Integrated Agriculture Practices & Food Value Chain: A Futuristic Approach for Sustainable Growth & Income of Farmers and Farmer Producer Organizations (FPOs)

by

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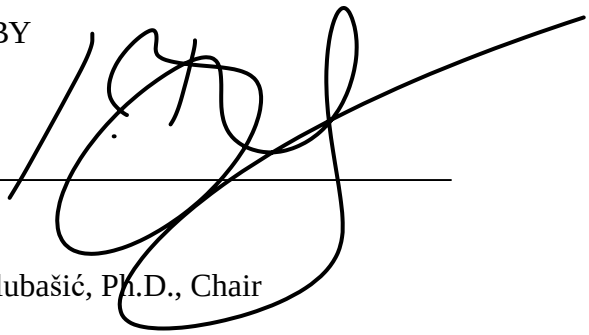

Prof. Iva Bulubašić, Ph.D., Chair

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Dedication

This work is dedicated to my father who had been an inspiration to me for his dedication towards his family all through his life. He always wanted me to be a successful person in life as he couldn't fulfill his dreams due to his dire economic conditions. He might not have given me the monetary benefits, but had given me abundant legacy of self-respect, discipline, hard work and values. Through this work I have tried to give a real perspective of challenges faced by many farmers like my father on how difficult it is to raise a family and how to improve the standard of living through sustainable practices in current scenario.

Acknowledgement

First and foremost, I would like to express my deepest gratitude to my Mentor, Mr. Sasa Petar, for his unwavering guidance, insightful feedback, and continuous support throughout this research journey. His expertise and encouragement have been instrumental in shaping this work.

Special thanks to Ms. Mounika for providing me with the resources necessary for my research.

My heartfelt thanks go to the farmers and Farmer Producer Organizations (FPOs) who generously shared their time, experiences, and data with me. Their cooperation and openness were vital in shaping the empirical research and case studies that form the backbone of this thesis.

I am thankful for the financial support from my wife Mrs. Deepali Thota, which made this research possible. Additionally, I would like to thank government bodies and institutions for their assistance and contributions.

Finally, I owe a great debt of gratitude to my family and friends for their unwavering support, patience, and encouragement throughout my academic journey. Your belief in me has been my constant source of strength.

Thank you all for your contributions to the completion of this thesis

ABSTRACT

Integrated Agriculture Practices & Food Value Chain: A Futuristic Approach for Sustainable Growth & Income of Farmers and Farmer Producer Organizations (FPOs)

Bharath Kumar Thota

Mentor: Prof.dr.sc. Saša Petar, Ph.D.

This DBA thesis explores the potential of integrated agriculture practices and the food value chain as a futuristic option for ensuring sustainable growth and income for farmers and Farmer Producer Organizations (FPOs) especially related to Spices in Andhra Pradesh. With the growing challenges faced by the agricultural sector, including climate change, market volatility, and resource constraints, there is an urgent need to adopt innovative and holistic approaches. This thesis examines the concept of integrated agriculture, its various components, and how it can be seamlessly integrated into the food value chain of spices to benefit farmers and FPOs. The study combines theoretical analysis, empirical research, and case studies to provide insights into the transformative potential of this approach.

In addition to examining integrated agriculture practices, the thesis investigates how these practices can be seamlessly integrated into the food value chain. The food value chain encompasses all the stages of production, processing, distribution, and consumption of food. By incorporating integrated agriculture into the food value chain, farmers and FPOs can achieve greater efficiency and value addition at each stage, leading to improved profitability and sustainability.

The thesis combines theoretical analysis with empirical research and case studies to provide a comprehensive understanding of the transformative potential of integrated agriculture practices within the food value chain. Through these approaches, the study identifies successful models and strategies that can be replicated and adapted to different contexts.

Moreover, the thesis evaluates the impact of integrated agriculture practices on the economic, social, and environmental aspects of farming. It assesses how these practices can contribute to food security, poverty reduction, and the empowerment of rural communities.

The findings of the thesis offer valuable insights and recommendations for policymakers, agricultural practitioners, and FPOs seeking to adopt integrated agriculture practices and improve their participation in the food value chain. Ultimately, the thesis provides a roadmap for achieving sustainable growth and income for farmers and FPOs through innovative agricultural practices and value chain

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CHAPTER -1

1.1 INTRODUCTION

India is the "land of spices". The flavor and fragrance of Indian spices had a magic spell in human civilization and culture considering that very ancient days. Spices deliver to thought pictures of tempting culinary art, captivating travels and bitter hostilities for supremacy. Expressions like "Variety is the spices of life" and "sugar and spices and all that are nice" exhibit how spellbound were men of letter about the fascination of spice. A spice is dried seed, fruit, root, bark or vegetable elements chiefly used for flavoring, retaining and coloring food. Spices are distinguished from herbs, which are parts of leafy green flora also used for flavoring or as garnish. Many spices have antimicrobial houses and used generally spiritual ritual, cosmetics or fragrance production, or as vegetable. For example, turmeric roots bump off as vegetable and garlic as an antibiotic. India specially exports Chilly, Turmeric, pepper, cardamom, Cumin, Ginger, Coriander, mustard, Garlic, cloves, Nutmeg, Mace, Cassia, Star Anise, tamarind, vanilla, Oils and oleoresins. Processed spices like spice oils and oleoresins, curry powders, mints products, blended spices and seasonings.[1]

Chilli is one of the most vital business crops of India. It is grown almost throughout the country. There are more than 400 different varieties of chillies located all over the world. It is additionally known as hot pepper, cayenne pepper, candy pepper, bell pepper, etc. Its botanical identify is "Capsicum annuum". The world's most up to date chilli "Naga Jolokia" is cultivated in hilly terrain of Assam in a small city Tezpur, India. Different varieties are grown two for two vegetables, spices, condiments, sauces and pickles. Chilli occupies an important region in Indian diet. It is a vital object in the kitchen, as it is fed on daily as a condiment in one structure or the other. Among the spices bump off per head, dried chilli fruits represent a foremost share. Currently, chillies are used all through the world as a spice and additionally in the making of liquids and medicines. If some sorts of chillies are well-known for purple coloration due to the fact of the pigment 'capsanthin,' others are recognized for biting pungency attributed to 'capsaicin.' India is the only country which is rich in many types with distinct exceptional factors. Chillies are wealthy

[1] V.A.Parthsarathy,M.S.Madan, "Spices Research and Development-an overview"Indian institute of spices research,Calicut. Page no.1

in vitamins, particularly in vitamin A and C. They are also packed with potassium, magnesium and iron. Chillies have long been used for pain alleviation as they are recognized to inhibit ache messengers, extracts of chilli peppers are used for assuaging the ache of arthritis, headaches, burns and neuralgia. It is additionally claimed that they have the strength to boost immune device and lower cholesterol. They are also useful in getting rid of parasites of gut.[2]

The fruit of chilli or Capsicum flora have a variety of names relying on vicinity and type. It is often known as chilli pepper, pink or green pepper, or candy pepper in Britain, and generally simply capsicum in Australian and Indian English. The massive slight shape is referred to as bell pepper in the US and Canada. It is known as paprika in some different countries (although paprika can additionally refer to the powdered spice made from quite a number capsicum fruit). The original Mexican term, chilli (now chile in Mexico) came from the Nahuatl phrase chilli or xilli, referring to a large Capsicum range cultivated considering the fact that 3000 BC, as evidenced by way of stays located in pottery from Puebla and Oaxaca. It is universally called by using extraordinary names such as Pimenton, Puvre de Guinee, Filfil Ahmar, Paprika, Spaanse Peper, Peperone, Pimento, Struchkovy pyeret, Togarashi, Hesiung Yali chiao, Lal-mirch,etc. In Indian subcontinent, chillies are produced at some point of the year. Two vegetation are produced in kharif and Rabi seasons in the country. Chilli grows fantastic at 20–30°C. Growth and yields go through when temperatures exceed 30°C or drops beneath 15°C for extended periods. The crop can be grown over a wide range of altitudes from sea degree up to nearly 2100 meter.[3]

Turmeric — the Golden Spice — is extensively cultivated in different countries such as India, China, Myanmar, Nigeria, Bangladesh, Pakistan, Sri Lanka, Taiwan, Burma, Indonesia, etc. Among these countries, India occupies the first role in area, with 224260 hectares and additionally in production, with 110792 tons in the course of 2022-23. In India, turmeric is grown in 18 states and Andhra Pradesh, Telangana, Tamil Nadu, Karnataka, Orissa and West Bengal are the principal turmeric-producing states. A yellow spice with a heat and mellow flavor, turmeric is related to ginger. Turmeric is used in coaching of mustard and curry powder and it is a famous ingredient in Middle Eastern cooking.[4]

