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Long Distance Supply of Tomato: A Case Study of Anand (Gujarat)

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Abstract **– Tomato is one of the most important and popular vegetable in the world. India is the second-largest tomato producer worldwide. Tomato production has continuously increased during last 15 years because of higher demand, increase in consumption and higher rate of return. Tomato is one of the essential commodities of the Indian market and is eaten as raw fruit well as processed products. So, there is a need of this delicious produce in every part of country. Every year huge amount of tomatoes are being transported from production area to various places. Tomato also being transported from Anand to different parts of India and nearby country border. Therefore a case study was taken up to assess the various post-harvest handling steps involved in tomato supply and economics of supply. It is observed that supply chain of tomato is lack of proper handling, collection and pack house facility. Traders and persons involved are not skilled, also not aware of physiology of tomato fruit, results in poor handling and loss. Growers are not benefited, but middleman and merchant gets more benefits. Merchants gets profit of Rs 4-7 per kg of selling at end place.**

Keywords **– Tomato Supply, Long Distance Transportation, Economics of Supply, Losses.**

I. INTRODUCTION

India is the second-largest tomato producer worldwide, with about 17.5 million tons. Tomato is also second most-widely grown vegetable in India after potatoes (K.C. Prakash, 2014, Indian Horticulture Database, 2013). Tomato is one of the essential commodities of the Indian market. It is eaten as raw fruit (salads, sandwiches and salsa) well as processed products (ketchup, juice, puree, paste, sauce, pickles) also (K.B. Ramappa et al., 2017, Sagar et al. 2015). Different supply chain of vegetables prevailing in Karnataka state of country studied by Torane et. al., 2015, and reported that the chain involving maximum number of intermediaries' leads high post-harvest losses of tomato about 31 percent. They also reported that post-harvest management needs a lot of improvement on various front including grading, packaging, storage and transportation. Sharma and Singh, 2011 have reported 21 percent loss of tomato during harvesting and transportation.

Tomato production has continuously increased during last 15 years because of higher demand, increase in consumption and higher rate of return. The production has increased over 20708 thousand metric ton but losses has been reported relatively higher than developed economies (Anonymous, 2016, Gupta 2018, MoA, 2017,). In India, Andhra Pradesh stood first in production followed by Karnataka, Madhya Pradesh, Telangana and Odisha. Gujarat is at 6th place in terms of production of tomato. The important tomato growing districts of Gujarat states are Anand, Kheda, Gandhinagar, Dang, Dahod, Narmada, Panchamahal, Banaskatha, Vadodara, Valsad, Sabarkatha and Bhavnagar.

India's tomatoes are primarily sold on the fresh domestic market. The processing industry represents only about 1% of total production and around 1-2% of Indian tomatoes exported. Ripe mature tomato is rich in health promoting compounds that are thought to help prevent the occurrence of degenerative health conditions and hence in demand widely. Because of huge demand in domestic market it is being transported and supplied from

production area to various parts of the country and for this merchant from big markets *(mandis)* goes to that area and send to their market. Hence, interstate trade of tomato within India is significant. One such long distance supply from Anand district of Gujarat has been studied. This paper mainly focuses on the supply of tomato from Anand district to various part of country and the economic in terms of business has been calculated. The main focus is to study the handling steps of tomato and to find out gap of engineering intervention in whole supply chain.

II. MATERIAL AND METHODS

2.1. *Selection of Study Area*

The *Charotar Pradesh* of middle Gujarat (Anand & Kheda district) is known for its prosperity, having rich in canal irrigation facility and fertile soil. Farmers are progressive and do the farming of cash crop. Along with other vegetables, tomato is widely grown in this area. There are large number of tomato growers having different farm sizes. The present study was conducted to analyze the supply of tomato from farm to distant market in order to assess the value chain marketing. The field of study has a number of favorable features such as collection, packaging (sorting, grading, filling), loading and transportation of the tomato.

