

**A STUDY OF SUPPLY CHAIN MANAGEMENT (SCM),
MARKETING OF CASH CROP AND EVALUATING
STRATEGIES FOR COST REDUCTION IN SUPPLY CHAIN
WITH SPECIAL REFERENCE TO UTTAR PRADESH**

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2022

DECLARATION

I hereby declare that the thesis entitled “**A Study of Supply Chain Management (SCM), Marketing of Cash Crop and Evaluating Strategies for Cost Reduction in Supply Chain with Special Reference to Uttar Pradesh**” submitted by me under supervision of **Prof. Kushendra Mishra**, Head, Department of Rural Management, Babasaheb Bhimrao Ambedkar University (A Central University) Lucknow and Co-Supervisor **Dr. Taruna**, Assistant Professor, Department of Rural Management, Babasaheb Bhimrao Ambedkar University (A Central University) Lucknow for the award of the degree of **Doctor of Philosophy in Management**. No part of this thesis has been previously submitted in parts or full for award of any degree or diploma to this university or any other university. Further I declare that the material embodied in the work is based on original research work and the indebtedness to others has been dually acknowledged at relevant places. I also declare that the thesis is essentially free from all kinds of plagiarism.

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This is to certify that the thesis entitled “A Study of Supply Chain Management (SCM), Marketing of Cash Crop and Evaluating Strategies for Cost Reduction in Supply Chain with Special Reference to Uttar Pradesh” submitted by Ms. Azmee Zaheer is an original work and has not been previously submitted in parts or full for award of any degree or diploma to this university or any other university.

The thesis submitted to Babasaheb Bhimrao Ambedkar University (A Central University) Lucknow, satisfies all the requirement as stipulated in the Master of Philosophy (M.Phil.) / Doctor of Philosophy (Ph.D.) regulation amended in 2017 and it is fit for submission and evaluation for the award of the degree of Doctor of Philosophy of the university.



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PREFACE

In India, the agriculture industry in general, and agricultural marketing in particular, require rapid policy initiatives and changes at the national and state levels. According to Prof. Swaminathan in his report on the National Commission on Farmers 2007, the goal of reforms is to give farmers with secure and remunerative markets. Farmer suicides have grown dramatically in the previous years, emphasising the importance of agricultural reforms. The Indian agricultural marketing sector has evolved through centuries, affected by socio-cultural influences as well as the British government's imperialistic objectives. The British government began market regulation in 1928, following the proposal of the Royal Commission for Agriculture. In the year 2003, the Indian government passed the Model APMC Act. The Act would aid in the liberalisation of the agriculture marketing sector, as well as increasing private and foreign participation. State legislatures were anticipated to follow suit and change their state laws to conform to the Model APMC Act. The Central and Uttar Pradesh state governments have introduced numerous reform measures in the agricultural marketing sector to address this state of affairs.

After rice, wheat, and maize, the potato, also known as "the king of vegetables," has risen to become India's fourth most significant food crop. Potato is a must-have in any Indian vegetable basket. Because of its edible calories and protein, potatoes are a nutritionally superior vegetable. In the bigger population, it has become an essential part of breakfast, lunch, and dinner. Because it is a short-duration crop, it produces more dry matter, edible energy, and edible protein in a shorter period of time than cereals such as rice and wheat. As a result, potato is regarded as a critical crop for ensuring the nation's nutritional security.

Potatoes are grown in practically all Indian states in a variety of Agro-climatic conditions, with the majority of potatoes being grown during the winter season under short day circumstances and harvested between January and March. Since the 1970s, India has been exporting potatoes. In the Indo-Gangetic plains of North India, almost 85% of potatoes are grown. Uttar Pradesh, West Bengal, Punjab, Bihar, and Gujarat together contributed for more than 80% of total production.

The majority of potato output in India comes from the Northern states. However, areas in North India such as Uttar Pradesh, Himachal Pradesh, Bihar, Punjab and Haryana have been farming potato crops during the rabi season. In the winter, it has ideal environmental conditions and soils for potato growing. The crop provides farmers with a faster source of revenue and is essential to human nutrition. However, price fluctuations, the presence of a large number of intermediaries, unstructured marketing, the increase in value added products, and other factors all contribute to a decrease in the producer's share of the consumer's rupee and worse marketing efficiency. As a result, the current study, named " A Study of Supply Chain Management (SCM), Marketing of Cash Crops and Evaluating Strategies for Cost Reduction in Supply Chain with Special Reference to Uttar Pradesh" was conducted to investigate the overall supply chain management, marketing efficiency, price spread, and challenges encountered in potato marketing.

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LIST OF ABBREVIATIONS

%	:	Percentage
APMC	:	Agriculture Produce Market Committee
et al	:	And other persons
etc.	:	And so, on
ha	:	Hectare
i.e.	:	That is
Km ²	:	Square Kilometre
Kg ha ⁻¹	:	Kilogram per hectare
Kg	:	Kilogram
mm	:	Millimetre
R ²	:	Co-efficient of Multiple Determination
Rs.	:	Rupees Indian Currency
Viz.	:	Namely

Chapter-01
Introduction

CHAPTER-01

INTRODUCTION

Supply Chain is a sequence of flows that aim to meet final customer requirements. It includes the producer and its suppliers, depending on the logistic flows, transporters, warehouses and retailers, and consumers themselves. Logistic flows take place within and between different stages along a continuum, from production to final consumption. Supply Chain Management (SCM) is the integrated planning, implementation and coordination of all Agri-business processes and activities necessary to produce and deliver products that satisfy consumer preferences and requirements. SCM involves following processes: Integrated Planning, Implementation, Coordination and Control.

Whether it be vegetables, fruits, cereals, pulses, or products derived from animals, a supply chain system for agriculture is made up of organizations and cooperatives that are responsible for the production and distribution of these goods. In general, we differentiate between two primary kinds:

"Food supply chains for agriculture," specifically for "fresh agricultural products" (such as fresh vegetables, flowers, fruit). In general, these chains might include growers, auctioneers, wholesalers, importers and exporters, retailers and specialty shops, as well as the suppliers who provide their input and services. To a large extent, the inherent qualities of the product that is being grown or produced are not altered in any way by any of these stages. The handling, conditioned storage, packaging, transportation, and most importantly the trading of these goods are the primary processes that take place.

"Food supply chains originating in agriculture for manufactured food products" (such as portioned meats, snacks, juices, desserts, canned food products). In these supply

chains, agricultural products are put to use as raw materials in the manufacture of consumer goods that have a greater value added to them. The shelf life of the products is typically increased as a result of conservation efforts and conditioning procedures.

The movement of food in a methodical manner from the farm to the consumer is referred to as the "food supply chain," and it is described here. This includes a number of different intermediate steps in the production, processing, distribution, and consumption of goods. It is possible to think of the process of supplying food as resembling a game of dominoes, in which changes made at any level of the supply chain have an effect on the entire chain, and in which the effects of these changes frequently take the form of price shifts. In a food supply chain, the resources and materials are passed downstream for the production of goods and provision of services, while the money paid by the consumer is passed upstream to various elements involved in the chain. This occurs because the resources and materials are needed for the production of goods and provision of services.

1.1 Agriculture Supply Chain Management

The academic and business communities in Europe and the United States showed a growing interest in supply-chain management (SCM) in agriculture during the 1990s. The trend toward the consolidation of organizations (at farm input, farm, processor, and supermarket levels), as well as the government's deregulation of agribusiness markets, were the driving forces. As a result of increased global trade in agribusiness products, there was also a growing interest in quality-management systems and food safety, as well as an increase in the amount of competition in the markets. The shift in demand is being driven by urbanization and dietary shifts, and production and marketing arrangements are adapting to meet this demand. The results of government-sponsored

horticulture programs are mixed, but over all they have been successful in creating more jobs than cereal production. In addition to interventions carried out directly by the government, new types of contractual and share cropping relationships are coming into existence between private dealers and farmers. Additionally, the development of an agro-industrial sector creates a new demand on the agricultural sector for a wider variety of agricultural products that are better suited for processing. The term supply chain management (SCM) refers to the process of managing the relationships between the businesses that are responsible for the efficient production and supply of agribusiness products from the farm level to the consumers. The goal of this process is to reliably meet the requirements of the consumers in terms of quantity, quality, and price. To successfully meet the requirements of customers requires integrated management of the business dealings and relationships that exist between companies as well as the processes that occur within companies. Managing these relationships provides an opportunity for overtly negotiating the shares between chain members of the value produced within the chain. Moreover, it is possible to engage in joint planning of collaborative strategies in order to increase the value that is shared. The latter situation is in stark contrast to the typical conflict that arises between the buyers and sellers of agricultural goods over their respective shares of the value generated. The only way for participants in an agricultural supply chain that is prone to instability to effectively manage and mitigate risk is for there to be a detailed identification and description of the root causes of the instability. In spite of India's high agricultural output, the country's agricultural sector appears to be in a precarious state, with more questions than answers. The inefficiency of the supply chain that links the farm where the produce is grown to the final consumer is the root cause of many of these problems and is the answer to many of these questions. However, due to the inherent issues that

plague the agriculture sector, the supply chains of various agricultural commodities in India are fraught with difficulties. The country's agri-supply chain system is determined by various sartorial issues such as a preponderance of small or marginal farmers, fragmented supply chains, a lack of scale economies, a low level of processing or value addition, insufficient marketing infrastructure, and so on. Agriculture is an extremely important sector of the global economy. However, the production of the majority of agricultural products is influenced by a large number of external factors, such as variations in the weather, the quality of the seeds, and the cultivation methods, which are not entirely under the control of the participants in the supply chain. The fact that there is a significant amount of lead time involved in the production of agricultural products adds another layer of complexity to the situation. This indicates that the production plan cannot be modified in response to shifts in the external environment. When it comes to the producers of agricultural goods, they do not have access to accurate market information and are unsure of the output that will ultimately result from their efforts. They are more blindfolded when it comes to choosing what to produce and how much to produce, particularly in an environment where there is uncertainty. Then, both an oversupply of the agricultural product and a shortage of the agricultural product are quite common in the market for agricultural products, this lowers the profit made by the supply chain and dampens the enthusiasm of the members of the supply chain. In the context of supply chain management, one of the most important topics to discuss is how to mitigate the negative effects of fluctuations and distribute the risks that are borne by the various members of the supply chain. Research on supply chain management has focused a lot of attention on the challenge of supply chain coordination. Supply chain contracts are contractual agreements that govern the pricing and exchange of goods or services between independent members of a supply chain.

Supply chain contracts can also be referred to as supply chain agreements. Contracts for supplies, if written up correctly, can be an efficient way to divide up the risk associated with demand and supply and improve the way that decentralized supply chains are coordinated. It is common knowledge that the supplier and the retailer can both improve their performance as a result of better coordination, which in turn can boost the overall efficiency of the supply chain as a whole. The supply chain can be more effectively coordinated by using a variety of well-known contract forms, including buy-back, revenue-sharing, quantity flexibility, sales rebate, two-part tariffs, and quantity discounts.

1.2 Agri -food Supply Chain Management

In India, the agricultural sector is responsible for one-fourth of the country's gross domestic product (GDP) and employs roughly two-thirds of the country's total population. However, as of today the food processing industry is solely responsible for six percent of India's GDP. The amount of processed food that is produced in the country is less than 1.6 percent, whereas in countries like Thailand, Malaysia, and Brazil, that number is somewhere between 65 and 75 percent. The agricultural supply chains in India and their management are currently undergoing change in order to adapt to the new marketing realities brought about by the wave of globalization and other internal changes. These internal changes include a rise in the level of discretionary income held by consumers as well as a shift in the food baskets of consumers toward higher value products such as fruits, vegetables, and animal proteins. The country's agricultural economy is facing new challenges, which has prompted government agencies to pursue various legal reforms in order to enable and invite private investment in agricultural marketing infrastructure, as well as to remove various entry barriers in order to promote coordinated supply chain and traceability. India now has the

opportunity to export agricultural and food products to the rest of the world as a result of the liberalization of trade that took place in the post-WTO regime. The processing of food has seen an increase of 7.1 percent per year in terms of production over the past decade. The food supply chain in India is extremely decentralized and disorganized. The chain contains an extremely high number of middlemen or other types of organizations. These intermediaries are essential due to the fact that they fill the role of infrastructure in places where it does not already exist. However, as time has passed, a new layer of intermediaries has emerged, the majority of which don't add much value to the product, but taken together, they contribute significantly to the total price. Producing fruits and vegetables, India is responsible for 10% of the world's total (Food and Agricultural Organization of the United Nations, 2008). Managing the relationships between the companies that are responsible for the effective production and supply of products from the farm level all the way to the consumers is what is meant by supply chain management (SCM) in the context of agribusiness. This ensures that the requirements of consumers in terms of quantity, quality, and price are met in a reliable manner. In actual business, this frequently involves the management of horizontal and vertical alliances, as well as the relationships and processes that exist between different companies. Wholesalers play an important role as an intermediary and a primary link in the distribution chain of retail vegetables. This is the case in the traditional business model. In general, the local wholesale market is an unavoidable source of dependence for all of the retail establishments. The lack of adequate transport facilities, the absence of large-scale cold storage, the absence of clear policy guidelines from the government, and the prevalence of fragmented and small farmers are the primary obstacles. The cultivation of fruits and vegetables for the purpose of processing not only creates a large number of jobs, but it also increases both the gross and the net returns that farmers

receive. Alterations in the macro environment were taking place simultaneously with adjustments made at the consumer level. These included a trend toward consolidation of organizations (at farm input, farm, processor, and supermarket levels), the primary purpose of which was to drive down the costs of production through economies of scale, but additional goals included gaining market share and competitive strength in an increasingly global market place. The process of preparing for global trade also led to the deregulation of agribusiness markets in several countries as a result of the government's withdrawal from the marketing of agricultural products. Because of this, the opportunity arose to rethink the business strategy and establish new relationships within the supply chain. In developing countries, traditional supply chains typically include a large number of participants and are tightly intertwined with long-established social structures. As developing nations enter into arrangements with the World Trade Organization, the agricultural industries of those nations will face a higher level of competition on the domestic markets of those nations, as well as greater incentives to conform to global standards when selling their goods on export markets. SCM is one approach that can be taken to plan the necessary improvements in the management of their agricultural production and marketing systems in order to meet the challenges of the future. According to estimates provided by the OECD and the FAO, the global population will reach 9 billion by the year 2050, meaning that agricultural production will have to increase by 60 percent over the course of the following 40 years in order to keep up with the growing demand for food. When compared to the levels seen in 2005–2007, annual production of cereals and meat will need to increase by an additional one billion tonnes and 200 million tonnes, respectively, by the year 2050. Traditional agricultural and food businesses that had previously placed a significant emphasis on price were ill-prepared to meet the increasingly diverse requirements of their customers.

Individually, they lacked the resources necessary to provide an efficient response to the needs of the customers. The production of an agribusiness product, as well as the product's subsequent transport, processing and retail sale to the end user, each of these steps represented only a small portion of the overall process. Current supply chains are lengthy and are controlled by a large number of intermediaries, including retailers, wholesalers, sub-wholesalers, and commission agents. When it comes to fruits and vegetables, farmers only receive one-third to one-half of the final price Gandhi and Namboodiri (2002), which indicates that marketing costs and margins are relatively high for these products Birthal et al. (2005) have estimated that the costs of marketing to be approximately twenty percent of the price at which vegetables are sold. In the case of milk, marketing costs are also relatively high, accounting for 15–20 percent Birthal et al. (2006). Farmers are prevented from participating in markets due to the high marketing and transaction costs that they face. Cooperatives, growers' associations, and contract farming are examples of institutions that are thought to reduce marketing and transaction costs and risks by providing markets to farmers close to their homes. This is because these institutions provide farmers with access to local markets Eaton and Shepherd (2001). According to Lowe and Preckel, the agri-food supply chain is characterized as being the ones with the longest lead times, as well as misalignment and uncertainty between their demand and supply. The food supply chain in India is responsible for massive amounts of wasted food and inefficient operations; for example, thirty percent of India's vegetable and fruit produce is thrown away. Because of the inadequacy of the supply chain, there are periodic shortages of food items that make up a regular part of the Indian diet. The primary distinction between the two distinct kinds of supply chains lies in the fact that the traditional supply chain has a greater number of intermediate links than the modern supply chain does. As a result,

the traditional supply chain generates a greater amount of waste, and its transaction costs are also higher. The fact that there are so many middlemen in this supply chain contributes to the exorbitantly high transaction costs that are the primary source of the chain's problems. Only 30–35 percent of the final price is distributed to the fruit growers, with the remaining portion being distributed to the various intermediaries. As a result of the lengthy and dispersed nature of the supply chain, there is an estimated 10–12 percent of the total quantity of fruit and vegetables that is wasted, which raises the possibility that prices will go up for consumers. The traditional methods of retailing vegetables are not very well organized. Approximately 97 percent of the total market is highly localized and highly fragmented, with a large number of intermediaries. Due to the lengthy transport process from the growers to the final consumer, an additional 10–12 percent of the total is lost in the process, on top of the cost of transportation.

1.3 Agriculture Marketing in India

Agriculture plays a significant role in the Indian economy. The region's varied agroclimatic conditions allow for the production of a wide variety of crops throughout the year. During the marketing process, these fruits and vegetables move from the hands of the producer to those of the consumer. Services such as grading, standardization, packing, transport, and storage are all part of the process of marketing a product or service. Smallholder farmers make up the vast majority of India's agricultural workforce; approximately 86% of farm households have landholdings that are less than 2 hectares. It is a common misconception that smallholder farmers are unable to diversify into high-value agriculture because they lack access to capital, inputs, technology, and services, as well as markets. This misconception may act as a barrier to their progress in this direction. Despite the fact that smallholder farmers make a significant contribution to food production, the size of their operations often prevents

them from accessing certain markets. Their surplus that can be sold is relatively low, while the availability of commodities in nearby markets is limited, and selling their products in more distant urban markets drives up the costs of transportation and marketing. It is believed that inefficient marketing channels and inadequate marketing infrastructure are to blame not only for high and variable prices paid by consumers but also for the fact that too little of the rupee spent by consumers actually makes its way to the farmer. Middlemen are typically very important to Indian farmers' businesses, particularly when it comes to the marketing of fruits and vegetables. The producers and the consumers are frequently on the losing end of the transaction, while the middlemen control the market but do not contribute significantly to its overall value. In addition to this, there is a significant amount of waste, a decline in quality, and frequent imbalances between supply and demand, both geographically and over the course of time. The operational environments of the food and agribusiness industries have undergone a number of shifts in recent years, which has contributed to an increase in interest in SCM. In turn, it was made abundantly clear to food suppliers that the key to commercial success was to be responsive to the demands of customers. Only through integrated management of the supply chain, from the farm to the retail shelf, will it be possible to satisfy the demands of the consumer market. Numerous examples from the food industry illustrate how productive cooperative relationships between participants in a supply chain can help to improve the chain's overall efficiency, which in turn boosts both innovation and competitiveness. The current supply chain, which connects farmers to both organized and unorganized retail, is extremely inefficient because it involves a number of intermediaries and manual handling of goods. The end result is a significant increase in the amount of food that is wasted, which can reach nearly 30 percent, in addition to decreased compensation for the farmers. There is neither a supply chain integrator nor a channel master for the retail channels in the Indian market. The findings of the survey, which was carried out by KPMG, are presented in the aforementioned

statements. If the supply chain in India is not integrated, efficient, and focused on the customer, then the retail industry in India will never be competitive.

1.4 Cash Crops Scenario in India

Scenario in India in the late 16th and early 17th centuries, the potato made its way to India. According to FAO, India is the world's second-largest producer of potatoes. Per capita consumption has increased from roughly 12 kg to 17 kg per year since 1990 (FAO). Potato is not primarily a rural staple food in India, but rather a cash crop that generates significant income for farmers. Agriculture in India GVA of Agriculture and Allied sector to Total Economy. The benefaction of allied sectors and agriculture in India's Gross Value Added (GVA) has increased over the last three years which accounts for 20.2%, according to provisional estimates provided by the National Statistical Office (NSO), Ministry of Statistics and Programme Implementation on May 31, 2021. Total Horticulture is estimated to be 329.86 million tonnes (Highest Ever), which is an increase of about 9.39 million tonnes (2.93%) over 2019-20. Therefore, vegetable production is expected to expand by 4.24 percent to 196.27 million tonnes in 2020-21, compared to 188.28 million tonnes in 2019-20, with Potato, Onion, Brinjal, and Cabbage accounting for the majority of the increase. India is the world's second-largest producer of vegetables after China with 132 million metric tons of fresh vegetables in 2019. Production of Potato is reported to be 53.69 million tonnes against production 48.56 million tonne in 2019-20, an increase of 5.13 million tonne (10.55% higher). Vegetables, which have a shorter growing season and require more labour, provide a stable source of income for most agricultural labourers with no land, farm women, small and marginal farmers.

They also provide livelihood security to many others involved directly or indirectly in the supply chain. China comes out on top, followed by India. China, India, Russia, the

United States, Poland, Ukraine and Germany accounts for more than 62% of world manufacturing. In India potato is produced mostly in every state, in a variety of agro-climatic conditions. In North India in the Indo-Gangetic plains around 85% of potatoes are cultivated. Uttar Pradesh, West Bengal, Punjab, Bihar, and Gujarat are the states involved. Potato types suitable to the country's climate (hot summers and short winters) are grown in the Indo-Gangetic plain during the short winter days from October to March, with occasional year-round production in the South. In India, about 80% of the potato crop is grown in the winter (Rabi) with guaranteed irrigation during the short winter days. Approximately 8% of the land is in the hills, where production occurs during the long summer days from April to October. Potato is grown in Karnataka, Maharashtra, HP, J&K, and Uttarakhand during the rainy season (Kharif).

- **Summer Crop- March-April----- August-September**
- **Autumn Crop- August-September-----December-January**
- **Spring Crop- January-February-----May-June**

Table 1.1: SGR & CGR of area, production and productivity of potato during different periods in Eastern plain zone

Period		Area	Production	Productivity
1980-81 to 1994-95	S.G.R	1.32	-0.53	-2.02
	C.G.R	1.43	-0.30	-1.68
1995-96 to 2004-05	S.G.R	0.14	1.88	1.87
	C.G.R	0.13	2.01	1.95
2005-06 to 2014-15	S.G.R	0.07	0.11	0.15
	C.G.R	0.07	0.10	0.13
1980-81 to 2017-18	S.G.R	0.41	1.14	0.50
	C.G.R	0.48	1.22	0.59

Source: Ncap

Table 1.2: SGR & CGR of area, production and productivity of during potato different periods in North Eastern plain zone

Period		Area	Production	Productivity
1980-81 to 1994-95	S.G.R	1.87	2.98	2.64
	C.G.R	1.88	3.16	4.72
1995-96 to 2004-05	S.G.R	-2.88	4.93	7.84
	C.G.R	-2.91	5.31	8.52
2005-06 to 2014-15	S.G.R	-1.27	-1.98	-0.61
	C.G.R	-1.26	-1.99	-0.61
1980-81 to 2017-18	S.G.R	-0.36	1.71	2.20
	C.G.R	-0.37	1.83	2.23

Source: Ncap

Table 1.3: SGR & CGR of area, production and productivity of potato during different periods in Vindhyan zone

Period		Area	Production	Productivity
1980-81 to 1994-95	S.G.R	4.44	6.85	2.15
	C.G.R	3.28	5.33	2.09
1995-96 to 2004-05	S.G.R	0.46	3.94	3.52
	C.G.R	0.56	4.50	3.71
2005-06 to 2014-15	S.G.R	0.11	1.66	1.49
	C.G.R	0.11	1.56	1.41
1980-81 to 2017-18	S.G.R	1.18	2.50	1.55
	C.G.R	1.45	3.09	1.62

Source: Ncap

Table 1.4: Instability index (in %) of potato during 1980-81 to 2017-18

Zones	Area	Production	Productivity
North Eastern Plain Zone	9.40	9.85	10.39
Eastern Plain Zone	10.73	13.07	13.61
Vindhyan Zone	19.50	31.11	18.55

Source: Ncap

Potato is a well-known native of South America. In 1537 the Spaniards first came into contact with one of the Andes communities and potato. In Europe potato was first introduced between 1580 and 1585 A.D. in France, Portugal, Spain, Italy, Belgium, and Germany. In the early 17th century Portuguese sailors introduced potato to India and during British rule its grown throughout the North India. Potato is grown in over 100 countries around the world, marked as one of the most important food crops. According to FAO (2008) year was designated as Potato Year and was also considered as future food crop and an important contributor to food security. Potatoes come in over 4500 different kinds and can be grown in variety of range of climates as compared to any other plants (International Potato Centre 2019).

