



SUPPLY CHAIN MANAGEMENT OF POTATO - A CASE STUDY OF PRAYAGRAJ DISTRICT OF UTTAR PRADESH.

*Anurag Dwivedi¹, Kailash Chandra Yadav²

*Corresponding authors: Anurag Dwivedi¹

¹M. Tech. Students, Department of Process and Food Engineering. Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj – 211007 Uttar Pradesh, India.

²Assistant Professor, Department of Process and Food Engineering. Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj– 211007 Uttar Pradesh , India.

ABSTRACT

The purpose of the study was to determine the current potato supply chain, to identify issues and expectations of formers, and to compare the price fluctuation at each point of supply chain in Prayagraj District, Uttar Pradesh, India.

The study provides insights into the complex supply chain of potatoes in the selected area. Additionally, the study sheds light on the farmer's struggles with lack of infrastructure including easily accessible and reasonably priced storage facilities, transportation facilities, marketing, and lack of progress in potato processing technologies, which results in significant yield loss. Through primary data collection, the study identifies the various stages in the supply chain, including production, transportation, storage, and distribution. The study also highlights the key stakeholders involved in the supply chain, including farmers, intermediaries, wholesalers, and retailers. One of the key findings of the study is the significant role played by intermediaries in the supply chain. Intermediaries, such as commission agents and traders, act as intermediaries between farmers and buyers, and play a crucial role in determining the price of potatoes. The study finds that the lack of transparency and competition in the intermediary market can lead to market inefficiencies and lower profits for farmers. The challenges that farmers face include unpredictable weather patterns, lack of access to credit, and limited technical knowledge, which can lead to lower yields and reduced profitability for farmers.

Key words: Supply Chain Management, farmer's struggle, Yield loss, intermediary, stakeholder.

1. INTRODUCTION.

Potato, originated in South America, is now grown worldwide. Potato belongs to the Solanaceae family. It has special value as food. It is also used in various industrial applications such as the production of starch and alcohol. For the past 300 years or possibly more, potatoes have been farmed in nearly every state in India. There are close to 4,000 varieties of potato globally and around 80 varieties are commercially available in India. The potato is rarely eaten raw because raw potato starch is poorly digested by humans. When a potato is baked, its contents of vitamin B6 and vitamin C decline notably, while there is little significant change in the amount of other nutrients. According to the Department of Agricultural Research and Education, a typical raw potato is 79% water, 17% carbohydrates (88% is starch), 2% protein, and contains negligible fat. In a 100-gram portion, raw potato provides 77 kilocalories of food energy and is a rich source of vitamin B6 and vitamin C (23% and 24% of the Daily Value, respectively), with no other vitamins or minerals in significant amount.

Uttar Pradesh has become the top producer of vegetables, getting back its first position by demoting West Bengal to the second position, with a difference of a Million Tonnes in production in 2021-22 Crop Year (CY)

July-June, after two years since 2020. Vegetable production in Uttar Pradesh is expected to be 29.58 Million Tonnes (MT) in the 2021–22 Crop Year July–June, down from 29.16 MT in 2020-21, while West Bengal output is expected to dip to 28.23 MT in 2021-22 from 30.33 MT in 2020-21. In Prayagraj district, the net area in Potato production in Crop Year 2021-22 was around 11777Ha. and Average productivity was around 195.31 Quintals/Ha.

2. MATERIAL AND METHODS

Marketing of Potato in selected area was aimed to make an appraisal about the marketing of Potato.

2.1. Sampling design:

For the present study stratified sampling procedure was adopted to select the samples.



Selection of district

- Description of Prayagraj District
- Soil
- Size and Distribution of land holding:
- Temperature and Rainfall

Selection of supply chain functionaries

- 15 farmers were selected, including small-scale farmers with less than 3 hectares land, medium-scale farmer 4-8 hectares, and large-scale farmer with land more than 8 hectares.
- 10 wholesalers and 10 Retailers were selected randomly for the study.
- 50 customers were selected randomly for the study

Development of survey schedule.

A structured schedule containing questions related to the various aspects was prepared to interview various persons involved at the different levels of the supply chain for collection of data. The survey scheduled had for different parts:

- Collecting Information from the farmers.
- Collecting data from the suppliers.
- Collecting data related to customer satisfaction.

Method of collection of data

• Primary Data:

Mundera mandi, 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 customers from different parts of Prayagraj district and to the other states.

- **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.

Computation of supply chain performance

In order to compute the performance of the supply chain, the various components which were considered are described in the section:

- **Producer's share in consumer's rupee:**

The producer receives what the consumer pay after the various cost of marketing has been deducted. This residual expressed as percentage of the price paid by the consumer (retail price) is the producer's share.

- **Price spread:**

The term refers to the difference between the two prices, i.e. the price paid by the consumer and the price received by the producer.

