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A Study on supply chain management of spices in India

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Abstract

During this pandemic, the role of the supply chain, its efficient and effective management is well understood in our country. In this paper, an attempt to understand the flow of commodities from different states across the country is done. Supply chain management is a structure that helps in the flow of goods from the producers to the consumers in a cost-effective way. The supply chain is a network of organisations that helps in the flow of materials from the point of origin to the point of consumption by controlling, managing, improving and storing the materials. There are a lot of changes in the supply chain distribution nowadays previously what was done laboriously is made easy with technology in hand. This field has evolved and adapted to the changes to offer alternative solutions that greatly influence organisational performance by gaining a competitive advantage in the manufacturing sector.

Keywords: Supply chain management, Supply chains, Spices industry, spices, market, export, demand, planning, consumers

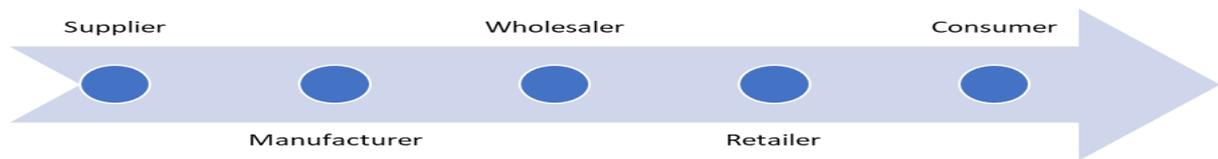
Introduction:

Supply chain management is a crucial process that any company defines as the management of the entire flow of goods, information and funds across the supply chains from the suppliers to the distributors like wholesalers and retailers ultimately to the consumers. The success of the supply chains starts right from the proper planning, sourcing, manufacturing, delivery and easy return policies. In simple supply chain management can be understood as an integrated process that involves all the activities from procurement of the raw materials and supplying the desired product to the end customer thereby serving both the manufacturing and the distribution supply chains. It focuses on the techniques on how the companies can make use of the integrated process, technology and capability to achieve their competitive advantage.

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The following is a simple chart that depicts the Supply chain management process of a company.



Objective of the Study:

1. To get an overview of the Spices Industry.
2. To understand the supply chains of different spices produced in the country.

Methodology:

This study is based on secondary data collected from various resources like journals, books, Spices board of India reports, published resources, etc and compiled.

Spices Industry in India:

Agriculture is the backbone of the Indian sub-continent and India is globally known as the 'Land of spices'. Indian Spices are used in cooking regularly for their aroma, taste and apart from it they have countless benefits and many are used as medicines to treat a variety of health issues. India is the largest producer of spices like cumin, ginger, turmeric and chilli while the second-largest producer of pepper globally. The history of spices in India is believed to be as old as the human race and traces of proof are seen in the ancient scriptures. The spices can be in various forms like fresh, prepared, dried, semi-dried, broken, whole, etc and they can be buds, flowers, barks, sprouts, seeds, roots, leaves or a part/entire plant.

Table 1: Major state-wise area and production of spices in India
(Area in Ha, Production in Tons)

States	2016-17		2017-18		2018-19		2019-20(*)		2020-21(ad.est)	
	Area	Prodn	Area	Prodn	Area	Prodn	Area	Prodn	Area	Prodn
Madhya Pradesh	553161	1280802	551400	1252335	640970	2970690	666705	3075980	699994	3237655
Rajasthan	1004380	1391800	918660	1144720	928896	1044530	1020530	1058915	1084903	1234576
Gujarat	510750	848330	566970	917310	490727	747160	699060	1009930	713933	1033184
Andhra Pradesh	246450	1106210	155460	714630	206774	592865	200130	896180	227924	936478
Telangana	183100	818080	130260	662970	141256	740296	142390	853095	145834	748576
Karnataka	258230	758640	228580	667660	393894	682485	318040	580226	360145	665348
Maharashtra	31180	213450	39740	224390	38404	196962	76335	388040	81864	423478
Assam	97670	284980	120310	347440	97195	300242	104613	331009	99510	311208
Orissa	146630	287020	148200	297260	148195	297260	148195	297260	148105	294448
Uttar Pradesh	387000	281010	386940	248730	391994	286684	386030	264575	387845	275556
West Bengal	120010	334620	120540	343870	61900	252086	61226	253312	64096	254131
Tamil Nadu	117400	21505	97770	159350	105336	174140	102955	190555	115960	183533
Kerala	167060	189120	165930	187100	161266	144660	163042	142670	162576	153750
Total (incl.other)	4122120	10422570	3927430	9599900	4032115	9211058	4317552	10125880	4517720	10485100

