Technique, and price spread analysis. The results indicate a high percentage of losses during harvesting and transportation stages, a lack of marketing infrastructure, and an overdependence on intermediaries. Moreover, the study reveals low awareness among farmers regarding scientific storage practices and cooperative marketing models. The conclusions underscore the need for systemic reforms in post-harvest handling and policy interventions promoting farmer education and infrastructural investments.

Keywords: Potato marketing, post-harvest losses, price spread, garrett ranking, farmer cooperatives, Barabanki district

Introduction
Agriculture in India is a multifaceted sector that supports nearly half of the country's population. Among the various crops cultivated, potato occupies a crucial place in both dietary and economic terms. It is rich in carbohydrates and vitamins, making it a staple food item in urban and rural areas alike. The Rajendra-1 variety, developed specifically for its resistance to disease and high yield, has become an integral part of potato cultivation in Uttar Pradesh, especially in Barabanki district.

As per FAOSTAT (2023), India produces nearly 54 million tonnes of potatoes annually, of which Uttar Pradesh contributes approximately 35%. This makes the region not just agriculturally important but also strategically vital in ensuring food security and livelihood for millions. Despite such high production, farmers continue to face immense challenges in marketing their produce. The lack of structured market systems, inefficient supply chains, unavailability of proper storage facilities, and inadequate access to market information lead to reduced income for farmers.

Chand (2017) [3] highlights that for doubling farmers' income, improving market access and reducing post-harvest losses are essential. FAO (2021) estimates that post-harvest losses in fruits and vegetables in India can be as high as 25-30%, a figure that reflects a massive wastage of resources. Potatoes, being perishable and bulky, are particularly vulnerable to losses during harvesting, handling, and transportation.

The Barabanki district, known for its fertile alluvial soil and favorable climatic conditions, has emerged as a leading producer of Rajendra-1 potatoes. However, despite its production capacity, the region struggles with systemic issues that hamper marketing efficiency. This study aims to assess the marketing practices, post-harvest challenges, and socio-economic conditions of potato farmers in Barabanki, and to propose actionable recommendations based on empirical data.

Review of Literature

Several studies have examined the economic and logistical aspects of potato marketing in India. Ezekiel and Pandey (2008) [4] emphasized the nutritional and economic value of potatoes, noting their superior dry matter yield compared to cereals. Singh *et al*. (2020) [5, 6] conducted a study in Punjab and found that improper handling during harvesting and packaging was a major cause of losses.

Kadian *et al*. (2020) [6] analyzed the post-harvest losses and suggested that storage infrastructure and market intelligence are crucial for reducing inefficiencies. Choudhary (2011) [9] reported that fragmented market structures and inadequate pricing mechanisms are the main constraints to efficient potato marketing in UP. Similarly, Verma and Mishra (2020) [7] pointed out that lack of credit and dependence on middlemen often force farmers into distress sales.

Research by Sodhi and Patel (2020) [8] in Gujarat demonstrated that marketing channels with fewer intermediaries tend to provide better margins to farmers. Their findings emphasized the role of cooperatives and direct-to-consumer models in improving marketing efficiency. These studies collectively underline the pressing need to develop integrated and farmer-centric marketing systems.

Objectives of the Study

The specific objectives of this study are as follows:

1. To examine the socio-economic profile of potato (Rajendra-1) growers in the Barabanki district.
2. To analyze physical and post-harvest losses at various stages of the supply chain.
3. To determine the price spread, producer share in consumer rupee, and marketing efficiency across different channels.
4. To identify key constraints faced by farmers in the marketing of potatoes and suggest feasible solutions.

Research Methodology

Study Area and Sampling Design

The study was conducted in Dewa Block of Barabanki District, Uttar Pradesh. This region was selected purposively due to its significant contribution to potato cultivation, especially the Rajendra-1 variety. A multistage sampling technique was used for respondent selection. Initially, eight villages were chosen based on production intensity. From these villages, 120 potato growers were randomly selected.