- **Market surplus:**

The market surplus is the residue left with the farmer after meeting his requirement for family consumption, payment of labor etc.

Assembling and Distribution:

Assembling is the primary and the most important function. The growers undertake the function of assembling the produce where they collect it and sells it to the buyers. The buyer in turn performs this function when they dispatch it to big markets. This function is further performed when big market dealers sell produce to small retailers or consumers.

Transportation:

The means of conveyance used depends upon the distance to be covered and the quantity of produce Usually, Big Trucks were used to move the produce to the faraway places, whether Trains were used to move the produce to ports for export purpose. To move the produce within the city, Tractor trolleys or some private vehicle was used.

Grading/ Packaging:

It may be defined as the sorting of unlike lots of produce into different lots. The farmers in the study area usually grade Potato according to size and quality. For transporting potatoes to distant markets, it was packed in Gunny bags made of jute.

Storage:

The holding of produce from the time of harvest till needed by the consumer is called storage.

3. RESULT AND DISCUSSION

The present study entitled "Supply Chain Management of Potato – A Case Study of Prayagraj District of Uttar Pradesh, India"- Keeping in view the objectives, formulated questionnaires were used to collect the data including review of previous researches on relevant topic to interview individuals/persons involved in the supply chain of Potato in Prayagraj district.

3.1. Identification of Supply Chain of Potato in Prayagraj District of Uttar Pradesh.

As per the data collected during the study, it was evident that majorly two types of supply chain of potatoes in Prayagraj district of Uttar Pradesh which typically involves various stages and participants. Here is an overview of the entire supply chain:

Supply Chain 1

Producer → wholesaler → Retailer → consumer

Supply Chain 2

Producer → Contractor/commission agent → Wholesaler → Retailer → Consumer

3.2. Comparison of price fluctuation at each point of supply chain in Prayagraj district.

To assess the price addition in supply chain of table potatoes at each step three main varieties were targeted G4 (Pahadi), yellow potatoes (Chipsona) and red potatoes (Lalima Potato), from the above responses of supply chain parties and results are:

• **G4 potato (Pahadi)**

Table 3.1: Monthly selling price of G4 potato (Pahadi):

Month wise selling price Rs/kg	Farmer	Wholesaler	Retailer	Profit	
				Wholesaler	Retailer
February	6	8	10	2	2
March	8	12	15	4	3
April	10	15	20	5	5
May	14	18	30	4	12
Average price <i>Rs/kg</i>	9.5	13.25	18.75	3.75	5.5
Standard Deviation	±2.958	±3.699	±7.395		

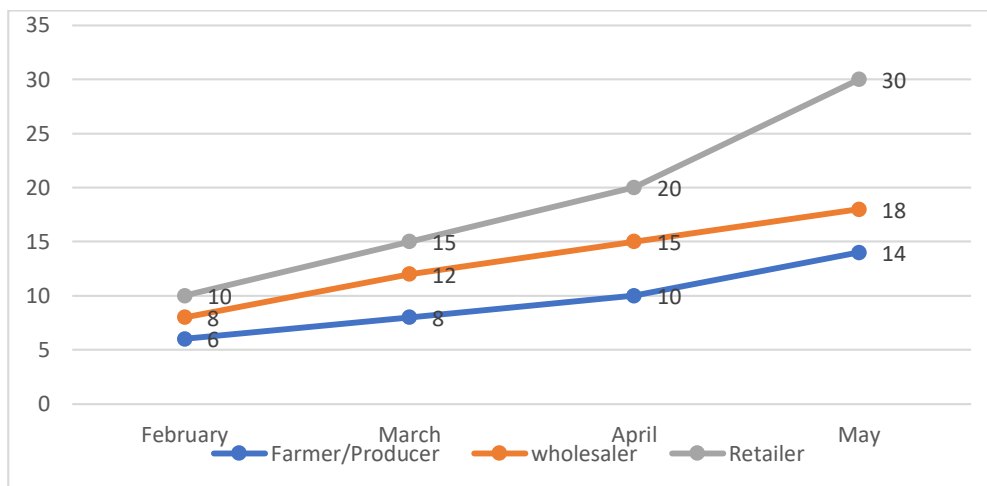


Fig. 3.1: Month wise price Rs/kg for G4 potato (Pahadi)

In the table 3.1, the producer’s selling and wholesalers buying price of G4 potato (Pahadi) for the month of February to end of May varies between 6 to 14Rs/kg, the retailers purchase price from wholesaler varies between 8 to 18Rs/kg. and selling price of retailer varies between 10 to 30Rs/kg depending upon quality and availability of material in the market. The average profit of the G4 potato (Pahadi) for wholesaler is 5.5 Rs/kg and for retailer it is 3.75 Rs/kg depending upon the availability. As per the calculation, the Standard Deviation value for farmer is ±2.958, for retailer is ±3.699 and for wholesaler is ±7.395. Similar results were compared with (Jadav et al., 2011).

