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### Socio-economic profile of growers and cost structure in the marketing of Surya T7 potato in Aligarh district, Uttar Pradesh

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#### Abstract

This paper presents findings on the first two objectives of a larger study on the marketing of Surya T7 potato (*Solanum tuberosum* L.) in Aligarh district of Uttar Pradesh: (i) the socio-economic profile of Surya T7 potato growers, and (ii) the cost structure involved in the movement of Surya T7 potato from producers to consumers. Primary data were collected from 120 Surya T7 potato farmers selected through multistage stratified random sampling across six villages of Iglas block during the 2025-26 Rabi season, using pre-tested structured interview schedules. The socio-economic analysis shows that the majority of growers (44.2%) fall in the 36-50 years age group, with an average age of 41.5 years; educational attainment is concentrated at the primary and secondary levels (60.0% combined); and marginal and small farmers together account for 50.0% of the sample, with an average landholding of 2.85 hectares under Surya T7 cultivation. On the cost side, the total marketing cost of Surya T7 potato was found to rise sharply with the length of the marketing channel, from Rs. 52.80 per quintal in the direct producer-to-consumer channel (Channel I) to Rs. 265.60 per quintal in the longest channel involving village traders, wholesalers, and retailers (Channel IV), with storage/cold-storage charges, commission charges, and handling losses being the principal cost-escalating components in longer channels. These findings underscore the influence of farmer demographics and channel length on marketing cost burden and provide a basis for targeted interventions such as farmer producer organizations and improved cold-chain access.

**Keywords:** Potato marketing, Surya T7, socio-economic profile, cost structure, marketing cost, Aligarh

#### 1. Introduction

Potato (*Solanum tuberosum* L.) is the fourth most important food crop in the world after wheat, rice, and maize, with global annual production exceeding 370 million metric tonnes (FAO, 2023) <sup>[1]</sup>. India is the second largest producer of potato after China, and Uttar Pradesh alone contributes approximately 31-33% of national output (NHB, 2023-24). Within Uttar Pradesh, Aligarh district is a major potato-growing area, and the Surya T7 variety - developed by the Central Potato Research Institute (CPRI), Shimla, and valued for its resistance to late blight and yield potential of 280-350 quintals per hectare - has emerged as a leading variety cultivated in the district, particularly in Iglas block.

While the efficiency of potato marketing has been examined in several parts of Uttar Pradesh, comparatively little is known about the socio-economic characteristics of growers cultivating the relatively newer Surya T7 variety, or about the cost burden this variety's marketing imposes on different classes of farmers and intermediaries. This paper addresses this gap by focusing specifically on the first two objectives of a broader study on Surya T7 potato marketing in Aligarh district: profiling the socio-economic characteristics of growers, and analysing the cost structure associated with moving the produce from the farm gate to the final consumer.

#### 1.1 Objectives

- To study the socio-economic profile of Surya T7 potato growers in the study area.
- To examine the cost of cultivation and marketing cost structure involved in the movement of Surya T7 potato from production points to final consumers.

#### 2. Materials and Methods

##### 2.1 Study Area and Sampling

The study was conducted in Aligarh district of Uttar Pradesh, purposively selected for its significant area under Surya T7 cultivation. Within the district, Iglas block was purposively selected on account of its high concentration of Surya T7 growers and favourable agro-climatic conditions. A multistage stratified random sampling design was followed: six villages (Sarai Khas, Pilkhuwa, Dhanipur, Bhirkhera, Mohkam Nagar, and Tajpur) were selected at random from Iglas block, and 120 farmer-respondents were drawn through stratified random sampling in proportion to five farm-size categories (marginal, small, semi-medium, medium, and large), representing 10% of the 1,200 Surya T7 growers listed in these villages.

## 2.2 Data Collection and Period of Study

Primary data were collected during the 2025-26 Rabi season through personal interviews using pre-tested structured schedules covering household characteristics, landholding, cultivation experience, input costs, and marketing costs incurred at each stage. Secondary data on production trends and cost norms were drawn from NHB, District Agricultural Statistics, Krishi Vigyan Kendra reports, APMC records, and CPRI publications for the period 2018-2024.