The sample was stratified into five categories based on landholding

- **Marginal:** up to 1 hectare
- **Small:** 1-2 hectares
- **Semi-medium:** 2-4 hectares
- **Medium:** 4-10 hectares
- **Large**: above 10 hectares

Data Collection

Primary data was collected using structured interviews with the help of pre-tested schedules. Secondary data was sourced from government reports, academic journals, and institutional websites such as the FAO, CPRI, and Ministry of Agriculture.

Analytical Tools

- **Percentage Analysis:** Used for demographic profiling.
- **Garrett Ranking Technique:** Applied to rank marketing constraints.
- **Price Spread and Marketing Efficiency:** Price Spread = Consumer Price−Producer Price

$$\text{Marketing Efficiency (ME)} = \frac{\text{Net Price Received by Farmer}}{\text{Marketing Cost}}$$

Results and Discussion

Socio-Economic Profile of Respondents

The analysis revealed that the average landholding among respondents was 1.33 hectares. A majority (approximately 60%) belonged to marginal and small categories. Literacy levels were highest among medium-sized farmers (73.31%) and lowest among marginal farmers (56.47%). Family sizes averaged 6.4 members, indicating the prevalence of joint family systems.

Post-Harvest Loss Analysis

Table 1: The average post-harvest loss was calculated across various stages

Stage	Average Loss (kg/quintal)
Harvesting	5.44
Grading	4.16
Packaging	2.09
Storage	3.25
Transportation	3.90
Marketing	2.26
Total	**21.1**

Harvesting and transportation accounted for the highest losses. This suggests a lack of training in scientific harvesting methods and the absence of mechanized tools.

Marketing Channels and Price Spread

Table 2: Four marketing channels were studied

Channel	Description	Price Spread	Marketing Margin	Marketing Cost	Efficiency
I	Producer \Consumer	11.21	0	179	High
II	Producer \Retailer \ Consumer	438.00	219	153	Moderate
III	Producer \Wholesaler \Retailer	549.00	330	406.5	Low
IV	Producer \ PHC \Wholesaler \ Retailer	770.00	456	406.0	Lowest

Direct marketing (Channel I) yielded the highest return but was used by only a small percentage of farmers due to infrastructural and logistical constraints.

Table 3: Garrett Ranking of Marketing Constraints

Constraint	Garrett Score	Rank
Lack of farmer organization	126	1
Lack of storage infrastructure	118	2
Multiple weights and measures	109	3
Inadequate transport connectivity	90	4
Limited access to credit	80	5

The top-ranking issue was the absence of cooperative structures, which forced farmers into distress sales and gave middlemen an upper hand.

Conclusion

This study has brought to light the severe challenges faced by potato farmers in Barabanki, especially those cultivating the Rajendra-1 variety. While the region possesses high production potential, the benefits are eroded due to post-harvest losses, inefficient marketing systems, and structural deficiencies.

Marketing channels with fewer intermediaries demonstrated better efficiency, but farmers lacked the means to access these channels. The absence of organized groups, insufficient cold storage, and outdated transportation networks collectively diminished farmers' bargaining power.

It is imperative that policymakers, agricultural institutions, and private stakeholders collaborate to create an enabling ecosystem for efficient marketing. Training, infrastructural support, and digital tools should be integrated into the rural agri-marketing framework.

Policy Recommendations

1. Establish and promote Farmer Producer Organizations (FPOs).
2. Invest in cold storage units at block and village levels.
3. Provide transport subsidies and establish rural logistics hubs.
4. Launch awareness drives on bio-fertilizers, grading, and packing.
5. Encourage digital platforms for real-time mandi prices and direct marketing.

Limitations and Future Research

This study was confined to one block in Barabanki district and focused on a single cropping season. Future research should expand to other districts and analyze seasonal trends. Comparative analysis with other perishable crops and the role of e-NAM in improving marketing efficiency also warrant investigation.

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