Production of Potato is estimated to be over 368.168 tonnes per year, and it is consumed by over billions of people around the world, according to the FAO (2018). Potato is a food crop and high starch content vegetable that is utilised in over hundreds of different dishes all over the world. The agro-climatic conditions in India for growing a variety of vegetables are good and potato accounts for the majority of vegetable production (approximately 27 percent). Potato is renowned as the "King of Vegetables," and after rice and wheat, maize has risen to become India's fourth most significant food crop. As a result, potato is regarded as a critical crop for ensuring the nation's nutritional security. Potatoes are grown in practically every state in India under a variety of agro-climatic

conditions, with the majority of the potatoes being grown in under short day circumstances in winter and harvested between January and March. Since 1970s India has been exporting potatoes. In North India potatoes are grown in the Indo-Gangetic plains, where they account for around 85% of the crop. Uttar Pradesh, Punjab, Gujarat, West Bengal and Bihar together contributed for more than 80% of total production. The biggest states producing the Potato crop in India are Uttar Pradesh (15812.62), West Bengal (12782.00), Bihar (7441.24), Gujarat (3845.02), and Punjab (2716.33) (January 2018-19, 1st A.E., production in '000 Tones). Potatoes were mostly sold in regulated markets by farmers. The favourable, beneficial and improved outcome of the regulated markets outstanding to which the auction of agricultural produce in the village has been watched to diminish over time is the result of the stable enlargement of arrival of commodities in the regulated markets. This has resulted in a significant improvement in market structure, behaviour, and presentation. Farrukhabad, Agra, Kanpur, Gorakhpur and etc. is the principal market in Uttar Pradesh that receives the biggest number of potato arrivals, from which the produce is distributed throughout the state. The major arrivals in these markets of potato are highest in January and lowest in October. As a result, the market price will be highest in October-November and lowest in February.

Table 1.5: Area and Production of Horticulture Crops

Total Horticulture	2019-20	2020-21	2020-21
	(Final)	(1st advance estimate)	(2nd advance estimate)
Area	26.48	27.08	27.23
Production	320.47	326.58	329.86

(Area in Million Ha, Production in Million tonne.)

Source- 2020-2021 Second Advance Estimates, Area and Production of Horticulture Crops by Horticulture Statics Division DAC&FW

1.5 Production of Potato in World

After rice, wheat and maize, potato is the world's most important food crop. It is the world's sixth most widely grown agricultural crop, as well as the world's largest tuber and root crop. According to FAO estimates, approximately 370 million metric tonnes of potatoes were produced worldwide in 2019, a significant rise from the 333.6 million tonnes produced in 2010. Humans consume just over two-thirds of global production, and the remainder is used to make starch and animal feeds on it. It is still an important crop in central and eastern Europe and also where per capita production remains the world highest. China is now the world's greatest potato-producing country, with 99,122,420 tonnes per year in 2020, while India is in second place with 53.11 million metric tonnes during 2020-21, China and India altogether produce nearly about third of the world's potatoes. Although the degree of this tendency is disputed, potato production has shifted away from wealthier countries and toward lower-income areas of the world.

In midst of growing economic issues, various international organisations emphasised the importance of potatoes in global food production in 2008. They emphasised its potential as a low-cost, prolific crop that thrives in a huge diversity of seasons and environments. Due to its perishability only around 5% of the world's potato crop is exported globally and its lack of representation in global financial markets contributed to its stable pricing during the 2007–08 global food price crisis. As a result, the United Nations designated 2008 as the International Year of the Potato in order to increase awareness of the crop in low-income and underdeveloped countries, describing it as a "hidden treasure." Many people around the world regard potato to be the "bread of life" even today. Potato consumption per capita in Germany is 185 kg, 94 kg in East Europe and the Soviet Union, 65 kg in West Europe, North America, and Oceania, 23 kg in

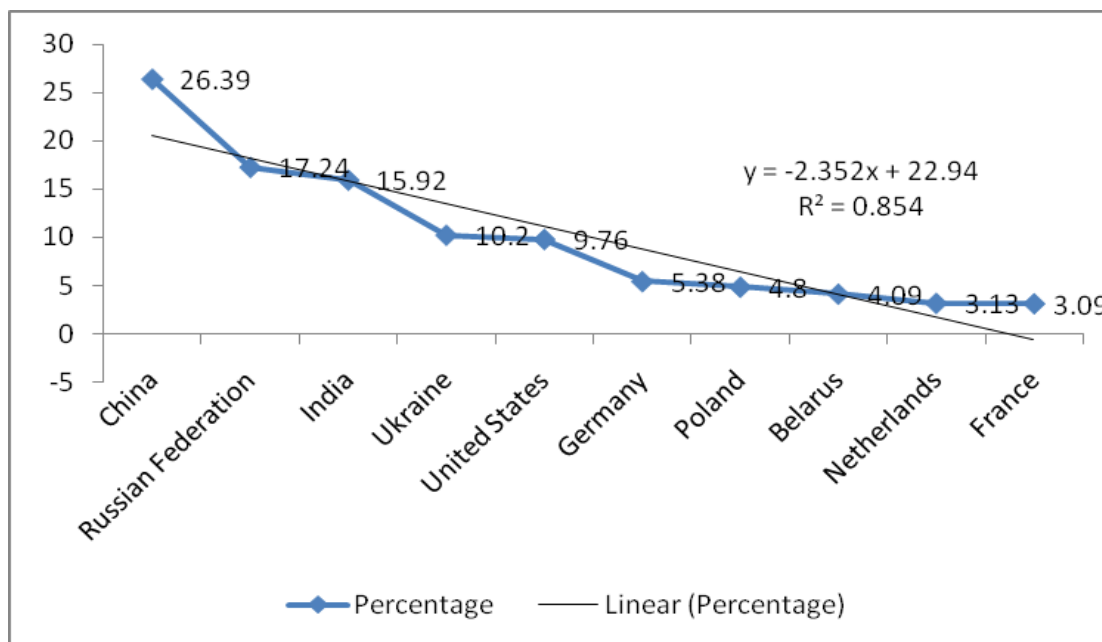
Latin America, 16 kg in other developing nations, and 14.8 kg in India. Potatoes are eaten in India in a variety of ways, including cooked, roasted, French fries, and chips.

Table 1.6: Top Potato Producing Countries in the World

Country	Production (Lakh Metric tonnes)	Percentage
China	570.60	26.39
Russian Federation	372.70	17.24
India	344.00	15.92
Ukraine	220.62	10.20
United States	210.97	9.76
Germany	116.24	5.38
Poland	103.69	4.80
Belarus	88.50	4.09
Netherlands	67.77	3.13
France	66.80	3.09
Total	2161.90	100

Source: Food & Agricultural Organization (FAO).

Graph 1.1: Top Potato Producing Countries in the World in Percentage



Source: Food & Agricultural Organization (FAO)

1.6 Production of Potato in India

Along with China, Russia, Ukraine, and Poland, India is the world's leading potato grower. Though it was only in 1932 that commercial farming and large-scale consumption began. It is because of the high price and inconsistent quality of the produce; the potato export market does not thrive anywhere on the planet. India has benefited from the opportunity to export to adjacent minor countries and can strengthen its mobility by improving potato quality. Potatoes are considered an essential economic crop in India. In more or less all of the country's states, the potato is grown. Uttar Pradesh, West Bengal and Bihar are the three major potato-growing states in the country. India's agroclimatic conditions are perfect for growing a variety of vegetables. Vegetable productivity in India averages 196.27 million tonnes in 2020-21. Potatoes account for 53.69 million tonnes of total production of vegetable in the country, followed by tomato (21.00 million tonnes), onion (26.92 million tonnes), and brinjal (13.15 million tonnes) in 2020-21.

In 2020-21, India produced 53.69 million tonnes of potato from a total area of 19 lakh hectares. In India, the states of Uttar Pradesh, West Bengal, Punjab, Bihar and Gujarat account for more than 80% of total production. In 2019, India will export approximately 5,606,490kg of potatoes, a value of \$7,453.85K worldwide. Potatoes are grown in practically all Indian states in a variety of agro-climatic conditions, with the majority of potatoes being grown during under the short-day circumstances in winter season and harvested between January and March. In the Indo-Gangetic plains of North India, almost 85% of potatoes are grown. Uttar Pradesh is the leading potato-producing state this year, accounting for 31.26 percent of total production, followed by West Bengal, Bihar, Gujarat, and Madhya Pradesh, which account for 23.29 percent, 13.22 percent, 7.43 percent, and 6.20 percent, respectively.

Table – 1.7: State wise Production of Potato in India

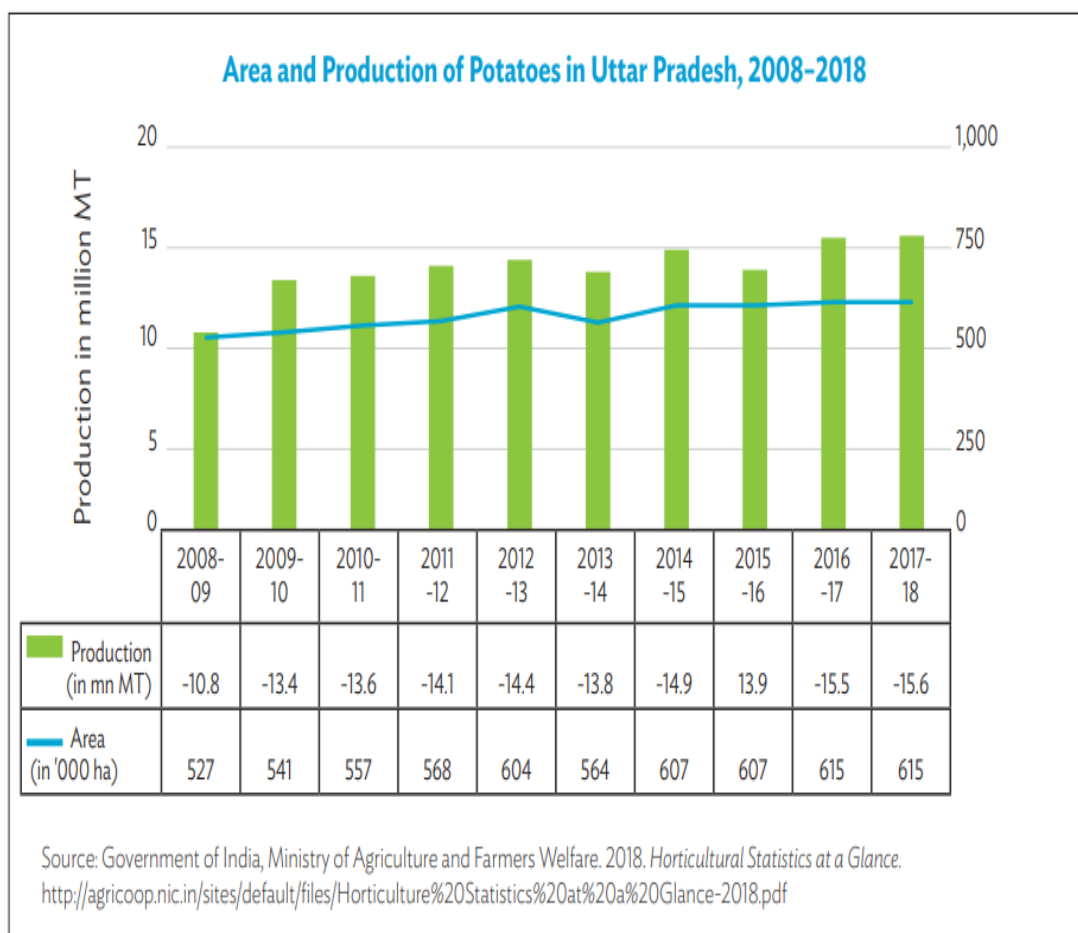
Sl. No.	States	Production. (,000 t)	Percentage
1.	Uttar Pradesh	9821.7	43.31
2.	West Bengal	7076.6	31.21
3.	Punjab	1338.1	5.90
4.	Gujarat	1088.7	4.80
5.	Bihar	1062.8	4.69
6.	Madhya Pradesh	752.6	3.32
7.	Assam	589.1	2.60
8.	Karnataka	361.0	1.59
9.	Haryana	323.9	1.43
10.	Uttaranchal	261.2	1.15
	Total	22675.7	100

Source: Food & Agricultural Organization (FAO).

1.7 Production of Potato in Uttar Pradesh

Area and Production Uttar Pradesh is the largest potato-producing state in India, contributing 28.9% to national production. Over the past few years, the production area has gradually increased. In 2017–2018, the state produced 15.5 million MT of potato cultivated on 615,000 ha. Uttar Pradesh lags in productivity compared with other potato-producing regions. Average productivity in Uttar Pradesh is 25.3 MT/ha, which is greater than the national average of 23.9 MT/ha and the global average of 19.58 MT/ha but lower than the productivity of other states such as West Bengal (29.9 MT/ha), Gujarat (28.5 MT/ha), and Punjab (26.1 MT/ha).

Graph 1.2: Area and Production of Potatoes in Uttar Pradesh 2008-2018



1.8 Production Regions

Potato cultivation is most prominent in the western subtropical and mid-plain agro-climatic zones. The top potato-growing districts in the state are Agra, Kannauj, Firozabad, Hathras, Farrukhabad, Aligarh, and Etawah. These districts collectively account for 50% of the state's potato production. Mainpuri, Allahabad, and Shahjahanpur districts are other major potato-producing areas.

However, in the state, the use of farmers' own package and techniques, as well as their traditional vision, is used to maximize open pollinated old and interior types. Cash crop production has made sustained attempts in the recent past (since 2004). Even yet, the area under hybrid cash crops is still quite small.

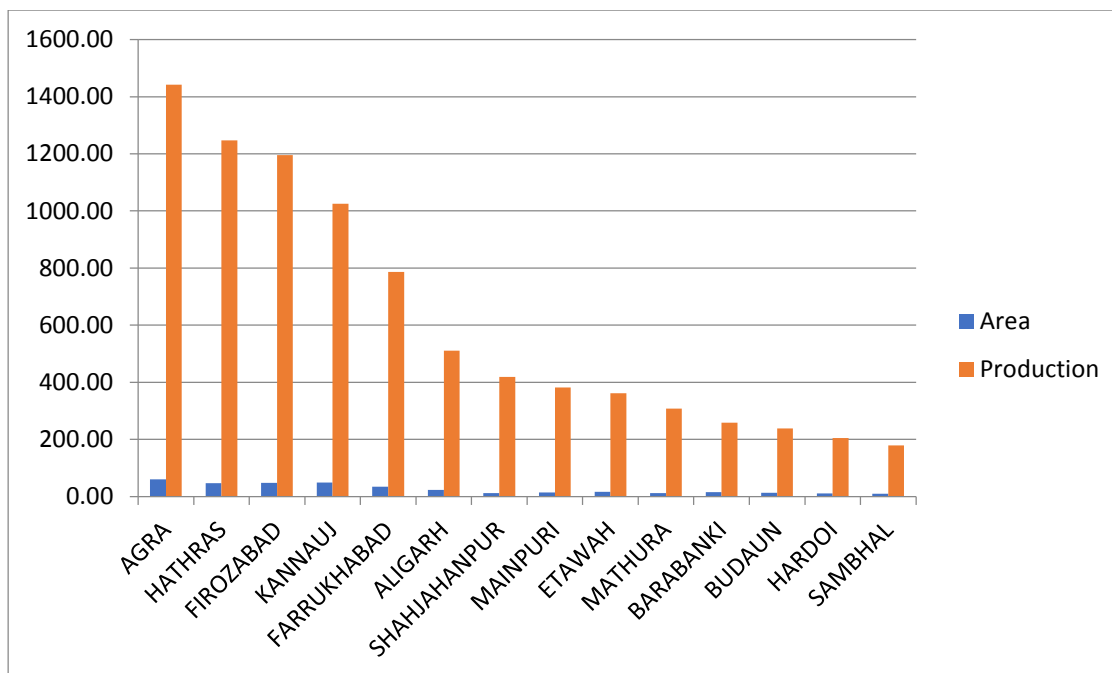
The state on the other hand, has enormous potential for cash crop development. Weather conditions are favorable in the state's high-altitude zone. Even cool-season cash crops can be produced in agency regions following the rice harvest in the winter season, which runs from January to April each year.

The cash crop situation in Uttar Pradesh has not been encouraging over the years, with both area and production declining between 2012-13 and 2018-19. The Uttar Pradesh government, on the other hand, continues to provide incentives to cash crop growers in the form of a seed subsidy that has been boosted from 50% to 75%. The main cause of the falling trend in crop area and productivity was due to a lack of seeds available to meet demand and unfavourable weather conditions.

Table 1.8: Crop Area and Production trends in Uttar Pradesh (2013-14)

Sr. No.	Crop Name	District	Area	Production
1	Potato	AGRA	60.11	1441.98
2	Potato	HATHRAS	46.62	1247.16
3	Potato	FIROZABAD	48.08	1195.99
4	Potato	KANNAUJ	49.25	1024.86
5	Potato	FARRUKHABAD	34.00	785.95
6	Potato	ALIGARH	23.31	510.33
7	Potato	SHAHJAHANPUR	12.35	419.19
8	Potato	MAINPURI	14.20	381.80
9	Potato	ETAWAH	16.31	361.35
10	Potato	MATHURA	11.66	307.52
11	Potato	BARABANKI	14.66	258.48
12	Potato	BUDAUN	13.48	237.83
13	Potato	HARDOI	11.22	204.41
14	Potato	SAMBHAL	10.08	179.30

Source: Ncap

Graph 1.3: Crop Area and Production trends in Uttar Pradesh (2013-14)

Source: Ncap

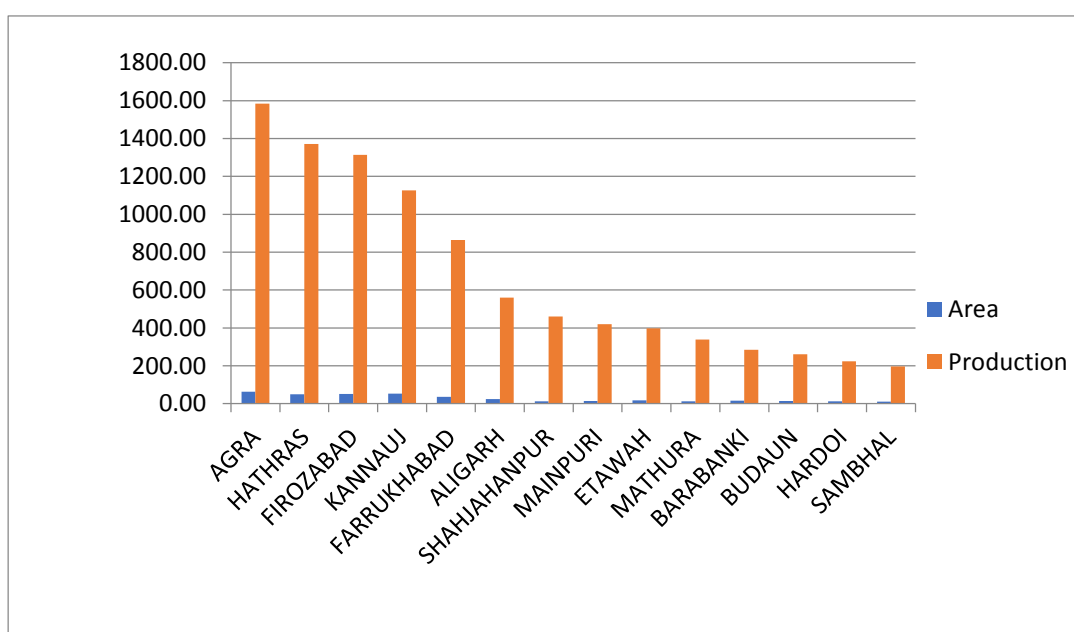
Table 1.9: Crop Area and Production trends in Uttar Pradesh (2014-15)

S.No.	Crop Name	District	Area	Production
1	Potato	AGRA	64.07	1584.95
2	Potato	HATHRAS	49.69	1370.82
3	Potato	FIROZABAD	51.24	1314.57
4	Potato	KANNAUJ	52.50	1126.47
5	Potato	FARRUKHABAD	36.24	863.87
6	Potato	ALIGARH	24.84	560.93
7	Potato	SHAHJAHANPUR	13.17	460.75
8	Potato	MAINPURI	15.14	419.66
9	Potato	ETAWAH	17.38	397.18
10	Potato	MATHURA	12.43	338.01

S.No.	Crop Name	District	Area	Production
11	Potato	BARABANKI	15.62	284.11
12	Potato	BUDAUN	14.37	261.41
13	Potato	HARDOI	11.96	224.67
14	Potato	SAMBHAL	10.74	197.08

Source: Ncap

Graph 1.4: Crop Area and Production trends in Uttar Pradesh (2014-15)



Source: Ncap

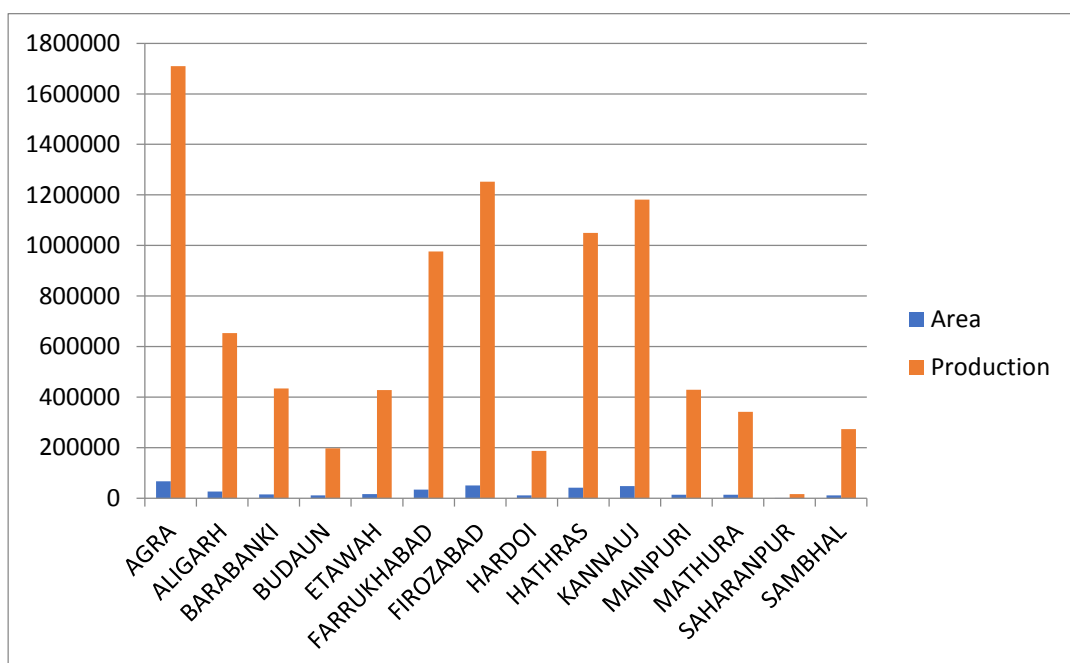
Table 1.10: Crop Area and Production trends in Uttar Pradesh (2016-17)

S.No.	District	Area	Production
1	AGRA	67006	1709725
2	ALIGARH	26299	653662
3	BARABANKI	15121	434411
4	BUDAUN	11931	197721

S.No.	District	Area	Production
5	ETAWAH	16215	427573
6	FARRUKHABAD	33822	975799
7	FIROZABAD	50635	1252507
8	HARDOI	11274	187599
9	HATHRAS	41642	1049961
10	KANNAUJ	47665	1181091
11	MAINPURI	14137	429821
12	MATHURA	13549	342099
13	SAHARANPUR	571	16399
14	SAMBHAL	11714	273018

Source: Ncap

Graph 1.5: Crop Area and Production trends in Uttar Pradesh (2016-17)



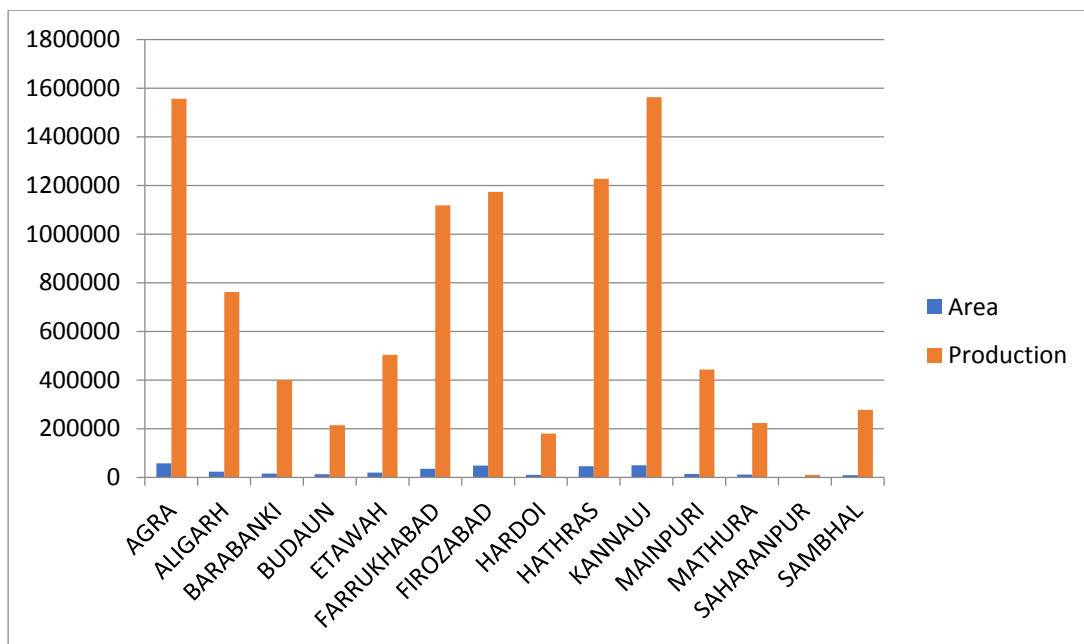
Source: Ncap

Table 1.11: Crop Area and Production trends in Uttar Pradesh (2017-18)