## 2.3 Analytical Framework

The socio-economic profile was analysed using simple tabular methods (frequency and percentage distribution) across age, education, farm size, and years of experience in Surya T7 cultivation. The cost of cultivation was intended to be assessed using the standard Cost A1, Cost A2, Cost B1, Cost B2, and Cost C2 concepts defined by the Commission for Agricultural Costs and Prices (CACP), with Cost C2 - which includes all imputed costs such as family labour and land rent - used as the comprehensive measure of production cost. The marketing cost structure was computed as the sum of transportation, loading-unloading, storage, commission, weight/market fee, grading-packaging, handling-loss, and miscellaneous costs incurred by all intermediaries across the identified marketing channels, following the standard total marketing cost (TMC) approach used in agricultural marketing studies (Kohls and Uhl, 2002)<sup>[2]</sup>.

## 3. Results and Discussion

### 3.1 Objective 1: Socio-Economic Profile of Surya T7 Potato Growers

#### 3.1.1 Age Distribution

The age-wise distribution of respondents (Table 1) shows that the largest share of growers (44.2%) belonged to the 36-50 years age group, followed by the 26-35 years group (28.3%) and those above 50 years (18.3%). Only 9.2% of growers were below 26 years, pointing to limited entry of younger persons into potato cultivation in the study area. The mean age of the sampled growers was 41.5 years, indicating that Surya T7 cultivation is largely in the hands of an experienced, middle-aged farming population.

**Table 1:** Age Distribution of Surveyed Farmers (n = 120)

| Age Group (Years) | Number of Farmers | Percentage (%) |
|-------------------|-------------------|----------------|
| Below 26          | 11                | 9.2            |
| 26 - 35           | 34                | 28.3           |
| 36 - 50           | 53                | 44.2           |
| Above 50          | 22                | 18.3           |
| Total             | 120               | 100.0          |

#### 3.1.2 Educational Profile

Education levels among the surveyed growers were skewed towards lower and middle tiers: 22.5% had education below primary level, 28.3% had completed primary education, 31.7% had secondary-level education, 12.5% were graduates, and only 5.0% held a post-graduate or higher qualification. Growers with higher education showed a greater tendency to use digital market information and to engage in more direct forms of marketing, consistent with the findings of Sharma and Patel (2023) on technology adoption among potato farmers in western Uttar Pradesh.

### 3.1.3 Farm Size Distribution

The sample was fairly evenly spread across farm-size categories, with marginal farmers (< 1 ha) accounting for 26.7%, small farmers (1-2 ha) for 23.3%, semi-medium farmers (2-4 ha) for 18.3%, medium farmers (4-10 ha) for 16.7%, and large farmers (> 10 ha) for 15.0% of respondents. The average area devoted to Surya T7 cultivation was 2.85 hectares per farmer, with larger farmers allocating proportionately more land to the variety, reflecting its growing commercial importance.

### 3.1.4 Experience in Surya T7 Cultivation

Regarding experience, 35% of growers had cultivated Surya T7 for less than 5 years, 42% for 5-10 years, and 23% for more than 10 years. This distribution suggests that Surya T7 is a relatively recently adopted variety in the study area that is gaining rapid acceptance owing to its higher yield and disease-resistance characteristics, a pattern also noted for improved variety adoption in western Uttar Pradesh by Sharma and Patel (2023)<sup>[4]</sup>.

Taken together, the socio-economic profile indicates that Surya T7 cultivation in Iglas block is dominated by middle-aged, moderately educated farmers with small to medium landholdings and comparatively recent experience with the variety - a profile that has direct implications for marketing behaviour, since, as discussed in Section 3.2 and corroborated by farm-size-wise channel preference patterns from the parent study, smaller and less-experienced growers were found to be more dependent on village traders for pre-harvest credit and produce disposal.