[2] V.A.Parthsarathy,M.S.Madan, "Spices Research and Development-an overview" Indian institute of spices research,Calicut. Page no.269

[3] Dr.CH.V.V.Satyanarayana, "Post harvest profile of Chillies "post harvest technology centre, ANGRAU, Bapatla page no.2

[4] Anne Plato, Post harvest management of Turmeric, FAOUNA page no.2

Turmeric is a spice derived from a rhizome (a kind of root) native to India and South East Asia. Turmeric used to be prized as a dye for centuries, thanks to its power to tint fabric--or food--high-quality yellow gold. The dried, powdered rhizome is used in curry powder, some sorts of pickles and additionally as herbal food colouring agent. Turmeric is sometimes substituted for saffron (which is a long way more expensive); but apart from their colour, the two spices have little in common. Turmeric's flavor has been described as peppery and really bitter, so it's vital to be really appropriate when adding this spice to foods.[5]

[5] J.S.Pruthi" Spices and Condiments" page no.244

1.1.1 Spices wise area under cultivation in India.

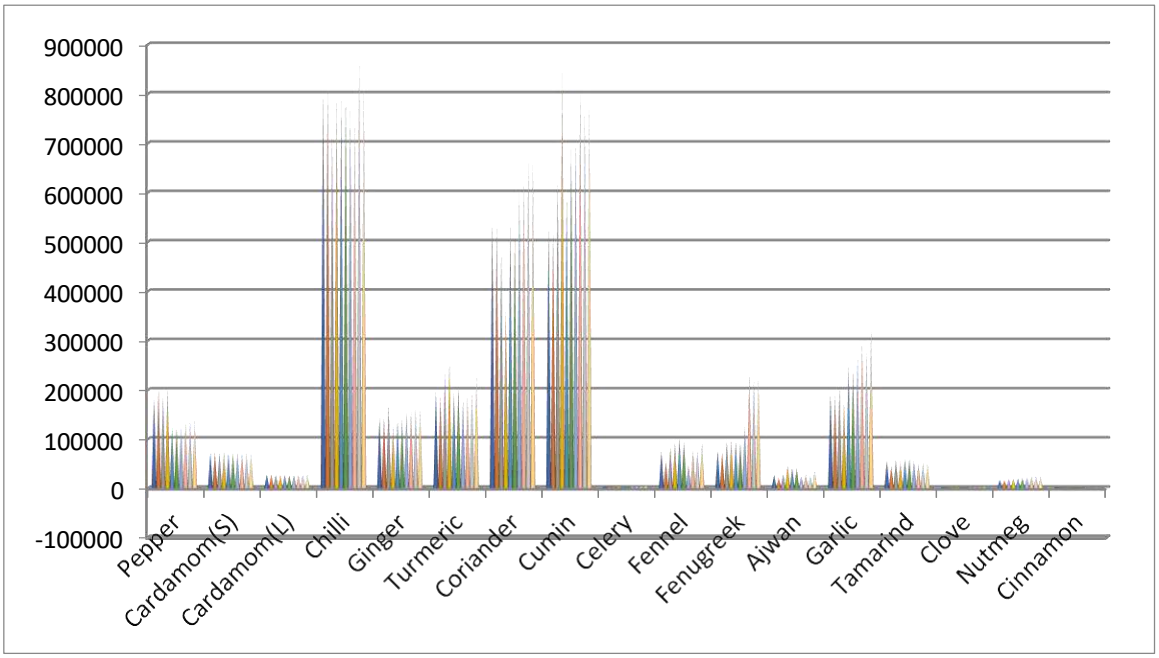
Table 1.1 Spice-wise area under cultivation in India (in Ha)

Spices	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Pepper	181299	198986	183780	201381	122500	122400	123900	131790	134280	135915	-3.15%
Cardamom(S)	71170	71110	71012	71285	69870	69970	69970	70080	69357	69330	-0.29%
Cardamom(L)	27034	27034	26984	26460	26060	26060	26387	26387	26617	26617	-0.17%
Chilli	802896	809699	716428	793921	787530	791930	766620	742950	864730	814790	0.16%
Ginger	143861	142089	167432	125374	134430	138200	153100	156910	160480	160860	1.25%
Turmeric	195076	187535	232022	251824	194330	207570	178470	183480	193395	224260	1.56%
Coriander	537327	530789	474250	362148	531070	516070	604090	624780	662345	665190	2.40%
Cumin	527132	517133	625087	843401	593980	690080	701560	808230	760130	780950	4.46%
Celery	4117	4312	3776	4176	4070	4070	4070	4010	4010	4010	-0.29%
Fennel	74149	53497	81890	92446	99610	94070	46760	76000	74660	89580	2.12%
Fenugreek	74512	71985	94760	96304	93110	90500	124710	227960	218430	219720	12.77%
Ajwan	26148	20628	27257	45693	39690	39260	24010	26600	24230	34500	3.13%
Garlic	190468	187271	202888	171800	247430	238760	261510	295600	274550	322340	6.02%
Tamarind	54281	44186	56530	52788	58300	58720	54120	47660	49020	48830	-1.17%
Clove	2172	2081	2195	2100	2060	2060	2380	2340	2350	2230	0.29%
Nutmeg	16400	16001	17760	18407	18730	19690	21110	22360	23080	22640	3.65%
Cinnamon	186	150	187	163	277	277	277	320	320	265	4.01%
Total	2948558	2899887	3043583	3541804	3172468	3145610	3192640	3457000	3529200	3969390	3.36%

Source: spices statistics from Spices Board

The table no.1.1 is explaining about the spices-wise area under cultivation from 2013-14 to 2022-23. By observing the table, it is understood that the pepper cultivation in 2013-14 was 181299 ha and subsequent years there is some up downs in area of cultivation and it is recorded as 135915 ha in 2022-23 and Compound Annual growth rate is -3.15%. This is because of drought and untimely rains and root rot caused by Phytophthora. There is no growth rate of cardamom area of cultivation also and CAGR recorded as -0.29%. Chilli area under cultivation 2013-14 was 802896 Ha and this is also come down subsequent years because of untimely rain fall, drought conditions and pest and disease problems. In 2022-23 area of chilli cultivation recorded as 814790 ha and CAGR is 0.16%. Turmeric growth is maintained steadily and it was 195076 ha in 2013-14 and 224260 ha in 2022-23 and CAGR was 1.56%. It is observed that Cumin area under cultivation is very significant growth and CAGR 4.46%, this was 527132 hectors in 2013-14 and 2022-23 area was reduced and it was 593980 because of extreme weather conditions, untimely rains and pest and disease problems. Further fenugreek area under cultivation is tremendous improvement, 74512 ha in 2013-14 and it was gradually growing and 219720 ha in 2022-23 and CAGR 12.77%. This was because of good weather conditions, timely rains and timely attending of pest and disease issues.

Graph no.1.1 Spice wise area under cultivation in India (in Ha)



Source: The Researcher Reporter compiled and designed from Table no.1.1

The above graph no.1.1 is explaining about the spices-wise area under cultivation from 2013-14 to 2022-23. By examining the Graphic is recognized that the chilli is the highest area

under cultivation, next is the cumin, coriander and Garlic also highest area under cultivation comparatively other spices. In 2022-23 area of chilli cultivation recorded as 814790 ha and CAGR is 0.16 per cent. Turmeric growth is maintained steadily and it was 195076 ha in 2014-15 and 224260 ha in 2022-23 and CAGR was 1.56 per cent. It is observed that Cumin area under cultivation is very significant growth and CAGR 4.46 per cent, this was 527132 hectors in 2013-14 and 2022-23 area was reduced and it was 593980 because of extreme weather conditions, untimely rains and pest and disease problems.