S.No.	District	Area	Production
1	AGRA	57879	1557061
2	ALIGARH	23332	761370
3	BARABANKI	14961	400222
4	BUDAUN	12897	213897
5	ETAWAH	18838	504086
6	FARRUKHABAD	35168	1118061
7	FIROZABAD	48589	1173959
8	HARDOI	9746	179716
9	HATHRAS	46333	1228010
10	KANNAUJ	50089	1563879
11	MAINPURI	14113	443176
12	MATHURA	11853	222884
13	SAHARANPUR	535	9894
14	SAMBHAL	9519	277003

Source: Ncap

Graph 1.6: Crop Area and Production trends in Uttar Pradesh (2017-18)



Source: Ncap

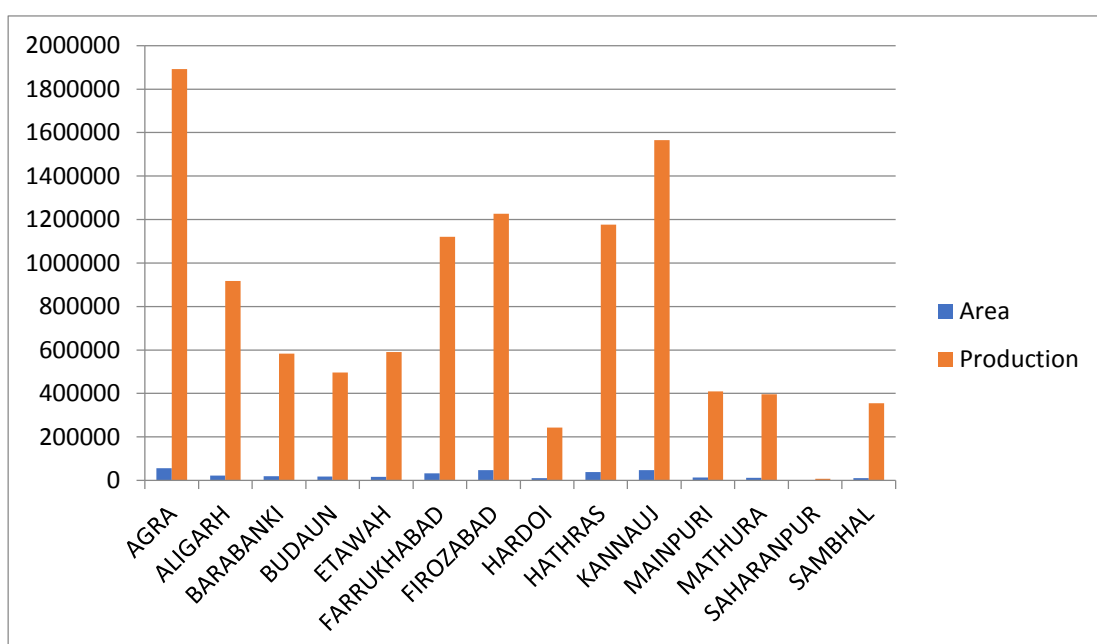
Table 1.12: Crop Area and Production trends in Uttar Pradesh (2018-19)

S.No.	District	Area	Production
1	AGRA	56630	1891385
2	ALIGARH	22847	918061
3	BARABANKI	19976	583399
4	BUDAUN	17592	496270
5	ETAWAH	16129	591225
6	FARRUKHABAD	32765	1120137
7	FIROZABAD	46847	1226970
8	HARDOI	10338	243605
9	HATHRAS	38853	1176624
10	KANNAUJ	47288	1565469

S.No.	District	Area	Production
11	MAINPURI	13668	409890
12	MATHURA	12215	396511
13	SAHARANPUR	615	6930
14	SAMBHAL	10272	354980

Source: Ncap

Graph 1.7: Crop Area and Production trends in Uttar Pradesh (2018-19)



Source: Ncap

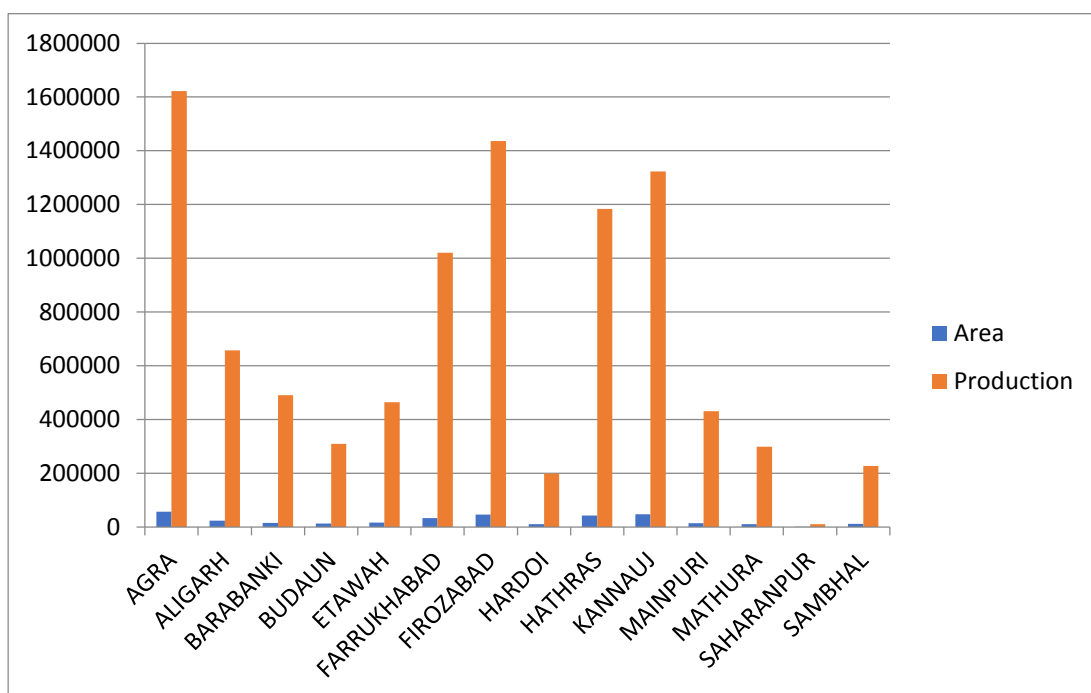
Table 1.13: Crop Area and Production trends in Uttar Pradesh (2019-20)

S.No.	District	Area	Production
1	AGRA	57010	1622391
2	ALIGARH	22816	656713
3	BARABANKI	14937	489844
4	BUDAUN	12104	309572

S.No.	District	Area	Production
5	ETAWAH	15862	464106
6	FARRUKHABAD	33056	1020240
7	FIROZABAD	45393	1435735
8	HARDOI	10460	198081
9	HATHRAS	41896	1183939
10	KANNAUJ	47661	1322879
11	MAINPURI	13889	430684
12	MATHURA	10608	297873
13	SAHARANPUR	399	10741
14	SAMBHAL	11327	227220

Source: Ncap

Graph 1.8: Crop Area and Production trends in Uttar Pradesh (2019-20)



Source: Ncap

1.9 Marketing of Potato in Uttar Pradesh

Farmers mostly sold potatoes in regulated markets. In Uttar Pradesh, Farrukhabad, Agra is the main market that receives the majority of vegetable imports, from whence the produce is distributed throughout the state. The major arrivals in these markets of potato are highest in January and lowest in October. As a result, the market price will be highest in October-November and lowest in February.

1.10 Economics of Cash Crops

Low and deteriorating productivity is the most significant problem limiting the Horticulture sector's growth. However, the potential yield for all cash crops is larger than current yields. The main constraints are a lack of high-quality seeds (Hybrid breeds in all crops), insufficient irrigation facilities, a lack of knowledge about the nutrient requirements of these crops, poor pest/ disease management, lack of timely credit from nationalised banks, high production costs, large post-harvest losses, a lack of road network, a lack of sufficient cold storage units, a poor market network, and high transportation costs.

There is still a lot of work to be done in the fields of research and investment to improve infrastructure and decrease post-harvest losses in the sector so that per-unit productivity and per-capita availability of cash crops can be raised. Timely delivery, grading, packing, production of a quality product, poor market infrastructure, agro processing plants, credit facilities, proper pricing, uniform grading and standardisation of weights and measures, poor post-harvest handling, and low productivity are some of the general constraints that this sector faces.

1.11 Problem Setting

The rapid growth of the world's population, as well as the increasing demand for balanced food production, are well-known issues that will become increasingly important as the world's population grows and their needs become more complex. As a result, there is a high demand for agricultural produce, particularly clean vegetables. The government's agricultural approach has prioritised food security for the country's rapidly growing population.

In Uttar Pradesh, sugarcane is the high yielding and producing cash crop in the state, generating quick income for farmers. All the subsidies, support, and MSP are fixed by the government for the marketing of sugarcane in the state. There is ample research work done on sugarcane-related topics, but in the case of potatoes, very little research work was done and it was also overlooked by researchers. On the other hand, Uttar Pradesh is also the second largest producer of potatoes after sugarcane and the largest potato producing state in the country. The Agra district alone accounts for more than half of all potato production. Despite being the largest producer of potatoes in the country, there is unrest among the potato growers in the state and especially in Agra district because there are no subsidies provided and no MSP is fixed by the government for the marketing of potatoes. The farmers use different supply chain channels to sell their produce in the market by involving many intermediaries, which reduces their profit margins. In the Agra district, every farmer is involved in potato cultivation and production, facing huge losses. One of the major issues confronting the government in this region was the ability to appeal and protest against the government during election times. Potato growers also face an issue with the scarcity and high cost of inputs, particularly seeds. Profit farmers, investors, and planners are concerned of the crop's

abundance due to its wide range in productivity and rising average cost when compared to other vegetables.

Potato productivity varies greatly from season to season and period to period. It could be attributed to differences in planting and harvesting dates, number of tubers used, tuber source, and geography, among other things. In the winter season for potato cultivation is the ideal soils and environmental conditions. Potato is vital in human nutrition and provides farmers with a faster source of revenue. However, fluctuating pricing, the presence of a maximum number of middlemen, unstructured marketing, and the daily increase in value added products reduce the share of producers in the price paid by consumers and marketing efficiency is claimed to be low. Sidhu et.al. (2012).

The study is useful in determining the productivity, production, and area of potatoes, as well as the expansion and potential of the potato dispensation business in the state. The study's findings are useful for policymakers, farmers, and input organisations concerned with supporting potato agriculture in developing policies and strategies to increase potato production in the state which is overlooked from so many years.

In view of the foregoing information, it is deemed essential to perform a micro level study and evaluate the potato supply chain and marketing in the study area, with the broad objectives.

1.12 Scope of the Study

Products made from processed potatoes such as frozen potatoes, potato powder, frozen French fries and potato flakes have a significant market potential. In the world potato chips/wafers are one of the most widely consumed snacks. It is currently the largest product category among snacks with total market share of around 85 percent. In the Asia-Pacific region, India is one of the high demand snack markets accountings for 3%

of the area's overall market snack. Potatoes as well as processed potato goods such as frozen French fries, frozen potatoes, potato powder, potato flakes and potato chips are in high demand in India. With the entry of a number of private firms, the emergence of potato processing as the upsurging industry to meet the burgeoning demand. The research will be helpful in evaluating potato marketing. The study's findings will be valuable to farmers, policymakers and marketing organisations participated in the designing policies and developing strategies to increase the state's potato market.

1.13 Conceptual Framework

1.13.1 Human Labor

Field worker i.e., human labour is measured as productive man-hours units of (on the farm workers accomplishes around 8 hours of productive work). For male, female, and hired labour, actual days worked in executing different traditional procedures in the production of potatoes were documented individually. The ratio of 1.5-woman days corresponding to one-man equivalent day was used to convert the women days into man equivalent days. Wages were compared to rupee equivalents either in cash, kind, or in a both ways. The casual labour prevailing wage rates utilised for similar jobs were used to calculate family labour.

1.13.2 Bullock Labour

Cattle pair day was defined as the amount of work done on the farm by a person and pair of bullocks over the course of a six-hour period. The cost of contracted cattle labour was determined by the amount paid by the farmers. Prevailing hire rates were used to calculate the imputed worth of owned bullock labour.

1.13.3 Tractor Services

Tractor services were charged at the current hourly rates both either owned or rented in the area.

1.13.4 Seed

The current market price was used to determine the cost of both farm-produced and purchased seed.

1.13.5 FYM

Cost of FYM per ton was calculated using current market prices for both acquired and owned goods.

1.13.6 Fertilizer and Plant Protection

Fertilizer and plant protection chemical costs were calculated using marketing prices.

1.13.7 Interest on Working Capital

It was calculated at a 12-percent-per-year rate.

1.13.8 Land Revenue

The respondents paid the actual land revenue subsequently, and it was divided up according to the amount of land planted in potatoes.

1.13.9 Supply Chain

The supply chain refers to the network of organizations, people, actions, information, and resources involved in getting a product or service from the manufacturer to the consumer.

1.13.10 Supply Chain Management

Supply chain management is the process of efficiently planning, implementing, and controlling supply chain operations. It manages all activities like raw material storage, processing of inventories and finished products movements from organization to consumer.

1.13.11 Marketing Channel

It is the path chosen by agricultural products as they travel from producers to consumers.

1.13.12 Producer

A farmer who grows the product and sells it in the market.

1.13.13 Commission Agent

A commission agent is a person who, on behalf of his principle and in exchange for a commission on the amount involved in each transaction, retains his principal's goods in his custody, sells them, and holds himself liable to deliver the items to the buyer and pay his principal the value of the goods.

1.13.14 Wholesaler

At controlled markets, wholesalers sell produce to retailers of different types or to others through their wholesale shops.

1.13.15 Retailer

The produce is purchased by retailers from wholesalers and further sells it in small amounts to customers. In the marketing channel, retailers are the ones who are closest to the customers.

1.13.16 Weighman

A person who weighs or counts a consignment of notified agriculture produce is referred to as a weighman.

1.13.17 Transport Agencies

It includes truck owners, drivers, and cart drivers, among others. These workers are in charge of transporting produce from one location to another within the market.

1.13.18 Packing & Packaging

Before being shipped, commodities are wrapped and crated, which is referred to as packing. Packaging refers to the process of packaging things in compact packages such as bottles, bags, cartons and parcels for sale to end users.

1.13.19 Processing

The processing activity results in a change in the commodity's shape. It transforms raw materials and brings finished goods closer to consumer use. It adds value to the items by altering their shape.

1.13.20 Consumer

A person who will really use the finished product (potato).

1.13.21 Marketing Margin

This relates to the costs and net share of the various market functionaries participating in the produce's marketing.

1.13.22 Producers Share in Consumer's Rupee

It is the net price of a farmer stated as a percentage of the retail price of produce.

1.13.23 Price Spread

It is the difference between the net price obtained by the farmer and the retail price.

1.13.24 Marketing Efficiency

It's the proportion of marketing input to market output (satisfaction). An increase in the ratio indicates increased efficiency, whereas a decrease indicates decreased efficiency.

CHAPTER- 02

REVIEW OF LITERATURE

CHAPTER- 02

REVIEW OF LITERATURE

This chapter is devoted to a review of previous research work on the subjected area. The literature that was looked at were about potato supply chain management and marketing. Under the following subheadings, a brief overview of the literature review is offered.

2.1 Studies Related to Supply Chain Management.

Bridge *et al.* (1996) studied the supply chain management for fresh vegetables in UK were concerned with the linkages in the supply chain, from primary producer to the final consumer. In practice, it seeks to break down the barriers which exist between each of the units in the supply chain in order to achieve higher levels of service and substantial savings in costs. Using the two examples of broccoli and crisping potatoes in the UK, the study concluded the six steps required for good supply chain management from the perspective of the primary producer: scale of operation, strategic alliances, production/storage flexibility, and continuity of supply, quality control and good communication.

Lin *et al.* (2001) concluded that potatoes were the most important vegetable crop in the United States, accounting for 16% of all vegetable and melon farm cash receipts in 1998. However, little is known about the distribution of potato consumption across different marketing sectors, geographic regions, or population groups. Using data from USDA's 1994-96 Continuing Survey of Food Intakes by Individuals, this study examined the consumption distribution of six potato products in the United States. The

analysis indicated that fast-food establishments and restaurants dominated the French fries market. There were distinct regional variations in the use of potato. African Americans consumed more potato chips and French fries, on a per capita basis, than other Americans. Senior Americans favored consumption of fresh and canned potatoes, while teenagers consumed more chips and French fries than others.

Kamal *et al.* (2001) carried out a survey to assess the market share status of different processed potato products in Meerut, Ghaziabad and Delhi, India. Results revealed that processed potato products constitute a sizeable portion of snack foods. Unorganized sector has got strong market presence in the market in the processed potato products category, particularly in case of potato chips where it shares equally with branded chips. However, 'lachha' and 'bhujia' market is still dominated by branded players. It is suggested that potato processing in unorganized sector has a great promise provided they get an assured supply of processing quality potatoes year-round.

Manish and Ezekiel (2001) carried out a market survey in the urban and suburban areas of Kolkata, West Bengal, India, during February-March 2001, to collect information on the quantity and quality of the processed potato products available in the largest city of India. Results revealed that potato chips, 'lachha' and 'bhujia' were popular in the metropolitan. A local product called 'Sangra farari' was found to be very popular. Consumers preferred a package size of 500-1000gram for locally processed potato products.

Janardan and Subhash (2000) have observed in their study that the prices are fewer in markets and mandies quicker to the potato producing area than in the detachment market spaces, due to high cost of transportation. And they have come to the termination that transport cost must be minimised then only farmers get benefited.

Vasileiou and Morris (2006) revealed that economic and related market factors associated with staying in business and maintaining competitive advantage were the dominant concern for all potato supply chain participants in the study area of Britain. Greater importance, however, is now given to social and environmental factors both as influences on decision making and as indicators of business performance. The social capital of the supply chain, as it describes relationships among participants, is an important moderator of business uncertainty, and confirms the relevance of sustainability criteria to measure and report supply chain performance.

Tuomisto (2007) studied the contract production of seed and food potato which reduces the market uncertainty and increases efficiency in the entire potato chain. Results indicated that no contract model provided seed potato producers with average positive net profits, and profitability ratios for seed potato farms stayed below one and seed potato producers trading on a fixed-price and pre-emptive market could sell their seed potato for 13 per cent less than on a transaction market, but with equal net profits. The more consistent supply chain leads to less market uncertainty. If the food potato producer was not party to the contract, there was no marked decrease in market uncertainty. With contract production the needs of contract parties could be controlled, but it will be up to the objectives of the party offering the contract, which party in the potato chain most benefits from the contract production.

Batt (2008) stated that contract farming is a direct mechanism for integrating small growers into the supply chain, the system is said to provide few advantages for growers. In particular, growers have expressed concerns regarding the equity of the contracts they sign with food processors and their economic security after the termination of the contract. This encouraged potato growers to negotiate a better deal and to access public sector support.

Mishra (2008) studied the micro finance and livelihoods institution, BASIX, became involved with financing the potato value chain in Jharkhand, India in 2005. In the first years the contract resulted in increased yields and higher incomes for the farmers, in later years farmers broke the contract as they found their potatoes were rejected at the factory, and they found they could achieve better prices in the open market. More was needed than finance only - stronger farmers' organizations were necessary to make sure that contracts operate fairly.

Nalini *et al.* (2009 a) stated that contract farming was helpful in reducing the cost of production by providing technical guidance and arranging quality inputs for potato production. The marketing cost also reduced in modern supply chain by elimination of middlemen and integration of grading activity with farmers and providing training to laborers. Therefore, it can be concluded that contract farming should be adopted which increases the competitiveness of Indian potato in the international market.

Nalini *et al.* (2009 b) studied the marketing of potato in Bathinda district of Punjab and identified the following marketing channels

Channel –I: Producer – Contractor/ processing firms

Channel- II: Producer- commission agent/ Wholesaler- Retailer-Consumer

Channel- III: Producer- Retailer- Consumer

Channel- IV: Producer- Cold storage- commission agent/ Wholesaler- Retailer-
Consumer

Channel- V: Producer- Cold storage- Consumer

Producer of processing varieties under contract farming generally followed the channel- I, producer with processing varieties and did not have contract followed the channel- II and IV. Mostly, channel- III and V were generally used for disposing of non-processing varieties and seed potatoes in the study area.

John *et al.* (2009) analyzed a 3-stage principal-agent supply chain model involving producers, wholesalers, retailers, and a futures market and compared the situation with and without a futures market. The empirical results regarding the Dutch ware potato marketing channel during 1971 to 2003 revealed that, as a result of increase in incentives to producers and wholesalers, the coordination costs of the marketing channel decreased significantly, both with and without the informational (i.e., price discovery) role of futures markets.

Harbir (2009) found that potato yield on contract farms were lower (about 13% in Merino model and about 30% in Pepsi Co model) than that of non- contract farms. This was on account of early harvest necessitated by keeping the tuber size medium, which is required to meet the processing standards (chips-grade potato). However, contract farmers got higher price than those selling in the open market. The net returns of the contract growers were about 14-24% higher than that of non- contract farmers under both the models.

Rajendran and Thamilmanni (2009) studied the farmer market principles in central part of Tamil Nadu and concluded that the farmers- market is an arrangement of supply chain management. Development of such marketing system evidently strengthened the supply chain management. The system successfully integrated many producers with consumers, eliminated middlemen, cut maximum marketing cost, provided good market infrastructure and environment, and maintained a good relationship between

sellers and buyers. Bidirectional information flow increased the strength of the market. The supply chain could be strengthened by taking serious steps to spread the system of farmers- market all over the country in order to sustain the production and marketing capacities of large number of small and marginal producers and fair marketing.

Sahadevan (2009) studied futures trading of potato market in India and stated that the trend showed that the spot prices have strengthened after the launch of futures trading. It was logical to expect that farmers were therefore indirectly benefited from the increased spot prices even if the local dealers did not pass the entire price benefits to them. The significant price difference between the spot and future markets which prevailed during the earlier seasons had further strengthened the findings. This indicated that the price discovery in futures helped strengthening of prices in spot market and price discovery and its dissemination helped farmers gain indirectly from futures markets.

Pandit (2009) studied the contract farming of potato in Bathinda district of Punjab, and showed that gross income from potato contract farming was about 18% higher than the non-contract farmers. The B:C ratio was also significantly higher in former category of farmers. The significance difference was mainly due to higher price of potato obtained by the contract farmer.

Abong *et al.* (2010) conducted study on potato crisps industry in Kenya, which is largely dominated by small scale processors who process potato crisps only as one of a diversity of other products. As pertains to produce sales, 83% of the processors sold their products directly to supermarkets, 4.3% through wholesalers and 13% directly to individuals and shops. A large number of processors (70%) stored their raw potatoes

for relatively short periods of time ranging from 2 days to 3 weeks and few (30%) processing firms, stored potatoes for a month or longer.

Bertazzoli *et al.* (2011) focused on three food chains: potato, fruit, and Grana cheese of the Emilia Romagna region, North Italy. The analysis was carried out on 189 enterprises for the potato chain, 187 for the fruit chain, and 203 for the cheese chain. The number of enterprises was invariable over five years (2003-2007), leading to 2,900 financial statement analysis. In the potato and fruit chains 35% of value was created by distribution, whereas in the cheese chain it was 13.6% only. Over the five years, value decreased 5% in fruit and potato and 9% in cheese. The lack of adequate strategic food chain partnership allowed an increasing retail market power over the whole chain at the expense of the primary sector entailing expense a declining sustainability for all chain actors.

Jadav *et al.* (2011) studied the different approaches of supply chain of potato and analyzed their efficiency in middle Gujarat, India. The results revealed that, out of the total production of potato, the marketable surplus was 91.93% and about three-fourth of total quantum was dispatched to distant markets by the sample growers. The Producer-Wholesaler-cum-Commission Agent-Retailer-Consumer was the major marketing channel as more than 60% of marketed surplus moved through this route.

Reddy *et al.* (2012) studied that the long supply chain (village traders, cold storage owners, commission agents, traders, wholesaler, retailers) in potato markets in UP is identified as the potential source of exploitation of farmers which leads to the increase in cost to the consumers. The farmer gets only 25-40% of the price paid by the consumer. Further value loss of the produce is estimated to be 30-40 %.

Tufa (2013) conducted a study in Ethiopia to describe existing and potential seed potato supply chains, and to evaluate the performance of these chains. The findings showed that seed potato supply chains vary in their performance with respect to cost, seed quality, flexibility and responsiveness. Actors in the chains also varied with respect to their importance to improve seed potato supply chain performance sub-indicators. The results of the study indicated that seed quality and availability could be improved by improving economic and agronomic aspects of the seed systems in general and seed supply chains in particular.