### 3.2 Objective 2: Cost of Cultivation and Marketing Cost Structure

#### 3.2.1 Cost of Cultivation Framework

The cost of cultivation of Surya T7 potato was intended to be examined using the CACP cost concepts (Cost A1 through Cost C2), which together capture paid-out costs, imputed value of family labour and owned inputs, rental value of owned land, and interest on fixed and working capital. This framework provides the comprehensive per-hectare cost base (Cost C2) against which the marketing costs discussed below can be compared. Detailed farm-level cost-of-cultivation estimates were being compiled from the primary survey; the discussion below therefore concentrates on the marketing cost structure, for which complete channel-wise estimates were available.

#### 3.2.2 Marketing Cost Structure Across Channels

Four marketing channels were identified for Surya T7 potato in the study area - Channel I (Producer to Consumer), Channel II (Producer to Retailer to Consumer), Channel III (Producer to Wholesaler to Retailer to Consumer), and Channel IV (Producer to Village Trader to Wholesaler to Retailer to Consumer). The total marketing cost (TMC), comprising transportation, loading-unloading, storage, commission, weight/market fee, grading-packaging, handling-loss, and miscellaneous costs, rose sharply with channel length, from Rs. 52.80 per quintal in Channel I to Rs. 86.60 in Channel II, Rs. 180.40 in Channel III, and Rs. 265.60 per quintal in Channel IV (Table 2).

**Table 2:** Marketing Costs in Different Channels (Rs./quintal)

| Cost Component (Rs./quintal)   | Channel I | Channel II | Channel III | Channel IV |
|--------------------------------|-----------|------------|-------------|------------|
| Transportation cost            | 18.50     | 22.40      | 28.60       | 35.80      |
| Loading & unloading charges    | 6.20      | 8.50       | 12.40       | 18.60      |
| Storage / cold storage charges | 0.00      | 12.00      | 42.00       | 62.00      |
| Commission charges             | 0.00      | 0.00       | 25.00       | 38.50      |
| Weighment & market fees (APMC) | 4.80      | 8.20       | 18.50       | 24.80      |
| Grading & packaging cost       | 12.00     | 15.50      | 22.60       | 28.40      |
| Loss due to handling (imputed) | 8.30      | 14.80      | 22.50       | 42.50      |
| Miscellaneous marketing cost   | 3.00      | 5.20       | 8.80        | 15.00      |
| Total Marketing Cost           | 52.80     | 86.60      | 180.40      | 265.60     |

Storage/cold storage charges and handling losses emerged as the largest incremental cost components as channel length increased, together accounting for over 39% of the total marketing cost in Channel IV. Commission charges, absent in the shorter Channels I and II, became a significant cost element (Rs. 25.00-38.50 per quintal) once wholesalers and village traders entered the channel. This pattern is broadly consistent with Singh *et al.* (2017), who similarly found transportation and storage to be the dominant cost components in longer potato marketing channels in Uttar Pradesh.

The rising cost burden along longer channels has direct implications for the socio-economic groups identified in Section 3.1: marginal and small farmers, who make up half the sample and were found in the parent study to rely predominantly on Channel IV owing to pre-harvest credit dependency on village traders, effectively bear a disproportionately higher marketing cost burden relative to larger farmers who are better able to access shorter, less costly channels (II and III).

#### 4. Conclusion

The socio-economic profile of Surya T7 potato growers in Iglas block of Aligarh district is characterised by a middle-aged (average 41.5 years), moderately educated farming population, with half the sample comprising marginal and small farmers and an average Surya T7 landholding of 2.85 hectares. The cost structure analysis shows that total marketing cost rises steeply from Rs. 52.80 per quintal in direct farmer-to-consumer sales to Rs. 265.60 per quintal in the longest, trader-intermediated channel, driven principally by storage, commission, and handling-loss costs. Since marginal and small farmers are disproportionately reliant on the longer, costlier channel, interventions such as strengthened cold-storage access at the block level, promotion of Farmer Producer Organisations to enable collective marketing, and improved institutional credit linkages are likely to have the greatest benefit for this segment of growers.

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