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Supply Chain Management of Tomato - A Case Study of Prayagraj District

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Abstract

The study was conducted to find out the existing supply chain, their problem and cost of Tomato in Prayagraj District of Uttar Pradesh from Producer to consumer. It was found that in Prayagraj, there are mostly four types of supply chain of Tomato depending on the type of Producer. 1st ***(Producer -> Consumer), 2nd(Producer ->Retailer -> Consumer*** *), 3rd* ***(Producer -> Wholesaler -> Retailer -> Consumer)*** *and 4th* ***(Producer ->Commission agent -> Wholesaler -> Retailer -> Consumer).*** *The producer share was highest in the 1st channel where he received 70.10% of the total produce, followed by channel 2nd with 30.65%, 3rd channel with 20.15%, 4th channel with 17.87% of share. Consequently, the consumer got maximum benefit in the 1st channel. It was also found that producer suffer with inadequate infrastructure which includes reachable and affordable transportation facility, Marketing and lack of advancement in processing technology of tomato resulting in huge loss of the produce.*

Key Words: *Tomato, Supply Chain Management, Producer, Wholesaler, Retailer, Consumer.*

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1. INTRODUCTION

The tomato (Solanum lycopersicum) is widely recognized as one of the most prominent vegetable plants on a global scale. According to existing scholarly perspectives, the process of domestication is widely hypothesized to have occurred in Central America, with its origins traced back to the western regions of South America. The tomato plant has undergone significant advancements in order to enhance its productivity, improve the quality of its fruits, and increase its ability to withstand various biotic and abiotic stressors. These developments have been driven by the tomato's crucial role as a staple food crop. The tomato has been widely employed in various capacities, primarily as a source of sustenance and as a subject of scientific investigation. The tomato plant exhibits several distinctive characteristics that distinguish it from other model plants, including rice and Arabidopsis. These features encompass the development of fleshy fruit, a sympodial growth pattern, and the presence of compound leaves. District Prayagraj is geographically located in the southern eastern region of the state of Uttar Pradesh. The geographical location in question is situated within the range of 24° 47' north latitude and 81° 19' East longitudes.

Tomato has been cultivated in Uttar Pradesh for a long time and it has become one of the most popular crop for vegetable purposes. Vitamin C (31.0 mg), vitamin A (321 IU), fiber (0.7 g), protein (1.98 g), sulphur (24 mg), moisture (93.1 g), chlorine (38 mg), minerals (0.6 g), and calcium (20 mg) are the vitamins and minerals that it is a substantial source of per 100 g fresh weight. The pulp and juice are mild aperients that are easily digested and a blood purifier. Intestinal infections are resistant to its antiseptic qualities.

Mundera Mandi, Transportnagar, Hathigahan Mandi, Navabganj are the major wholesaler centric mandi in Prayagraj District with an average footfall of 3500 Retailers and Customers buying directly from wholesalers and farmers. Some of the major retail markets in Prayagraj District are Soraon Sabzi Mandi, Mauaima Block Bazaar, Mansoorabad Mandi, Phaphamau Sabzi Mandi, Jhunsi Sabzi Mandi, Bara Block Bazaar, Jasra Mandi.

2. METHODOLOGY

i. Selection of Study Area

Prayagraj region was specifically chosen for the current study because it has a significant area dedicated to tomato cultivation and is well known for producing tomatoes on a huge scale.

ii. Description of Prayagraj District

Prayagraj district is ranked 13th in India (out of a total of 640) by the 2011 census, which indicates that it has a population of 5,959,798. This is nearly comparable to the population of Eritrea or the US state of Missouri. Out of 71 districts in Uttar Pradesh, it has the most population as of 2011. 1,087 people live in the district every square kilometre (2,820 per square mile). Its population increased at a rate of 20.74% between 2001 and 2011.

Figure 1: Study Site

iii. Sampling Procedure and Data Collection

To choose the samples for this investigation, a stratified sampling approach was used. In order to gather the primary data from the chosen respondents, a survey that used a semi-structured questionnaire, focus groups, and direct field observation was conducted from February to May 2023. Different factors were incorporated into the questionnaire and checklist using a coordination schema, and an interview schedule was held by visiting each respondent at their home, workplace, and farm. With the same region's 15 farmers, 25 wholesalers, and 40 retailers serving as key informants, more data was gathered. Secondary data was gathered from the sources that were published.