Ugonna *et al.* (2013) examined the value chain analysis of Irish potato as an industrial raw material in Nigeria. Potatoes in Nigeria are cultivated mainly by small, rural farmers in marginal areas of the country. The research draws attention to the three sub-chains identified within the Nigerian potato value chain; namely the production of potato for immediate consumption, the manufacturing of traditional products, potato production for industrial processing and marketing of fresh potato and potato products. Whilst all the three sub-chains can be used to improve income, the first two contribute greatly towards the conservation of biological diversity and are suitable for small farmers.

Singh K.Dhiraj & *et.al.* (2018) explains the most typical marketing route in the study area was producer-wholesaler-retailer-consumer. Farmers incurred the majority of marketing costs, which must be decreased in order to enhance the producer share of consumer rupees. The findings revealed that the retailer's profit margin was more than double that of the wholesaler. However, retailer wastage charges were extremely significant, at 3%, and must be decreased by effective grading, packaging, and storage.

Khare Ishaan *et al.* (2019) analyzed the potato supply chain is an excellent illustration of how value addition contributed to supply chain management and helped small farmers in India meet their needs. The company's extensive extension network aids in the monitoring of marketing and product quality. Farmers who work as contract growers clearly benefit on several levels: they receive extensive training and education in the proper timing and method of sowing, harvesting, and other field operations, and their overall management capabilities are bolstered by meetings and visits from agricultural experts from time to time. Contract farmers have higher gross margins.

Wondim & Desselgn, (2019) concludes that were obtained from each district were distinct from one another. The marketing chain for potatoes was broken down into its component districts and revealed different marketing channels in each district. Despite this, there was a wide range of variation in the amount of potato that went through each channel as well as the participation of the various actors in the market chain. The greatest number of potato products were purchased from farmers by retailers. Retailers were the most active buyers. Every participant in the market chain had a different percentage of the total profit margin. In the South Achefer district, retailers earned the highest percentage share of profit margin next to processors, whereas in the Jabi Tehinan district, producers earned the highest percentage share of profit margin next to processors. The largest portion of the percentage profit margin was taken in by the processors. The processing industry is still at a very early stage of development and operates on a very limited scale. Nevertheless, it is a productive sector in terms of job creation for young people. According to the findings of an econometric analysis, factors such as distance from the nearest market, number of owned oxes, experience in potato production, availability of credit, total amount of potato produced, and information regarding the market all have a significant impact on the supply of potatoes on the

market. The market ought to be competitive so that farmers can benefit from it, and there ought to be increased marketing linkage as a result of the provision of marketing information and training. In general, governmental and nongovernmental organizations should both participate in filling the gaps left by various actors along the value chain through their respective interventions.

From the preceding evaluations, it is obvious that supply chain models differed from place to place and time to time as a result of numerous studies undertaken by various research workers in various parts of the world.

2.2 Studies Related Market Efficiency, Margins, Price Spread and Marketing Cost.

Kokab and Smith (1989) studied the marketing of potatoes in Pakistan. The results revealed that the producers received for their table potatoes 64%, 56% and 49% of the consumer price for un-stored hilly, stored autumn and un-stored autumn potatoes, respectively. Traders' net margins were correspondingly low. Retailers' margins were higher than those of wholesalers as turnover was less and they need to cover a greater risk of loss through rotting. The prevailed situation of price inelastic demand coupled with price elasticity of supply means that any increase in supply resulted in a disproportionate fall in price, so that farmers' net revenue was reduced.

Karam *et al.* (1996) studied marketing of potato in Punjab, India. The following marketing channels were identified.

Channel I: Producer- Wholesaler- Retailer- Consumer
Channel II: Producer- Retailer- Consumer

Channel II: Producer- Consumer (Apni Mandi)

The results showed that the producers share in consumer rupee was the highest in Channel- III (83.76%) for all the selected markets followed by Channel- II (37.81%) and Channel- I (34.08%) respectively, the marketing costs incurred by farmers also showed the similar patterns.

Ananth (1996) studied the producers share in consumer price at Indore (Madhya Pradesh) vegetable mandi which came to 67.32%. The marketing costs and margins accounted for 18.68% and 14% respectively. The marketing cost borne by producers were higher, being 12.68% compared to charges paid by retailer and wholesaler, being 3.6% and 2.4% respectively of the price paid by consumers, the middlemen margin was higher in case of retailer being 8.4% and lower for wholesaler being 5.6% of consumer rupee.

Dijkstra (1999) studied that collecting wholesalers contribute to the efficiency in marketing channels to the benefit of both farmers and distributing wholesalers. The analysis is based on the Kinangop potatoes grown for the Nairobi market (Kenya). For potato farmers in Kinangop, selling potatoes at the farm gate was more profitable than taking them to Nairobi with the attendant high initial costs, especially in relation to transport, information and financing. A farmer's total average marketing costs would, by taking his crop to Nairobi, exceed his average marketing revenue. Collecting wholesalers have lower average costs because of substantially higher turnovers which allow them to level out their initial costs. Even if farmers' costs in relation to transport, financing and information were reduced through credit and improved market information, the majority of farmers would be still better off selling their produce to collecting wholesalers. Their supply was simply too small. Only when acting as a group could they hope to reach the same scale of operation as collecting wholesalers. Collecting wholesalers operate in such a way as to allow distributing wholesalers to

focus entirely on their urban clientele. This is an important in large urban centers where wholesale and retail markets were operational six days a week. For such distributing wholesalers, being absent resulted in lost revenue and poor customer relations.

Devadoss and Reeve (2001) conducted a study to measure the farm-retail price spread in the Idaho (USA) fresh potato market and examine the factors that impact this margin. Conclusions drawn from the estimated results indicate price asymmetry, i.e., price linkages at each exchange point are strong for products requiring minimal transformation. The results of the estimation of the packer-retail and farm-packer price spreads verify the suggestion that costs play an important role in the determination of these marketing margins. In both cases, the cost variables were positive and statistically significant, indicating that as costs rise, an increase in the packer-retail and farm-packer spreads, respectively, are expected.

Dahiya *et al.* (2002) studied the seasonal price fluctuations, price spreads, and marketing efficiency for potatoes in the Delhi, Mumbai, and Calcutta markets (India) during the period 1981-98 were examined. The producer's share in the sale price was highest (77.7%) in Calcutta, followed by 68.2% in Mumbai and 58.2% in Delhi. The Calcutta and Mumbai markets indicated better marketing efficiency than the Delhi market.

Rana *et al.* (2003) studied the market integration among the important potato markets in India based on data on potato prices in 10 different markets during the years 2001-02 and 2002-03. October and December were the crucial months when most of the prices showed a wide variation in prices, indicating that the markets were not integrated. Ahmedabad and Jalandhar markets showed many opportunities where traders could have earned very good profits by transporting potatoes either from or to Delhi.

Correlation coefficients of potato prices showed that the markets were not integrated even at shorter distances where there was no high risk of spoilage during transport.

Basu and Soumyananda (2003) studied the market efficiency and integration of potato in Hooghly district, West Bengal, India. The study has used bivariate price series correlation, error correction method and Engle-Granger tests, to analyze price series correlation to explore market integration in potato. The study concludes that potato markets were competitive and efficient at the wholesale level. The potato markets in Hooghly district were shown to be integrated mainly due to close proximity, good communication facilities and good infrastructure availabilities among the market centers in the study district. However, the study is not concerned with the village level market where producers have direct links with traders and the question of efficiency may call for government intervention.

Sandip and Abhirup (2003) conducted a study on potato markets in West Bengal, India. The calculated values of coefficient of variations were 1.62 for 1999-2000 and 0.67 for 2000-01. It may be mentioned that the trader's profit per quintal of potato for these two years were Rs. 7.68 and Rs. 4.53 respectively, thus the year with a higher variance in market sales by farmers saw higher profits for traders, in other words data supports the theoretical argument that trader's profit group with an increase in the variance of market sales by farmers.

Hatai *et al.* (2007) studied in Orissa state that the price received by the farmer was highest (Rs.254/q) when potato was directly sold to consumer and the lowest (Rs.150/q) for the sale through retailer. The marketing cost incurred by sample potato growers for the sale through commission agent / wholesaler, processor, consumer and retailer were

Rs. 88, Rs 82, Rs 40 and Rs 8 per quintal respectively. However, the net price received by sample farmer was highest when directly sold to consumers (Rs. 214/q).

Harsimranjeet *et al.* (2007) studied price spread and marketing efficiency of kin now in Srinagar district of Rajasthan and revealed that the share of producer in consumer rupee was 35.70% (Rs. 1126.65 per qt), the price spread was as high as 64.29% out of which 26.46% was accounted by the marketing cost (Rs. 832.72 per qt) and 37.77% was accounted for by margins (Rs. 1189.48 per qt) of pre harvest contractor, wholesaler and retailer in Producer – Pre harvest contractor – Consumer channel, and it was 49.18% of producer's share in consumer rupee (Rs. 1517.81 per qt) and price spread was 50.82% out of which 25.56% was accounted for by marketing costs (Rs. 788.70 per qt) and 25.26 % by margins (Rs.779.66 per qt) of wholesaler and retailer respectively.

Nikam *et al.* (2007) studied marketing of potato in Pune and Satara districts of Maharashtra. The results revealed that at the overall level, the average per quintal cost of marketing was Rs. 88.70 of the total marketing costs, the items such as commission, transport cost and packing cost were observed to be the most important items of cost which accounted for 44.60%, 22.36% and 16.72%, respectively. These items together shared 88.68 per cent of the per quintal marketing cost. Remaining 11.32 percent of the marketing cost was shared by grading wages, hamali, weighing and market fee which accounted for 5.35, 2.63, 2.15 and 1.19, respectively.

Awal *et al.* (2007) examined the pricing efficiency of potato markets in Bangladesh using Engle-Granger test (EG), Co integration Regression for Durbin Watson (CRDW) test and Error Correction Methods (ECM). For the test of pricing efficiency of potato markets, the wholesale prices were used to test co integration using data from 1993 to 2005 yielding a total of 676 observations. Engle-Granger test was used to estimate the

integration among the potato markets in Bangladesh. In the co integrating set up, error correction method estimated the long-run relationship between reference markets (Dhaka) and selected markets. The cointegration regression for Durbin Watson test revealed that the wholesales potato markets in Bangladesh were integrated.

Brijbala (2009) studied the cooperative marketing in Himachal Pradesh that the average marketing costs per quintal, for member farmers were Rs.103 as against Rs. 127 for non-members. There was significant difference in the commission, transportation and market fee charges for both the groups. Commission charges constituted more than half of the total marketing costs for both the groups. Again, the cooperative marketing society members were able to fetch significantly (10-15%) higher prices for their produce than the non-members, in the same market. Thus, the members of the societies received higher proportion of the wholesale price which has been reflected through the higher MEI for members as compared to non-members.

Shelke (2009) studied the marketing of potato in Maharashtra. During the peak period of arrivals, the wholesale and retail prices of potatoes were much lowered. There was much wide difference between wholesale and retail prices. The margin of the retailer was extra ordinary high in all the vegetables under study. The retailers share ranged between 12 to 41% while the producer's net share ranged between 42 to 57%. The retailers received lion's share of the consumer's rupee. Producers can be highly benefited and increased their share to 95.85% from 55.35% in consumer's price by selling their vegetables directly to consumer rather than selling to wholesalers. Hence producers should arrange to sell their vegetables directly in the consumers market wherever possible.

Basu (2010) examined the marketing efficiency of potato markets in West Bengal's Hoogly district. The analysis was made at three levels, namely wholesale markets, retail markets and the village market. The analysis using the co integration test revealed that the potato markets were integrated and efficient. The study simultaneously covered two regions - the cold storage concentration zone and the non-concentration zone and concluded that 'efficiency', as revealed by integration of wholesale and retail markets, cannot coexist with a complex and non-competitive market structure at the village level. This means that the village findings support the inefficiency of potato marketing. There is a need to intervene the private corporate sectors in the potato market to enhance the efficiency at the village level.

Sidhu *et al.* (2012) studied that the sale pattern of potato and brought out that its maximum quantity was sold by the growers in the wholesale market (about 83%). The rest of the sale was at the farm, in the village, distant market (Delhi) and Apni Mandi. The price spread of potato in supply chain I (producer- commission agent- wholesaler- retailer- consumer) in Jalandhar market brought out that net price received by the producer was about 58% of the consumer's price. This figure was 61% in supply chain II (producer- commission agent- retailer- consumer) and 93% in supply chain III (producer – consumer). The producer's share in supply chain III was more on account of direct sale by the producer to consumer.

A study conducted by AERC, Department of Economics and Sociology, Punjab Agricultural University (2012) examined the comparative of performance of traditional marketing channels to that of emerging channels for potato and kin now mandarin in Punjab (India). The emerging marketing channels are supposed to reduce transaction costs and ensure that high margins maintained by intermediaries in the supply chain are reduced so that the farmers benefit and get a better price as compared to sale in regulated

markets. On the whole, it has been found that farmers have benefitted by selling their produce through emerging marketing channels both in the case of potatoes and kin now mandarins mainly because they avoid/saved marketing costs. However, the marketing operations of emerging marketing channels were very limited and restricted to the purchase of superior quality produce, which enabled only a few farmers to secure higher prices.

A study conducted by AERC, Uttar Pradesh (2012) revealed that producers' share in consumer rupee in case of Traditional Marketing Channel (TMC) was 75.55% and total marketing cost incurred by producer accounted for 3.02% of consumer price. The price spread in case of TMC was 165.70 per quintal of which, the share of the wholesaler was 3.32 % from producer price and 2.51% from retailer's price. The net margin retained by wholesaler and retailer in APMC was estimated at 2.51% and 3.60% of consumer's price respectively. The marketing efficiency was worked out of 0.36 in case of TMC. In case of Emerging Marketing Channel (EMC) the producer had sold the potato at rate of Rs.588 per quintal to PepsiCo against Rs.512 in APMC Agra. Thus, the producer received the net margin of 76 per quintal in case of EMC than when sold through TMC.

Strydom *et al.* (2012) observed that in South Africa the table potato market was associated with the spot market governance whereas the processing potatoes mainly made use of the more hybrid format of contracting. The spot market and the contract market within the potato industry were compared in terms of transaction costs. The results indicated that the contract market had the lowest transaction costs. The results indicated that by forming an alliance, producers were able to overcome the obstacles they faced and the elements which should be in place were sound administration, trust and loyalty, market research, marketing and traceability.

Bonabana *et al.* (2013) assessed the marketing performance of potato markets in Uganda. The data were collected from 291 respondents in two innovation platforms (IPs) of South westerns in Uganda. Descriptive statistics were used to characterize potato traders and farmers while Gross Margin Analysis was used to determine the market performance for different potato varieties. Purchase prices varied by district between UgSh350/kg for Rwashaki variety and UgSh531/kg for Kinigi variety. Sutama and Victoria varieties had the highest marketing margins in Kabale and Kisoro districts respectively.

Nag. Dibyajyoti & *et al.* (2015) in the study of seasonal potato cultivation in Ranchi district a comparative study has observed that Potato is one of the significant crops in the world, cultivated in more than one hundred countries. It is essentially cool recurring crop but due to climatic advantages (especially temperature) of Ranchi district (often called as vegetable bowl), potato can grow well during rainy season as well. The present exploration has been carried out at six villages of Nagri and Bero blocks of Ranchi district in the year 2013. This paper highlights the labour utilization pattern and economics of potato growing in different seasons, by the selected farmers of two blocks of Ranchi district. Both villages and samples were selected purposively. Higher net income and benefit cost ratio were recorded for Bero block.

Pandey. N. K (2015) in the study of Economics of seed potato production in India, analysed that although potato production is a very remunerative crop enterprise yet its profitability is dented by the periodical gluts and price crashes. Being a vegetative propagated crop, seed quality and adoption of the Seed Plot Technique (SPT) are critical for improvement of potato productivity and profitability. To maintain crop production at desired levels the government should develop a horticultural price policy.

Singh D.K. & Kharumnuid P. (2017) studied the arrival and price of potatoes in the Agra market over the last ten years. From 2004-05 to 2013-14, the acreage and production of potato in a selected district increased at healthy rates of 7.7% and 7.1 percent each year, respectively. However, in order to raise potato producers' income, production must be improved. The studies also revealed that market arrivals and prices of potato in the Agra market varied from year to year, although both grew at a good rate. Potato arrivals climbed dramatically in December and reached their highest level in January, whereas they were at their lowest in October. As a result, market prices were higher in October and November and lowest in February. Arrivals were low from June to November and high from December to May, according to seasonal indexes of potato arrivals and prices. During the months of January, February, and March, there was a strong correlation between market arrivals and pricing. Farmers must compare potato prices across the market before selling their harvest in order to maximise their profits. Furthermore, they can stockpile potatoes in cold storage throughout the harvest season when prices are low and sell later when prices start to rise.

According to Sarjono et al. (2019) in Tawangmangu, there are two different supply chains, and when these are compared, they produce different results. Both Tawangmangu with company interference, in the form of PT Indofood, and Tawangmangu without company interference, in the form of buying and selling on the market, are options. These conditions vary from farm to farm, which contributes to the unique challenges faced by each farmer. The majority of Tawangmangu farmers do not believe that there are significant barriers to marketing potatoes or maintaining reasonable selling prices for potatoes. However, farmers are more concerned about issues that may arise during the wet season and cause potatoes to become damaged. It is possible to draw the conclusion that the majority of Tawangmangu potato farmers opt to plant potato seeds

produced by PT Indo-food. Because of the price of purchasing and selling potatoes, the price that the company is offering has been predetermined from the beginning of the agreement, as have the conditions that are being offered. Because of this, the farmers are not left in a state of confusion because the prices at which they can sell and buy seeds from the company are more likely to remain stable, which is to the farmers' benefit. But despite this, there are still some shortcomings that farmers experience, such as those regarding payments. The business requested a one-month payment delay for potatoes that were purchased from local farmers. As a result, it should not come as a surprise that some Tawangmangu farmers do not wish to collaborate with businesses and would rather sell their produce directly to middlemen. because there is not a significant amount of time spent waiting to make the payment. Despite this, there are some drawbacks to dealing with collectors, such as the fact that prices are not fixed and, as a result, have a propensity to fluctuate depending on what the current market price.

Bhoi et al. (2019) concludes that average percentage of profit that farmers take home from their crops' retail prices ranges from 28% to 78% depending on the crop. In general, it was discovered that traders' and retailers' markups were higher for perishable goods than they were for non-perishable goods. In addition, it was found that the profit margins for retailers and traders varied depending on the location of the production or consumption center, with the margins for retailers remaining, on average, higher in consumption centers than the margins for traders. It's possible that a significant amount of product is lost during the retail marketing stages, particularly for perishable goods, which contributes to higher margins for retailers. In addition, the markups are affected by a number of different factors, which each participant in the market prioritizes differently. For instance, farmers are responsible for a significant portion of the costs

associated with loading and unloading, as well as the costs associated with packing, weighing, and assaying their produce, which include commissions and mandi charges. Storage fees and membership dues, in the case of retailers, and labor charges, the cost of transporting goods, shop rentals, and local taxes are some of the most important aspects of a retailer's total operating costs. For traders and retailers alike. According to the results of the survey, cash is the most common form of payment accepted in mandis. In terms of the farmers' perspectives, it was found that 62% of the farmers believed that the prices they were selling their crops for were higher than the costs of production. In addition, with regard to the policies of the government, farmers have stated that MSPs and easily accessible market information are beneficial to them, allowing them to realize better prices. Farmers also mentioned that having access to reliable weather forecasts, improved storage facilities, and government advisory on crops could help them make better decisions regarding cropping. On the other hand, the vast majority of traders believed that expanding storage capacity and permitting free trade would be beneficial, while the vast majority of retailers believed that supply management measures taken by the government in conjunction with improved access to information would help check rising food price pressures. A lack of rainfall and an increase in per-capita income both contribute to an increase in mark-ups, whereas supply-side improvements, such as road networks, market densities, tele-densities, irrigation facilities, and overall literacy rates in the country, help reduce mark-ups. Empirical results show that these factors help reduce mark-ups. Primary survey data collected to understand the formation of markups, particularly during periods of supply shocks or behavioral shifts in consumption pattern, can help improve the assessment of food inflation dynamics. This is because multi-stage mark-ups across crops play an important role in determining the trajectory of food inflation and its volatility.

Sinha et al. (2021) in his study of “Land Allocation Choice in Both Contract and Non-Contract Farming: A Study of Potato Growers in West Bengal, India” and found that the primary goal is to establish a reliable source of income for themselves and their families. The farmers have considered hedging their position because an alternative native option has been available for the past few years. This can be done by carefully employing the land and other resources that are split between the cf and the ncf. Under the terms of the NCF, the allotment of land was designed in such a way that it allows farmers to take into account both the losses sustained during periods of low price and the gains obtained during periods of higher price when determining their overall position. However, the land utility pattern is affected by the restrictive nature of the seed supply that the agro-processing company (PepsiCo) provides to the vendors, and the vendors provide to the farmers. In order for the farmers, particularly the marginal and small farmers, to continue earning the confidence of the vendors who supply them seeds, they need to be extra careful, extra cautious, committed, and loyal. Farmers are left with limited options for making meaningful use of land as a result of the rash decision that was made regarding the limitation of quantity at a time when farmers are either not willing to divert land or are unable to take on additional burdens or risks. This results in a decrease in their level of satisfaction because the difference curve is lowered as a result. As a direct consequence of this, there is once more a tendency of position towards uncertainty as a result of the relatively unbalanced ratio that exists between the ncf and the cf. The cultivation choices available to small and marginal cultivators are narrowed as a result of imposed restrictions on seed supply and the partiality of vendors. Therefore, the small and marginal landholders do not benefit from the real opportunity to gain from contract farming, and they are forced to live in uncertainty as a result. West Bengal had not yet amended or notified (West Bengal Agricultural Produce Marketing

(regulations), Rules) for provision of contract farming (Chand & Singh, 2016), and as a result, the practice of contract farming has not been formally recognized in the state. On the other hand, twenty Indian states had amended the Agricultural Produce Marketing Committee (APMC) Act to allow for contract farming. The Indian government enacted three new farm laws in 2020, one of which, the Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act, 2020, was directly linked to the promotion and facilitation of contract farming. Contract farming falls outside the purview of the APMC. In this scenario, the state government has the ability to establish a separate Contract Farming Board in order to improve the level of regulation of the practice of contract farming in the state from the perspective of farmers, vendors, and the contract farming agency. The Board is able to address issues related to the agreements for the supply of inputs, the purchase of inputs, and the sale of inputs in advance, with adequate emphasis on the security of farmers. In addition, land utility constraints can be overcome through the strategic planning of land use carried out by state agricultural departments at the block and village levels, as well as through the provision of incentives to small and marginal farmers.

According to the aforementioned studies, multiple methodologies were used by various writers to calculate marketing efficiency, and the majority of the authors revealed that the producer share in consumer spending was largest when there were fewer market intermediaries.

2.3 Studies Related to Constraint and Suggestion in Marketing of Potato.

Piazza (1999) reviewed on the state of the market sector for potatoes in Italy, advocated those two reforms were necessary to prevent a downturn in a very competitive situation made more complicated by reforms in official support: cooperatives and 'inter-

professional' agreements. The latter were described as agreements uniting producers, middlemen, food-processors, industrial users, transport firms, packers and distributors, and also a review of the current financial situation of the sector, aggravated by the fact that some regions, such as Bologna and the Veneto, were coming to market just at the time when prices were at their lowest.

Anil and Arora (1999) conducted study at hills of Uttar Pradesh, India. The results revealed that scientific grading is yet to come into existence for vegetables at grower's level, similarly packaging material which in turn influences the cost of packaging, has to be supplied at a reasonable price. Further cost of transportation of vegetables was very high in the region. An efficient transport system was the paramount need of the area. Finally Agricultural Extension system should be integrated with marketing extension system to transfer post-harvest technology to the vegetable growers. If these issues are properly looked into by policy makers not only post-harvest management at farm level will get optimized, the post-harvest losses and overall cost will be substantially curtailed and this bowl of off-season vegetables will receive its due from the emerging economic scenario in the country.

Scheer *et al.* (2000) suggested some new storing and handling methods to improve produce quality in the potato handling chain in his investigation. Compared to bulk storage, box storage reduced the average weight loss by 16% and the average quality index of subcutaneous tissue discoloration by 30%. Reduction of qualitative and quantitative losses of table potatoes, stored in boxes, is worth mentioning. It was also investigated whether a box storage system for the potato handling chain was financially beneficial to encourage and stimulate participants to invest in innovative harvest and box-storage-filling systems. The total of indirect and direct costs of the harvest and

store-filling systems was 3-37% higher for storing potatoes in boxes compared to the traditional systems of storing potatoes in bulk.