1.1.2. Chilli and Turmeric growing districts in Andhra Pradesh

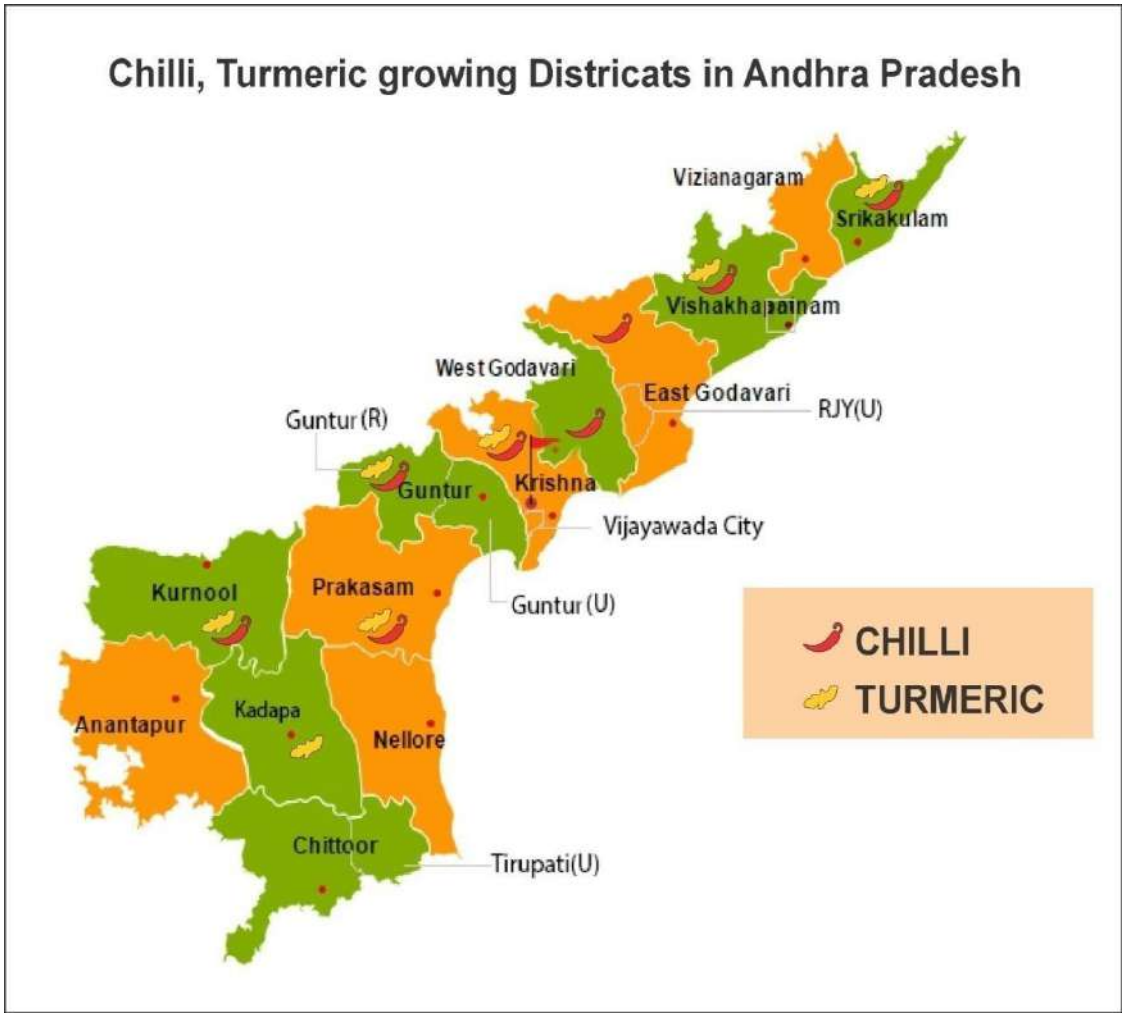


Figure No.1.1 Chilli Turmeric growing district of Andhra Pradesh
Source: Annual reports of Spices Board India.

1.1.3. Spices growing states in India.

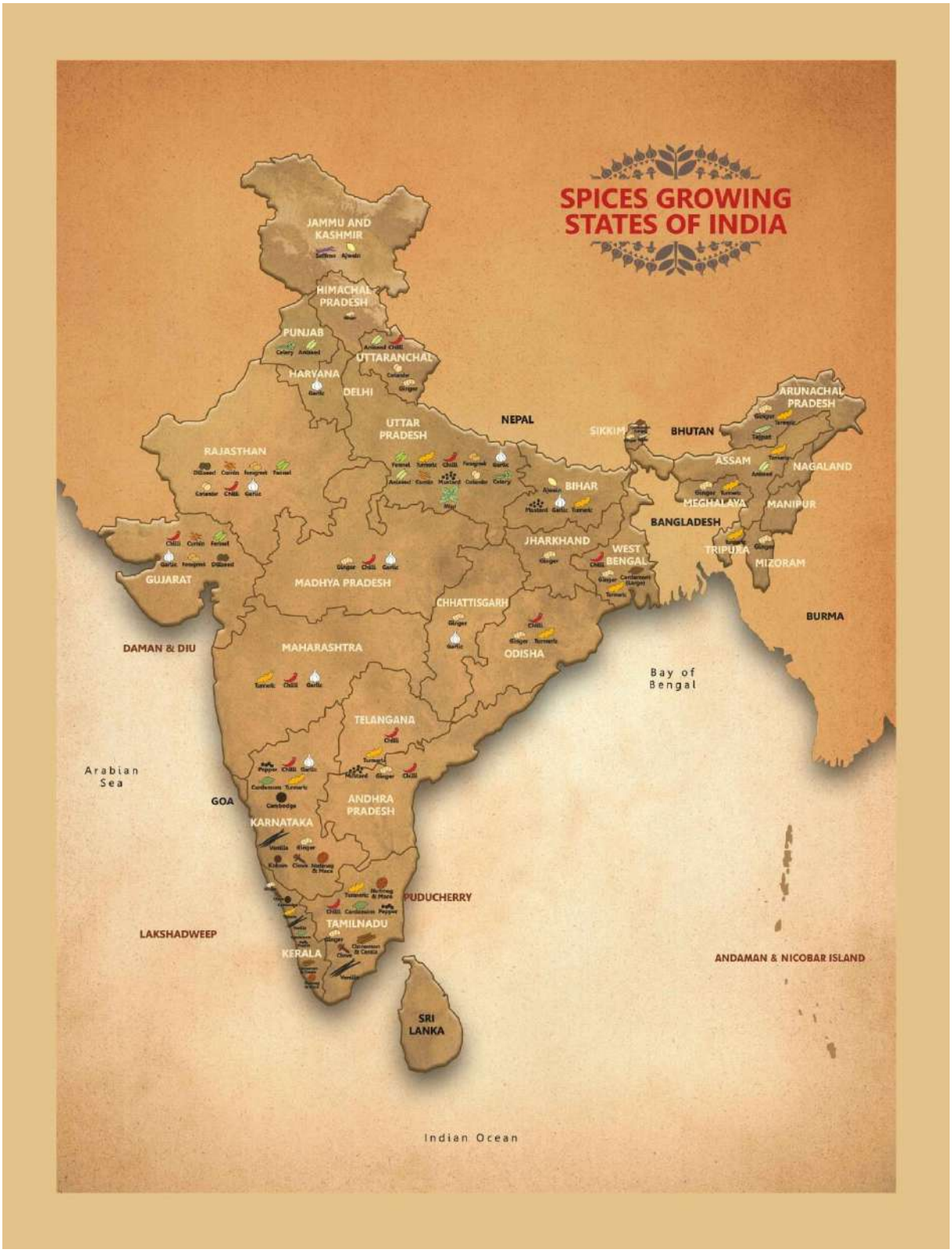


Figure No. 1.2 Spices Growing States in India
Source: Annual reports of spices Board India.

1.1.4 Spice wise export from India (Qty in MT)

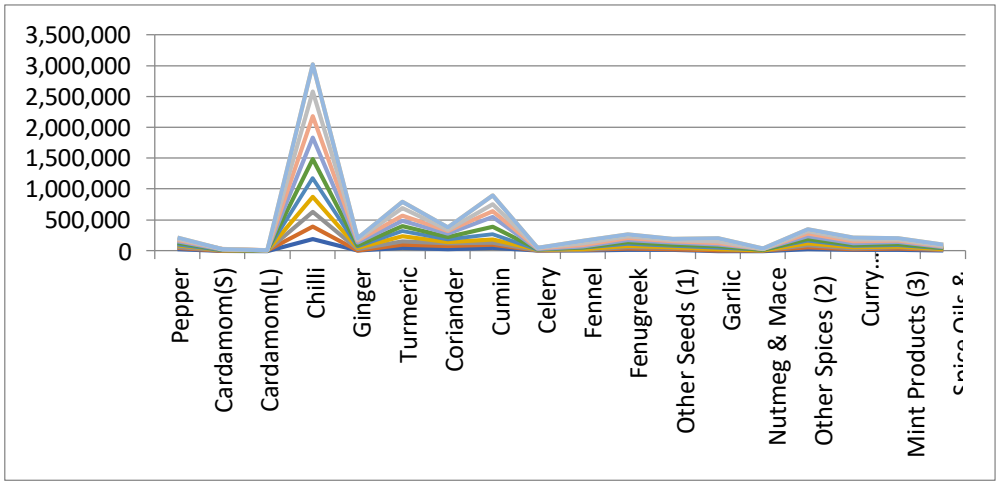
Table No. 1.2 Spice wise export from India (Qty in MT)

