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Research Paper

# Economic evaluation of post harvest losses in tomato in Latur district of Maharashtra State

**R.B. CHANGULE, R.D. SHELKE AND B.B. MANE**

See end of the article for authors' affiliations

Correspondence to :

**R.B. CHANGULE**
Department of Agricultural Economics and Statistics, College of Agriculture, LATUR (M.S.)

## ABSTRACT

Investigation was carried out during the year 2009-10 in Latur district of Maharashtra. In all sixty farmers were selected for the study on tomato production, marketing practices and losses incurred by farmers at the farm level and during transportation to markets. To study the post harvest losses in the marketing channels of tomato, two varieties was selected for the present study. The results revealed that the respondents were in the group of middle age, education level was of Primary level and the majority of respondents were medium farmers. At the farm level, the post harvest losses occurred during collection, sorting, packing and transportation. These losses occurred at farm level due to lack of storage facilities and improper handling. Storage of tomato was practiced neither at farm level nor at the trader level over a period of time. The overall post harvest losses were estimated to 35 kg per quintal of tomato. The post harvest losses in the market network were observed in each and every stage of handling. Plastic crates were used for long distant transportation and the packing losses were found minimum in the packing materials like plastic crates.

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**Key words :** Tomato, Processor, Post harvest losses, Gross return, Net profit

## INTRODUCTION

India being a vast country with varied soil and agro-ecological conditions has grown a wide variety of vegetables. India is the second largest producer of vegetables in the world next to China with an estimated production of about 50.09 million tonnes from an area of 4.50 million hectares. India shares about 12 per cent of the world output of vegetables from about two per cent of the cropped area in the country and contributes about 24 per cent of gross agricultural output .Lack of efficient methods of harvesting and non-availability of adequate facilities like transportation, packaging, storage, processing and market accessibility are the other problems in vegetable cultivation.

### Post harvest losses-some key issues:

The post harvest losses of vegetables are a matter of grave concern for India's agricultural sector (Chadha, 1995). The vegetables being highly perishable commodities are lost after harvest due to insufficient methods of harvest, decay, over-ripening, mechanical injury, weight loss, trimming and sprouting. Therefore, these aspects are to be looked critically to see if any improvement in the present state of vegetable industry, especially in the context of processing and marketing are to be accomplished .Post harvest losses generally lead to social and economic losses to the farmers, wholesalers, retailers and also to the consumers. It is estimated that the post harvest losses of food grains in the developing countries is due to mishandling, lack of storage facilities and pest infestations are put at 35 to 40 per cent. This means that one quarter of what is produced never reaches up to the consumers for whom it was grown, and the efforts and money required to produce it, are lost forever. It is understood that nearly 35 to 40 per cent of agricultural produce are wasted, which amount to a staggering loss of Rs.50000 crores annually. The amount of vegetables wasted in India is sufficient to meet the requirements of United Kingdom. Hence, careful handling of vegetables by selecting appropriate post harvest means will be of paramount importance to reduce the handling losses to a considerable extent.

**Prevention of losses in tomato:**

More tomato fruit for consumption by the village people, more tomato fruit will be available for farmers to sell. Higher living standards of farmers, more tomato available for non-farming population/urban people, Higher quality and competitiveness of export commodities in world trade, sounder economy for the country and improvement of its international standing (F.A.O., 1989).

There is need to know the socio-economic status of *Kharif* tomato growers as well as post harvest losses in *Kharif* tomato at different stages and post harvest losses at different marketing channels in tomato. Keeping in view above aspects, the present study has been undertaken in order to know the socio-economic status of *Kharif* tomato growers, post harvest losses at different stages and marketing channels preferred by the farmers of the region.

## MATERIALS AND METHODS

For the present study, primary data were been used to analyse the post-harvest losses in tomatoes in Latur district of Maharashtra. The performance in terms of physical and financial achievements to targets of the tomato crop and marketing aspects helps us to understand the macro-picture over the years.