Manju and Ezekiel (2001) conducted a study at Shimla, Mohali, and Chandigarh, India, during February-March 2001. The results revealed that most of processors in unorganized sector apparently did not have an idea about the kind of indigenous machinery available in the market for small scale processing while indigenous processing equipment's for small scale processors were available. They were not conscious about technical details like optimum slice thickness, frying temperature, oil quality and proper packaging. They were not aware of the processing quality of potatoes required for producing good quality potato chips. The quality of potato chips produced by unorganized sectors could be improved greatly by educating the processors about the quality requirements of potatoes for processing and the indigenous machinery available for potato processing.

Pandit *et al.* (2003) stated that potato marketing in India suffers from severe constrains like high marketing costs and margins, wide price fluctuations, existence of large number of middle men, storage and transportation bottle necks and lack of other marker infrastructures. The potato markets are imperfect, and are inefficiently performing the marketing functions and producers are deprived of the proper share in consumer's rupee due to existence of large number of middle men in the marketing channel.

Rana *et al.* (2003) studied the seasonal indices of prices and arrivals for important potato markets in India during 2001-02 and 2002-03. It was found that prices remained higher than average during the last three months of the calendar year and lower than average during the first three months. Arrival patterns are specific to the markets and not the months. The coexistence of high arrivals and high prices as well as low arrivals

and low prices during some months in some markets indicated imperfections in the Indian agricultural marketing system.

Pandey *et al.* (2003) in their study focused both on the marketing system and estimation of postharvest losses in terms of physical and economic in Nalanda district, the leading potato growing district in Bihar and the major terminal market of Patna in India. Two marketing channels i.e. (i) producer-cold store-wholesaler-retailer- consumer and (ii) producer-wholesaler's field agent/wholesaler-retailer-consumer accounted for 46.8% of potato disposal in Bihar Sharif block and 91.3% potato disposal in Noorsarai block respectively. The significant postharvest losses were found on weight basis at farm level (12.84%), wholesale level (12.40%) and retail level (9.45%) due to cuts, cracks and diseases. The postharvest losses on weight and number basis were observed to be 26.84%. Total economic loss was worked out to be only 5.67%.

Chang *et al.* (2008) found that sweet potato is the major staple food crop in PNG (Papua New Guinea), providing around two thirds of total dietary intake. Poor post-harvest handling, storage and transportation result in a product with a short shelf life (3 weeks) and poor-quality characteristics. Losses to distant markets were high, with 30- 50% of product being unsalable on arrival in Lae or Port Moresby, due to rots and/or physical damage. The potential for marketing sweet potato to distant markets increased significantly in recent years due to increasing urbanization.

Nalini *et al.* (2008) stated that the potato crop was found to be remunerative in the study area (Banaskantha, Gujarath). More than 95 % of the total produce was being sold during the harvest period due to poor retention capacity of farmers. Lack of quality seed, inadequate irrigation facility, uncertainty in potato prices, costly potato inputs,

shortage of labor and lack of latest know how of potato cultivation the major constraints were faced by farmers in potato cultivation.

Brijbala (2009) identified the constraints in cooperative market of vegetables in Himachal Pradesh as the shortages of funds coupled with complicated procedure for availing funds, poor efforts by office bearers and losses to the societies due to stiff competition in the market from private traders were some of the major bottle necks affecting the smooth running and the overall success of cooperative marketing societies. Among the constraints hindering the emergence of new societies, unawareness among farmers, complicated procedure of formation of registration of the cooperative societies, lack of cooperation and leadership quality among farmers appeared to be the major obstacles.

Abong *et al.* (2010) conducted study on potato crisps industry in Kenya, about 4% identified the main constraints as lack of proper equipment's and market, 64% complained of lack of potatoes and its poor quality, while 43% indicated lack of finances to increase volume of production and also industries faced with several constraints including raw potato price fluctuations, scarcity and poor quality of potatoes, lack of facilities, skills and information on raw potato storage. The industry relies heavily on one variety that is not always available for all the processors. This information is important for potato breeders and postharvest technologists to avail sufficient suitable potato cultivars for crisping.

Dixit *et al.* (2010) stated that off season potato (with respect to plain) with high benefit cost ratio was found to be a commercially viable enterprise in Pauri district of Garhwal region. The area is backward in terms of poor pre and post-harvest infrastructure, low agricultural productivity and weak institutional linkages. These situations do not allow

the farmers to take advantage of off-season market opportunities. The study finds that the potato growers are the victim of circumstances, and the contractors coming from Haldwani, Ramnagar, Rudrapur and Kotdwar markets take the undue advantage. The scenario calls for concerted efforts of public-private sectors in a partnership mode for creation of basic infrastructure facilities, and Non-Governmental Organizations (NGOs) should act as a facilitator and extension workers need to guide the farmers for accessing both technology and credit facilities.

Guenthner (2010) made some predictions as an overview of world potato markets based on the literature review and analysis of trends. First, the global potato industry will expand until at least 2020. Second, growth will be most rapid in less developed countries (LDC). Third, fresh and processed potato usage will increase while seed use declines. Fourth, the inelastic demand for fresh potatoes will continue to cause price volatility. Fifth, new technology including GM potatoes will ultimately be accepted in global markets.

Mugisha *et al.* (2010) studied that the Potato value chain in Uganda was characterized by many scattered small farmers and buyers facing high transaction costs, resulting from lack of mutually beneficial linkages between actors in the chain and market coordination problems in terms of quantity, quality and varieties. These problems contributed to low adoption of improved production technologies and consequent low productivity, which, in turn, contribute to limited access to profitable markets and suggested the capacity building through degree training and creating a forum for involvement of value chain actors in interactive learning and knowledge sharing.

Jadav *et al.* (2011) identified that the major marketing constraints faced by the vegetable growers of middle Gujarat were higher production expenditure, higher price

fluctuation, lack of marketing information and lack of transportation facilities. To overcome the problems, provision of cold storage facilities to the farmers at village level, adequate transport facilities for the movement of vegetables from the places of production to various market centers, dissemination of market information to the farmers, establishment of vegetable co-operative marketing societies and fixation of minimum/ maximum prices of vegetables were some of the means suggested to improve the efficiency of marketing of potato in the state.

Sharma *et al.* (2011) studied the post-harvest losses in vegetable supply chain in the Kumaon division of Uttarakhand. Twelve major vegetables were selected for the study. The maximum aggregate post-harvest losses were found in tomato, followed by potato, brinjal, chilly, French bean and pea. The study suggested that establishment of producer co-operatives to handle various activities relating to production and marketing of vegetables would help in reducing post-harvest losses.

According Laititi M. S (2014) study conclude that the potato industry in the country is feasible, profitable, and sustainable. The potato crop, on the other hand, confronts both supply and demand constraints, as indicated by respondents and advocated in this study. Because the business has been proven to be profitable, stakeholders must overcome the highlighted obstacles in order to bring the commodity to the forefront as a food security and commercial crop. This will ensure that the business is as successful as possible and that investors benefit significantly from the venture while also ensuring that it stays in business. As a result, increased production and productivity will be achieved, boosting the potato harvest to the desired high level. In order to do so, the current study suggests that stakeholders dedicate the necessary resources to addressing the highlighted obstacles.

Tripura Binoy & Ghosh Souvik (2017) explains the current status of the supply chain, the margin analysis for the potato supply chain for both peak season and off season strongly points to widespread exploitation of the farmers. Numerous middlemen dominate the supply chain, adding little value along the way but a large amount to the ultimate price. Farmers' limited bargaining power exacerbates the dilemma, as they are unable to secure a fair price for their produce in the absence of a transparent pricing process. The margin analysis reported in the paper backs this up. Several strategies have been recommended in the report for a successful overhaul of the supply chain toward a more efficient structure. The private sector must be encouraged to participate more fully in the supply chain. The government will also play a key role in developing the overall strategy and overseeing its implementation, as well as upgrading infrastructure and establishing a favorable climate for large-scale investment. In the future, there will be more investment in this industry.

Bhatia & Bhat (2020) considered only perishable crop for this study so that the complexities and the constraints associated with the packaging, storage, and harvesting of these crops can be observed and analyzed. It has been determined through conversations with farmers that the distance between the point of production and the marketplace influences not only the type of transportation network required to access the agricultural product but also the packaging of it. A review of the relevant research reveals that fluctuations in the cost of fuel have an effect on overall transportation expenditures. In many cases, the distance that separates the farm and the distribution centers is one of the most important factors that determines the price of the produce on the market. The timing of crop sowing and harvesting in order to meet the demands of consumers is the primary decision that must be made in the process of model development. Because of this, the model will make it possible for us to determine the

kind of transportation, packaging, and storage facilities that should be made available to farmers in order to reduce the costs associated with farming. Despite the fact that the model is only concerned with the management of perishable products, it is possible to expand it so that it takes into account both perishable and non-perishable goods at the same time.

According to the assessments cited above, the most of the issues with potato marketing are post-harvest losses, wide price swings, higher marketing costs, and inadequate infrastructure at market yards.

Chapter 3
Research Methodology

CHAPTER 03

RESEARCH METHODOLOGY

This chapter covers the sampling design, the type and mode of data collection, the statistical and functional analytical tools used to achieve the study's objectives, and the various concepts and methodologies used throughout the investigation are discussed under the areas below.

3.1 Objective of Study

1. To examine the supply chain management of potato in Uttar Pradesh.
2. To examine the marketing efficiency and price spread for potato.
3. To identify different constraints in marketing of potato.
4. To find out strategies of cost reduction for supply chain management.

3.2 Research Questions

- a. What is the width of visibility of variables are required for supply chain management process for producer or suppliers?
- b. What are the roles and skills requirement of supply chain management?

3.3 Sampling Design

3.3.1 District Selection

Agra district was chosen as the volume of production of potato is relatively high in this region of Uttar Pradesh.

3.3.2 Selection of Respondents

The sample size of 490 respondents were picked from the selected areas, villages and district market taking into account the level of cultivation and production. The data is

collected from farmers, wholesalers, retailers, and middlemen functioning in the marketing system

Table 3.1: Sample Size and Composition

Sl.No	Particulars	No of sample
1.	No of farmers interviewed	290
2.	No of middlemen interviewed	200
3.	Total Sample size	490

Table 3.2: Intermediaries Sample Size

Crop	Wholesaler	Retailers	Middlemen
Potato	40	100	60

3.3.3 Age Group of Respondents

In below mentioned table data is collected on the basis of different age groups in both the farmers and intermediaries' categories.

Table 3.3: Age Group of Respondents

S. No.	Age Group (Years)	Farmer No. of Respondent	Intermediaries No. of Respondent
1.	20-29	75	25
2.	30-39	90	45
3.	40-49	80	50
4.	50-59	25	48
5.	60 and above	20	32
	Total	290	200

3.3.4 Educational Status of Respondents

Below table explain the educational background of the respondents in both the categories farmers and intermediaries.

Table 3.4: Educational Status of Respondents

S. No.	Educational Status	Farmer No. of Respondent	Intermediaries No. of Respondent
1.	Illiterate	30	20
2.	Primary (1 st to 7 th)	20	12
3.	Secondary (8 th to 10 th)	40	30
4.	High School	50	60
5.	Intermediate	60	50
6.	College	30	20
7.	Technical Training Agri	60	8
	Total	290	200

3.3.5 Sampling Methods

The non-probability convenience sampling method was employed in this investigation.

3.3.6 Selection of Crop

It was decided to select one crop from the cash crops (potato) in the markets.

3.4 Data Collection and Information

The relevant data for this study was gathered through a survey method, in which farmers were personally interviewed using a pre-tested schedule.

3.4.1 Primary Data

Farmers' basic information was gathered based on recall recollection. Data on various marketing expenditures spent by producers, as well as the price gained for their produce, were acquired at the producer level. Personal interviews with the intermediaries were conducted and data on marketing costs incurred and prices received were gathered. To determine the marketing issues with potatoes, an opinion survey was conducted.

3.4.2 Secondary Data

The data on is gathered from the various government sources, paper, journals, thesis, articles, newspaper, Agra regulated market pricing and arrivals records and etc.

3.4.3 Duration of Study

The research was carried out between July-October of 2021, and data for the 2011-2021 agricultural year was obtained.

3.5 Tools of Analysis

3.5.1 Price Spread

It is the difference between the price a customer pays and the price a producer receives for an equivalent amount of the same product.

For example- $P_1 - P_2$

- P_1 - price at consumer level
- P_2 - price at producer level

3.5.2 Average Gross Margins Methods

$$MT = \Sigma [(S_i - P_i)/q_i]$$

Where,

- MT is the total marketing margin
- S_i is the sale value of a product from the i^{th} firm
- P_i is the purchase value paid by the i^{th} firm
- Q_i is quantity of the product paid by the i^{th} firm

3.5.3 Marketing Margins of a Middleman

1. Absolute margin of i^{th} middleman (A_{mi}) = $P_{Ri} - (P_{Pi} + C_{mi})$
2. Percentage margin of i^{th} middleman (P_{mi})

$$P_{Ni} = \frac{-(P_{Pi} + C_{Ni})}{P_{Ri}} \times 100$$

- P_{Ri} - Total value of receipts per unit (sale price),
- P_{Pi} - Purchase value of goods per unit (purchase price),
- C_{mi} - Cost incurred on marketing per unit

3.5.4 Producers Share in Consumer's Rupee

$$PS = (PF/PR) \times 100$$

Where,

- P_f is price received by the farmer
- P_r is retail price (consumer price)

3.5.5 Marketing Efficiency

3.5.5.1 Acharya's Modified Marketing Efficiency

- $MME = FP / (MC + MM)$

- MME - Modified measure of marketing efficiency
- FP - Price received by farmers
- MC - Marketing cost
- MM - Market margin

According to Acharya, an ideal measure of marketing efficiency, especially for comparing the effectiveness of different markets or channels, is one that considers all of the following factors.

- Total marketing costs (MC)
- Net marketing margins (MM)
- Price received by the farmer (FP)
- Price paid by the consumer (RP)

3.5.5.2 Factors affecting Marketing Efficiency

$$Y = f(x_1 \dots x_n)$$

Where,

$$Y = \text{Marketing efficiency (\%)}$$

$$X_1 = \text{Marketing cost (Rs.)}$$

$$X_2 = \text{Marketing margin (Rs.)}$$

$$X_3 = \text{Transport cost (Rs.)}$$

$$X_4 = \text{Open market price (Rs.)}$$

$$X_5 = \text{Labour wages (Rs.)}$$

$$X_6 = \text{Controlling middlemen (put '1', if middlemen are controlled and '0' if not)}$$

- X7 = Volume of produce handled (kg)
- X8 = Presence of cold storage facilities (put '1', if present and '0' if not present)
- X9 = Length of the market channel (No. of market intermediaries)
- X10 = Length of the market channel (No. of market intermediaries)
- X11 = Nature of produce (put '1', if semi-perishable and '0' if perishable)

3.5.6 Constraint perceived by the Farmers/ Wholesalers/ Retails

Garrett's Ranking Technique

$$\text{Percent position} = \frac{100 (R_{ij} - 0.50)}{N_{ij}}$$

- R_{ij} is the rank given by i^{th} item by j^{th} individual
- N_{ij} is the number of items ranked by the j^{th} individual

(Note: The percent position of each rank is converted into scores by referring tables given by Garrett and Woodworth (1969). Then for each factor, the scores of individual respondents are added together and divided by the number of respondents for whom scores are added. The mean scores for all the factors are ranked by arranging in descending order).

Chapter 04
Data Analysis,
Findings & Discussions

CHAPTER 04

DATA ANALYSIS, FINDINGS & DISCUSSIONS

This chapter includes the explanation and presentation of outcomes which resulted from the analysis, in accordance with the study's predetermined objectives.

4.1 Agro-Economic Features of Study Area

Any crop productivity and profitability are examined to a considerable part by the region's physical environment, agro-climatic conditions, resource endowment and social matrix the presentation of agroeconomic aspects of the area under investigation is thought vital. As a result, a detailed explanation of the research area is given in order to provide a full picture of the region.



4.1.1 Agra district an over view

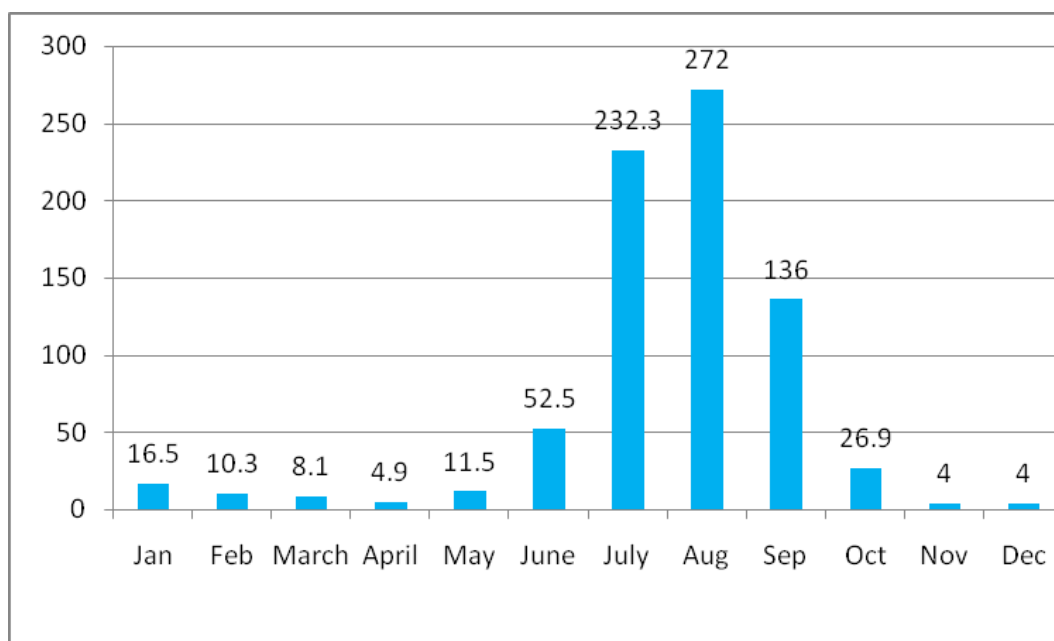
4.1.1.1 Physiographical features and Location

Agra district is located in the semi-arid zone of Uttar Pradesh's south-west. It is situated at 27.20 North latitude and 77.90 East longitude. The geographical area covered by Agra district is approximately 4027sq.km. River Chambal flows from west to east separating it from district of Bhind (M.P) and forms the southern boundary of the district. Firozabad and Etawah district borders Agra Northern region. Agra district includes Tehsil-06, Blocks-15, Nyaya Panchayat-154, Gram Sabha-640, Village-941, Town/City-17.

4.1.1.2 Climate and Rainfall

Agra district experience semi-arid climatic conditions bordering sub-tropical climate. The average temperature of the district varies from max 34.5 degree Celsius to min 16.2 degree Celsius. The annual average rainfall of the district is 750 mm.

Graph 4.1: Annual Rainfall of Agra District (Rainfall in mm)



Source: Agriculture Contingency Plan of District U.P

4.1.1.3 Soils

The major soil type of the district is mainly sandy loam, clayey loam, loam, rocky of various color and texture varies from fine to coarse.

Table 4.1: Soil Type in Agra District

Major Soils	Area ('000 ha)	Percent (%) of total
Deep loamy soil	210.0	67.0
Deep fine moderate saline/ sodic soil	62.0	20.0
Silty soil	32.9	10.0
Others (Eroded)	9.0	3.0

Source: District ground water brochure Agra district UP

4.1.1.4 Demographic features

According to Census 2011 the total population of Agra district is 4418797 crores and the district sex ratio (per 1000) is 868. Were male population accounts to 53% and women population accounts to 47% in the district.

4.1.1.5 Literacy status

The total literacy rate of district is 71.58 percent, with 80.62 percent male literacy and 61.18 percent of female literacy (Census 2011).

4.1.1.6 Irrigation

Below table shows the district source wise irrigation

Table 4.2: Source wise area Irrigated

Irrigation	Area ('000 ha)
Net irrigation area	258.2
Gross irrigated area	283.6
Rain fed area	26.1
Canals	27.0
Tanks	0.02
Open wells	0.2
Bore wells (Govt+Private)	256.3
Total Irrigated Area	283.5

Source: Statistical Abstract U.P

4.1.1.7 Land utilization

Land use analysis is critical in any area since it provides a comprehensive picture of land usage, net area sown, available fallows and economic contributions to the zone's economic growth.

Table 4.3: Land utilization pattern

Land use pattern of the district(Latest statistics)	Area ('000 ha)
Geographical area (ha)	399.0
Cultivable area (ha)	314.0
Forest area (ha)	36.7
Land under non- agricultural use (ha)	43.5
Permanent pastures (ha)	0.9
Cultivable wasteland	2.5
Land under Misc. tree crops and groves	6.9
Barren and uncultivable land	4.0
Current fallows (Ha)	15.5
Other fallows (ha)	4.9

Source: SASA U.P

4.1.1.8 Cropping pattern

Following table gives the clear picture of a diverse range of crops are grown in the Agra region. Rice, wheat, barley, maize, jowar and Urd are the main crops farmed in the area.

Potato is grown in rabi season in this region.

Table 4.4: Cropping pattern

Crop	Area ('000 ha)	Production (Q)	Productivity (Q/ha)
Paddy	5215	112590	21.90
Wheat	140427	5199640	37.03
Barley	7058	232750	32.98
Jwar	103	1010	9.74
Bajra	115736	2046640	16.68
Maize	129	2220	17.21
Urd	179	1140	6.37
Moong	255	1700	6.67
Lentil	581	10500	18.07
Gram	1281	23790	18.57
Pea	82	1840	22.46
Arhar	827	5750	6.95
Mustard	52639	9164480	17.41
Til	1885	3730	1.98
Potato	56303	14851040	263.77
Cotton	370	990	2.67

Source: Agra kvk

4.1.1.9 Cost of cultivation of potato

The cost of cultivation is seen to be important in comprehending the interplay of supply chain management. The cost of cultivation of potato is 74766 per hectare. The yield is 345 bags of produce per hectare therefore 1 bag accounts for 55Kgs produce. The overall gross return accounts 325000 per hectare. As a result, the farmer's net return estimates to 170112 per hectare. The B.C Ratio was calculated to be 22.5.

Table 4.5: Cost of Cultivation of potato (2018-19)

Cost of cultivation per Hectare	Yield per Hectare(Q)	Price per Quintal (Rs.)	Gross returns per Hectare	Net Returns per Hectare	B:C Ratio (6/2)
74776	345 bags per hectare (1 bag =55 kgs)	680	325000	170112	2.25

Source: Directorate of Economics and Statistic, U.P

4.2 Supply Chain Analysis of Cash Crops in Agra District

The supply chain has a flaw: it's a multi-tiered marketing channel that lacks the necessary infrastructure. In order to have an efficient supply chain, all layers of infrastructure must be strengthened, including input distribution, credit, irrigation, procurement, post-harvest losses, cold store chains, processing units and marketing tactics, storage plants, and marketing information.

The horticulture sector's growth potential is being harmed by a lack of infrastructural improvements to boost efficiency and supply chain links. The availability of inputs on

a timely basis, as well as the establishment of a well-organized input market infrastructure for storage and delivery, can boost horticultural crops output. The creation of a cold chain network will aid in the reduction of fruit and cash crop post-harvest losses. Improved post-harvest management translates to increase per-unit productivity. The cold storage chain for refrigerated truckers procuring food from the orchard gate, pre-cooling chambers, cold space for porting and grading the produce, and refrigerated trucks for moving the produce to market distribution all demand investment. This chain expansion necessitates a significant investment in technology, infrastructure and upkeep. The price received by the grower is only roughly one fourth to half (1/4 to 1/2) of the retail price paid by the consumer due to supply chain deficiencies.

The economics of the chosen crop revealed that all farmers participating in its production were receiving the anticipated returns, both in terms of absolute value and in terms of rupee value. However, the main issue that farmers have had with all crops has been their perishability and a lack of enough infrastructure to maintain storage quality until it reaches the end consumers, or at least until the supply leaves the farmer-producer level.

4.2.1 Innovative Model for Potato Supply Chain

Varied crops had different innovative marketing systems, as did crop to crop and functionaries to functionaries.

In the case of potatoes, the new marketing method mostly took place from the producer to the wholesalers and finally to the customers via Self Help Groups (SHGs). Farmers rely on wholesalers to sell their produce since it is more profitable for them. In the

potato harvest, SHGs in all the Bazars of Uttar Pradesh city marketplaces looked after the consumer's interests.

Supply chain development is a novel strategy that differs significantly from the existing fragmented traditional markets. When a new system is being installed, there may be a number of obstacles to overcome. Certain elements relevant to the marketing of horticultural products must be examined, as shown below.

- Policy environment
- Developing linkages with growers
- Coordination with growers
- Procurement
- Post-harvest management

The retail industry will be responsible for developing contemporary value chains. It is necessary to make some financial investments. The government should foster the formation of such chains, and some of the activities that will be required are as follows:

- Creating an environment that encourages private sector investment.
- To maintain product quality, criteria are established.
- Infrastructure, competent people, and post-harvest management
- Development of ties between small and marginal farmers and the retail sector on the one hand, and the retail sector on the other.