2.2. *Sample Size*

Traders select their site (collection center) near according to production pocket, most probably on road side. After coming to their selected place, traders travel around the place, contact the growers by keeping local agents with him. Generally, traders comes in mid of January and does the business up to March end. Peak period of the tomato is February month. Traders loads the truck at farmer's field in case of greater quantities. Otherwise they collect at common place and load a truck (15ton) within 2-4 days interval during early period, then loads 1-2 trucks daily in mid of February, then daily one-half to one truck during late period. Most profitable business is in mid of February, in these day average 2 trucks loaded per day as per demand from distant market. For this study 25 wholesalers/ purchasers were contacted at random in each Taluka, covering all area of Anand district.

The authorized agent who collect tomato from farmers and main merchant who supplies the tomato to other markets were contacted personally and data collected. Thus, the total sample included 60. The primary data were also collected from farmers who come to sell tomatoes at collection centre for selling of their produce (tomato). Study is based on personal interview method.

2.3. *Data Collection*

For collection of data questionnaires were designed especially for the purpose, seeking information on procuring costs, handling at collection centre, cost of successive operation at centre, returns and marketing practices. The information was gathered carefully explaining the purpose and convincing the actors to provide factual and truthful data. Data collected by personally visiting the site in the selected pocket during January-March 2015 period.

2.4. *Collection Centre*

A temporary shed constructed beside road side (*meda*), which is covered from three sides using low-cost locally available material (wooden bamboo/pole, green shed net, plain cloth), having open space in front of the *meda* for vehicle loading as well as unloading. Farmer brings their produce at site which is unloaded, weigh and

then it is sorted, graded and packaged in plastic crates. During sorting damaged and fully ripened tomato removed. The quantity of sorted tomato is very small @ 0.4-0.5% during early days. Whereas in-mid period removed quantity reaches to 1% and in last day it is 1-2%. The removed (unwanted) tomatoes are thrown away as wastage. After sorting three grades are prepared big, medium and small. First two grades are filled in plastic crates and weighed before loading. Third grade (small size) is sent in local market. Packed crates are than stake inside the shed. Two size of plastic crate were used. Bigger one is 540×350×300mm with 28kg and smaller one have dimensions 400×320×250mm with 14kg. These activities remain continue Whole day and loading done during evening time. After loading truck body covered with plastic sheet and tied. Loaded truck leaves for destination in late evening. Handling of tomato at collection center is shown in figure 1.

Fig. 1. Handling of tomato at collection centre.

III. Results and Discussion

The main objective of this study is to work out the economy of long distance supply of tomato. Worked out economy is depicted in table 1. Economy can be worked out by dividing period of transport in three different categories; first is start period (first 15 days), second is middle period (full bloom season) and third is end period (last 10-15days). At destination market tomatoes is sold as whole crate (25kg/crate).

3.1. *Start Period*

This period is from middle of January to end of January. It was observed that initial 4 to 5 days are used for setting of collection centre, contacting farmers and survey of standing tomato crops. During these days traders sends one truck of full loaded with tomato at an interval of four to five days. There is very less wastage of tomato, less than one percent. The profit margin during this period after excluding the all costs incurred is Rs. about 4 to 5 per kg of tomato (Table 1).

3.2. *Middle Period*

End of January to first week of March is the middle period. This is the peak season for tomato. This is the peak season of tomato and huge quantity available. Every day one truck is loaded, sometime two trucks loaded depending on demand from distant market. Losses are little but more (1-2%) as compared to initial period. Two or more traders jointly loads truck in case of less produce collected. Profit margin is high during this period because of demand, about 5 to 10 per kg of tomato. This profit margin is also goes up when there is demand from Pakistan. When Wagha border is open, this business is highly profitable, also farmers gets more price (about Rs 12/kg).

3.3. *End Period*

Second week of March onward is end period for traders. Season is at the end during this period and tomato fruits coming at collection centre is ripened, hence more losses, less demand and less return. Traders are putting their efforts to load a truck at an interval of maximum two days. Profit margin goes down during this period @ 3- 6 rupees per kg of tomato. Demand remains continue from other markets but non-availability of tomato fruit and weather change (rise in temperature) forces trader to wind up their business. Also losses are more during transportation.