(E): Estimate (*) Provisional

Source: State Agri/Horticulture Departments/DASD Kozhikkode.

The above Table 1 is a representation of the total spices production and land area in the different states of India. It clearly shows that the production of spice has increased in almost all the states. Andhra Pradesh is the largest producer of Chilli in the country. Kerala is the largest producer of black pepper and cardamom followed by Karnataka and Tamil Nadu. Seed spices are largely produced in Rajasthan and Gujarat. The spices produced in the country have a worldwide market and the demand-supply in the market is managed through efficient supply chains planned by the exporters. Chart 1 depicts the state-wise area and production of spices in India from 2016-17 to 20.20-21. The gap between area and production across the states are decreasing over the periods needs our attention.

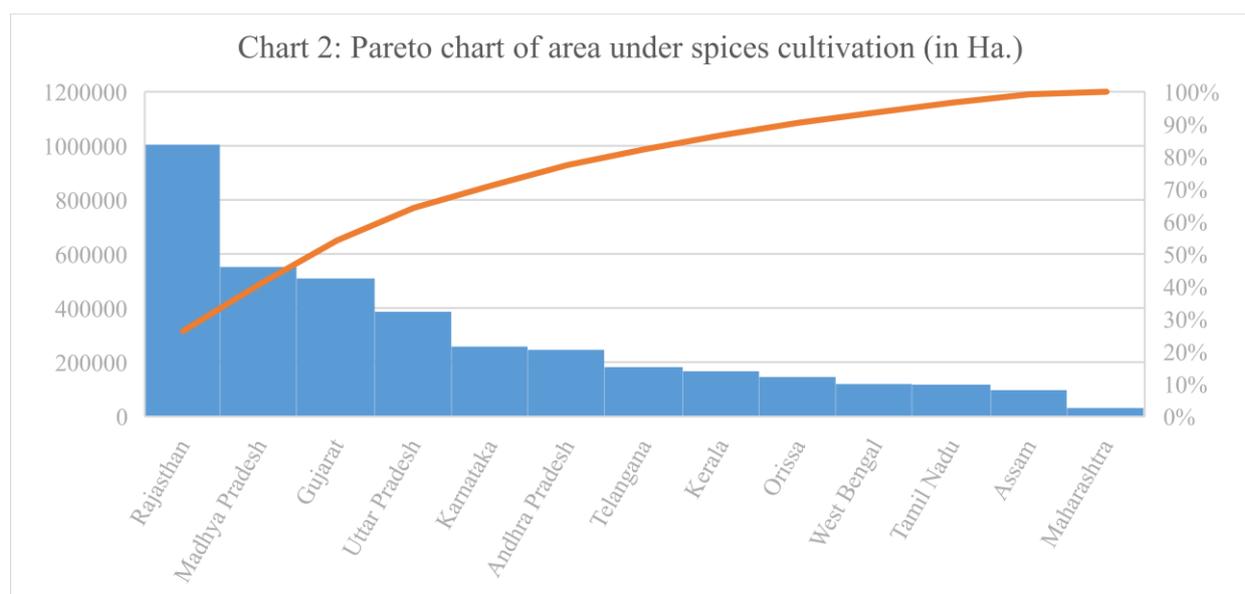
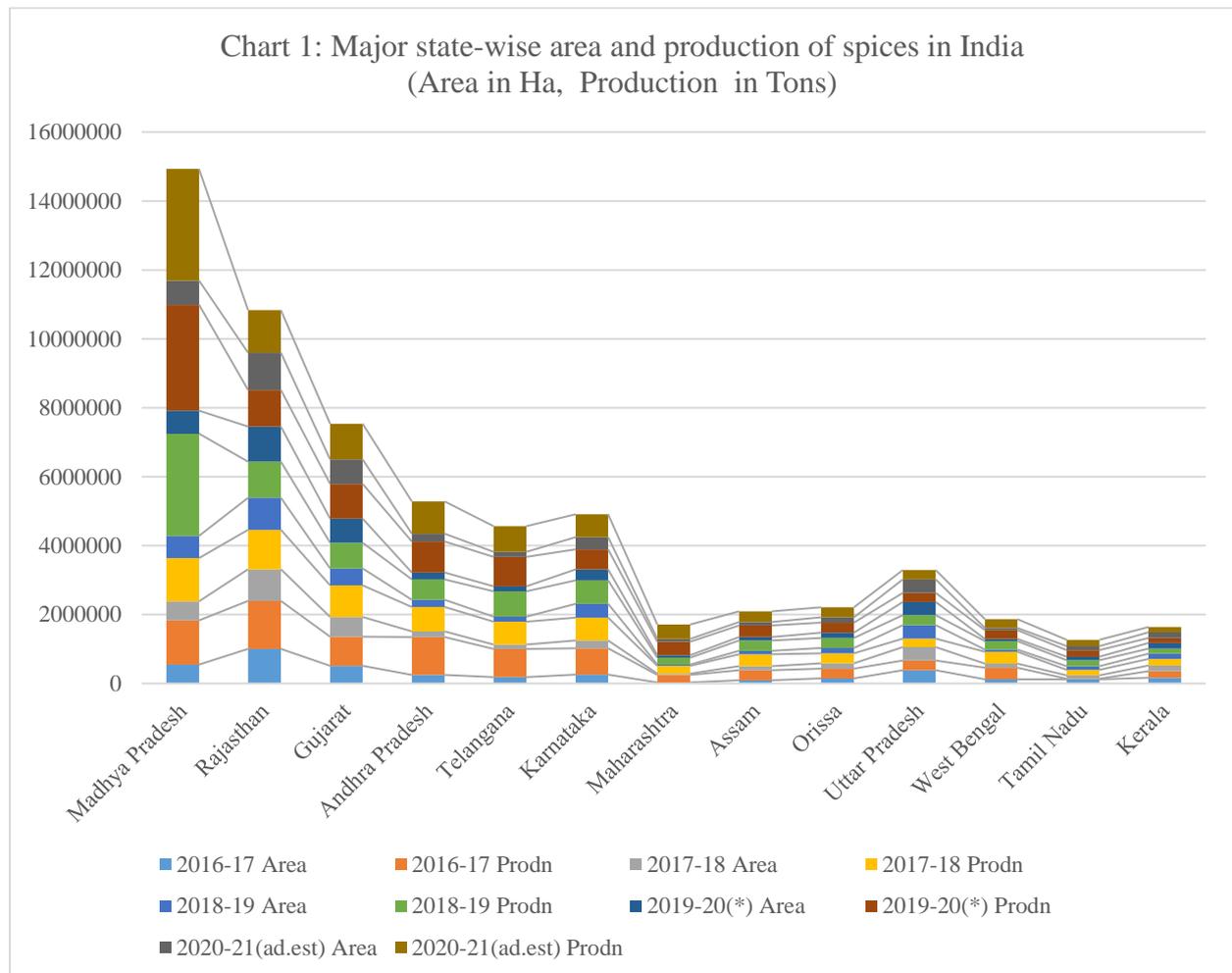


Chart 2 portrays Pareto chart plots of the distribution of data in descending order of frequency in cumulative line on a secondary axis as percentage of total indicates the significant difference in the area under cultivation spices across the states in India.