All of the above efforts to kickstart the retail revolution is likely to have far-reaching consequences for traditional market stakeholders such as producers, wholesalers, and merchants. It could also help small businesses. Naturally, the magnitude of the impact will be determined by the share of organised retail and the participation of small and marginal farmers in the production of these specific horticulture commodities.

The most crucial factor that should be given first and foremost in most people's minds is price stabilisation. At the moment, the policy is focused on a few key commercial crop crops, particularly potatoes. Other fruits, cash crops, and commercial flower crops should be included. This approach naturally aids the grower in obtaining a higher market price for his produce, while simultaneously benefiting the customer.

4.2.3 Role of market functionaries and intermediaries

In the consumer rupee, there are a variety of distinct player shares. When opposed to private trade, the grower's share is higher when the fruit is sold through a cooperative group. At the primary level of marketing, there is usually no intermediary, thus the growers market the produce themselves at the wholesale market. Market functionaries such as village merchants, village contractors, and others may be involved as mediators in the case of other commodities.

Growers' familiarity has been a significant criterion in deciding the agency of sale, i.e. the commission agent, and two-thirds of growers supply to the commission agent based on familiarity. During transactions, non-regulated producers such as s and s are not weighed at all. They may require truck loads from both grower-suppliers and pre-harvest-contractors. Their produce, on the other hand, is weighed and sold by retailers at the retail level.

The commission agent's main job is to act as a middleman between the seller and the buyer, and some of them also serve as assemblers and wholesalers.

Although, selling on credit may result in a bigger profit margin for commission agents and merchants, this highlights the market's economic inefficiencies. Wholesalers and dealers from different areas or states, who are followed by retailers, are sometimes

involved as intermediates at the wholesale market. The following are some common marketing strategies.

Up to Wholesaling

- Grower -----> Commission agent
- Grower ----- > Village merchant/Pre-harvest contractor > Commission agent

After Wholesaling

- Commission agent ----- > wholesaler/Re-wholesale ----- > retailer/hawkers> Consumer.
- Commission agent ----- > Retailers > Consumers.
- Commission agents -----> Hawkers-----> Consumers

4.2.4 Marketing channels involved in supply chain of potatoes in study area

The data related to the number of farmers adapted by different supply chains for potato crops was presented in the table along with relevant flow charts showing the path of the produce connected to the consumer from the producer.

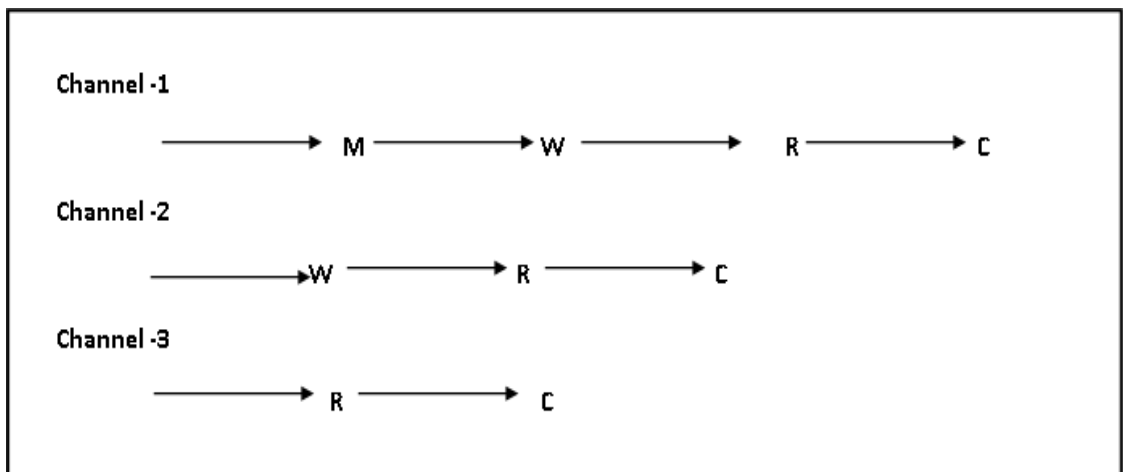
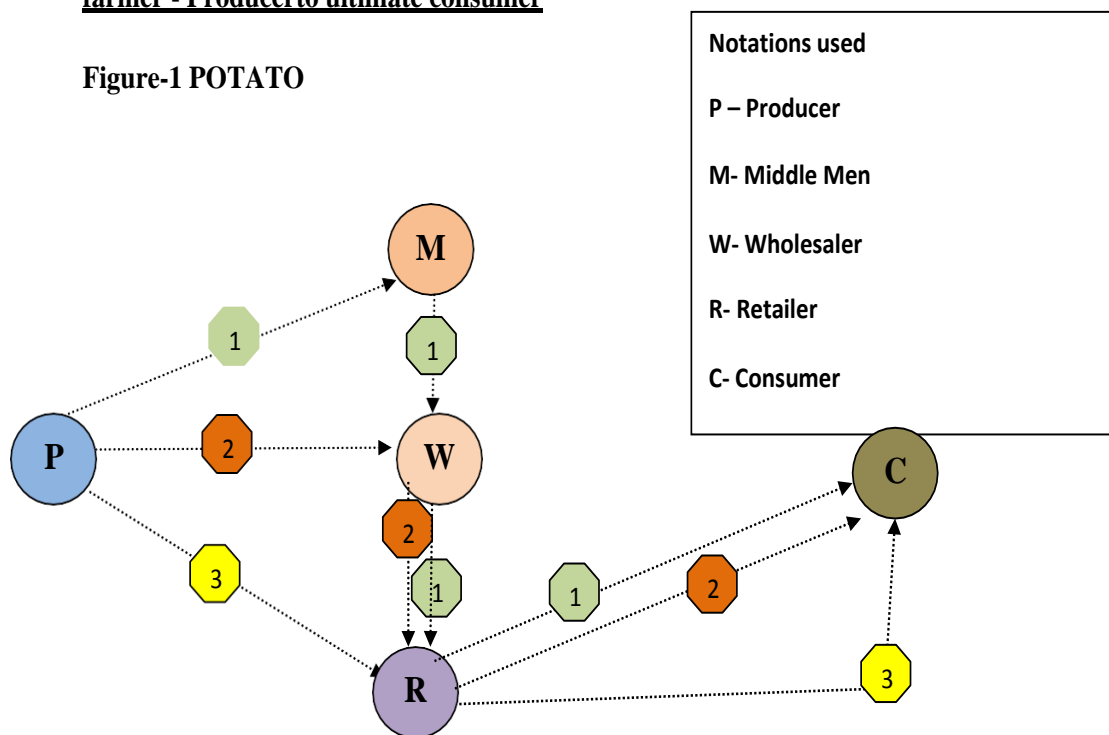
Table 4.6: Crop wise sample farmers preferred market channels in the existing supply chain system

Particulars	Supply Chain	Potato
Channel 1	P-M-R-C	10
Channel 2	P-M-W-R-C	9
Channel 3	P-R-C	38
Channel 4	P-W-R-C	43

Potato growers favoured supply networks that ran from producer through wholesaler, retailer, and customer. Producer, middleman, wholesaler, retailer, and consumer chain were all favoured by a small fraction of the farmers in the survey. Producer, merchant, and consumer were the three potato channels regarded as being very intriguing. Where retailers play an important role in the marketing of potato products and assist farmers in obtaining a better price for the product across the supply chain.

Supply chain Network depicting selected crops produce movement from farmer - Producer to ultimate consumer

Figure-1 POTATO



4.2.5 Quantity of produce moved through different channels

The channel wise quantities dealt under different supply chain systems are presented in the Table 4.7

Table 4.7: Quantities handled in different supply chains in kgs per day

Marketing channel	Potato
P-M-R-C	10
P-M-W-R-C	24520
P-R-C	19657
P-W-R-C	15072

The multi-channel system has handled the highest volume of produce (24520 kgs/day) followed by the producer–retailer–consumer channel (19657 kgs/day) and this channel was preferred very much in the supply chain system by the producer farmer.

4.3 Marketing of Cash Crops

With the creation of bazars, the selling of cash crops in Uttar Pradesh has taken a positive turn, with the goal of assisting cash crop growers to maximise their profits. With the entry of corporate bodies, this public investment impacted private investment in cash crops marketing. Because of the high level of competition in the perishable market, fresh and perishable commodity producers, particularly farmers, are getting a fair price for their precious produce. Transport, loading/unloading, market charge, and commission are some of the costs associated with the marketing of cash crops and fruits. The cost shares of different commodities show a lot of variety.

This was primarily owing to the high transportation costs paid by the producer farmer who was positioned distant from the markets. In the case of locally manufactured goods,

transportation costs were the most important factor. Because there were common rules for collecting such charges in the previous marketing system, the variances in the share of other costs such as commission, loading/unloading, market fees, and so on for different commodities were not great.

Retailers' part of overall horticulture product marketing costs may be dominated by middle-man commissions, followed by transportation costs. In some circumstances, retailers do not have to pay a fee to wholesalers for commodities sold since they buy directly from the cultivators, but this is a rare occurrence.

Farmers have traditionally relied significantly on middlemen, especially in the marketing of fruits and cash crops. The efficiency of horticultural produce marketing has been a source of great concern in recent years. It is believed that low marketing channel efficiency, along with inadequate marketing infrastructure, will result in not only high and volatile consumer costs, but also only a small portion of the consumer rupee reaching the grower. It may also lead to a decline in quality and a regular mismatch between demand and supply over time, resulting in price volatility. As a result, current marketing techniques, seasonal phenomena, physical market infrastructure, existing market channels, and the price spread of these fruits, cash crops, and flowers are all addressed in this research.

Some key recommendations must be examined in order to improve the marketing of these horticulture products. To begin, it is critical to regulate more markets and place them under the control of market committees. Second, it is critical to encourage the practise of open auction in marketplaces, as well as to enforce the norms or laws that govern it. Third, increasing the number of buyers and sellers in wholesale markets is

critical in order to promote healthy competition in ideal market conditions and greater price realisation for growers and cultivators.

Improvements in market infrastructure, such as cold storage, storage facilities, better weighing facilities, better mechanical loading and unloading facilities, proper stalls, good road links, and so on, would be beneficial to improving marketing efficiency in addition to the aforementioned measures. Finally, the market information system, which makes the most up-to-date and comprehensive market information available to all market participants via the internet, on-line marketing, and other methods of communication, requires special attention.

4.4 Marketing Cost and Margins

The total cost incurred by supply chain participants to move a product from various levels to its final destination is referred to as marketing cost. Packing, storage, transportation, and commissions to be charged and incurred by the intermediaries are the most common marketing cost items. The market cost scenario for the selected crop has been presented in a table and examined.

Table 4.8: Marketing cost and Marketing Margins

S.no	Name of the Crop	Potato		
	Item	Unit	Cost	% Consumer Price
1	Farm gate price at village	1Q	660	46.35
2	Sorting	1Q	10	10
3	Packing	1Q	93.28	6.80
4	Transport	1Q	27	2.05
5	Others	1Q	26	2.05

S.no	Name of the Crop	Potato		
	Item	Unit	Cost	% Consumer Price
6	Total marketing cost	1Q	148.3	10.01
7	Farmer's selling Price to local	1Q	728	51.75
8	Assembly Trader at rural market	1Q	535	65.75
9	Sorting	1Q	10	10
10	Packing	1Q	97	6.85
11	Storage	1Q	10	10
12	transport	1Q	30	2.2
13	Total marketing cost	1Q	128	8.16
14	Marketing	1Q	28	1.70
15	Sorting	1Q	10	10
16	Packing	1Q	10	10
17	Storage	1Q	30	1.48
18	transport	1Q	27	1.90
19	Market fee	1Q	6	0.39
20	Total marketing cost	1Q	55	3.54
21	Marketing	1Q	987	4.56
22	Wholesalers price to retailers	1Q	960	81.06
23	transport	1Q	28	1.48
24	Packing	1Q	17	1.1
25	Total marketing cost	1Q	34	2.86
26	Marketing margin	1Q	18	1.1
27	Retailers price to consumer	1Q	136	100

According to the potato crop data, the farmer paid 11.01 percent in marketing costs such as packing, transportation, and other expenses to get the goods to local assemblers and traders in rural marketplaces. The marketing cost was 9.16 percent of the consumer rupee at the wholesale level, 3.67 percent at the retailer level, and only 2.57 percent by the time it reached the customer. The intriguing and striking fact was that compared to other players in the market, the farmer producer of potato crop was incurring the greatest marketing cost in consumer rupee. Furthermore, the statistics revealed that as compared to wholesalers and commission brokers, the market cost spent by retailers was the lowest. This was mostly due to the fact that, due to the quick moving nature of the product and its variable price situation, retailers desire to sell out the product with the least amount of storage time possible, resulting in a low marketing cost and marketing margin. The marketing system's efficiency is determined by the marketing costs and margins between different intermediaries. When market cost is low and margins are high, the market is said to be efficient. Table 4.9 shows the information on marketing margins and costs.

Table 4.9: Marketing cost and Marketing Margin of Selected Cash crops

(Rs/q)	Potato	
Item	Cost	% Consumer Price
Farm gate price	680	49.35
Marketing cost		
Producer	140.2	11.01
Wholesaler	130	9.16
Retailers	52	3.66
Total marketing cost	328.4	24.83

Marketing margin		
Assembler/Trader	27.24	1.78
Wholesaler	72	5.48
Retailer	12	1.1
Total marketing	113.2	8.47
Consumer price	1280	100

In the instance of potatoes, the marketing cost was 24.83 percent, with the producer farmer accounting for 11.01 percent and the wholesaler accounting for 9.16 percent. With a marketing margin of 5.48 percent in the total marketing margin of 8.47 percent, the wholesaler was earning a greater proportion of advantage in the potato crop. Ananth (1996), Sandip and Abhirup (2003), Hatai et al. (2007), Nikam et al. (2007), and Brijbala (2007) all reported similar trends (2009).

4.5 Price Spread under Different Channels

In the case of perishable agricultural commodities, it is widely believed that the price spread is wide, causing the consumer to pay a higher price while the producer receives a smaller share of the customer's rupee. As a result, price spread was investigated in order to assess the current state of potato marketing.

For all of the selected crops, data on the price received by the farmer/producer and the price paid by the consumer has been calculated using different supply chain systems for the sample farmers. Crop wise information on market cost and margins under various supply chains to various intermediaries incurring costs and making margins was presented.

4.5.1 Potato

The price spread for the potato crop collected under various supply chains systems revealed that marketing margins at wholesalers and retailers, as well as market cost, were rather large at the intermediary level. The data backs up the claim that intermediaries play a critical role in achieving higher margins for them than potato growers.

Table 4.10: Price Spread of Potato (per Kg.)

Particulars	Potato			
	P-M-R-C	P-M-W-R-C	P-R-C	P-W-R-C
Price received by the farmer	10	6.25	6.6	6.3
Cost incurred	10	1.23	1.45	1.8
Margin	10	1.25	2	2.1
Wholesaler's purchase price	10	7.5	10	8.4
Cost incurred	10	10	10	10
Margin	10	1.5	8.6	1.8
Retailer's purchase price	10	9	8.6	10.2
Cost incurred	10	2	1.85	1.5
Margin	10	4.27	4.9	3.7
Price paid by the consumer	10	13.27	13.5	13.9

While transporting the produce from the producer to the consumer, each intermediary agency will receive its fair part. For their function and role, each middleman will receive a portion of the consumer rupee. As a result, the data was reviewed, and the proportion of share taken by each agency for their role in moving food from producer

to consumer was estimated. Table 4.11 shows the data on different agencies' crop shares.

Table 4.11: Share of different agencies during marketing of selected crops (%)

S.No.	Particulars		Potato
	Agency	Function	Share in final price
1	Retailers	Retailing	71.06
2	Wholesalers	Breaking bulk	61.39
3	Commission agent	Market/making	52.75
4	Trader	Packing/transportation/making	48.35
5	Commission agent	Market/making	10
6	Large farmer	Consolidation	54.96
7	Small farmer	Production	40.35
8	Consumer	Price	328.9

The most surprising characteristic of the data was that retailers had the highest share of all the crops studied, followed by wholesalers, traders and finally farmers. As in the supply chain system's downward sequence, this is quite rational and true. Retailers had the highest share of the supply chain system, followed by other agencies. Farmers' share of consumer rupee was low in all crops for a variety of reasons, including insufficient negotiating power, low product retention capacity, illiteracy, good market outlets, and adequate incentive in the form of price support and appropriate storage facilities for perishable goods.

Karam et al. (1996), Dahiya et al. (2002), Hasimranjeet et al. (2007), Shelke (2009), Reddy et al. (2012), and Sidhu et al. (2012) all reported similar findings in their investigations conducted at different location.

4.6 Determination of Marketing Efficiency and Factors Affecting it

4.6.1 Marketing efficiency

Marketing efficiency refers to the amount to which marketing agencies are able to convey commodities from producer to consumer at the lowest possible cost, with the best possible service, and at affordable rates.

The Acharya formula was used to demonstrate market efficiency in various supply chain systems. The market efficiency of the Producer-Retailer-Consumer channel was 90%, followed by the Producer-Wholesaler-Retailer-Consumer channel at 75%, and the Producer-Middleman-Wholesaler-Consumer route at 75%. According to the data (Table 4.12), the market efficiency of supply chain systems decreases as more intermediaries are included, and vice versa.

Table 4.12: Measurement of Marketing Efficiency of Potato under different marketing channels

S.N.	Particulars	Unit	Channel 1	Channel 2	Channel 3	Channel 4
			P-M-R-C	P-M-W-R-C	P-R-C	P-W-R-C
1	Retailer's sale price	Rs/q	10	1200	1244	1145
	(RP)					
2	Total marketing costs (MC)	Rs/q	10	126	98	90
3	Total margins of intermediaries	Rs/q	10	602	650	730
	(MM)					

S.N.	Particulars	Unit	Channel 1	Channel 2	Channel 3	Channel 4
			P-M-R-C	P-M-W-R-C	P-R-C	P-W-R-C
4	Price received by	Rs/q	10	632	670	665
	farmer (FP)					
5	marketing system (1-4)	Rs/q	10	533	330	495
Index of Marketing Efficiency						
6	Acharya's method	Ratio	10	0.75	0.9	0.8
	(MME) $[4 / (2+3)]$					

Several aspects will influence the marketing efficiency of agricultural commodities in a variety of situations. The producer earns a bigger percentage of the consumer rupee when marketing efficiency is strong. The more the manufacturer invests in the consumer rupee, the more efficient the marketing system becomes. As a result, it was decided to include some characteristics in order to investigate their impact on marketing efficiency. Table 4.13 shows the statistics linked to factors impacting marketing efficiency by crop.

The data revealed that the Potato (-0.2385) marketing margin coefficients had negative coefficients and were all significant at the one percent level of probability. When a result of the statistics, it appears that as the marketing margin increases, marketing efficiency decreases. The marketing cost data for Potato (-0.1467) revealed a negative connection, indicating that the higher the marketing cost, the worse the marketing efficiency. Other findings showed a negative association between worker salaries and

middlemen control, implying that these factors were also significantly influencing market efficiency.

The findings were rational because the variables found have a direct association that has a significant impact on marketing efficiency. Furthermore, the data revealed that the longer the market channel, the lower the market efficiency of potatoes. The results were significant, according to the statistics. The marketing efficiency of the chosen commodities was calculated using Acharya's modified approach and the shepherd formula. The net price obtained by farmers was computed using Acharya's modified method by subtracting transportation costs plus the value of loss sustained by farmers (during the transit of commodities to the market) from the absolute price received by the farmers. Estimated marketing efficiency is an index, and the higher the index value, the more efficient the market. Basu (2010) and Sidhu et al. both found similar results (2012).

Graph 4.2: Estimation of marketing efficiency of major marketing channel

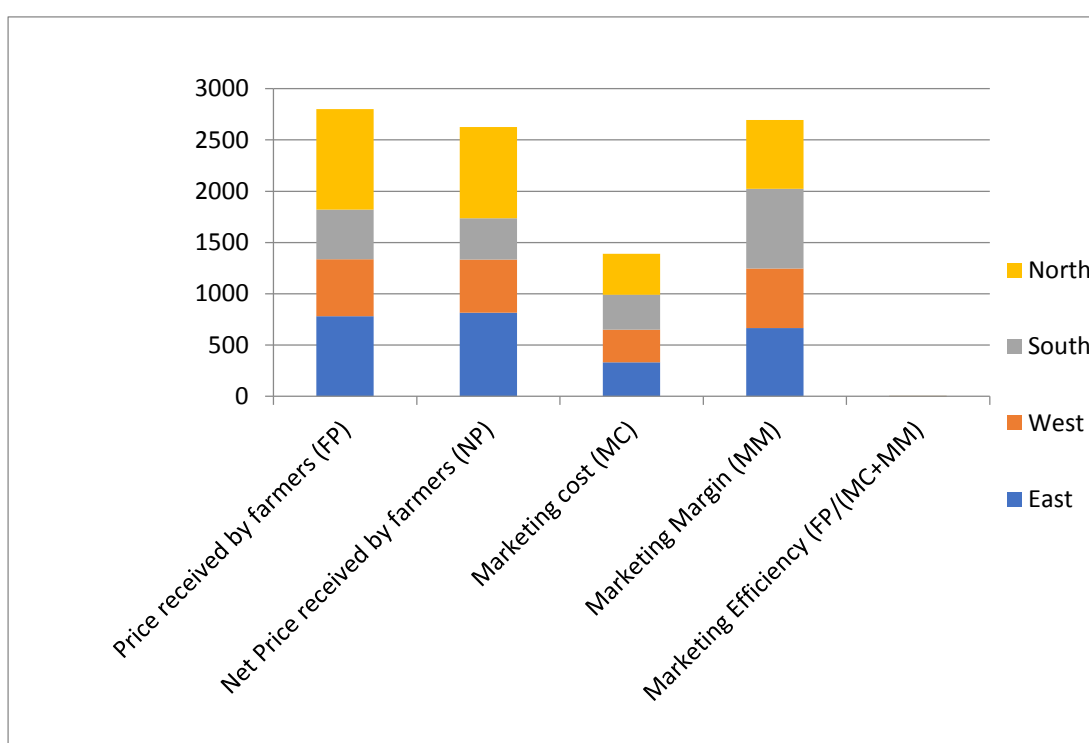


Table 4.13: Estimation of marketing efficiency of major marketing channel

S.no	Particular/Commodities	East	West	South	North
1	Price received by farmers (FP)	780	556	485	980
2	Net Price received by farmers (NP)	815	520	400	890
3	Marketing cost (MC)	330	320	340	400
4	Marketing Margin (MM)	665	580	780	670
5	Marketing Efficiency (FP/(MC+MM))	0.78	0.56	0.35	0.8

4.6.2 Factors influencing the Marketing efficiency, Margins and Cost

Marketing Efficiency-f= (x/lxn)

These chosen crops are noted for their perishability and seasonality in plain sight, which has manifested itself significantly in these crops. According to the report, the extent of contract between farmers and commission brokers is low and has to be significantly improved. It also revealed that the market's open auction practise was very low, and that there was a lot of room for improvement in market efficiency.

After that, the current study discovered that the farmer's portion of the consumer price is only 48% for cash crops and 37% for fruits. Furthermore, this explicit cost accounts for just a small portion of the price difference between the farmer and the consumer, with the profit margin ranging from 80 to 90% of the difference. Despite the presence of marketing cooperatives, normal markets, and Rhytu bazaar, Super markets in the marketing supply chain system, the marketing system was rather inefficient.

As a result, measures to improve market efficiency should include the adaptation of open auction measures to increase the number of buyers and sellers in the market, improvements in market infrastructure such as go-downs (storage facilities),

mechanically weighing facilities, loading and unloading facilities, cold storages, and improved transparency through supervision and making up-to-date market information available through electronic media, intranet, and other means. Sidhu et al. (2012) found a similar pattern of results.

Table 4.14: Factors influencing the Marketing efficiency, Margins and Cost

Factors	Potato		
	Coefficient	't' value	Coefficient
Marketing cost x1	-0.1564	3.80**	-0.0670
Marketing margin x2	-0.2384	38.190***	-0.1040
Transport cost x3	0.0004	0.468	0.0030
Open market prices x4	0.1217	27.088***	0.0540
Labour wages x5	-0.0002	0.487	0.0005
Controlling middlemen x6	-0.0018	0.525	-0.0110
Volume of the produce handled x7	0.0007	0.040	0.0001
Presence of cold storage facilities x8	0.0003	0.060	-0.0030
Length of the market channel (No. of market intermediaries) x9	-0.010	0.720	-0.0420
Existence of competition in selling x10	0.0037	0.260	0.012
Nature of produce (perishable/semi-perishable) x11	0.0020	0.140	-0.0015

4.7 Constraints Analysis in Marketing Of Potato

The constraints in potato marketing were ranked using Garrett's ranking technique. The percent position was calculated using Garrett's method. By referring to Garrett's table, these were transformed into scores. The mean score values were calculated, and the restrictions with the highest score value were determined to be the most critical. The analysis was done separately based on the opinions of famers, wholesalers, and retailers.