Primary data were collected from the selected farmers who grow tomato in the selected villages of Latur district, which has a substantial area under tomato crop was selected in the district. In the district two Talukas *viz*., Chakur and Nilanga were selected from the point of view of marketing infrastructure. Again from each Taluka, three villages were selected. From Chakur taluka, Kadmoli, Mohnal and Vadval villages and from Nilanga taluka, Aurad Sahajani, Halgara and Ambulga (B) villages were selected. From each selected village, a probability preparation sample of 10 farm households, representing different categories of size of holdings, were selected for a detailed household survey on tomato production, marketing practices and losses incurred by farmers at the farm level and during transportation to markets. To study the post harvest losses in the marketing channels of tomato, one variety each was selected from each Taluka, ex from Chakur and Nilanga Taluka local variety *i.e.*, local 5005 and hybrid variety *i.e.* Namdhari-12 was selected for the present study.

**Collection of data:**

Cross sectional data were collected from tomato growers by personal interview method with the help of pre-tested schedule. The data pertained for the year 2009-10. Statistical tools like mean, frequency, percentage and ratio were used and cost concept *viz*. variable cost and fixed cost were applied.

**Assessment of post harvest losses:**

Estimation of post harvest losses, both in physical quantities and monetary terms were undertaken in each and every stage of the identified market channels and also in between market intermediaries. The micro-level particulars were used to compute the estimation of losses both in physical and monetary units by extrapolating the micro-level information based on the results obtained from the assessment of post harvest losses at different stages of production and marketing in the supply chain. Sensitivity analysis was carried out for different market intermediaries and the post harvest losses observed in the three identified market channels were used to scale up the physical and monetary losses at the district level.

## RESULTS AND DISCUSSION

Socio-economic characteristics of tomato growers were estimated and are presented in Table 1.In the study area, 50 per cent of the respondents were in the group of middle age *i.e.* in between 29-39 years. The education level was 38.33 % Secondary level and 31.66 % of Primary level. The capital investment requirement was 0.55 lakhs in the study area. The majority (56.66 %) of the respondents were medium farmers. On an average, the milch animals in the study area were 1.12 per cent.

In the study area, three major channels, were used by the farmers for transacting the commodities from the farm gate to the consumer level (Flow chart).Of the four channels, the first three channels were predominant, since more than 80 per cent of the productions were transacted

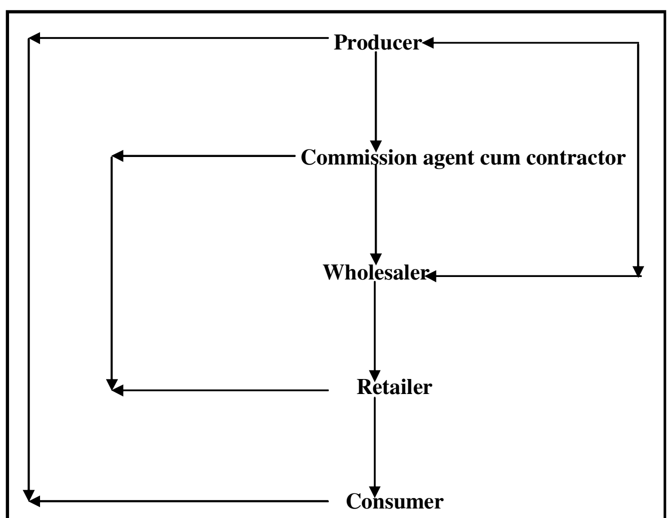


Fig. : Flow chart

**Table 1 : Socio economic characteristics of tomato growers**

| Particulars | Frequency | Percentage |
|---|---|---|
| **Age(year)** | | |
| 1.Young Age (19 to 28 years) | 11 | 18.33 |
| 2.Middle Age (29 to 39 years) | 30 | 50.00 |
| 3.Old Age (40 and above) | 19 | 31.66 |
| **Family size(no)** | | |
| 1.Upto four | 09 | 15.00 |
| 2.Four to six | 34 | 56.66 |
| 3.Six and above | 17 | 28.33 |
| **Education level(score)** | | |
| 1.Primary | 19 | 31.66 |
| 2.Secoundary | 23 | 38.33 |
| 3.Higher Secondary | 14 | 23.33 |
| 4.Degree and above | 04 | 6.66 |
| **Capital investment (Rs. lakhs)** | | 0.55 |
| **Land holding (ha)** | | |
| 1.Small | 12 | 20.00 |
| 2.Medium | 34 | 56.66 |
| 3.Large | 14 | 23.33 |
| **Milch animal (No.)** | | 1.12 |