Supply Chain management of Spices:

The supply chain management of spices in both the domestic and international market is a challenge when executed optimally supply chains can be the value addition that promotes export and thereby leads to a better livelihood for the farmers³. India produces a variety of spices like black pepper, cardamom, ginger, cumin, coriander, chilli, turmeric, garlic, celery, fenugreek, etc of which 52 spices are under the direct purview of the Spices Board of India out of the 109 ISO notified list in the country. Almost all the states and union territories in the country produce at least one of the spices because of the conducive climatic conditions prevailing in the places. Spices can be in various structures like new, prepared, dried or broken and can also be the barks, leaves, buds, roots, seeds, etc that cause the smell, flavour, taste, sharpness in the food items apart from just the seasoning aspect². The demand for the spices produced in India is higher as indicated by the Spices Board of India, a Government of India initiative for the development and worldwide promotion of Indian spices whereby the report stated that the export of spices has attained a record in terms of both the volume and value in the previous financial year with a 30% increase in volume and a 23% increase in value (Rupee terms).

Table 2: Item Wise Export of Spices from India (Qty. Tonnes & Value Rs. Lakhs)

Item	2016-17		2017- 18		2018-19		2019-20		2020-21(EST)	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Pepper	17,600	1,14,312.60	16,840	82,078.48	13,540	56,868.00	17,000	57,370.94	16,300	54,445.50
Cardamom(s)	3,850	42,150.33	5,680	60,908.15	2,850	35,625.00	1,850	42,537.15	6,500	1,10,675.00
Cardamom(l)	780	8,265.45	760	5,646.60	860	6,106.00	1,310	7,090.17	1,325	9,126.25
Chilli	4,00,250	5,07,075.63	4,43,900	4,25,632.74	4,68,500	5,41,117.50	4,96,000	6,71,039.53	6,01,500	8,42,975.00
Ginger	24,950	25,704.85	22,605	21,607.49	18,150	19,602.00	60,410	52,905.00	1,25,700	75,665.00
Turmeric	1,16,500	1,24,190.65	1,07,300	1,03,567.63	1,33,600	1,41,616.00	1,37,650	1,28,690.53	1,83,000	1,67,660.00
Coriander	30,300	29,208.49	35,185	27,274.96	48,900	35,208.00	47,135	39,831.38	57,000	48,982.50
Cumin	1,19,000	1,96,320.14	1,43,670	2,41,798.78	1,80,300	2,88,480.00	2,14,190	3,32,806.00	2,99,000	4,25,310.00
Celery	6,250	6,246.11	6,480	5,950.30	6,100	6,649.00	6,230	6,903.85	7,650	9,983.50
Fennel	35,150	30,875.93	34,550	25,906.35	26,250	24,412.50	24,220	23,162.14	31,800	27,630.00
Fenugreek	34,680	18,276.49	29,280	12,688.57	27,150	13,846.50	26,570	15,690.38	38,300	24,642.00
Other seeds	18,100	15,455.86	22,175	16,045.55	29,740	18,736.20	37,580	22,080.72	48,800	30,008.00
Garlic	32,200	30,711.50	46,980	30,936.38	29,500	17,110.00	22,280	17,182.52	17,950	15,630.00
Nutmeg & mace	5,070	23,641.65	5,500	22,094.31	3,300	15,015.00	2,900	13,280.00	3,875	19,000.00
Other spices	40,210	50,595.00	38,305	65,253.17	43,300	61,486.00	37,235	66,545.96	44,000	70,942.50
Curry powder/paste	28,500	59,910.43	30,150	61,619.55	33,850	74,470.00	38,370	81,278.66	38,450	89,145.00
Mint products	22,300	2,52,749.67	21,500	3,22,834.86	21,610	3,74,933.50	24,470	3,83,202.24	27,400	3,66,825.00
Spice oils & oleoresins	12,100	2,45,532.80	17,200	2,66,172.39	12,750	2,19,300.00	13,000	2,44,682.74	16,450	3,30,675.00
Total	9,47,790	178,1223.59	10,28,060	17,98,016.24	11,00,250	19,50,581.20	12,08,400	22,06,279.91	15,65,000	27,19,320.25

Value in million us \$		2,655.29		2,789.35		2,805.50		3110.63		3,624.76
(EST): estimate										
Source: DGCI&S., Calcutta/shipping bills/exporters' returns.										