The details of type of trucks, loading capacity, distance to be travelled, destination, costing and selling, etc., is shown in table 1.

Table 1. Economic of long distance supply of tomato.

Vehicle (Truck)	Loading capacity, ton	No. of crates	Crate size, mm (l×b×h)	Buying cost from farmers, Rs/kg	Packaging, loading, Rs/kg	Transport -ation cost, Rs/kg	Place to be Transport -ed	Dis- -tance (km)	Time required, h	Total cost price, Rs/kg	Selling Price Rs/kg	Loss/ Profit per trip of truck Rs/kg
Case-I: During early period (From 15 Jan to 30 Jan)							Delhi, Gurgaon, Hissar, Meerut, Dehradun, Kotputli, Chandigarh, Wagha border	1000 - 1800	18-72			
EICHER	13-14	900	400x320x250	8 -10	7 - 8	4 - 5				19-23	25-28	(+) 4-5
EICHER	16	575	540x320x300									
TATA	20	725	540x320x300									
CASE: II : During mid-period (First week of Feb to First week of March)												
EICHER	13-14	900	400x320x250	6 -8	7 - 8	4 - 5				17-21	25-28	(+) 4-7
EICHER	16	575	540x320x300									
TATA	20	725	540x320x300									
CASE-III: During last days (Second and Third Week of March)												
EICHER	13-14	900	400x320x250	1 -5	7 - 8	4 - 5				12-18	25-28	(+) 4-5
EICHER	16	575	540x320x300									
TATA	20	725	540x320x300									

(Source; from collected primary data)

IV. CONCLUSIONS

Present supply chain of tomato is not well organized and farmers are not getting benefit. Also there is lack of proper handling, collection and pack house facility in whole supply chain. Traders and persons involved are not trained, also not aware of physiology of tomato fruit, resulting in poor handling and loss. Losses during sorting observed to be 8-10%, whereas physical loss in weight observed 2-3% during transport. Middleman and merchant gets more benefits. Merchants get profit of Rs 4-7 per kg of selling of tomato at end place.

REFERENCES

[1] Anonymous, (2013). Indian Horticulture Database, National Horticulture Board, Government of India, (www.nhb.gov.in).
[2] Anonymous (2016). Fruits and vegetables Supply Chain in India. A report published by Indian Institute of Foreign Trade, Ministry of Agriculture, Govt. of India. (https://agricoop.nic.in/en)
[3] Gupta, P.K. (2018). A report on value chain study of tomato of Karnal, Haryana. Published by National Horticultural Research and Development foundation (www.nhrdf.com)
[4] Prakash, K.C. (2014). An analysis of supply chain of tomato from farm to retail outlets for spenders retail outlets in Bangalore city. International Journal of Commerce and Business Management, 7(2): 243-250. (DOI: 10.15740/HAS/IJCBM/7.2/243-250) (EISSN–0976–7940).
[5] Ramappa, K.B., Manjunatha, A.V., Umamageswari, M. and Venkatareddy, B. G. (2017). Value chain analysis of tomato marketing systems in karnataka. A chapter published in book: Financing Agriculture Value Chains in India: Challenges and opportunities. Springer Nature, Singapore January 2017. ISBN 978-981-10-5957-5. DOI: 10.1007/978-981-10-5957-5_7.
[6] Sagar, M, Torane, S.R., Dhananjaya Swamy, P.S. and Yogeesh, K.J. (2015). Economic Analysis of post-harvest losses in different marketing channels of vegetables in Mandya District of Karnataka State. International Journal of Agricultural Science and Research, 5(2): 225-230.
[7] Sharma, G. and Singh, S.P. (2011). Economic-Analysis of post-harvest losses in marketing of vegetables in Uttarakhand. Agricultural economics Research Review, 25: 309-315.
[8] Torane, S.M., Swamy, S.R.D., P.S. and Yogeesh. K.J. (2015). International Journal of Agricultural Science and Research, 5(2): 225-230.

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