• **Yellow potato (Chipsona):**

Table 3.2: Monthly selling price of yellow potato (Chipsona):

Month wise selling price Rs/kg	Farmer	Wholesaler	Retailer	Profit	
				Wholesaler	Retailer
February	7	9	12	2	3
March	9	14	18	5	4
April	11	17	22	6	5
May	15	20	32	5	12
Average price <i>Rs/kg</i>	10.5	15	21	4.5	6
Standard Deviation	±2.958	±4.062	±7.280		

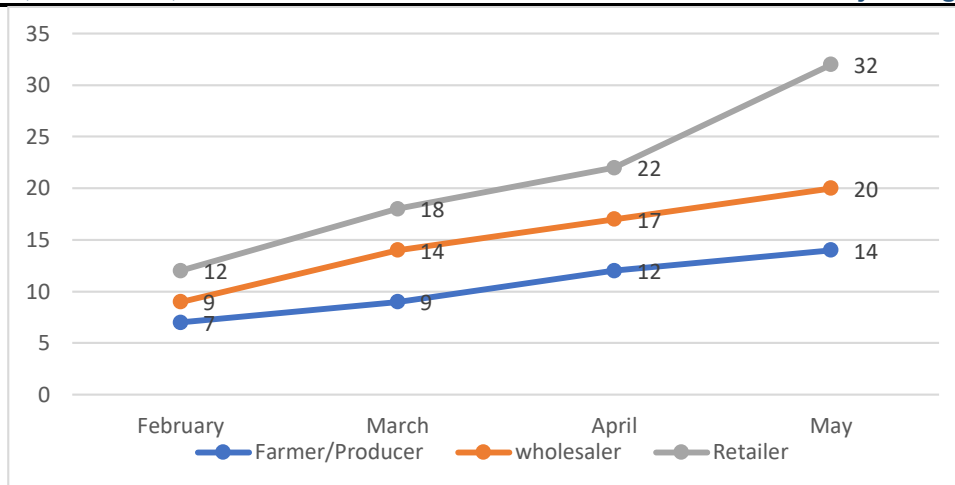


Fig. 3.2: Month wise price Rs/kg for Yellow potato (Chipsona)

In the table 3.2 the prices for yellow potato (Chipsona) varies at different stages. Producer’s selling and wholesalers buying price varies between 7 to 15Rs/kg depend upon the availability of potatoes in the market. The retailers purchase price from wholesaler from the month of February to end of May varies between 9 to 20Rs/kg. and selling price of retailer varies between 12 to 32Rs/kg depending upon quality and availability of material in the market. In the table 3.2 the average profit of the yellow potato (Chipsona) for wholesaler is 6 Rs/kg and for retailer is 4.5 Rs/kg depending upon the availability. As per the calculation, the Standard Deviation value for farmer is ±2.958, For retailer is ±4.062 and for wholesaler is ±7.280. Similar result was obtained by (Gupta et al., 1999)

• **Red Potato (Lalima)**

Table 3.3: Monthly selling price of Red potato (Lalima):

Month wise selling price Rs/kg	Farmer	Wholesaler	Retailer	Profit	
				Wholeseller	Retailer
February	8	11	14	3	3
March	10	16	19	6	3
April	13	19	25	6	6
May	17	22	35	5	13
Average price Rs/kg	12	17	23.25	5	6.25
Standard Deviation	±3.391	±4.062	±7.822		

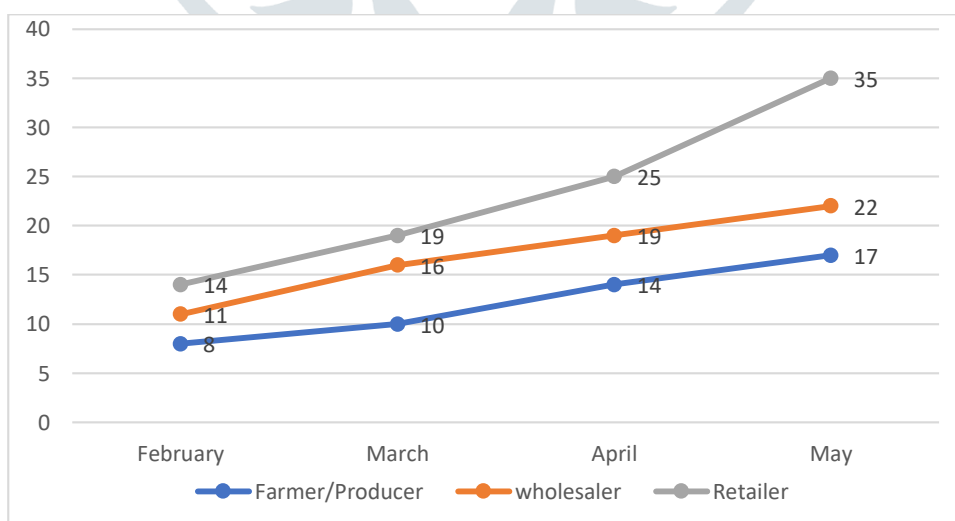


Fig. 3.3: Month wise price Rs/kg for Red potato (Lalima)