Primary Data: The location of Mundera Mandi was purposefully chosen as the site for collecting primary data in this study. The primary market in question serves as a central hub for the sale and distribution of tomatoes. It functions as a key location where tomatoes are acquired for subsequent dissemination to various regions within the Prayagraj district, as well as to other states. Phaphamau market, Soram market, Mauaima Block Mandi was used as a source of primary data collection as these are the markets focused on wholesaler and individual customer.

Secondary Data: The required secondary data to the primary data and to support the study was obtained from different sources like Block development office, District agriculture office, Krishi vigyan kendra,Krishi utpadan mandi samiti, journals, newspaper and Internet library etc.

iv. Methods and Techniques of Data Analysis

The collected data underwent a coding process and were subsequently entered into a Microsoft Excel spreadsheet. Analysis of the data was conducted using both the Statistical Package for Social Science (version 25) and Microsoft Excel.

3. RESULTS AND DISCUSSION

Identified supply chain management practices in the marketing of Tomato in Prayagraj District:

i. Marketing Channels

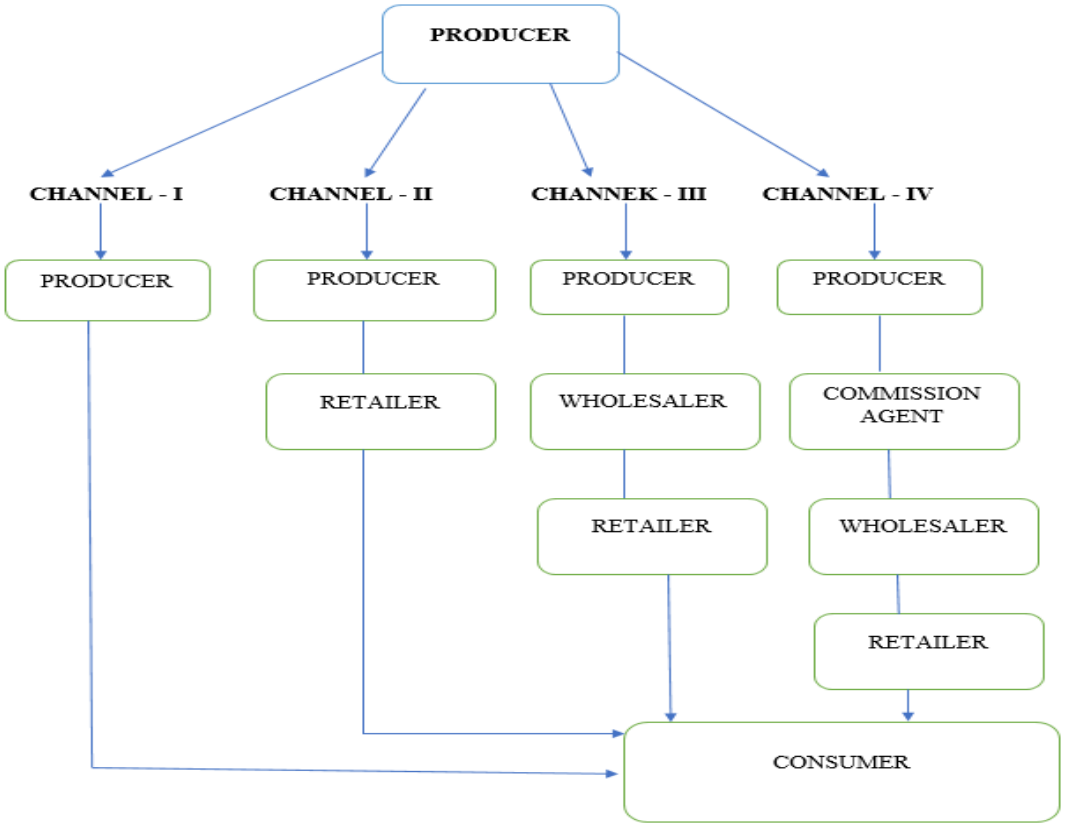


Figure 2: Supply Chain for Tomatoes in the Research Region

The researches were carried out to determine the Tomato supply chain in Prayagraj District. The Tomato supply chain contained the 4 identified supply chains. Data were gathered from the Hathigahan, Mundera, and Phaphamau sabzi mandi. To gather data and information for the