through these routes. In channel II, producers directly sold their produces to the wholesalers. The channels III and IV mostly met the requirements of the local consumption. Processing units/contractors used to purchase tomatoes at the time of glut in the market and also at a time when the prices were very low in the market.

### Existing marketing channels in the study area:

– Channel I-Producer-Commission Agents cum contractor-Wholesaler-Retailer-Consumer

– Channel II- Producer- Wholesaler-Retailer-Consumer

– Channel III- Producer-Commission Agents cum contractor- Retailer-Consumer

– Channel IV- Producer- Consumer

### Post harvest handling at the production point:

Post harvest handling, packaging and storage were observed to be the major post harvest operations for tomato. The fruit skin and low firmness results in higher post harvest losses of tomato. The post harvest losses at farm level include losses due to crack, over maturity, damage by pest and diseases, nutritional disorders and environmental factors. Various packaging mediums like wooden crates and plastic crates of varying shapes and sizes were commonly used by the farmers and traders. The wholesaler and retailer for intermediate handling and rarely for transporting also used plastic crates. It costs around Rs.325 each and will hold 22 kg of fruits. Plastic crates are last for seven years so now-a-days 90% of the farmers use the plastic crates for storage and transportation.

The losses were maximum when tomato was packed in bamboo basket. The loss by scorching and cracking was found high in the entire packaging medium. The reasons might be due to the self-weight of the fruits acting on the tomato at lower layers and also due to the arrangement of crates directly one above the other during transportation. When tomatoes were packed in plastic crates and when the traders transported tomatoes to distant markets, the transport losses were found to be higher. At the time of auction, some quantities of the produce brought for marketing by the farmers had to be changed to another crates to assess the product quality and volume. The process further hastens the damages to tomatoes and increases the post harvest handling losses.

### Post harvest losses at the market level:

Traders always inspect the produce brought by the farmer to the market for sale. Handling (inspection), grading, re-packaging, loading, transportation, unloading and transferring to other crates enhanced post harvest losses. At the time of bidding, the trader used to tight pack the tomatoes in the containers to accommodate more weights. This further accelerates the damaging of the fruit significantly. An average post harvest loss of 7.5 per cent was found during the above process. The losses due to improper handling were estimated and reported channel wise. At the retail level, tomatoes are sorted out before selling. During sorting, it was estimated that about 9 per cent of the produce got damaged. The extent of losses depends mostly on the stage of ripening. The retailer or vendors incurred an additional loss of 9.5 per cent while selection due to handling of the tomato by the consumers.

### Post harvest losses of tomato in different market channels:

It is obvious from the Table 2 that the post harvest loss of tomato in channel I was maximum (35.10 kg) among the three channels under consideration. The loss in value was about Rs.280 per quintal. In channel I farm level post harvest losses amounted to 11.7 kg per quintal, which worked to a loss of Rs.94 .In channel I, the loss at farm level, commission agent's level, wholesaler level and retailers level were 11.7,8.5,6.3 and 8.5 kg per quintal. This was due to loading, unloading, packaging, sorting, packing, transportation and during sales to retailer.