In the table 3.3 the producer’s selling and wholesalers buying price of red potato (Lalima) from the month of February to end of May varies between 8 to 17Rs/kg, the retailers purchase price from wholesaler varies between 11 to 22Rs/kg. and selling price of retailer varies between 14 to 35Rs/kg depending upon quality and availability of material in the market. In the table 3.3 the average profit of the red potato (Lalima) for wholesaler is 6.5Rs/kg and for retailer is 5Rs/kg depending upon the availability. As per the calculation, the Standard Deviation value

for farmer is ± 3.391 , For retailer is ± 4.062 and for wholesaler is ± 7.822 . Similar result was observed by (Chauhan et al., 1998).

3.3. Value gain by individual in different supply chain models:

According to channel 1 i.e. (producer-wholesaler-retailer-consumer), there is the amount spend in the chain by different intermediaries and producer's share in consumer's rupee (PCR).

In the chain first comes the producer the total price paid by the producer is 181.5 Rs/Quintals, PCR was 44. The producer paid the money on transportation Rs. 65 i.e. Tractor, Trucks and canter for bringing the produce from farm to market, PCR was 2.6. Then he paid Rs. 8 for loading and unloading of the produce in the market, PCR was 0.32. Charges are also paid for palledari i.e. Rs. 4 and PCR was 0.16. The maximum charges were paid for packaging i.e. Rs. 22 and PCR was 0.88 so that the produce is protected and stacked well. The produce worth Rs. 55 gets spoiled per quintal due to some physical and climatic effects, PCR was 2.2. There is also a fixed amount that has to be paid by each farmer for selling their produce in the mandi so the charge paid to the Mandi Samiti was Rs. 27.50, PCR was 1.1. Therefore, the total charges paid by the producer were 181.50 and PCR was 7.26. The net amount that was received by the producer after paying all the charges was Rs 918.5 and PCR was 36.74. Next in the chain comes the wholesaler the purchase price of wholesaler from producer was 1500 Rs/Quintals., producer's share in consumer's rupee (PCR) was 60. The wholesaler also has to pay different charges for moving the produce in the market. So, the charges paid were on taulayi and palledari Rs. 4 and PCR was 0.16, the produce worth Rs. 45 gets spoiled, PCR was 1.8. Therefore, the total charges paid by the wholesaler were Rs 114 Rs/Quintals and PCR was 4.56. The net amount received by the wholesaler was Rs. 286 and PCR was 11.44. The wholesaler sold the produce to retailer at 2100 Rs/Quintals. and PCR was 84.

Then comes the role of retailer, the retailer bought the produce from wholesaler at the rate of 2100 Rs/Quintals. and PCR was 84. The retailer also had to pay some marketing charges that were on transportation on bringing it from mandi to the local shops in the city, cost incurred was Rs. 65 and PCR was 2.6, charges on palledari was Rs. 4 and PCR was 0.16, approximately produce of worth Rs. 63 and PCR 2.52 gets spoiled in moving the produce from mandi to the local markets. The total charges spend by the retailer was Rs. 132, PCR was 5.28. The net amount received by the retailer was 468 and PCR was 18.72. The retailer sells the produce to consumer at Rs 2500 Rs/Quintals. and PCR was 100.

Finally, the produce reaches the customer at the rate of 2500 Rs/Quintals.

The table 3.4 indicates the average marketing cost and margin of Potato (Channel 1). The marketing cost incurred by producer was found to be 181.50 Rs/Quintals, wholesaler 114 Rs/Quintals and retailer Rs 132 Rs/Quintals. The sales price of producer was found to be 1100 Rs/Quintals, wholesaler 1500 Rs/Quintals and in case of retailer was 2100 Rs/Quintals. The purchase price of producer was nil, wholesaler 1100 Rs/Quintals and in case of retailer was 2100 Rs/Quintals.

The net amount received was found to be 918.50 Rs/Quintals in case of producer, 286 Rs/Quintals in case of wholesaler and 468 Rs/Quintals in case of retailer.