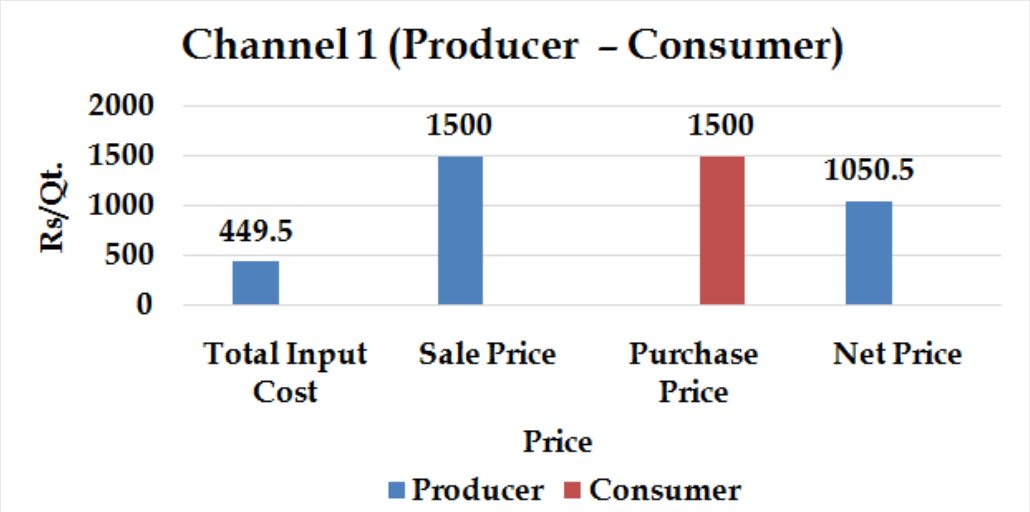
supply chain mechanism at various levels, questionnaires were designed. Later studies were carried out in the regions that produced Tomato, the wholesale market, and the retail market/shops.

For the purpose of selling fresh tomato in the various market outlets, farmers typically employ four different types of marketing channels, as indicated in Figure 2. The typical supply chain for small quantity tomato suppliers was shown by channel 1 in Figure 2, which connected Producer - Consumer. In comparison to the second and third channels, the fourth channel, which includes producers, commission agents, wholesalers, retailers, and consumers, had a considerably higher marketing margin. Since there were so few cooperatives engaged in the production and selling of tomato, the second channel, which involved producers, merchants, and consumers, was the least important. The majority of respondents were unfamiliar of marketing through agricultural cooperatives, but those who had done so reported the lowest marketing margins. The first channel, which combined producers and consumers, demonstrated that this was the one in which producers made the most money.

ii. Channel 1 (Producer – Consumer)

Table 1: Total Input Cost, Sale Price, Purchase Price, Net Price Received (Rs/Qt.)

Particulars	Total Input Cost	Sale Price	Purchase Price	Net Price
Producer	449.5	1500	-	1050.5
Consumer	-	-	1500	-

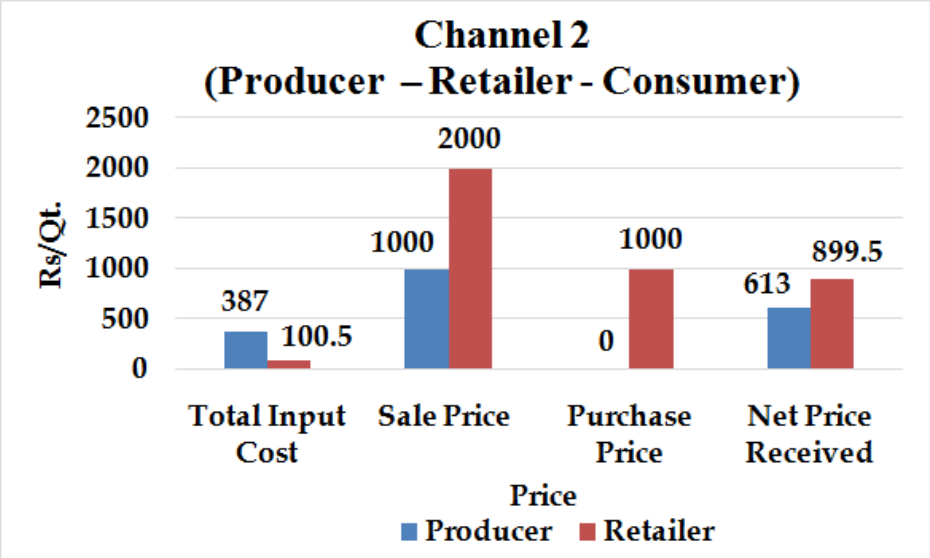


Producers obtained net share of approx. 70.03%. Channel 1 turned out to be most profitable channel for producer and consumer both.

