


## Chapter 26

# Factors that impact Quality during the Transportation of Tomatoes: Evidence from India

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### ABSTRACT

*This paper examines the factors that impact the quality of tomatoes during the transportation through the supply chain. This is motivated by the criticality transportation in north India region. Primary data was collected through a survey using a questionnaire with responses from 140 transporters from the Himachal Pradesh and Uttarakhand states of India. The data were analyzed using factor analysis to identify the factors that are impacting the quality of tomatoes during the transportation stage. Based on the analysis, three factors were identified that impact quality: Operational, Preservation and Infrastructure. The identification of these factors will benefit the stakeholders involved in the process of decision-making, like the state government, food processing units, transporters, and the farmers. This will help us to understand the current status of transportation and related issues and challenges which enable them to make better planning and management to improve efficiency in the transportation stage of the supply chain.*

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## **1. INTRODUCTION**

Transportation is one of the most important elements of supply chain management. It plays a crucial role in moving goods from one place to another and without its presence the supply chain cannot run successfully. It plays a more important role in supply chain of perishable commodities where the goods need to be reached to its destination a lesser time as compared to other products (i.e., the customers) in a limited period due to high perishability and shorter shelf-life of the products. Supply chains connect each stage of production and distribution starting from the farms to the consumers and helps to move the fresh produce from farm gate to local markets, often called mandis in India, to wholesale markets, then to retailers, and then ultimately to the end-consumers.

Faster transportation with less damage in transit is vital for successful supply chain of perishable products. In India, transportation through roadways is preferred for shipping fresh produce because of the rapid movement of items and advantages of door step services.

The rising significance of vegetables in the Indian economy can be seen in terms of the increasing national demand on description of increase in population and per capita income; their growing export potential; the need for providing employment prospects in the rural area, and vegetables being relatively more remunerative crops. While national and export demand is progressively rising, the distribution and logistics of vegetables face tremendous uncertainties on numerous counts.

Tomatoes are one of the most popular and extensively grown vegetables in the world ranking second in importance to potatoes in many countries. It is the second most extensively grown vegetable crop in India which provides a healthy perspective on the post-harvest encounters facing the Indian agriculture sector. India is second highest producer of tomatoes in the world after China, with the total production of about 19.40 million tons in 2013-14 (NHB, 2015). They are widely grown in the Himalayan region of north India, especially in Himachal Pradesh and Uttarakhand. Like the rest of the nation, the economies of Himachal Pradesh and Uttarakhand are predominantly agrarian. About 80% of the employment is directly or indirectly linked with agriculture and allied activities. Most growers in Himachal Pradesh and Uttarakhand state are of marginal and are small businesses. However, tomato crops have gained importance as they provide sustainable income, nutritional security and for providing employment opportunities to lots of people in these states. Agro-climatic situations in the states provide opportunity for production of off-season vegetables for sustainable income to the farmer.

Tomatoes grown in these areas have its own importance as they are produced in the foothills of Himalayas and are considered as some of the best quality produce having high demand in the plain areas. It is widely used as vegetable, consumed both as raw and cooked form. Tomatoes, being perishable in nature and produced in excess, must be either processed or stored in cold storage for further consumption, which otherwise would lead to glut resulting in wide price fluctuations. Owing to the limited shelf life and high perishability, these items require appropriate transportation and handling system so they can travel from farm to plate in a fresh manner. Transportation also connects the parties responsible for efficient production and supply of fresh items from farmer to final consumers, to consistently meet the need of the customer in terms of required quantity, fresh quality and right price. Over India, tomatoes are widely grown but the supply chain is characterized by inefficiencies which consequently results in poor price realization for the producers of tomato on one hand and high purchase prices to consumers due to improper quality of tomatoes at the final point of sale. In these states, the transportation stage of perishable fruits and vegetables is suffering from maximum inefficiency leading to significant loss and waste.

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