Table 3.4: Average marketing cost and margin of Potato (Rs/Quintals)

Particulars	Marketing Cost	Sale Price	Purchase Price	Net Price received
Producers	181.5	1100	-	918.5
Wholesaler	114	1500	1100	286
Retailer	132	2100	1500	468

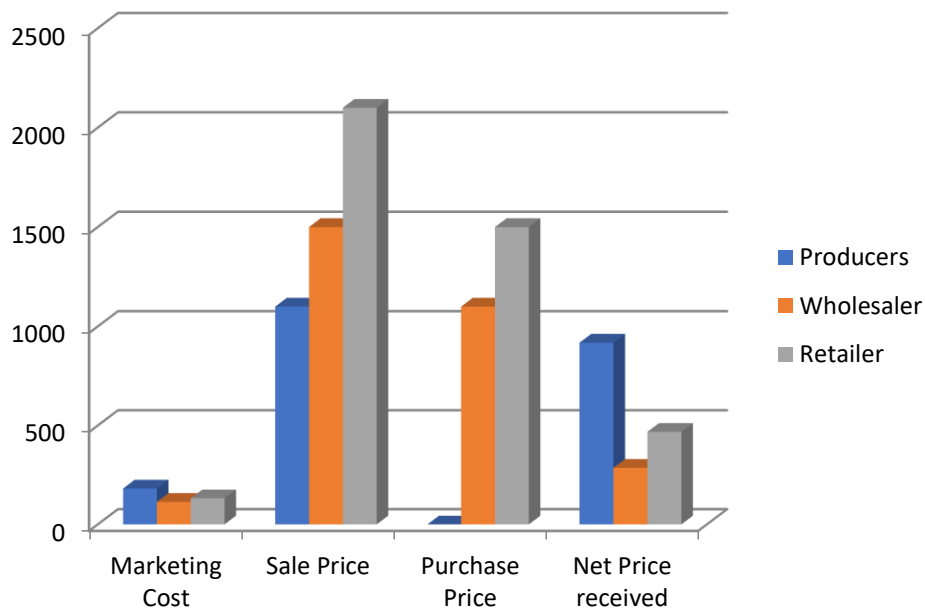


Fig 4.24 Average marketing cost and margin of potato (Channel 1)

According to channel 2 i.e. (producer- commission agent- wholesaler- retailer- consumer), the number of middlemen involved in channel 2 is more as compared to channel 1. The amount spend in the chain by different intermediaries and producer's share in consumer's rupee (PCR).

The net amount received by producer was 695.5 Rs/Quintals. and PCR was 27.82. The producer does not directly sells his produce but gives his farm on contract basis to the pre-harvest contractor or commission agent who gives to the producer a fixed amount and then is responsible for selling the produce.

The purchase price of pre harvest contractor was 800 Rs/Quintals. and PCR was 31. The main charges paid by the pre-harvest contractor were transportation charges on Tractor trollies, Trucks and canters were 65 Rs/Quintals. and PCR was 2.6, palledari and weighing charges was 8 Rs/Quintals. and PCR was 0.16, charges paid by the contractor to the Mandi Samiti for selling his produce were 27.5 Rs/Quintals. and PCR was 1.1, produce worth 55 Rs/Quintals. gets spoiled and PCR was 2.2. The total charges paid by the pre harvest contractor were 159.5 Rs/Quintals. and PCR was 6.38. The net amount received by the pre harvest contractor was 140.5 Rs/Quintals. and PCR was 5.26. The sales price of contractor was 1500 and PCR was 60.

Next in the chain comes the wholesaler, the purchase price of wholesaler from pre- harvest contractor was 1500 Rs/Quintals, producer's share in consumer's rupee (PCR) was 60. The wholesaler also has to pay different charges for moving the produce in the market. The charges paid on taulai and palledari 4 Rs/Quintals and PCR was 0.16, the produce worth 45 Rs/Quintals gets spoiled and PCR was 1.8, wholesaler also paid Rs 27.5 Rs/Quintals to the Mandi Samiti for selling his produce and PCR was 1.1.

Therefore, the total charges paid by the wholesaler were 114 Rs/Quintals and PCR was 4.56. The net amount received by the wholesaler was 586 Rs/Quintals and PCR was 23.44. The wholesaler sold the produce to retailer at 2100 Rs/Quintals. and PCR was 84.

Then comes the role of Retailer the retailer bought the produce from wholesaler at the rate of Rs 1080/Quintals., PCR was 77.41. The retailer also had to pay some marketing charges that were on transportation on bringing it from mandi to the local shops in the city were Rs 68, PCR was 4.87, on taulai Rs 8, PCR was 0.57, approximately produce of worth Rs. 41.65 PCR was 3.00 gets spoiled in moving the produce from mandi to the local markets. The total charges spend by the retailer was Rs 117.85, PCR was 8.44. The net amount received by the retailer was 197.15 and PCR was 14.13. The retailer sells the produce to consumer at Rs 1395/Quintals. and PCR was 100. Finally, the produce reaches the customer at the rate of 2500 Rs/Quintals.

3.4. Identification of Problems and expectations of Potato farmers in Prayagraj.

Potato farmers in Prayagraj District of Uttar Pradesh face various problems and have certain expectations. Here are some common issues and expectations:

- **Price Fluctuations:**

Potato farmers often struggle with price volatility in the market. Fluctuations in potato prices can lead to uncertainty and financial instability for farmers. They expect stable and remunerative prices for their produce.