For numerous constraints, both Garrets and regular rankings were examined, and it was discovered (Table 4.15) that the Garret ranking came out on top for the constraint Malpractices in auction, whereas the normal ranking suggested Faulty weighment. In the eyes of farmers, normal ranking indicated second place in the event of a constraint linked to facilities for farmers to stay in the market, and second place in the eyes of wholesalers for the same constraint. Wholesalers attributed the highest Garret ranking to a shortage of storage facilities. According to the Garret rating, retailers believe that the lack of marketing credit is a serious barrier for the potato production.

The second constraint in the order recognised by the farmer, according to the Garratt Ranking, is compulsory sales to pre-harvest contractors when there is insufficient market, although the typical ranking suggested by the retailer is 12th position. Anil and Arora (1999), Pandit et al. (2003), Abong et al. (2010), Jadav et al. (2011), and Sharma et al. (2011) all report similar restrictions.

Table 4.15: Constraints perceived by the farmers, wholesalers and retailers in marketing of Potato

Constraints	Farmer		Wholesalers		Retailers	
	Normal Ranking	Garret Ranking	Normal Ranking	Garret Ranking	Normal Ranking	Garret Ranking
Forced to sell to pre-harvest contractor due to	3	8	1	3	12	2
Non-availability of marketing credit	12	10	3	7	6	1
Faulty weighment	1	11	4	11	2	5
Very high commission rates	4	7	5	9	3	7
Commission charged more than once	5	9	6	10	4	9
Malpractices in auction	11	1	12	8	5	8
Presence of exploitative middlemen	7	5	9	12	1	12
High Market Fee	8	4	10	6	9	4
Practice of bribing at the market	9	2	8	5	7	6
Inadequate facilities at the market	10	3	11	2	11	10
No storage facility	6	6	7	1	10	3
No facilities for personnel stay at the market	2	12	2	4	8	11

4.8 Strategies of cost reduction in supply chain

The potato supply chain is a complicated network involving a large number of intermediaries for the movement of produce from framers to consumers, involving a high amount of financial inflow, but the producers' share of consumer money is still low and consumers are paying high prices for the products. Therefore, the following strategies of cost reduction will help producers to earn larger profits and consumers pay lower prices for the products:

- Governments should either build warehouses for storage of the farmer's produce in every village or provide cost cover to private warehouses so that farmers have to pay minimum charges for storage.
- Proper condition of roads and their connectivity to mandis for selling their produce.
- Government mandis should be regulated and should decide MSP for the horticulture products sold.
- There should be no toll fee on horticulture products.
- The government should educate their farmers with new techniques and technology for growing and selling their produce.
- There should be a minimum tax on agriculture tools, machinery, seeds, fertilizers, etc.
- Corporate farming should be promoted so that farmers can directly sell their produce directly to retailers.
- All mandis should be properly connected to internet so that farmers can sell their product they find suitable to sell.

Chapter 05
Conclusion

CHAPTER 05

CONCLUSION

This study looked at the arrival and price of potatoes in the Agra market over the last seven years. From 2013-14 to 2019-20, the area and production of potato in a selected district increased at healthy rates of 7.7% and 7.1 percent each year, respectively. However, in order to raise potato producers' income, production must be improved. The studies also revealed that market arrivals and prices of potato in the Agra market varied from year to year, although both grew at a good rate. Potato arrivals climbed dramatically in December and reached their highest level in January, whereas they were at their lowest in October. As a result, market prices were higher in October and November and lowest in February. Arrivals were low from June to November and high from December to May, according to seasonal indexes of potato arrivals and prices. During the months of January, February, and March, there was a strong correlation between market arrivals and pricing. Farmers must compare potato prices across the market before selling their harvest in order to maximise their profits. Furthermore, they can stockpile potatoes in cold storage throughout the harvest season when prices are low and sell later when prices start to rise.

With specific reference to Potato, the many factors affecting the selling of cash crops and fruits in Uttar Pradesh can thus be enumerated and examined. The demand for market intermediaries was shown to differ depending on the type of product. While potato growers prefer to rely on market middlemen such as wholesalers and commission agents, the growers' produce is frequently marketed effectively and profitably by the growers directly. This was likely due to the fact that they were sold in

elitist niche markets that were not accessible to growers/producers for direct retail, and in the case of potatoes, the bulk handling and storage requirements were probably better handled by middlemen with access to transportation and mass storage infrastructure. Wholesalers frequently buy from commission agents and then send the produce to hawkers and merchants, therefore there was often more than one intermediary. Some farmers/growers were selling straight to corporate representatives, which was an interesting occurrence of Corporate Farming.

In terms of supply chains, the favoured channels in the potato industry were producer-wholesaler-retailer-consumer (PWRC) and, less frequently, producer-retailer-consumer (PRC); relatively few chose the long route of producer-middlemen-wholesaler-retailers-consumer (PMWRC). Producer-middleman-wholesaler-retailers-consumers (PMWRC) was the preferred supply chain for es, followed by producer-wholesaler-retailer-consumer (PWRC), producer-retailer-consumer (PRC), and Reliance. Producer-middlemen-retailer-consumer (PMRC), producer-wholesaler-retailer-consumer (PWRC), and producer-retailer-consumer (PRC) were the supply chains for baby corn (PRC). Producers of preferred producer-wholesaler-retailer-consumer (PWRC) supply chains followed a similar pattern in the following years, with producer-middleman-wholesaler-retailers-consumer (PMWRC) supply chains being the most popular (PRC). As a result, intermediaries continue to play an essential role, despite manufacturers' efforts to decrease their involvement in order to increase profits.

As a result, the majority of potato harvests were sold through PMWRC and PRC; in terms of marketing costs, the potato farmer was found to have the greatest marketing expenditures compared to the other crops evaluated. Furthermore, the market costs experienced by retailers were clearly lower than those borne by wholesalers and commission agents. This was mostly due to the fact that, due to the quick moving nature

of the product and its variable price situation, retailers desire to sell out the product with the least amount of storage time possible, resulting in a low marketing cost and marketing margin.

In terms of price spread, it was clear that marketing margins at wholesalers and retailers, as well as market cost, were rather substantial at the intermediary level in the marketing of all crops. The data backs up the premise that middlemen play a critical role in achieving higher margins for all crops than producers. When compared to manufacturers, wholesalers and retailers had a far better price spread. The area under has decreased dramatically, and the farmers that produce this commercial crop are suffering as a result of a lack of profit and incentive. When it came to the share of different agencies in the marketing of fruits and cash crops, the retailer had the biggest share, followed by wholesalers. In terms of market efficiency, it was clear that the producer-retailer-consumer (PRC) supply chain model had 90 percent efficiency, followed by the producer-wholesaler-retailer-consumer (PWRC) supply chain model with 75 percent efficiency, and the producer-middleman-wholesaler-consumer (PMWC) supply chain model with 75 percent efficiency. According to the data, the lower the market efficiency, the more intermediaries there were in the supply chain systems. For instance, in the case of, the participation of a corporate entity (Reliance) between the producer and the consumer in the intermediary marketing system has shown high efficiency of up to 100%. However, because this was such a popular fruit, marketing efficiency in all supply chain systems was quite high. Farmers' main restraints, according to various parties, were auction malpractices and inaccurate weighing; wholesalers blamed insufficient storage facilities, and retailers highlighted exploitative middlemen and poor marketing facilities. Farmers also complained about exorbitant market costs.

As a result, marketing costs, marketing margins, transportation costs, labour wages, and the length of the marketing channel all have a negative impact on marketing efficiency. According to the research, open market prices have a favourable impact on market efficiency.

5.1 Policy Implication

The development of a robust research infrastructure for horticultural crops has aided in increasing output. In recent years, the expanded involvement of research has also aided in the maintenance of a sustainable horticulture. Institutional support, on the other hand, must be innovative. For example, production under the contract system of farming guarantees growers a guaranteed income and eliminates or reduces the risk of product marketing. Furthermore, there may be an opportunity to export the product to other nations, with the farmer receiving a portion of the earnings.

In the light of shifting global policy environments, identifying Agri-export zones would aid in addressing challenges of produce marketing.

It is vital to develop some critical management inputs, particularly supply chain management, in collaboration with other stakeholders, as well as efficient vertical and horizontal integration. As a result, it should be prioritised in terms of horticultural products.

As a result, policy-relevant research on issues such as genetic engineering, biotechnology, integrated and sustainable agricultural systems, post-harvest handling storage, marketing, and consumer education is just as vital as policy-relevant research. These technological and associated institutional developments outlined above naturally become focal points for the horticultural sector's future development. It also increases

the likelihood of exporting high-quality horticulture products. All of these efforts, over time, not only contribute to the overall expansion of the economy, but also to the creation of jobs and the upliftment of small and marginal farmers.

As a result, the government should foster an atmosphere that encourages farmers and the organised sector to work together in a mutually advantageous manner. Along with infrastructure investment, the growth of extension activities and connections with farmers is another major area where the government can exert influence.

5.2 Limitation of the Study

It is because of time constraints, investigation is restricted and limited to a small geographic region. As a result, the current study had intrinsic limitations, such as wholesalers' reluctance to provide accurate information, farmers' lack of documented information, and the data collected was based on recall. The research area's farmers are mostly small and medium-sized landowners. Processing industries are few and modest in the study area. As a result, making exact generalisations about the study's implications would be challenging. Within these constraints, the study's findings, interpretations, and conclusions can be best understood.

Chapter 06
Suggestion &
Recommendation

CHAPTER 06

SUGGESTION & RECOMMENDATION

Supply chain efficiency can be improved by following suggestions:

- The entire supply chain can be benefited by grouping farmers into large producer groups. The better positioning of these organisations in terms of lower processing costs, combine pre- and post-harvest management and increased bargaining power.
- Farmers should be educated and trained in post-harvest handling of potatoes, such as cleaning, grading, and packing in gunny bags weighing no more than 40 kg, in order to maintain good quality and obtain good prices.
- Direct dealing and selling by farmers and avoiding numerous intermediaries in the supply chain, will result in higher income for farmers.
- Encourage the organised retail growth. Farmers will be able to obtain modern farm technology, quality input supplies and timely assistance at manageable interest rates through the organised retailers, which will directly work with them to enhance yields.
- Through a simple tax system and other credit incentives for encouraging the processing industry.

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Appendices

A Study of Supply Chain Management (SCM), Marketing of Cash Crop and Evaluating Strategies for Cost Reduction in Supply Chain with Special Reference to Uttar Pradesh

Profile - Farmers

A. Basic Profile:

- 1- Name: _____
- 1.1- (a) District: _____ (b) Block: _____
(c) Village: _____ (d) Tehsil _____
- 1.2- Gender: _____ (1-Male,2-Female)
- 1.3- Age: _____
- 1.4- Education: _____ (Illiterate-1, Primary-2, Upper Primary-3, High School-4, Intermediate-5, Graduate-6, Post Graduate-7, Technical Education-8)
- 1.5- Social category : _____ (Gen-1, OBC-2, SC-3, ST-4)
- 1.6- Farming Experience (Years) _____
- 1.7- (a) Have you ever taken agriculture related training? _____ (Yes-1, No-2)
(b) If yes which type of training you have taken: _____ (Production related-1, Waste minimization-2, Post harvest management-3, Marketing-4)
(c) Training period _____ (3day-1, one week-2, 15 days-3, >15days-4)
(d) Organizing agency: _____ (KVK-1, Cooperative society-2, NGO-3, Other govt. organization-4)

1.8- Land detail

S. no.	Cultivable Land	Irrigated (in acre)	Unirrigated (in acre)
a)	Own holding		
b)	Lease in		
c)	Lease out		

- 1.9- Sources of irrigation: _____ (Canal-1, Tube wells-2, Pump set-3, Tank-4, Other sources-5)

B. 1. Cropping pattern for Rabi season

S. no.	Crops grown	Area (in acre) (i)	Production (In qt) (ii)
1.			
2.			
3.			
4.			

5.			
6.			

B-2. Production cost of Potato

2.1. Source of potato seed _____ (*Self stored seed-1, Buy from market-2, Govt. Dept.-3*)

2.1. a. Seed required (*per acre in qt*) _____

2.1. b. Cost of seed (*Rs/qt.*) _____

2.1. c. Total seed purchased (*in qt.*) _____

C- 1. Total cost of cultivation

S.N.		Frequency (1)	Quantity (2)	Cost (3)	T. Labors (4)		Total fuel (5)		Rent of machinery (6)	Total cost (7)
					No. (i)	Cost (ii)	Ltr. (i)	Cost (ii)		
(a)	Land preparation									
(b)	Potato sowing									
(c)	Weeding									
(d)	Herbicides									
(e)	Pesticides									
(f)	Fertilizers									
	a)									
	b)									
	c)									

C- 2. Total cost of irrigation

Frequency (a)	Total labors required (b)		Total diesel required (c)		Rent of pump (d)	Total cost (e) (b2+c2+d)
	Number (1)	Total Cost (2)	Ltr. (1)	Total Cost (2)		

C-3.Total harvesting & handling cost

		Number of labour (1)	Per labour cost (2)	Fuel / acres (3)	Fuel cost (4)	Vehicle charges for transportation (if rented) (5)	Total cost (6)
(a)	Harvesting						
(b)	Loading & unloading						
(d)	Transportation						
(e)	Total cost						

C- 4. Production details of Potato

S. no.		Quantity (qt.) (1)	Value (Rs) (2)
a)	Total production		
b)	Self consumption		
c)	Wage payment in kind to labour		
d)	Store for seed purpose for next year		
e)	Estimated loss before sale at farm level		
f)	Marketable surplus		
g)	Store for future sale		

C-5.1 Quantity of storage (in qt.) _____

C-5.2 Duration of storage (in days) _____

C-5.3. Storage cost

		Number of labour (1)	Cost/ labour (2)	Fuel (3)	cost (4)	Vehicle charges for transportation (if rented) (5)	Total cost (6)
(a)	Loading & unloading						
(b)	Transportation						
(c)	Cold storage cost (Per qt.)						
(d)	Other storage cost (Per qt.)						
(e)	Total cost (a+b+c+d)						

D- 1. Pattern of sowing

1.1 Which variety of potato you are using for cultivation: _____

1.2 Kind of variety: _____

1.3 After how many years do you replace the seeds? _____

1.4 How long you are cultivating this variety: (Years) _____

1.5 Reasons for cultivating this variety:

- (a) Disease resistance
- (b) High production
- (c) Fetch higher price
- (e) If any other (specify) _____

1.7 (a) Would you like to shift to another variety _____ (Yes-1, No-2)

(b) If yes, please specify the reason _____

1.8 (a) What are major pests which attack your crops? _____

(b) Potential loss of inaction (%) _____

(c) Time taken to destroy full crop if action not taken. _____

1.9 (a) What are the major diseases? _____

(b) Potential loss of inaction (%) _____

(c) Time taken to destroy full crop if action not taken. _____

E- 1. Input characteristics

S. no	Input	Timely availability* (a)	Source of purchase** (b)	Distances you travel for normal purchase*** (c)			Source of information (Price and use)**** (d)
				Distance (Km) (i)	Time (hr)(ii)	Cost (iii)	
(1)	Seed						
(2)	Fertilizer						
(3)	Pesticides						

* Available-1, Unavailable-2

** Co-operative society-1 block-2, NGO-3, Relatives -4, Agri-traders -5, District Horticulture Office-6, others-7

*** <1km-1, 1-5km-2, 6-10km-3, 11-15km-4, >15km-5

**** TV/Radio/New-papers-1, Relatives/friends-2, Fellow farmers-3, Local input traders-4, Co-operative society-5, Block-office-6, NGO-7, Mandi-8, Market-9, Company representative-10, Own experience -11

F-1(a) Are you interested to increase the area under potato in future? (Yes-1, No-2) _____

(b) If yes, what kind of supports do you want? (Ranking)

Input subsidy support Marketing of potato Price support Storage support
 Any other (Specify) _____

G. 1. Marketing characteristics

1.1. Sale and cost characteristics

S. no.	Place of sale	Farm gate (1)	Trader in local mandi (2)	Big trader (3)
(a)	Quantity (<i>in qt.</i>)			
(b)	Price (<i>Per qt</i>)			
(c)	Cost of transportation (<i>Rs. / trip</i>)			
(d)	Cost of loading unloading (<i>Rs. / trip</i>)			
(e)	Frequency of sale			
(f)	Mode of payment? (<i>Cash -1, Credit-2</i>)			
(g)	If credit, time period			

H- 1. Financial characteristics

H-1.1 (a) Have you taken loan in last three years _____ (*Yes-1, No-2*)

(b) If yes

	Loan amount (Rs) (a)	Source of loan ¹ (b)	Collateral details ² (c)	Interest rate per annum (d) (%)
i.				
ii.				

¹Source code :(1- PSB, 2-RRB, 3-Co-ops, 4-Pvt Bank, 5-KCC, 6-SHG, 7- Friends &relatives 8- Money lenders,)

²Collateral code :(1-Land, 2-House, 3-Gold, 4-Bank FD, 5-Any Other

H-1.2. If money lender, advantage of taking loan from money lender _____

(*Easily available-1, No collateral-2, High amount of loan-3, No need of documentation-4, flexible repayment-5*)

I. 1. Risk assessment:

S. no.	Input related risk	%
a)	Fluctuation in price of seed in a year	
b)	Poor quality of seed (<i>% not germinating</i>)	
c)	Not availability of seed in time	
d)	Fluctuation in price of fertilizer in a year	
e)	Not availability of fertilizer in time	
f)	Fluctuation in price of pesticides in a year	
g)	Not availability of pesticides	
	Production related risk	
h)	Production fluctuation across season	
	Marketing related risk	
i)	Price fluctuation of potato across the month	
j)	Not able to sale the output	

J. 1. Supply chain characteristic

J-1.1 Mode of supply chain channel used in moving produce to market by farmers

- (a) P-APMC-W-R-C
- (b) P-APMC-SM-C
- (c) P-APMC-PR-C
- (d) P-W-R-C
- (e) P-R-C

J-1.2 How much quantity of produce is taken to market through above mentioned channels in qt.? _____

K.1. APMC Mandi Characteristics

K 1.1 Staff pattern at APMC Mandi

S. No	Name of the Post	Strength
1.	Selection Grade Secretary	
2.	Secretary Grade II	
3.	Secretary Grade III	
4.	Assistant Secretary	
5.	Supervisor	
6.	U.D.C	
7.	L.D.C	
8.	A.M.S	
9.	Dy. Executive Engineer	
10.	Typist	
11.	J.M.S	
12.	Attender	
13.	Watchmen	
14.	Security Guard	
15.	DEO	
16.	ETC.	

K 1.2 Market functionaries at APMC Mandi

S. No.	Name of the functionaries	Number	License Fee (Rs.)
1.	Commission Agent		
2.	Traders		
3.	Hamalies		
4.	Others		

K 1.3 Method of sale (a) Open Auction (b) Closed Tender Method

K1.4 When and how payment of sale proceeds is done? _____

K1.5 Potato MSP rate in qt. _____



A REVIEW OF SUPPLY CHAIN MANAGEMENT AND ITS SYSTEM COMPLEXITIES

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ABSTRACT

Supply chain management is a complex set of network which constitutes producers, suppliers, wholesalers, subcontractors, retailers and customers between whom material, information and money flows. The major goals of supply chain is to minimize cost through proper flow of goods and information's in the exact quantities, to the right destinations and in the accurate time to final customer leading to maximization of profits and margins. SCM is no longer related to the company itself in achieving its goals, but also its all partners are too involved concluding as value chain management in current perspective. The collective contribution of all its players satisfies the requirement for structured and judicious management of the whole supply chain. The management of these flows and exchange is becoming increasingly difficult and constitutes the main source of the supply chain complexity. In order to resolve this problem and improve supply chain performance, its structured representation is important taking into consideration it's all attributes which make it a complex system.

Keywords: Supply Chain Management, System, Complexities, Performance

Introduction

“Supply Chain Management” term was first introduced in early 1980s to explain the need for integrating major business processes and management of interconnected chains within business. SCM has become an imperative modern management model since 1990s and also became a new way of managing business and its relationships. Supply chain management is the strategic coordination of activities involved within a specific organization and processes included within the supply chain with the motive of generating values for customers and stakeholders. SCM is a interconnected network of businesses spread in huge demographical area or even the globe. It

controls overall businesses associated with the flow of products or services since beginning to the final customer. SCM operations involves areas of logistics, marketing, operations management, industrial engineering and information technology. The management of the supply chain draws from the ordering raw material, storage, finished goods, and logistics. Integration of suppliers, manufacturers, warehouses, and stores were involved properly for efficient movement of supply chain. All over the world free trade, open borders and international trade accounts into major companies issues. Industries implement new schemes and offers to attract and fulfill their customers needs, wants, desire and also tries to

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produce the best economical products in shortest time, cheaper than their competitors. The processes of achieving supply chain goals, functions and activities is not only related to company itself but also associated to all its partners in supply chain. Hence there is need of enhanced collaboration among all its partners for judicious, efficient management of whole supply chain. The concept of SCM gained its popularity because of many reasons particularly discovered its remarkable drift in international trade, time and quality based competition was given main importance and their individual contributions to maximum uncertain environment. Furthermore, today there is more focus towards quality and time considered by particular companies and supply chains in general. Delivering a defect-free product to the customer soon before time or specifically on time than its competitors is no more considered as competitive advantage merely a market demands. There is consistently fast delivery demand of products from customers, with no damage and exactly on time which enhances the coordination with suppliers and distributors. The management of both information and goods is accounted as most difficult and main component in smooth functioning of supply chain flow and also majorly contributes in supply chain complexities. Therefore supply chain can be considered as a complex system and also organization can't ignore its difficulties steadily day by day.

Literature Review

Management is on the verge of a major breakthrough in understanding how industrial company success depends on the interactions between the flows of information, materials, money, manpower, and capital equipment. The way these five flow systems interlock to amplify one another and to cause change and fluctuation will form the basis for anticipating the effects of decisions, policies, organizational forms and investment choices (Forrester 1958). Furthermore, supply chain members should work together on new product development and product portfolio decisions (Drozdowski

1986). As a philosophy, SCM takes a systems approach to viewing the supply chain as a single entity, rather than as a set of fragmented parts, each performing its own function (Ellram and Cooper 1990). In other words, the philosophy of supply chain management extends the concept of partnerships into a multifirm effort to manage the total flow of goods from the supplier to the ultimate customer (Jones and Riley 1985). Another definition notes a supply chain is the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer (Christopher 1992). In other words, a supply chain consists of multiple firms, both upstream (i.e., supply) and downstream (i.e., distribution), and the ultimate consumer. (Langley and Holcomb 1992) suggest that the objective of SCM should be the synchronization of all supply chain activities to create customer value. Authors have even conceptualized SCM differently within the same article: as a form of integrated system between vertical integration and separate identities on one hand, and as a management philosophy on the other hand (Cooper and Ellram 1993). Normally, several independent firms are involved in manufacturing a product and placing it in the hands of the end user in a supply chain—raw material and component producers, product assemblers, wholesalers, retailer merchants and transportation companies are all members of a supply chain (La Londe and Masters 1994). Lassar and Zinn (1995) suggested that successful relationships aim to integrate supply chain policy to avoid redundancy and overlap, while seeking a level of cooperation that allows participants to be more effective at lower cost levels. More recent replications of this phenomenon include the “Beer Game” simulation and research covering the “Bullwhip Effect” (Lee, Padmanabhan, and Whang 1997). SCM in operational terms involving the flow of materials and products,

some view it as a management philosophy, and some view it in terms of a management process (Tyndall et al. 1998). According to Labarthe, “Supply chains constitute an economic and social system made up of a set of inter-acting enterprises, and implementing processes of cooperation, coordination and negotiation in order to ensure their efficiency and durability in satisfying the customer demand”. Within each organization in a supply chain, a participant receives demands from the prior downstream stage and places orders with the next upstream stage to be able to supply the downstream customer demands. APICS dictionary defines supply chain as: “The global network used to deliver products and services from raw materials to end customers through engineered flows of information, physical distribution, and cash”.

Research Methodology

This paper is a review paper i.e. data is collected by going through existing literature from different paper published in different journals, websites, newspapers, books, magazines and etc. The data is collected from secondary source.

Objectives

1. To understand the concept of supply chain management and identify its scope.
2. To explain its channel complexities and related consequences.

Results and Discussion

After reviewing and studying the literature the findings of **concepts of supply chain management and identifying its scope** can be explained in the following ways:

The term “supply chain” cannot be defined universally that clarifies its exact global meaning. Some definitions adopt an enterprise, process, a product point of views. Although the literature concludes that the maximum explanations confirms some common idea like finished good or a family of finished goods mostly referred in a supply chain. Numerous of organization, enterprises, companies, dealers, intermediaries and others are involved. All of

these companies and others are interconnected by three major streams: financial flows, the information flow and physical flow. Each stakeholder perform functions of supply, transportation, production, distribution and sales. An organization is possibly engages in number of supply chains for proper functioning of organization. Certainly businesses usually strives to increase its client-organization and its products can be used for the development and enhancement of multiple final products. It generates customers advantage, accomplish targets and benefits for the organizations by minimizing its expenses, increasing efficiency, enhancing productivity, reducing warehouse costs, lowering inventories cost, decreasing cycle times, establishing better customer relationship, cut down both indirect and direct costs, developing inventory management, businesses assistance in diminishing waster and getting a high level of quality.