iii. Channel 2 (Producer – Retailer - Consumer)

Table 2: Total Input Cost, Sale Price, Purchase Price, Net Price Received (Rs/Qt.)

Particulars	Total Input Cost	Sale Price	Purchase Price	Net Price Received
Producer	387	1000	-	613
Retailer	100.5	2000	1000	899.5

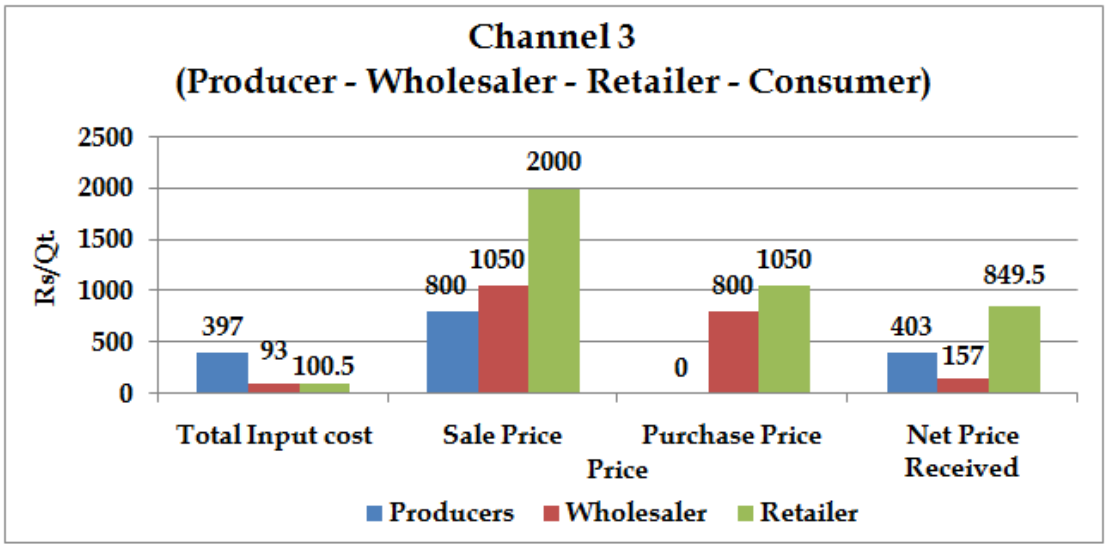


Producer obtained net share of 30.65% with majority of profit enjoyed by retailers in the 2nd channel. Retailers make profit of approx. Rs. 899.5 per quintals. Producers receive the least amount of profit in the 3rd channel compared to the other channels.

iv. Channel 3 (Producer – Wholesaler - Retailer – Consumer)

Table 3: Total Input Cost, Sale Price, Purchase Price, Net Price Received (Rs/Qt.)

Particulars	Total Input cost	Sale Price	Purchase Price	Net Price Received
Producers	397	800	-	403
Wholesaler	93	1050	800	157
Retailer	100.5	2000	1050	849.5