- **Lack of Storage Facilities:**

Limited access to adequate storage facilities is a significant challenge for potato farmers. The absence of proper cold storage infrastructure leads to post-harvest losses, as potatoes can spoil quickly without appropriate storage conditions. Farmers expect improved storage facilities and cold chains to preserve their produce effectively.

- **Access to Credit and Financial Support:**

Many potato farmers face difficulties in accessing credit and financial support for their farming operations. They expect easier access to affordable credit, crop insurance, and government subsidies to help them invest in better agricultural practices and mitigate risks.

- **Quality Inputs and Technology:**

Farmers require high-quality seeds, fertilizers, pesticides, and machinery to enhance their potato yields and quality. They expect access to reliable and genuine agricultural inputs, along with training and support in adopting modern farming techniques and technologies.

- **Market Linkages and Market Information:**

Potato farmers often face difficulties in accessing markets and finding buyers for their produce. They expect better market linkages, including transparent and efficient supply chains, access to information on market demand and prices, and support in connecting with buyers and market intermediaries.

- **Pest and Disease Management:**

Potatoes are susceptible to various pests and diseases, which can significantly impact crop yield and quality. Farmers expect support in the form of training, advisory services, and access to effective pest and disease management techniques to protect their crops.

Addressing these issues and meeting the expectations of potato farmers in Prayagraj District would contribute to improving their livelihoods, productivity, and overall agricultural sector in the region.

CONCLUSION:

It is concluded that in Prayagraj district there are two types of supply chain exist for Potatoes including farmers, wholesalers, and retailers as involved parties. It is also concluded that the Potato farming sector mostly depend on the medium scale farmers having land of 4 to 8 acre and none of them have storage facilities which result in the spoilage and getting lesser benefits and huge wastage of produce during harvest season. It is also observed that lack of transportation facility and good infrastructure adds a considerable amount of cost to the end consumers. Due to Lack of storage infrastructure potatoes gets costly during peak summers but farmers have less benefit of it.

Among the existing supply chain producer get more benefits when sell directly to the consumer, but farmer usually prefers to go through wholesaler because of sale in bulk quantity. In the month of April – May the potato price was at peak.

Red Potato (Lalima) being the most costlier at all the time due to its quality and taste and sold at 35 Rs/Kg, G4 Potato (Pahadi) being the best for daily consumption and easily available in the market sold at 32 Rs/Kg, Similarly, Yellow Potato (Chipsona) was being sold at 30Rs/kg to consumer.

The study provides recommendations for improving the potato supply chain in the Prayagraj district, such as greater transparency in the intermediary market, promotion of contract farming, and development of better storage and transportation facilities. The findings of the study can serve as a valuable resource for policymakers, researchers, and industry professionals working in the agricultural sector.