Spice	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Pepper	25,250	19,750	18,850	26,700	15,363	21,250	21,450	28,100	17,600	16,840	-4.40%
Cardamom(S)	750	1,975	1,175	4,650	2,372	3,600	3,795	5,500	3,850	5,680	25.23%
Cardamom(L)	1,875	1,000	775	935	1,217	1,110	665	600	780	760	-9.55%
Chilli	1,88,000	2,04,000	2,40,000	2,41,000	3,01,000	3,12,500	3,47,000	3,47,500	4,00,250	4,43,900	10.02%
Ginger	5,000	5,500	15,750	21,550	22,207	23,300	40,400	24,800	24,950	22,605	18.25%
Turmeric	52,500	50,750	49,250	79,500	88,513	77,500	86,000	88,500	1,16,500	1,07,300	8.27%
Coriander	30,200	47,250	40,500	28,100	35,902	45,750	46,000	40,100	30,300	35,185	1.71%
Cumin	52,550	49,750	32,500	45,500	85,602	1,21,500	1,55,500	97,790	1,19,000	1,43,670	11.82%
Celery	3,650	5,000	3,750	3,650	5,171	5,600	5,650	5,310	6,250	6,480	6.59%
Fennel	8,675	6,800	7,250	8,100	13,811	17,300	11,650	15,320	35,150	34,550	16.60%
Fenugreek	20,750	21,000	18,500	21,800	29,622	35,575	23,100	33,330	34,680	29,280	3.90%
Other Seeds (1)	17,500	15,500	12,500	13,050	18,442	27,800	28,250	23,880	18,100	22,175	2.67%
Garlic	760	10,750	17,300	2,200	22,872	25,650	21,610	23,085	32,200	46,980	58.13%
Nutmeg & Mace	2,155	3,275	2,100	3,620	3,231	4,450	4,475	4,050	5,070	5,500	10.97%
Other Spices (2)	31,805	32,600	25,250	35,900	34,298	34,700	36,500	43,955	40,210	38,305	2.09%
Curry Powder/Paste	13,250	14,300	15,250	17,000	17,436	23,750	24,650	26,550	28,500	30,150	9.57%
Mint Products (3)	20,500	19,000	17,450	14,750	20,039	24,500	25,750	23,250	22,300	21,500	0.53%
Spice Oils & Oleoresins	6,850	6,750	7,600	7,265	9,515	11,415	11,475	11,635	12,100	17,200	10.77%
TOTAL	4,70,520	5,02,750	5,25,750	5,75,270	7,26,613	8,17,250	8,93,920	8,43,255	9,47,790	10,28,060	9.07%

Source: Spices Statistics-Spices Board

Table no. 1.2 is explaining about the spices exports from India by volume (quantity in tones) from 2013-14 to 2022-23. Pepper exports in 2013-14 were 25250 tons and 16840 tons in 2022-23 and Compound Annual Growth Rate was -4.40% less and it is because of increased competition from Vietnam, Brazil and Indonesia. Small Cardamom exports volume was increased with CAGR registered as 25.23%, in 2013-14 as 750 tons and 5680 tons in 2022-23. There is very significant growth rate of Chilly exports volume with CAGR 10.02%, it was 188000 tons of exports in 2013-14 and every year the quantity of exports was increased. In 2022-23 the exported quantity of chilly was 443900 tons, this is because of quality and more demand for Indian chilly.

There is a significant growth in Turmeric export volume also. This was 49250 tons in 2013-14 and 116500 tons in 2021-22, because of quality material produced and supplied by Indian spice industry. Other value-added spices like Curry powder exports volume in 2008-08 was 13250 tons and in 2022-23 was 30150 tons and compound annual growth rate is 9.57% and there is significant growth rate of oils and oleoresins also and CAGR registered as 10.77%.



Graph No.1.2 Spice wise export from India (Qty in MT)

Source: The Researcher Reporter compiled and designed from Table no.1.2

The above graph no.1.2 is explaining about the spices exports from India from 2013-14 to 2022-23. Out of all 52 spices which come under the purview of spices Board, the chilli exports growth in volume in quantity places very significant highest position each and every year. Next Cumin exports also places very significant growth with rate of CAGR 11.82% in all years. Turmeric exports in volume CAGR growth rate 8.27%. Nutmeg & mace also has significant growth rate

10.97%. Garlic also has very significant growth rate is 58.13%. Value added spices like spices oils & Oleoresins CAGR growth rate is 10.77%.

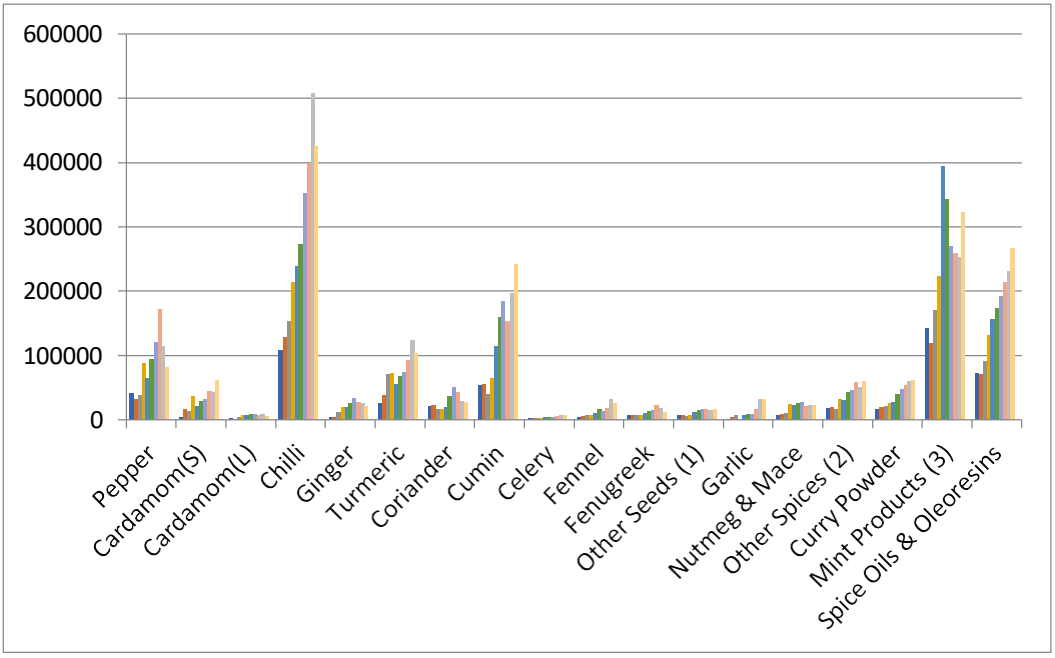
1.1.5 Spice –wise exports from India (Value in lakhs)

Table No.1.3 Spice-wise exports from India (Value in Rs. Lakhs)

Spice	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Pepper	41374	31393	38319	87813	63810	94002	120842	173042	114313	82078	7.91%
Cardamom(S)	4727	16570	13216	36322	21215	28381	32347	44983	42150	60908	32.84%
Cardamom(L)	2281	1789	4463	6830	6255	7961	8404	7551	8266	5646	10.59%
Chilli	108095	129173	153554	214408	238061	272227	351710	399744	507075	425633	16.45%
Ginger	3483	4675	12131	20420	18725	25614	33133	27596	25705	21606	22.48%
Turmeric	24858	38123	70285	73434	55488	66676	74435	92165	124189	103567	17.18%
Coriander	20379	22586	16663	16402	20183	37186	49813	42681	29208	27274	3.29%
Cumin	54400	54825	39598	64442	115307	160006	183820	153113	196320	241800	18.03%
Celery	2333	2663	2586	2340	2977	3661	4302	5328	6246	5950	10.96%
Fennel	4315	5624	6588	7209	10466	16001	13166	17240	30876	25907	22.04%
Fenugreek	7175	6972	6548	7275	10488	13378	13948	23381	18277	12689	6.54%
Other Seeds (1)	6499	5890	5558	5881	11179	15426	16513	16206	15455	16045	10.56%
Garlic	350	3042	6977	1416	6868	8387	8183	15959	30712	30936	64.54%
Nutmeg & Mace	6075	9187	9777	24098	22592	26286	26798	20928	23642	22094	15.43%
Other Spices (2)	17339	19481	16015	32033	30209	41847	44915	58349	50595	60193	14.83%
Curry Powder	16375	18919	21051	25208	27516	40132	47626	53175	59910	61620	15.86%
Mint Products (3)	142025	118972	169679	222372	394050	343042	268925	258130	252750	322836	9.55%
Spice Oils & Oleoresins	72050	70875	91062	130438	155888	173325	191090	214255	230775	266172	15.63%
Total	530025	556050	684071	978342	1211276	1373539	1489968	1623823	1766461	1792955	14.50%

Source: Spices Statistics-Spices Board

The table no.1.3 is explaining about the Indian spices exports scenario in value from 2013-14 to 2022-23. The highest compound annual growth rate registered by Garlic 64.54% which was 350 lakhs in 2013-14 and gradual increase of exports value every year and finally 30936 lakhs in 2022-23, this is because of good quality and demand for Indian Garlic. The next spices is the small cardamom CAGR with 32.84% it means the value exported 2013-14 was 2475 lakhs and in 2020-21 was 44983 lakhs. Indian Cardamom is always quality and have more demand than Guatemala. Chilli is another important item of export value and it is registered compound annual growth rate as 16.45%, It was 108095 lakhs export value in 2013-14 and 425633 lakhs value in 2022-23. All seed spices growth is very significant. Value added products CAGR registered as curry powder 15.56% and spices oils and oleoresin as 15.63%.