Source: Spices Board of India review on export performance of spices during 2020-21

The above Table 2 clearly showcases the demand for Indian spices in the global market. Looking at the quantities exported annually we can see that there is a consistent increase in the demand for spices like Cardamom (small & large), chilli, cumin, other spices and seeds category and a skewed demand for other categories like pepper, ginger, turmeric, coriander, celery, fennel, fenugreek, garlic, nutmeg & mace, curry powder/paste, mint products and spice oils whereas when we measure the value of these exports there is a variation in the price factor every year and the same is reflected in the table values except for cumin, other seeds, curry powder/paste and mint products where there has been a regular increase in the value as recorded. The accumulated value of the total exports of different spices from India globally has seen a steady increase in the following years and the value generated is also stable. These factors create the interest in understanding the demand market for Indian spices globally and how the supply chain management process can be effectively planned to meet the demand of the global market.

Results and Discussion:

Chirag Kishor Kolambe et al (2021) define the functional and cross-functional components of supply chains including factors like a production facility, storing facility, transportation, pricing component, supply chain data analysis and information requirements to effectively and efficiently improve the supply chain performance of any company. Apart from these elements the supply chain process includes material, inventory and money flow that act as the critical and challenging components that any company should overlook. Various significant practices decide the execution of the supply chains effectively like lean manufacturing which is the cost reduction management approach, just in time practices, collaborative inventory planning, forecasting and replenishment of goods, vendor and supplier management, outsourcing, cross-docking, green supply chain management and reverse logistics. When these factors are managed and integrated successfully the supply chain practices of a company can led them to gain a competitive advantage and thereby achieve the goals of the firm competently over the cost and time trade-off.

Sharangi, A. B., & Acharya, S. K. (2007) discuss the status, scope and issues in the supply chain management of banana, black pepper, capsicum and seed spices. The supply chain of a perishable item like a banana is influenced more by the private sector as the market span for the product is short-lived and as many as 5 channels are identified as the routes to reach the consumer. The majority of the production of the spice is in the hands of the small and marginal farmers who prefer to sell their marketable production to private houses and rural markets. Countries like India and Indonesia are the largest producers of black pepper and the existing regulations for marketing influence of the product greatly the supply chain of this commodity. Even though the seed spices and other spices like black pepper produced in India have a sizeable market globally there are challenges like inadequate processing and storage facility, poor transportation, high level of intermediary interventions, multiple taxation points and poor knowledge of value-added products that can reduce the losses and as well increase the scope in the global market.

Rajkumar, Paulrajan (2012) identifies the wholesale market as the important link that connects the producer and the consumer through a proper supply chain management process. The average distance that a food/commodity grown in a place travel to reach its consumer is called Food

Mileage. This food mileage is a measure of the efficiency of a supply chain and an indicator to measure the economic, social and ecological system followed in the Country. Five spices namely chilli, garlic, black pepper, turmeric and ginger are considered for the study and the model calculating the food mileage for these spices through the traditional retail model indicates the spice route from farmers to consumers through agents, wholesalers and traditional retailers. Whereas the organised retail model showcases the spice route from farmers to consumers through buying centres, hubs and stores. The study clearly shows that the organised food retail model has higher food mileage than the traditional model and many factors lead to this higher value one of it being sourcing the suppliers near the harvest zones that are relatively far away from the retail hub thereby identifying the opportunities that influence the global supply chain of these spices.

The role of technology is inevitable in almost all the fields in the current scenario. Aneeq Jamal & Sami Rajpoot (2021) focused on how digital transformation of supply chain management can enhance the supply chain performance and its effectiveness. The paper represented the results obtained through interviewing the government and semi-government organisations' supply chain managers who expressed that the success of the supply chains relies on software and applications that are integrated with all the activities right from procurement to technology base. The paper also highlights the utilisation of the supporting technologies that can carry out the daily operations and facilitate internationalisation in supply chain practices followed by organisations which will ultimately help in value creation.

Conclusion:

This paper was an attempt to understand the spices industry and supply chain management that helps in the import and export of these goods. The future work of this paper is intended to collect primary data and interview farmers and intermediaries to understand the supply chain management structure followed practically in the Country.

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