REFERENCES

- Abhiyankar, H.G; Nilesh, R.M. (2017).** Agricultural exports supply chain management: International journal of development research: 7 (10) 16440-16446.
- Adsule, P.G; Yadav, D. S; Anuradha, U; Satisha, J; and Sharma, A.K. (2013)** Good agricultural practices for production of quality table grapes: National research Centre for grapes, Indian council of agricultural research.
- Agarwal N L and Saini T C (1995).** *Vegetable Marketing – A case study of Jaipur Market (Rajasthan)*, Indian journal of Agricultural Marketing, Vol.9, No.1, pp. 36-43.
- Ajay, K.S; Adsule, P.G; Banerjee, K. (2012).** *Export of grapes: Issues and strategies.*
- Andrew et al., (1998),** Building effective partnership in the meat supply chain: Lessons from the UK. Can J.Agric.Econ., 46:491-518.
- Anil, M.A; and Bhonde, S.R. (2008)** Marketing channels and price of grapes: A national journal of agriculture and rural development: 40 (3) 28-31.
- Beamon, B. (1998)** Supply chain design and analysis: International journal of production economics: 55 (3) 281-294.
- Bhosale, S.S; Kale, N.K; Sale, Y.C. (2016).** Trends in area, production, and productivity of grapes in Maharashtra: International journal of advanced multidisciplinary research: 3 (10) 21-29.
- Blandon, J; Henson, S; Cranfield, J. (2009)** Small-scale producer participation in new agri-food supply chains: case of the supermarket supply chain for fruit and vegetables in Honduras: Journal of International Development: 21 (7) 971-984.
- Caswell, J.A; Bredahl, M.E; Hooker, N.H. (1998)** How quality management metasystems are affecting the food industry: Review of Agricultural Economics: 20 (2) 547-557.
- Chandra, V; Hussain, H. (2013).** Strategic change in model of fruit and vegetables supply chain: Global journal of management and business studies: 3 (9): 965-970.
- Chauhan, R. S., Singh, J. N. and Thakur, D. R. (1998).** Producers share in vegetables in Azamgarh district of Uttar Pradesh. *Indian Journal of Agricultural Marketing*, 12 (3): 104 -105.
- Cooper, C.M; Ellram, L.M. (1993).** Characteristics of supply chain management and the implications for purchasing and logistics strategy: International journal of logistics management: 4 (2): 13-24.
- Cox et al.,(1999).** Power, value and supply chain management. *Supply Chain Management: Intl. J.* 4(4):852-861
- Devaraja et al., (1998),** channels and price spread in potato marketing- A case study in Belgaum Development Studies. Sussex. district, Tamil Nadu”. *Ind. J. Agric. Mktg.* 41 (2):32-34.
- Dubey, R; Gunasekaran, A; Papadopoulos, T; Childe, S.J; Shibin, K; Wamba, S.F. (2017)** Sustainable supply chain management: framework and further research directions: *Journal of Cleaner Production*: 142 (2)1119-1130.
- FAO (2009).** *Statistical Yearbook of Food and Agricultural Organization of United Nations.*
- Fearne, A. and Hughes, D. (1999)** “Success factors in the fresh produce supply chain: insights from the UK”. *Int. J. Supply Chain Management*, 4 (3):120-129.
- Ganesh Kumar, B., Pramanik, S.C. and Shakila Nawaz.(2004),** Economics of production and marketing of vegetables in Andaman and Nicobar islands. *Ind. J. Agric. Mktg*, 18 (2): 36-40.
- Goburdhun and Jhuree,(1997).** Reducing post-harvest losses of fresh pineapple in Mauritius. *Revue Agricoleet Sucriere de l'ile Maurice* Vol: 76 Issue: 2 Pages: 23-33 Ref: 29.
- Govindan, K. (2018)** Sustainable consumption and production in food supply chain: international journal of production and economics: 195: 419-431.
- Grimsdell, K. (1996).** The supply chain for fresh vegetables: what it takes to make it work. *Supply Chain Management: Intl.J.*1(1):11-14.
- Gudmundsson E, Asche F, and Nielsen M (2006).** *Revenue distribution through the seafood value chain.* FAO, Rome, Italy
- Gupta, S.P. and Rathore N.S. (1999),** Disposal pattern and constraints in vegetable market: A case study of Raipur District of Madhya Pradesh. *Agric. Mktg.* 42 (1): 53-59.
- Harriet K; Christopher S.B; Johnny M. (2018),** Potato market access, marketing efficiency and on-farm value addition: *Am. J. Potato Resour*: 373-382.
- Hartmut, S; Kilger, C. (2008).** Supply chain management and advanced planning, concept, models, software, and case studies: *Springer texts in business and economics.*
- Helen M.F. White (2000),** "Buyer-supplier relationships in the UK fresh produce industry", *British Food Journal*, Vol. 102Iss: 1, pp.6 – 17.
- Hicks A. et al., (2002).** Minimum Packaging Technology for Processed Foods: Environmental considerations. *AU J.T.* 6(2):89-94.