Graph No. 1.3 Spices wise exports from India (Value in Rs.Lakhs)

Source: The Researcher Reporter compiled and designed from Table no.1.3.

The above Graph no.1.3 is explaining about spice wise exports value from India. It is observed that out of all spices chilli exports are in higher position, next is the mint products, next is spice oils and oleoresin and cumin products are very significant growth rate. it is because of the Indian spices quality, meeting international norms and standards. But still India needs to improve the export value by exporting in the form of whole spices, powder, crushed and oils and oleoresins.

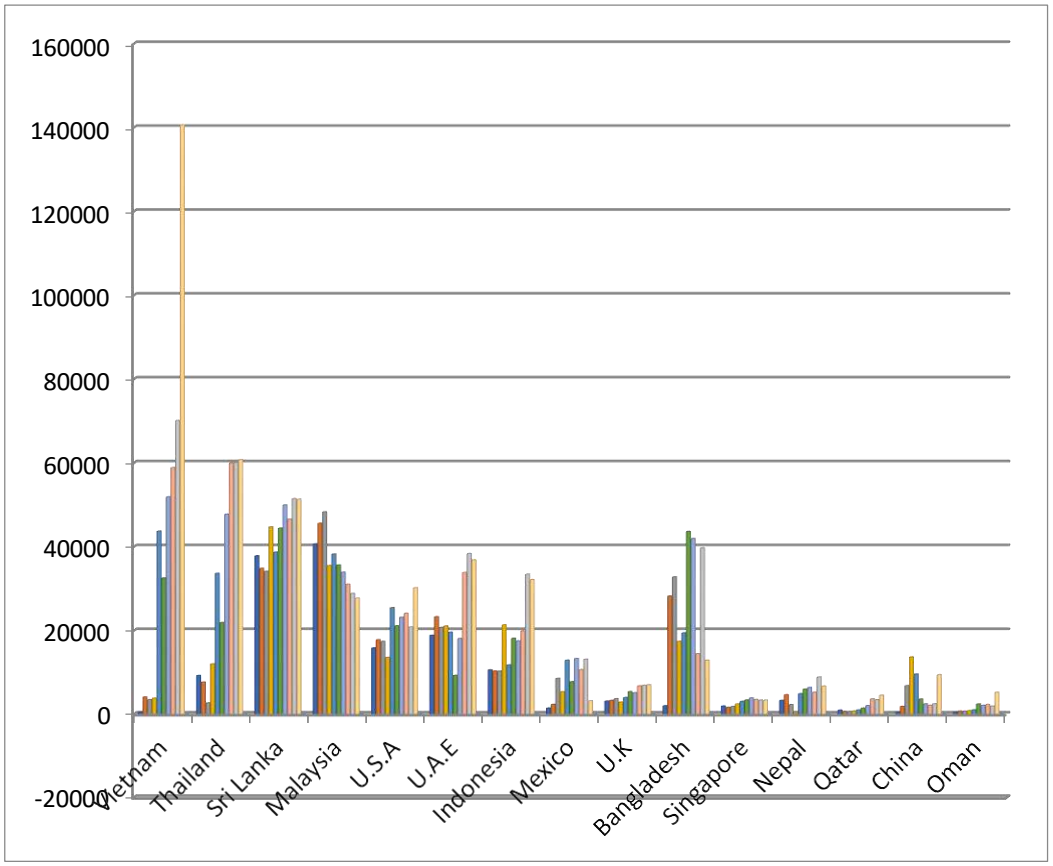
1.1.6 Country wise exports of chilly from India

Table 1.4 Country wise exports of chilli from India (Qty in MT)

COUNTRY	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Vietnam	422	4036	3383	3751	43659	32485	51829	58843	70013	76.46%
Thailand	9190	7605	2601	11975	33592	21850	47703	59916	60009	23.18%
Sri Lanka	37792	34788	34072	44666	38635	44361	49901	46509	51393	3.47%
Malaysia	40615	45545	48248	35447	38188	35581	33868	30994	28792	-3.75%
U.S. A	15793	17744	17362	13528	25406	21076	23109	24074	20792	3.10%
U.A. E	18813	23232	20703	21041	19545	9207	18050	33786	38318	8.22%
Indonesia	10531	10267	10242	21297	11731	18095	17480	19856	33394	13.68%
Mexico	1363	2256	8500	5300	12869	7709	13280	10589	13106	28.59%
U. K	3045	3205	3612	2810	3901	5308	5054	6695	6830	9.39%
Bangladesh	1923	28173	32742	17366	19393	43578	41917	14426	39686	39.98%
Singapore	1857	1546	1745	2354	2980	3306	3826	3432	3277	6.51%
Nepal	3225	4568	2197	290	4832	5909	6328	5168	8812	11.82%
Saudi Arabia	1921	1664	1726	3053	2918	5193	4091	2017	2427	2.63%
Qatar	876	598	598	680	917	1355	1966	3571	3365	16.13%
Canada	830	918	1087	617	1703	1259	1313	1472	1464	6.51%
China	382	1769	6771	13633	9538	3532	2378	2029	2400	22.65%
Australia	708	909	859	1000	1421	1207	1295	1357	1587	9.38%
Oman	387	654	623	768	934	2353	2031	2227	1844	18.94%
South Africa	2815	2469	2469	2136	2592	2508	2881	1484	2023	-3.60%

Source: spices statistics-Spices Board.

The table no.1.4 is showing the chilli imports from India from 2015 to 2023 by various countries. . Compound Annual Growth Rate (CAGR) of imports into Vietnam, Thailand, Sri lanka is 2%. Which is Vietnam imports 4326 MTs' in 2014-15 and 70013Mts in 2022-23, Thailand imported chillies 2914 Mts in 2014-15 and 60009 Mts in 2022-23.Malaysia imported 51782 Mts in 2014-15 but subsequent years imports were reduced because, Malaysia importing from other countries. The compound annual growth rate is 1of Singapore, Nepal, Saudi Arabia, Qatar, Canada, China and Australia. South Africa CAGR is -3%, which means 2349 Mts in 2014-15 and in 2023 mts in 2022-23.



Graph1.4 Country wise exports of chilly from India (Qty in MTs)

Source: The Researcher Reporter compiled and designed from Table no.1.4

The above graph no.1.4 is explaining about the country wise exports of spices from India by quantity. Vietnam is the major importer of Indian spices, Thailand also importing good varieties of spices from India. chilli is mostly imported by Srilanka, Malaysia, Bangladesh, Indonesia and china. This is because of Indian chilli is different in color, pungency, flavor and variety than any other country chillies.

1.1.7. Year -wise all spices area, production, domestic consumption and exports in quantity

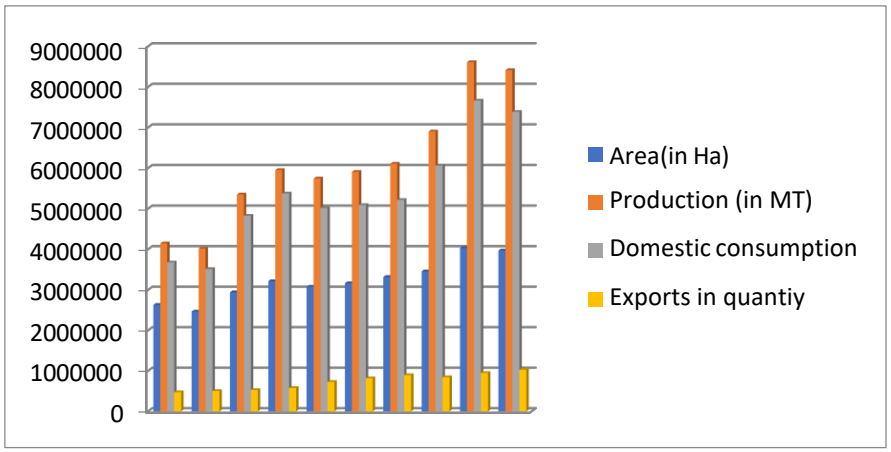
Table No.1.5 Year -wise all spices area, production, domestic consumption and exports in quantity