Moreover, some other works laid huge significance on the objective of a supply chain in initiating the concept of performance, the satisfaction of the ultimate customer leads in majorly identification of this performance. Therefore, *Michael H. Hugos* has pointed outmeasures which describes performance in the fourth edition of his guide “*Essentials of Supply Chain Management*” that companies in any supply chain must focus and make decisions collectively and individually regarding their actions in following five areas:

1. **Production:** In this master production schedules is creation which includes quality control, managing plant capacities, equipment maintenance, balancing of workload and others.
2. **Inventory:** It act as a shield against uncertainty is the basic purpose of inventory in supply chain. However, stocking inventory can be high cost because there is no defined optimal inventory levels and recorder points.
3. **Location:** The location should be cost efficient which facilitates in production, inventory storage and availability of

effective possible path for movement of goods to the final consumer.

4. **Transportation:** Airfreight and track delivery is a expensive mode but considered over shipping by sea or rail, for fast and reliable mode of inventory transportation from one supply chain to another in lesser transit times and avoid uncertainty.
5. **Information:** Producers and consumers for effective decisionsmaking uses important and necessary information like what to produce, how much, inventory location, logistics decision, product

details, feedbacks, producer details and etc.

Supply chain complexity

Complexity in supply chain can be defined as quantitative differences between actual and predicted states, which are interrelated with uncertainty or variety caused by both internal and external drivers in a supply chain system. The important source of the supply chain complexity is the management of information and material flows, due to which supply chain operations are becoming extensively difficult and complex.

Table:1 Factors Affecting in the Supply Chain Complexity

Uncertainty	Markets, manufacturing, production, deadlines, processes, customer demand and etc. are some sources of uncertainty within supply chains. The difference between the amount of information that is already available with organization and the amount of information required in performing a task by organization defines uncertainty.
Heterogeneity	The stakeholders, relationships, interactions, products, locations, items (raw, manufactured or end), processes, goals, etc. are major components which contributes increasingly all together is a characteristic of the complexity in a supply chain system.
Variance	System represents dynamical behaviour which consists of different elements or components from each other.
Scope	Nowadays companies in meeting the customers need are continuously seeking to implement new subsidiaries in search of new markets and new customers in the various other continents. As a result, supply chain becomes more complex, the number of its processes multiplies and its product lines become more diversified in its scope.
Speed	The advanced implementation of information and communication technologies, resulting in higher production speed and shorter the product life cycles . However, survival and maximization of market share, value and etc. were considered as important aims of any industries.
Multiplicity	It is related with the homogeneity or heterogeneity of a system. For example: The results of a high level of complexity in supply chain is because of a high level of diversity of any components (supplier, product, mean of transport) along the supply chain leads to system's heterogeneity.

However, all various factors contribute in complexity and has numerous drawbacks in supply chains like customer dissatisfaction, operational costs rises, delayed delivery, collaboration, inventory surplus or inventory scarcity, cooperation diminishment , supply chain partners conflicts and etc. International market globalization and the opening borders for trade also contributes mostly in the complexities of the supply chain system. In order to stay competitive in the market and meet

needs of its target audience in better way, goods management is the main aim of any industry in supply chain complexity.

Conclusions

The aim of this paper is to overview supply chain management literature, justifying its various factors, flows and system complexity that causes hinderance in its improvement. It is concluded that the supply chain systems are complex, multidisciplinary and managing them

is quite challenging. Nowadays e-commerce is currently facing huge challenges in managing all factors in supply chain system. At various stages in the buyer/supplier interface there are risks involved in supply chain management such as uncertainty of delivery timings, production break down, high logistics cost, unavailability of raw material, market share, varying customer demand and etc. The important and major challenge faced by industries is matching supply and demand in supply chain system. Although risk and uncertainty cannot be eliminated, they can be minimized is the only solution for efficient and smooth management in supply chain complexity. Global supply chains face more challenges because there are more big issues involved such as different countries have different multiple policies, currencies, legal regulations, tax laws and trading protocols. In supply chains corruption (power of public abused for private benefit) prevents them from achieving desired performance. According to IBM Global Services (2009), the most crucial challenge that has the very significant impact on supply chain is "Supply chain visibility" with 70%, then "Risk management" with 60%, "Increasing customer demands" with 56%, "Cost containment" with 55%, and ultimately "Globalization" with 43%.

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A STUDY OF ONLINE SHOPPING PROMOTION AND EMERGING TRENDS IN LIFESTYLE OF GENERATION Y IN AN ERA OF GLOBALISATION

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Prof. M.S Khan**

ABSTRACT

Online Shopping has seen remarkable boom in recent years particularly after demonetisation. The boom is because of the accelerated technology acceptance by masses which leads to extensive use and demand of devices like smartphones and tablets along with the easy access of internet through broadband, Wi-Fi, 3G and 4G etc. led to huge online consumer base. Moreover, the high internet base has assisted in their growth. Internet act as a new territory for extensive boom for online shopping, accommodate exchange of goods and services and also regulates access of customers own personal accounts online. The e-commerce technology and usage of online shopping have high domestic economic prosperity and sustainability in India. The objective of my research paper is to study the strategies followed by the online shopping promotion sites to attract increased customers. Another objective focuses on the effect on emerging trends in lifestyle of youth and also challenges faced from huge retailers & unorganised markets. The research in this paper is purely based on secondary data i.e. all information is collected from various research journals papers, articles, newspaper, websites, social media, books, magazines and etc. The research methodology is deductive in nature. The findings of my research suggest the influence of online shopping promotion and advertisement on youth which leads to increase in customers visit on their websites. It further suggests the effect of changing trends among youths due to online shopping promotion which can be achieved through deep penetrating & high promoting strategies adopted by e-commerce sites. The conclusion and suggestion of my study is that in globalisation era, youths are more attracted towards e-commerce sites and adopting & accepting changes brought in their trends & lifestyles. On other hand youth shouldn't be dependent completely on the e-commerce sites.

Keywords: E-commerce, online shopping, promotion, internet

Introduction:

Online shopping is additionally called E-commerce, E-Marketing or Internet Advertising and is a portion of electronic business and also an outcome of Information Communication Technology (ICT).

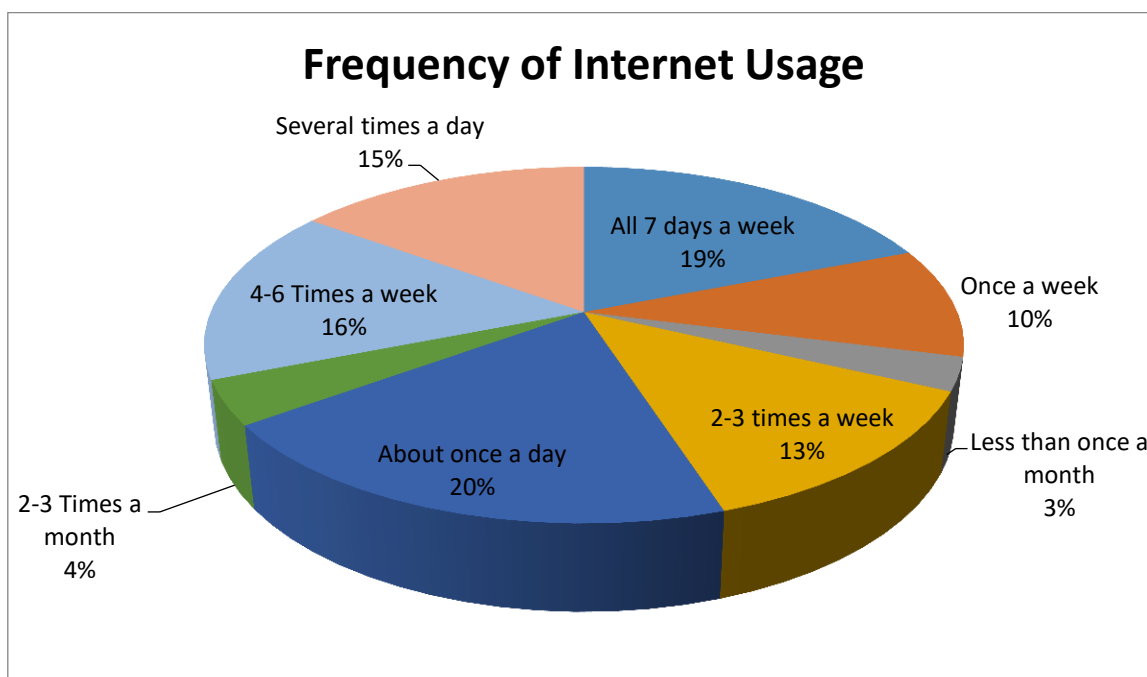
Online shopping is a trade processes through data exchange transaction of goods and services via computer networks such as the Internet. In India online shopping is getting a remarkable growth because of high usage of internet facilities,

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maximization of education standards, developing lifestyle and economic growth of the country reasons in demand of e-commerce technique and tools. India is progressively becoming the country with large number of internet literate population in the world and the internet reach is mainly driven by mobile phones, with some of the cheapest and most basic mobile phones majorly offering access to the internet. According to Telecom Regulatory Authority of India (TRAI), India's total internet usage stands up to 238.71 million as of December 31, 2013. Due to increase internet usage in India, the versatility of online shopping and better shopping experiences offered by the online shopping websites among Indians have increased rapidly. All round shopping experiences and quick developing transaction facilities is further step up opportunity from rest of the market segment. The major advantage of online shopping is that the sites provides easy, safe and

secure shopping transaction through internet i.e. their instant verification of payments done through digital wallet, debit and credit cards etc. This symbolic impact has concluded in high numbers of customers explore various fields of online shopping for their benefits. There is also a significant national consumer's in online shopping acceptance, majorly in downstream marketing, sales and other customer-oriented activities. Increasing Internet usage and availability of more transaction options boost the online shopping industry. Online shopping provides different brands under one roof at cost effective prices. Mobile acts as the major influential mode for online shopping promotion. Online shopping promotion is attracting more and more customers from Tier 2 and Tier 3 cities. Indians are additionally shopaholic like other Asian countries. There is a main growing up population in India with increased levels of disposable income.



Source:International Journal of Computer Science and Information Technologies. Vol.5(6).

Literature Review:

Blattberg and Scott (1990) defined the purchase strategy as a general buying pattern which "incorporates several dimensions of buying behaviour such as brand loyalty, private brand

proneness and deal proneness." A greater understanding of the different types of consumer responses to promotions can help managers to develop effective promotional programs as well as provide new insights for consumer behaviour

theorists who seek to understand the influence of different types of environmental cues on consumer behaviour. Blattberg et. al.(1981)find evidence that promotions are associated with purchase acceleration in terms of an increase in quantity purchased and, to a lesser extent, decreased interspurchase timing. Researchers studying the brand choice decision-for example, when promotion experience is linked to these kinds of feelings, thoughts and benefits, more favourable and positive brand associations are linked to the brand. In fact, as suggested by the number and the valence of spontaneous thoughts are better predicted by feeling responses, found promotions to be associated with brand switching. David (1971) found that promotion-prone households were associated with lower levels of brand loyalty purchasing strategy segments based on three purchase dimensions: brand loyalty, single brand, single brand shifting, many brands, type of brand preferred national, both national and private label, and price sensitivity purchase at regular price, purchase at deal price. There are other variables that may be used to describe purchase strategies, examples are whether the household purchases a major or minor share national brand, store brand, or generic, or whether it is store-loyal or not. Webster Jr. (1965) used certain segments derived from previous study and adds a purchase acceleration variable to study the profitability of product promotions. Throughout the world, consumer sales promotions are an integral part of the marketing mix for many consumer products. Marketing managers use price-oriented promotions such as coupons, rebates, and price discounts to increase sales and market share, entice trial, and encourage brand switching. Non-price promotions such as sweepstakes, frequent user clubs, and premiums add excitement and value to brands and may encourage brand loyalty. In addition, consumers like promotions. They provide utilitarian benefits such as monetary savings, added value, increased quality, and convenience, as well as hedonic benefits such as entertainment, exploration, and self-expression. According to Neslin and Shoemaker (1989) sales promotion is an activity that acts as a direct

inducement, offering added value or incentive for a product to resellers, salespersons or customers. Aake (1992) defined sales promotion as special offers which essentially aim to stimulate demand for the products. Shea (1996) has categorized the different types of consumer sales promotion techniques induced by the retailers to boost the sales and respond as Coupons, Rebates, Free trial premium, Contest, Sweepstakes and Price packs. Such activities enhance the value of product either by reducing cost or adding benefits. Pierre and Wansink (2002) reported that sales promotion techniques used by the marketer are not only effective in attaining short-term sales but are also more cost effective than advertising. Lowengart(2002) categorized sales promotions as Consumer Sales promotion and Trade Sales promotion. According to their study, consumer sales promotion refers to any short-term promotion techniques designed by retailers to enhance customer response to the products.

Research Methodology:

The research methodology adopted for my research is fully based on secondary data which is collected from concerned books, magazines, journals & websites. The research method is fully deductive in nature and character.

Objectives:

The objectives of my study are:

1. To study the strategies followed by the online shopping promotion sites to attract increased customers.
2. To study the effect on emerging trends in lifestyle of youth.
3. To study challenges faced from huge retailers & unorganised markets.

Findings:

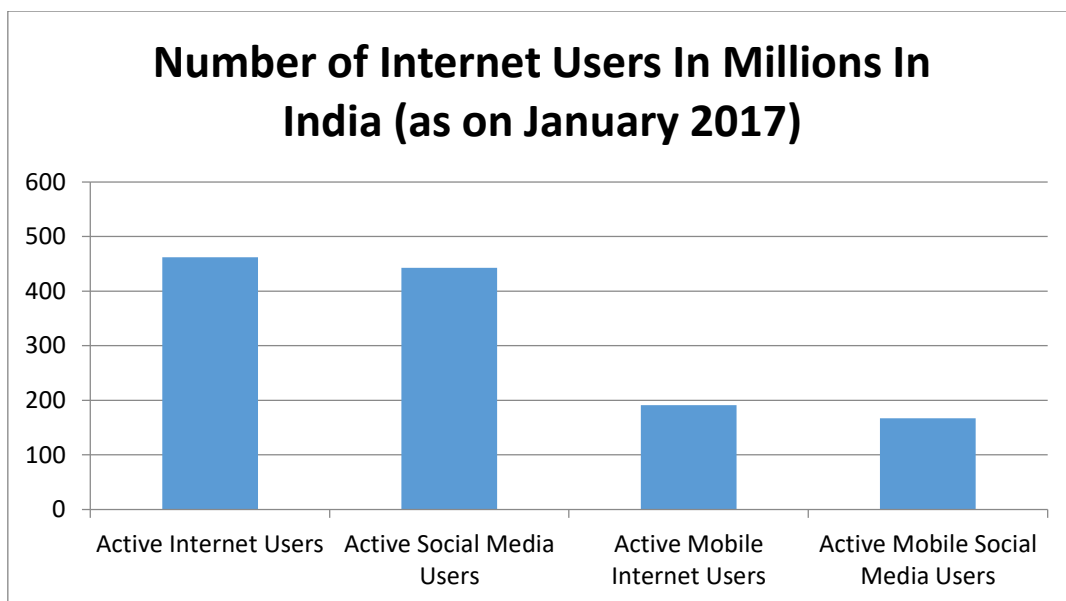
The Findings of my study suggest the strategies followed by online shopping sites along with favourable technology helps in attracting more and more customers on their sites for purchase.

The major findings of the study can be enumerated as below:

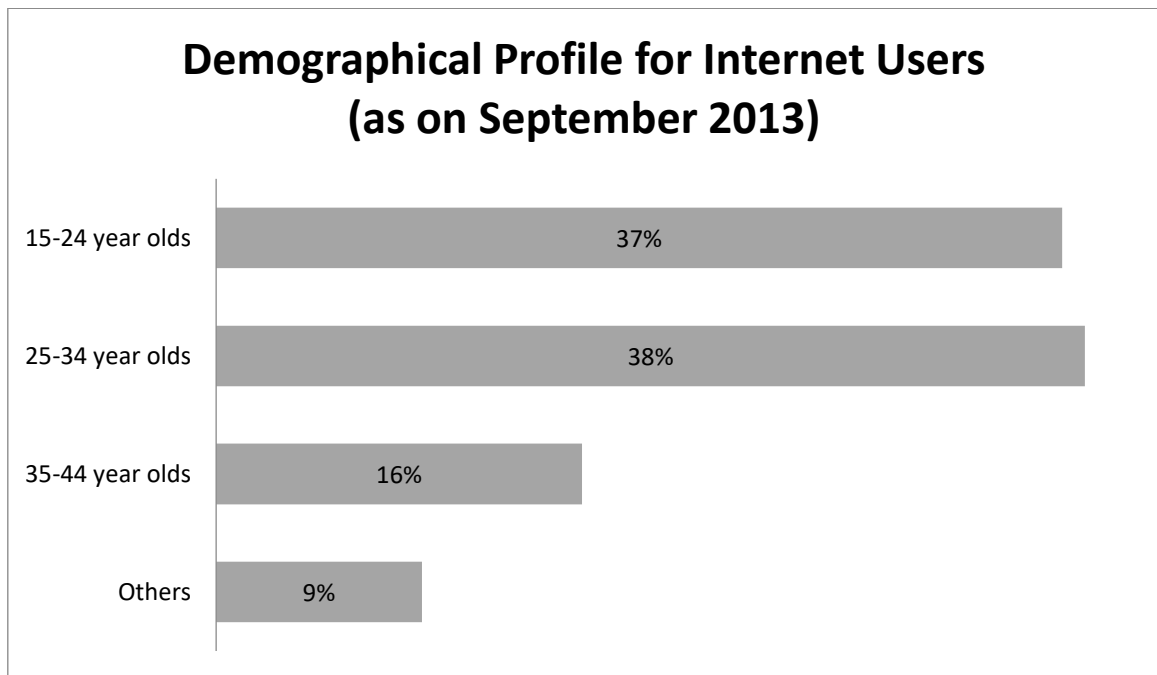
1. **Extensive advertisement through various platform-**Various online shopping sites are using different mode of advertisement like on television, YouTube, content marketing, newspaper, mobile advertisement and etc. Online shopping sites explore the different innovative promotional strategies to attract customers. For example:Myntra launched India’s first lesbian relationship campaign as “Bold is Beautiful”
2. **Expanding the product basket-**Online shopping sites are providing all the things under one roof like Amazon selling Apparels, white goods, Accessories, Electronics, Kids products, books, kitchen products and etc.Different sites focus on sales of particular product like Gofers selling grocery items, Netmed selling medicine and instrument, Blue stone selling jewellery and etc.
3. **Product review and awareness of product-**On online shopping sites customers can read all the details related to product mentioned on website before purchase they

can also go through previous customer’s comments and feedback.

4. **Easy on door delivery and easy exchange-**Online shopping deliver the purchased products on the doors of customers. This facility helps customers save their time from traffic jams.
5. **Easy payments modes-**Online shopping payments can be easily done through debit and credit cards, digital wallets and points earned during purchase, fuel purchase etc.
6. **Festivals Sale-**Online Shopping sites at time of festivals attracts customers by putting their products on sale, discounts, one on one free offers, coupons, cash back and etc.
 - a. The findings of my study further focus on the change in trends and lifestyle of youth as under:
7. **Mobile and increased internet usage-**Increase number of people accessing the sites through mobile phones. The high usage of Internet users is also leading to a substantial growth of online shopping sites. Online shopping sites developed mobile apps for smartphones are increasingly replacing PCs for online shopping.

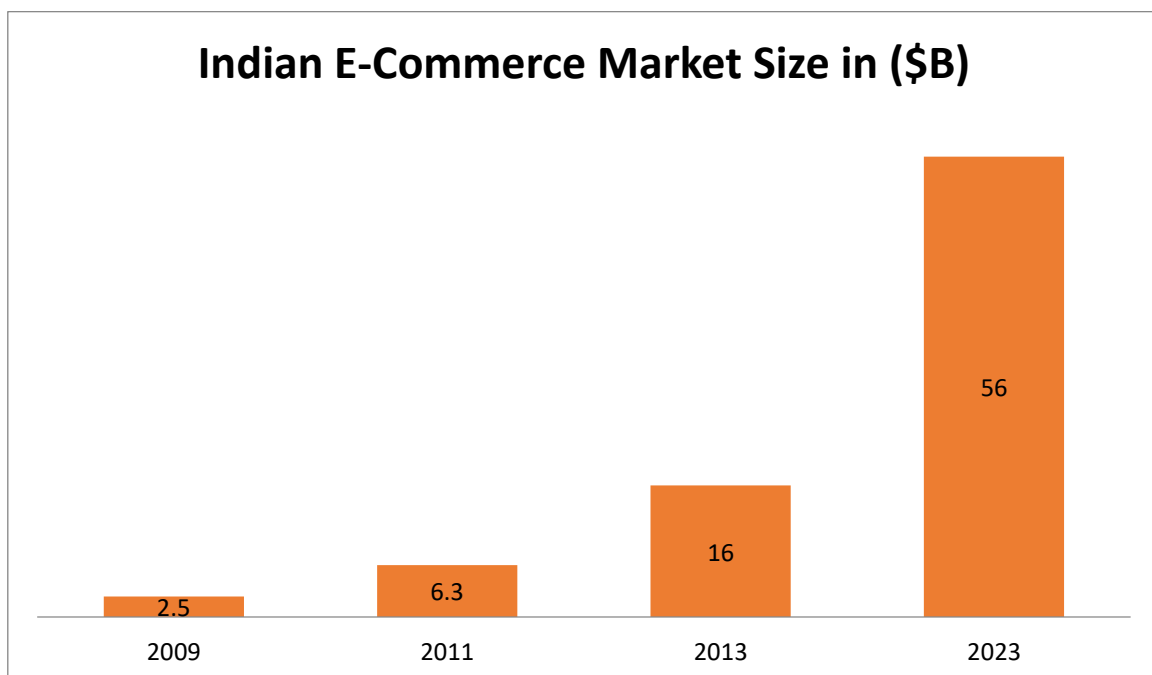


Source: Statista Website Accessed



Source: Statista Website Accessed

- 1. Increasing middle class disposable income-**The growth of small and medium enterprises, India's own powerful multinational corporations and foreign direct investment creating millions of jobs opportunity. Customers willingness toward spending more money and purchasing online could only happened because of growing job opportunities and increase in disposable income.



Source: International Journal of Computer Science and Information Technologies. Vol.5(6).

2. **Enhanced shopping experiences**-Online shopping customers are also shopping online for festivals and weddings, because of huge range of products being offered. The free and quick shipment and huge variety of products, along with the ease of shopping online as compared to in-store shopping, is also helping Online shopping gather rapid business.
3. **Exclusive partnership with brands**-There has been a trend of exclusive tie-ups between online shopping sites and established boutiques, designers, and high-end lifestyle and fashion brands. It can be more effectively explained with an example in 2014, Jabong associated with international fashion brands such as Dorothy Perkins, River Island, Blue saint and Miss Selfridge, along with local fashion brands through Jabong Boutiques. Similarly, Mynt benefited from exclusive tie-ups with brands such as Harvard Lifestyle, Desigual and WROGN from Virat Kohli.
4. **More business coming from smaller towns**-Online shopping is widely attracting customers from Tier 2 and 3 cities, where customers have limited access to brands but have high aspirations. According to online shopping sites, these cities have seen a 30% to 50% rise in transactions.

The major challenges that online shopping sites are facing in today's age are as under:

1. **Product and market strategy:**

The main objective of online shopping sites is to rapidly engage customers, maintaining new and updated product portfolios, market share and advancement, management of multiple customers engagement on platforms, assessing information and focusing on exploration of new geographies, customer satisfaction and simultaneously

coping up with a hypercompetitive pricing market.

2. **Customer and digital experience:**

Online Shopping sites have to provide attractive, rich, fresh and simple customer experience. It should manage propagation of technologies and handle market pressure for new applications. In the recent past, social media has become more effective than paid marketing.

3. **Payments and transactions:**

Online shopping sites may face issues around security and privacy laws and controlling faked transactions. Further, RBI restrictions for prepaid instruments or digital wallets act as barrier. From a transaction perspective, regulatory issues and cross-border tax, and backend service tax and withholding tax can have serious obstruction.

4. **Fulfilment:**

Internet availability and speed is indispensable for online shopping sites physical infrastructure. Innovative, proper and efficient channelization of integrated end to end logistics is used to avoid delayed deliveries issues. The third-party association and difficulties faced in reverse logistics is also one of the barriers to growth of online business.

5. **Risk, fraud and cyber security:**

From a risk perspective, online shopping sites could face issues around brand risk, insider threats and website uptime. Cyber security gives legal assurance, security and safety from exploitation by external entities and frauds.

Conclusion and Suggestion-

The conclusion and suggestion of my study is that in globalisation era, youths are more attracted towards e-commerce sites and adopting & accepting changes

brought in their trends & lifestyles. On other hand youth shouldn't be dependent completely on the e-commerce sites.

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