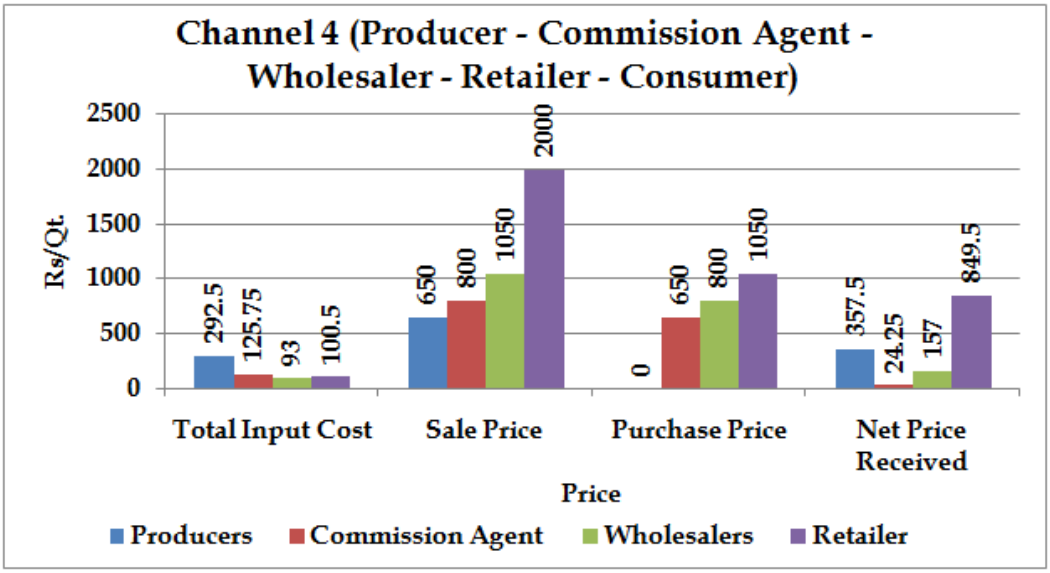


Producer obtained net share of 20.15% in the third supply chain. Presence of wholesalers and retailers affects the profit margin of producers. Retailers and wholesalers sell the product for Rs. 2000 and Rs. 1050 per quintals respectively.

v. Channel 4 (Producer – Commission Agent – Wholesaler - Retailer – Consumer)

Table 4: Total Input Cost, Sale Price, Purchase Price, Net Price Received (Rs/Qt.)

Particulars	Total Input Cost	Sale Price	Purchase Price	Net Price Received
Producers	292.5	650	-	357.5
Commission Agent	125.75	800	650	24.25
Wholesalers	93	1050	800	157
Retailer	100.5	2000	1050	849.5



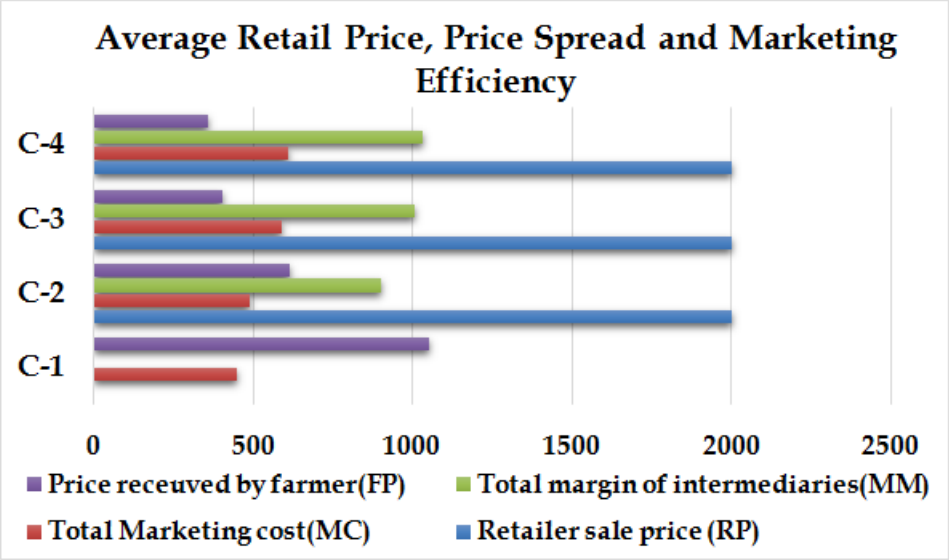
Producer obtained net share of 17.87% with majority of profit enjoyed by wholesalers and retailers. Commission agent makes profit of approx. Rs.24.25 per quintals.

vi. Efficiency of marketing and variables affecting ME on various platforms

Table 5 shows that while marketing cost and margin had an inverse relationship with marketing efficiency, the price farmers received was directly related to marketing efficiency. The research backs up Chand's (2010) conclusion that the marketing channel's marketing margin and cost have a detrimental impact on marketing effectiveness. Channel 4 was rated as having the highest marketing efficiency, followed by Channels 1, 2, and3.