Year	Area	Production	Domestic consumption	% domestic consumption	Exports in Quantity	% of exports
	(in Ha)	(in MT)	in MT		in MTs	
2013-14	2629000	4145000	36,74,480	89	4,70,520	11
2014-15	2464000	4016000	35,13,250	87	5,02,750	13
2015-16	2940000	5350000	48,24,250	90	5,25,750	10
2022-23	3212000	5951000	53,75,730	90	5,75,270	10
2017-18	3076000	5744000	50,17,387	87	7,26,613	13
2018-19	3163000	5908000	50,90,750	86	8,17,250	14
2019-20	3317000	6108000	52,14,080	85	8,93,920	15
2020-21	3457000	6901780	60,58,525	88	8,43,255	12
2021-22	4031700	8610810	76,63,020	89	9,47,790	11
2022-23	3969390	8413980	73,85,920	88	10,28,060	12
Average	**3225909**	**6114857**	**5381739.2**	88	**7,33,118**	**12**
CAGR	**3.8**	**4.45**	**4.37**		**3.35**	

Source: Spices statistics, Spices Board India

The above table no.1.5 is explaining about the year wise area, production, domestic consumption and exports of various spices. If we closely observe the table year wise area of cultivation of various spices in India is growing. In 2013-14 area was 2629000 ha and 2022-23 3969390 Ha and it is a very significant growth rate. In the same manner the production also recorded as 4145000 in 2013-14 and in 2022-23 is 8413980Mt. Around 15% exports were recorded in 2019-20 and later on it is reduced by 11%. Domestic consumption also improving year by year and exports needs to be encouraged for getting good remunerative price to the spices, market and for getting foreign currency.

Graph No.1.5 Year -wise all spices area, production, and domestic Consumption & exports in quantity



Source: The Researcher Reporter compiled and designed from Table no.1.5.

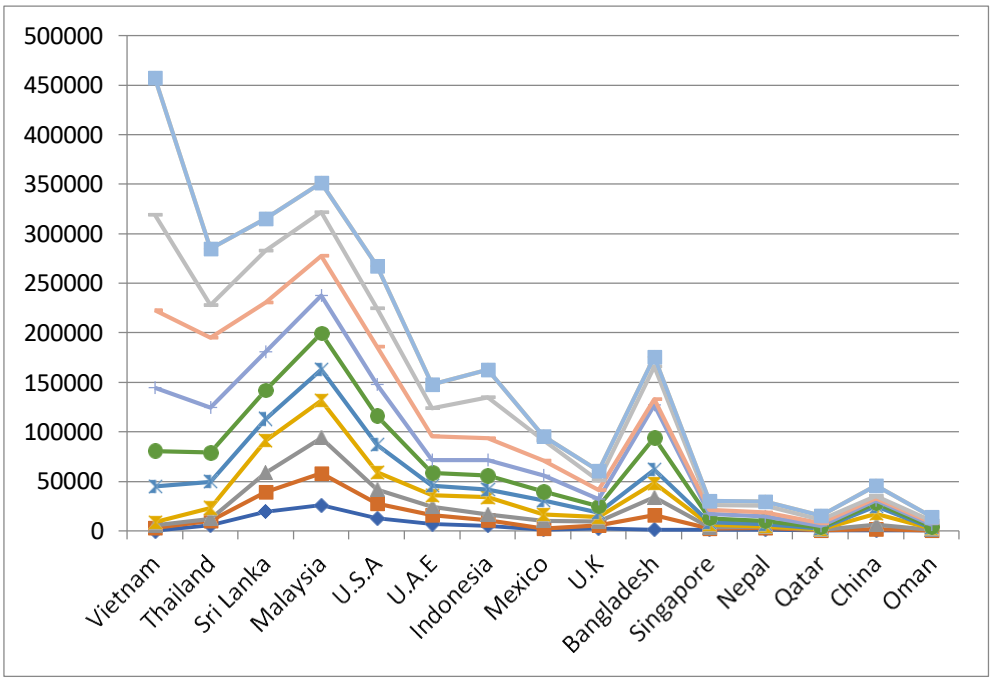
The above Graph no.1.5 is explaining about the year wise area, production, domestic consumption and exports from 2014 to 2023. The growth in Area under cultivation and production of spices in every year is very significant. This is because of the soil condition, best seed variety, good agriculture practices, pest and disease management by the farmers and government guidance and support. Simultaneously domestic consumption and exports value was also increased year by year.

1.1.8 Country wise exports of chilly from India (value in lakhs)

Table 1.6 Country wise exports of chilly from India (value in lakhs)

COUNTRY	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Vietnam	232	3143	2400	3133	36201	35857	63537	78560	95929	138379	103.42%
Thailand	5435	5110	1851	10782	26235	30141	45184	70671	32706	56584	29.73%
Sri Lanka	19628	19442	19729	31956	22480	28680	38784	50120	52053	32706	5.84%
Malaysia	26072	32304	35642	37545	31579	36417	38145	40031	44187	29374	1.33%
U.S.A	12882	15137	13801	17626	27729	29081	31653	37846	39172	42643	14.23%
U.A.E	7006	8998	8479	11708	9459	13319	12774	23690	28636	24084	14.71%
Indonesia	5149	5564	6035	17749	7527	14150	15545	22116	40934	27764	20.59%
Mexico	899	1828	7628	6166	14473	9098	16377	14719	20309	3842	17.51%
U.K	2647	3271	3745	4347	4698	6725	6826	8715	10303	9160	14.79%
Bangladesh	1023	15158	18208	14177	13213	32648	32977	5614	32720	10276	29.22%
Singapore	1278	1128	1351	2600	2481	4010	4275	4315	5086	3507	11.87%
Nepal	1228	2060	861	161	2454	3433	4384	4143	7043	3871	13.61%
Qatar	420	373	410	615	764	1024	1533	2696	3565	3726	27.45%
China	316	1284	4699	11063	7825	3171	2469	2211	2723	9767	46.41%
Oman	336	515	521	858	849	1493	1502	2072	2298	3913	31.36%

Source: Spices Board statistics



Graph no. 1.6 Country wise exports of chilly from India (value in lakhs)
Source: The Researcher Reporter compiled and designed from Table no.1.6

The above graph no.1.6 is explaining about the country wise chilli exports from India 2013-14 to 2022-23. Vietnam is the highest importer of Indian spices and it has recorded 103.42 per cent of CAGR. Thailand also a good importer of chilli from India which has recorded 29.73 per cent of CAGR. Compound annual growth rate of chilli exports from India to Bangladesh from 2013-14 to 2022-23 is 29.22 per cent. Indonesia is also a good importer of chilli from India and its CAGR is 20.59 per cent. Compound annual growth rate of chilli exports to china from 2013-14 to 2022-23 is 46.41 per cent. This is because of the availability best quality, pungency, color and flavors of Indian chilli comparatively other countries.

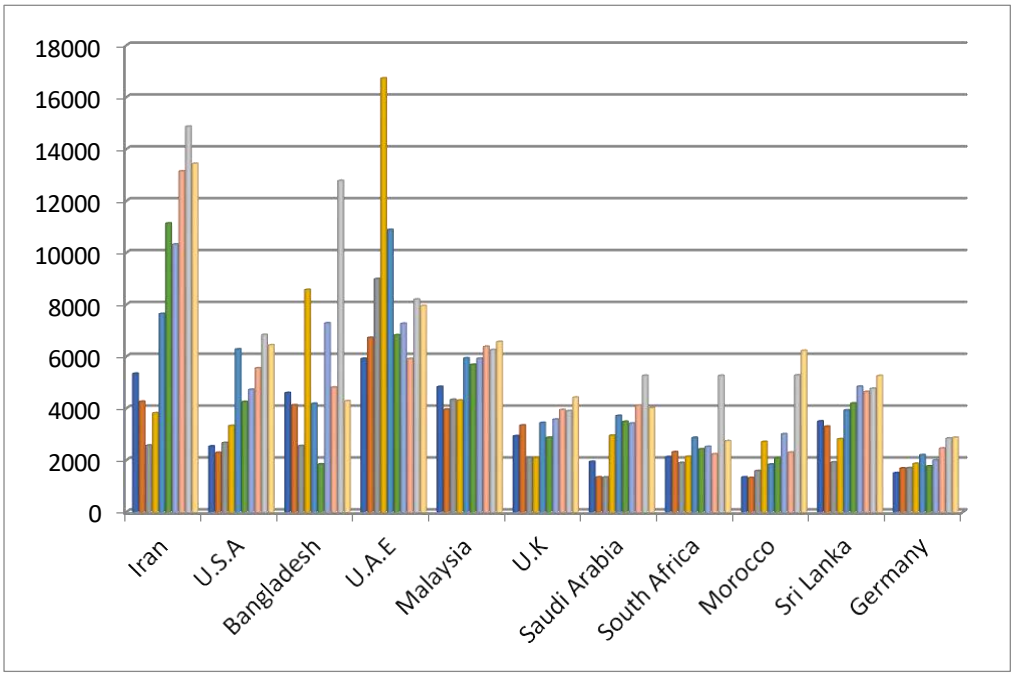
1.1.9 Country-wise exports of turmeric from India (Qty in MT)