In channel III, the total loss amounted to 26.2 kg per

**Table 2: Post harvest losses of tomato in different marketing channels**

| Sr. No. | Stages | Channel I | | Channel II | | Channel III | |
|---|---|---|---|---|---|---|---|
| | | Qty(kg) | Value(Rs.) | Qty(kg) | Value(Rs.) | Qty(kg) | Value(Rs.) |
| 1. | **Farm level** | | | | | | |
| | Collection | 2.3 (6.55) | 18.4 | 3.4 (13.71) | 27.2 | 2.7 (10.31) | 21.6 |
| | Sorting | 3.4 (9.69) | 27.2 | 2.1 (8.47) | 16.8 | 1.8 (6.87) | 14.4 |
| | Packaging | 2.2 (6.27) | 17.6 | 1.2 (4.84) | 9.6 | 1.4 (5.34) | 11.2 |
| | Transportation | 3.8 (10.83) | 30.4 | 3.5 (14.11) | 28.0 | 3.3 (12.60) | 26.4 |
| | Total | 11.7 (33.33) | 93.6 | 10.2 (41.13) | 81.6 | 9.2 (35.11) | 73.6 |
| 2. | **Commission agent cum contractor level** | | | | | | |
| | Unloading | 2.4 (6.84) | 19.2 | | | 3.6 (13.74) | 28.8 |
| | Packaging | 1.9 (5.41) | 1.52 | | | 1.6 (6.11) | 12.8 |
| | Loading | 1.4 (3.99) | 11.2 | | | 1.4 (5.34) | 11.2 |
| | Transportation | 2.8 (7.98) | 22.4 | | | 2.1 (8.02) | 16.8 |
| | Total | 8.5 (24.22) | 68.0 | | | 8.7 (33.21) | 69.6 |
| 3. | **Wholesalers level** | | | | | | |
| | Unloading | 1.6 (4.56) | 12.8 | 1.9 (7.66) | 15.2 | | |
| | Repacking | 3.4 (9.69) | 27.2 | 2.7 (7.66) | 21.6 | | |
| | Loading | 1.3 (3.70) | 10.4 | 1.9 (7.66) | 15.2 | | |
| | Total | 6.3 (17.95) | 50.4 | 6.5 (7.66) | 52.0 | | |
| 4. | **Retailers level** | | | | | | |
| | Unloading | 1.3 (3.70) | 10.4 | 1.6 (6.45) | 12.8 | 2.1 (8.02) | 16.8 |
| | Sorting | 3.8 (10.83) | 30.4 | 3.7 (14.92) | 29.6 | 3.5 (13.36) | 28.0 |
| | Sales | 3.5 (9.97) | 28.0 | 2.8 (11.29) | 22.4 | 2.7 (10.31) | 21.6 |
| | Total | 8.6 (24.50) | 68.8 | 8.1 (32.66) | 64.8 | 8.3 (31.68) | 66.4 |
| | Grand total | 35.10 (100.00) | 280.8 | 24.8 (100.00) | 198.4 | 26.2 (100.00) | 209.6 |

* Figures in parenthesis indicate percentages to total

quintal, which was valued at Rs.209.6 kg per quintal. The losses were observed high at the retail level, which was valued at Rs.82. It was due to sorting and selection of fruits by consumers. The losses at farm level and commission agent level were almost same in channel III. Post harvest loss in channel II was found to be 24.8 kg per quintal and was valued at Rs.198.40.The loss was found to be least in this marketing channel due to the prevalence of less number of market intermediaries at the farm level and retail levels. The losses amounted to 10 kg per quintal in each stage. At wholesale market level, the post harvest losses 6.5 kg per quintal, which amounted to Rs.52 per quintal. When compared with the other channels under consideration, only in channel I, the post harvest losses were observed maximum since this channel involved too many market intermediaries. Further, loading, unloading and re-packing had to be one at three intermediary levels, which again led to maximum post harvest losses. The losses observed in channel II was minimum due to the elimination of commission agents. The harvested tomato reached the market much earlier in this channel, which reduced the losses significantly. The losses at farm level had been high in channel I because the retail market was comparatively far away from the product point among the three channels. Hence, the market functionaries used to reject more quantity of tomato for quality.

Authors' affiliations:

**R.D. SHELKE AND B.B. MANE,** Department of Agricultural Economics and Statistics, College of Agriculture, LATUR (M.S.)

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