Table 5: Average Retail Price, Price Spread and Marketing Efficiency

S.No.	Particulars	Unit	C-1	C-2	C-3	C-4
1	Retailers Sale Price (RP)	Rs/Qt.	-	2000	2000	2000
2	Total Marketing Cost (MC)	Rs/Qt.	449.50	487.50	590.50	611.75
3	Total Margin of Intermediaries (MM)	Rs/Qt.	-	899.50	1006.50	1030.75
4	Price Received by Farmers (FP)	Rs/Qt.	1050.50	613	403	357.50
	Marketing Efficiency = 4/(2+3) =	Rs/Qt.	2.33	0.44	0.25	0.21



4. Conclusion

The cultivation of tomatoes has demonstrated considerable potential as a profitable and auspicious agricultural pursuit, serving as a significant means of generating household revenue. Our study's findings indicate that merchants and wholesalers have a significant role in price fixing. The system for determining the minimum support price for tomato growers has to be strengthened. The observed disparity in pricing between farmers and urban consumers is indicative of potential inefficiencies within prevailing marketing strategies. Unfortunately, these marketplaces are frequently managed in a highly opaque way by a small number of intermediaries. In this situation, marketing firms and merchants should set tomato pricing based on research. The process of setting prices need to include input from the farmers as well.

References

[1] Anastasiadis, F., Manikas, I., Apostolidou, I., & Wahbeh, S. (2022). The Role of Traceability in End-to-End Circular Agri-Food Supply Chains. Industrial Marketing Management, 104, pp. 196-211.

[2] Abhyankar, D. HG and Nilesh R. Mate. (2017). Agriculture Exports Supply Chain Management - A Literature Review from Indian Context", International Journal of Development Research, 7(10), pp. 16440-16446.

[3] Buntak, K., Brlek, P., & Cesarec, B. (2021). The Impact of the Internet of Things and Artificial Intelligence on the Supply Chain. Bus. Logist. Mod. Manage, 21, pp. 369-383.

[4] Bhandari, H., Bhandari, T., Timsina, K. P., & Panta, H. K. (2021). Supply Chain Efficiency of Tomato in Kathmandu Valley. Journal of Agriculture and Natural Resources, 4(1), pp. 111-119.

[5] Brekalo, L., Albers, S., & Delfmann, W. (2013). Logistics Alliance Management Capabilities: where are they?. International Journal of Physical Distribution & Logistics Management.

[6] Chaboud, G., & Moustier, P. (2021). The Role of Diverse Distribution Channels in Reducing Food Loss and Waste: The Case of the Cali tomato Supply Chain in Colombia. Food Policy, 98, 101881.

[7] Del Borghi, A., Gallo, M., Strazza, C., & Del Borghi, M. (2014). An Evaluation of Environmental Sustainability in the Food Industry through Life Cycle Assessment: The Case Study of Tomato Products Supply Chain. Journal of Cleaner Production, 78, pp. 121-130.

[8] Emana, B., Afari-Sefa, V., Nenguwo, N., Ayana, A., Kebede, D., & Mohammed, H. (2017). Characterization of Pre and Post Harvest Losses of Tomato Supply Chain in Ethiopia. Agriculture & Food Security, 6(1), pp. 1-11.

[9] Kumar, Kamal, Kumar, Ashok & Meenu (2020), "Literature Review and Survey of Inventory Control Policy with Various Demand Parameters", International Journal of Trade and Commerce-IIARTC, 9(1), pp. 191-199.

[10] Negi, S., & Anand, N. (2015). Cold Chain: A Weak Link in the Fruits and Vegetables Supply Chain in India. IUP Journal of Supply Chain Management, 12(1), p. 48.

[11] Imtiyaz, H., & Soni, P. (2013). Economics of Production and Marketing of Vegetables and Fruit— A Case Study of district Allahabad, India. New Agriculturist, 24(2), pp. 235-240.

[12] Sharma, U.C. & Sharma, Mayank (2019), "Study of Differences in Purchase Behaviour for High Involvement Consumer Durable Goods in Districts of Rajasthan", International Journal of Trade and Commerce-IIARTC, 8(2), pp. 348-356.

[13] Tolani, V. C., & Hussain, H. (2013). Strategic Change in Model of Fruit and Vegetables Supply Chain. Global Journal of Management and Business Studies, 3(9), pp. 965-970.