Table 1.7 Country-wise exports of turmeric from India (Qty in MT)

Country	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Iran	5335	4255	2563	3810	7638	11130	10319	13141	14862	13431	10.80%
U.S.A	2532	2285	2664	3324	6275	4248	4718	5544	6830	6435	10.92%
Bangladesh	4593	4119	2545	8567	4177	1838	7283	4803	12773	4277	-0.79%
U.A.E	5911	6719	8988	16726	10882	6818	7264	5906	8196	7952	3.35%
Malaysia	4826	3952	4330	4299	5928	5678	5913	6376	6249	6562	3.47%
U.K	2927	3340	2091	2082	3437	2867	3567	3935	3893	4417	4.68%
Saudi Arabia	1935	1339	1334	2947	3708	3481	3413	4105	5257	4007	8.42%
South Africa	2121	2312	1892	2133	2865	2423	2515	2229	5257	2736	2.87%
Morocco	1338	1315	1583	2705	1833	2071	3003	2294	5271	6220	18.62%
Sri Lanka	3495	3293	1914	2811	3920	4187	4838	4634	4758	5253	4.63%
Germany	1501	1686	1695	1860	2195	1761	1993	2451	2838	2872	7.48%

Table No.1.7 is demonstrating about the turmeric exports from India to different nations by quantity. Out of all leading imports of Indian turmeric, Iran is no.1 country who imports more turmeric from India which CAGR is 2%, in 2013-14 at 5335 Mts and we can observe the very significant growth subsequent years. In 2021-22 14862 Mts imported. Most of the turmeric they use is for medicinal value. USA also a very good market for Indian turmeric in 2021-22 at 6830 Mts turmeric imported, Bangladesh is also a good imported of Indian turmeric which imported 2021-22 is 12773 Mts and its compound annual growth rate is 2. The compound annual growth rate of South Africa, Morocco, Sri lanka, Germany and Spain is gradually increasing. They are all imported Indian turmeric 5257,5271,4758,2838 and 3859 Mts respectively from India.

Graph No. 1.7 Country wise exports of turmeric from India (Qty in MT)



Source: The Researcher Reporter compiled and designed from Table no.1.7

The above Graph no.1.7 is explaining about the country wise exports of turmeric in quantity from India during 2013-14 to 2022-23. Turmeric is mostly used in cosmetics industry, pharmaceutical industry and culinary purpose. The most important countries are UAE, Iran, Morocco, USA, Malaysia, Srilanka, UK, and South Africa. Compound annual growth rate of turmeric exports from India to Morocco from 2013-14 to 2022-23 is 18.62 per cent. Saudi Arabia is also a good importer of Indian Turmeric which has recorded 8.42 per cent CAGR. Iran recorded as 10.80 per cent and USA recorded as 10.92 per cent. It is because of the Indian turmeric variety, color, curcumin content and other important factors.

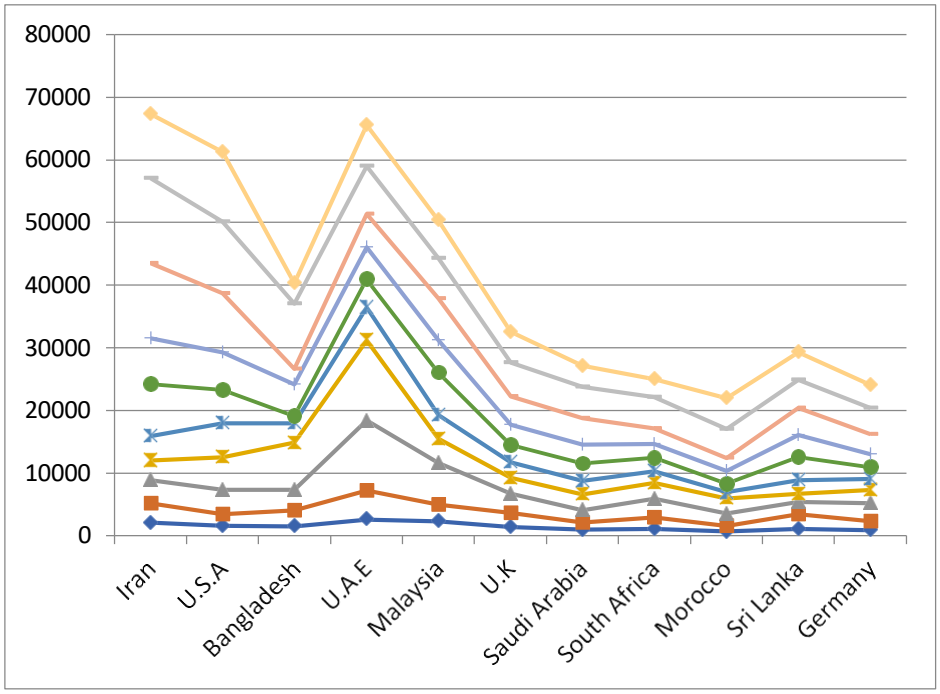
1.1.10 Country wise exports of turmeric from India (Value in Lakhs)

Table 1.8 Country wise exports of turmeric from India (Value in Lakhs)

Country	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR
Iran	2136	3009	3724	3117	3947	8282	7281	11975	13576	10291	19.09%
U.S.A	1551	1881	3916	5217	5410	5279	6065	9389	11410	11159	24.52%
Bangladesh	1524	2535	3282	7541	3021	1206	5045	2478	10465	3190	8.55%
U.A.E	2569	4639	11184	12782	5281	4460	5148	5298	7646	6549	10.96%
Malaysia	2269	2678	6700	3807	3786	6801	5222	6593	6409	6105	11.62%
U.K	1421	2180	3061	2537	2480	2738	3358	4411	5473	4878	14.69%
Saudi Arabia	1005	1120	1952	2469	2155	2833	2997	4196	5037	3379	14.42%
South Africa	1093	1850	2908	2534	1867	2137	2294	2445	5037	2812	11.07%
Morocco	672	862	1982	2420	1002	1326	2088	2027	4656	4912	24.73%
Sri Lanka	1039	2363	1933	1337	2166	3726	3485	4337	4483	4462	17.58%
Germany	850	1432	2828	2187	1723	1849	2159	3145	4231	3645	17.56%

Table no. 1.8 is showing about the value of turmeric imported by different nations in the world. The highest value of turmeric importer Iran, which imported 2136 lakhs value in 2013-14, but there is very significant growth in every subsequent year. In 2021-22 Iran imported 13576 lakhs value of turmeric. The next biggest importer of Indian turmeric is USA, the compound annual growth rate is 2 percent. If we observe deeply the turmeric consumption levels of USA is increased more than ten times. In 2013-14 USA imported 1551 lakhs worth of turmeric, but in 2021-22 at 11410 lakhs worth turmeric imported. The next big importer of turmeric is Bangladesh and UAE, in 2021-22 imported 10465 and 7646 lakhs respectively. Malaysia also a good consumer of Indian turmeric, based on quality and percentage of curcumin content and availability of medicinal properties.

Graph No.1.8 Country wise exports of turmeric from India (Value in Lakhs)



Source: The Researcher Reporter compiled and designed from Table no.1.8

The above Graph no. 1.8 is explaining about the country wise exports of turmeric from India in value from 2013-14 to 2022-24. Morocco is number one importer of India spices for which has recorded as 24.73 per cent compound annual growth rate. USA is also an important nation for importing of turmeric. Iran is the important country for importing Indian turmeric. In value USA is the important country where 24.52 per cent CAGR. UAE, Malaysia, UK, Saudi Arabia, South Africa and srilanka is importing countries of Indian turmeric. Indian turmeric has more demand in international level because of its quality, color and flavor.