- Hugar, L. B. (1980)**, Marketing of Vegetables in Belgaum city- An economic analysis. M.Sc. Thesis, Uni. Agric. Sci. Bangalore. (India).
- Ioanna Reziti et al., (2003)**, “An investigation into the relationship between producer, wholesale and retail prices of Greek agricultural products”, A study by Center of Planning and Econ. Research (KEPE).
- Jadav, K.S., Leua, A.K. and Darji, V.B. (2011)**. Economic analysis of supply chain of fresh potato in middle Gujarat, *Indian Journal of Agricultural Research*, 45(4): 266-274.
- Jozsef L., Csaba. B.I., Komaromi N. and Lehota z (2009)**. Development of Traceability in Hungarian fresh vegetable and food sector. 4th Aspects and Vision of Applied Economics and Informatics. March 26-27. Debrecen Hungary.
- Julie Kenett., Murray Fulton., Harvey Brookes and Pauline Molder. (1998)**, Supply chain management in cereal grains: A case study from the US milling wheat industry. *Can. J.Agric.Econ.*, 46:549-558.
- Kaguongo W., Gildemacher P., Demo P., Wagoire W., Kinyae P., Andrade J., Forbes G., Fuglie K., Thiele G. (2008)**, Farmer Practices and Adoption of Improved Potato Varieties in Kenya and Uganda: *International Potato Centre (CIP), Lima, Peru*, p. 85p
- Kaplinsky, R. and M. Morris (2001)**. *Handbook for Value Chain Research*.
- Kalei S.N. et al., (2008)**. *Supply Chain Management in Food Industry*. Ifai University Press.
- King, R.P; Phumpiu, P.F. (1996)**, Reengineering the food supply chain: the ECR initiative in the grocery industry: *American Journal of Agricultural Economics*: 78 (5) 1181-1186.
- Kumar, K.N.R; Gummagolmath, K.C; Babu, S.C. (2021)**. Value chain management of grapes during covid 19: National institute of agricultural extension management.
- Lambert D.M., Cooper M.C., Pagh J.D. (1998)**, Supply Chain Management: implementation issues and research opportunities. *International Journal of Logistic Management* 9(2) pp1-19.
- Langlais c and Bertin (1999)**. *Thirty years of Agricultural Diversification in Martinique: Reasons for success or failure*. 54:5, 358-541.
- Lee S.K, Kader A.A (2000)**. Preharvest and post-harvest factors influencing vitamin c content of horticultural crops. *Post harvest Biol.Technol.*20:207-220.
- Madan, M.S. and B.A. Ullasa (1991)**. Postharvest losses in mango: causes and control. **Marjatta Sihvonen. (2005)**, “Retail - farm price margins growing rapidly” *MTT Agric. Food Research, Finland*.
- Mergenthaler M, Weinberger K and Qaim M (2009)**. Quality assurance programs and access to international markets: the case of horticultural processors in vietnam. *Supply Chain Management: Intl. J.*14(5);359-368
- Manning, L; Baines, R; Chadd, S. (2006)**, Quality assurance models in the food supply chain: *British Food Journal*: 108 (2) 91-104.
- Marsden, T; Banks, J; Bristow, G. (2000)**, Food supply chain approaches: exploring their role in rural development: *Sociologic Rurales*: 40 (4) 424-438.
- Mihai, F; Irina, A. (2013)**. Concept of supply chain management: *Journal of Economics and science*: 15 (33) 14-19.
- Murthy, M.R.K; Reddy, G.P; Rao, K.H. (2014)**. Marketing of fruit and vegetables in India and export of grapes: *European journal of logistics purchasing and supply chain management*: 2 (1): 62-70.
- Murthy, S. D., Gajanana, T. M. and Sudha, M. (2002)**. Marketing practices and post-harvest loss estimated in Mango var. Baganpalli at different stages of marketing –*A methodological perspective*.
- Narayana Reddy, P et al., (2004)**, Efficiency benefits pass on to consumers: New development in retail market environment in India, *Ind. J. Mktg*, 34: 23-25
- Parkhi, S; Joshi, S; Gupta, S; Sharma, M. (2015)**. A study of evolution and future of supply chain management; 2. 7: 95-106
- Pandey K.S., Sarkar D., Singh V. (2006)**, Potato processing in India: *today and tomorrow Potato J.*, 33 (1–2), pp. 11-19
- Pawa, J; Mali, M. (2020)**. The impact of food supply chain management on food safety: *international journal of scientific research in science, engineering, & technology*: 7 (5): 1-6.
- Pingali P., Khwaja Y., Meijer M. (2005)**, Commercialising Small Farms: Reducing Transaction Costs: *FAO Agribusiness Division, Rome Italy*
- Rana, R.K., Kumar, S. and Chaudhary, K.R. (2016)**. Kharif potato production in India – Overcoming the lapses in its marketing, *Indian Farming*, 66(4): 13-15.
- Rashi, S; Devika, K; Jyoti, D.D; Jha, P.C. (2022)**, Analysis of collaborative sustainable practices in multi-tier food supply chain using integrated models: *Journal of cleaner production*: 354. 15-18.
- Ricks Donald., Timothy Woods., And James Stern. (1999)**, “Supply Chain Management Improving Vertical Coordination in Fruit Industries”. *J. Food Distribution Res*,30(3): 44-53

Saxena, K.B.C. and Sahay, B. S. (2000), “Managing IT for World Class Manufacturing: the Indian Scenario”, *International Journal of Information Management*, Vol. 20, pp. 29-57.

Sazzad P. (2013). Food supply chain management in Indian agriculture: Issues, opportunities, and further research: *African journal of business management*: 8 (14): 572-581.

Somashekhar, I.C. (2014): Agricultural supply chain management: A scenario in India: *Research journal of social science and management*: 6 (2) 28-31.

Trienekens, J; Van der vorst, J; verdouw, C. (2014), *Global food supply chain, encyclopedia of agriculture and food systems: Business management & organizations, operations research, and logistics*.

Wang, X; Chan, H.K; Li, D. (2015), A case study of an integrated fuzzy methodology for green product development: *European Journal of Operational Research*: 241 (1) 212-223.

Warner, D; Albers, S. (2000), Supply chain management in global context: Department of business policy & logistic, university of cologne: 102.

Wu, K.J; Liao, C.J; Tseng, M; Chiu, K.K.S. (2016), multi-attribute approach to sustainable supply chain management under uncertainty: *Industrial Management & Data Systems*: 116 (4)777-800.