1.1.11. State wise chilli area under cultivation in India (Area in Ha)

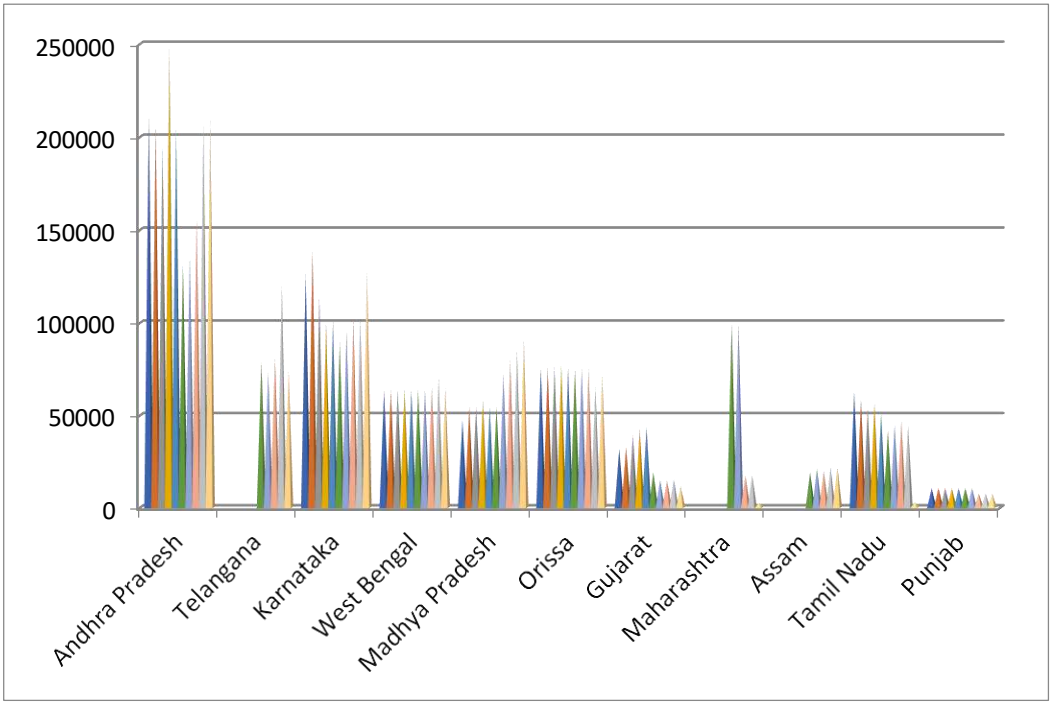
Table 1.9 State wise chilli area under cultivation in India (Area in Ha)

State	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Andhra Pradesh	210792	206541	195471	248264	204000	131316	134960	156055	206000	209350	-0.08%
Telangana	NA	NA	NA	NA	NA	78935	73270	81597	120160	73780	-1.67%
Karnataka	125965	138711	113849	100076	100729	89556	95450	102290	102290	127600	0.14%
West Bengal	63249	63450	63618	64018	63600	63600	63600	65123	70000	65120	0.32%
Madhya Pradesh	47332	54414	54414	58120	54410	54410	72130	79736	85000	90980	7.53%
Orissa	75510	75530	76010	77130	75600	75000	75000	75000	65500	71700	-0.57%
Gujarat	31810	32854	38970	42435	43395	19050	14780	14723	15200	11350	-10.82%
Maharashtra	NA	NA	NA	NA	NA	99500	99500	17323	17323	2340	-60.84%
Assam	NA	NA	NA	NA	NA	18920	21010	19929	21626	21700	3.49%
Tamil Nadu	62617	58476	53626	56442	50672	41400	44610	46522	44176	2530	-29.99%
Punjab	10414	10524	10555	10562	10600	10600	10600	7501	7501	7500	-3.58%

Source: spices statistics-spices Board**.**

Table no.1.9 is the representing about the chilli area under cultivation in different states in India. Chilli is the highest grown spice out of all spices grown in India. Andhra Pradesh is the leading producer of chilli. In Andhra Pradesh 2020-21 area under chilli cultivation is 206000 Ha, next is the Telangana which has cultivated 120160 hectors, next is the Karnataka at 102290 Ha, Madhya Pradesh also contributing the chilli production, which has cultivated was 85000 Ha, Orissa area under cultivation reduced in previous years lack of irrigation facility and cost of cultivation and pest and disease. Tamil Nādu also contributing in production chilli in particular areas and variety chilli

Graph No.1.9 State wise chilli area under cultivation in India (Area in Ha)



Source: The Researcher Reporter compiled and designed from Table no.1.9

The above Graph no.1.9 is explaining about the chilli area under cultivation state wise in India from 2013-14 to 2022-23.The compound annual growth rate of chilli area under cultivation in Madhya Pradesh from 2013-14 to 2022-23 is 7.53 per cent, in West Bengal is 0.32 per cent, in Karnataka 0.14 per cent. In Andhra Pradesh CAGR is -0.08 per cent. There is a negative growth, even in Telangana state recorded CAGR is -1.67 per cent negative growth rate. This is because of the lack of good seeds, lack of water availability, lack of unseasonal rains, lack pest and disease management.

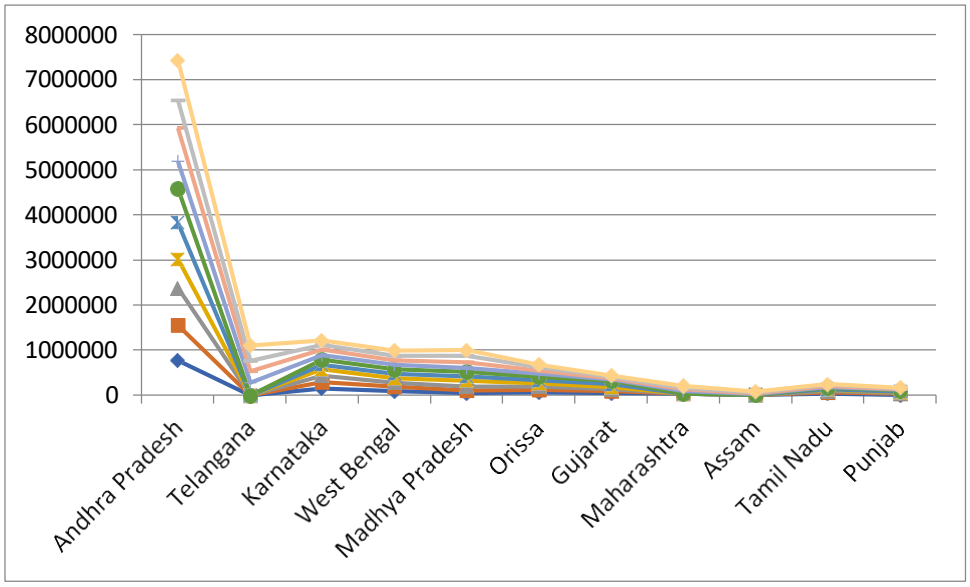
1.1.12 State wise chilli production in India (Production in MTs)

Table 1.10 State wise chilli production in India (Production in MTs)

State	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR %
Andhra Pradesh	771395	781671	830990	638298	804204	761000	601990	739620	618420	883000	2.64
Telangana							279770	253260	227610	337005	3.11
Karnataka	154760	143481	144044	128806	107037	107000	111540	118490	103242	103242	-4.34
West Bengal	93697	96002	95765	96216	96300	100000	95000	100000	100338	110000	1.94
Madhya Pradesh	49110	58455	90569	127435	95310	93570	93570	132440	132438	135534	2.54
Orissa	63920	64300	64320	70390	74030	70000	70000	70000	70000	64500	1.03
Gujarat	55020	36215	42305	48051	68534	68534	33300	26940	26910	25320	-4.14
Maharashtra	44200	NA	NA	NA	NA	NA	45600	45600	35875	35875	-3.73
Assam	10130	NA	NA	NA	NA	NA	16480	18380	17736	19376	1.76
Tamil Nadu	34084	32924	31230	21690	24141	23056	11290	29390	23762	21482	-3.85
Punjab	16880	17256	17492	17912	17979	17700	17700	17700	14084	14084	-3.42

Source: Spices Statistics-Spices Board

Table no.1.10 explaining that the chilli production in India state wise from 2014 TO 2023. Andhra Pradesh is the leading producer of chili in the country, which produced 883000 MTs in 2022-23. Similarly, Telangana also a leading producer of chilli, which produced 337005 Mts in 2022-23. Chilli production in Karnataka is declined from 2007 onwards continuously because of the low rainfall, price factor, pest and disease problems and marketing problems. The new leading chilli producing state is Madhya Pradesh, which produced 49110 Mts in 2013-14 and 135534 Mts in 2022-23. Another important producing state is Orissa, which produced 70000 Mts previous years, but in 2022-23, 64500 MTs produced, because of lack facilities;



Graph No. 1.10 State wise chilli productions in India (Production in MTs)
Source: The Researcher Reporter compiled and designed from Table no.1.10

The above Graph no.1.10 explaining about the state wise production of chilly from India from 2013-14 to 2022-23. Andhra Pradesh is the highest producer of the chilli in India but the compound annual growth rate from 2014 to 2023 it is recorded as 2.64 per cent, whereas Telangana state recorded as 3.11 per cent, Madhya Pradesh recorded as 2.54 per cent and West Bengal also a significant growth in production from 2014 to 2023. Mostly the production depends on the availability of quality and pure seed, irrigation facilities, sufficient financial facilities, timely proper handling of pest and disease management, maintain good agricultural practice and best post-harvest practices.

1.1.13 State wise turmeric areas under cultivation in India (area in Ha)

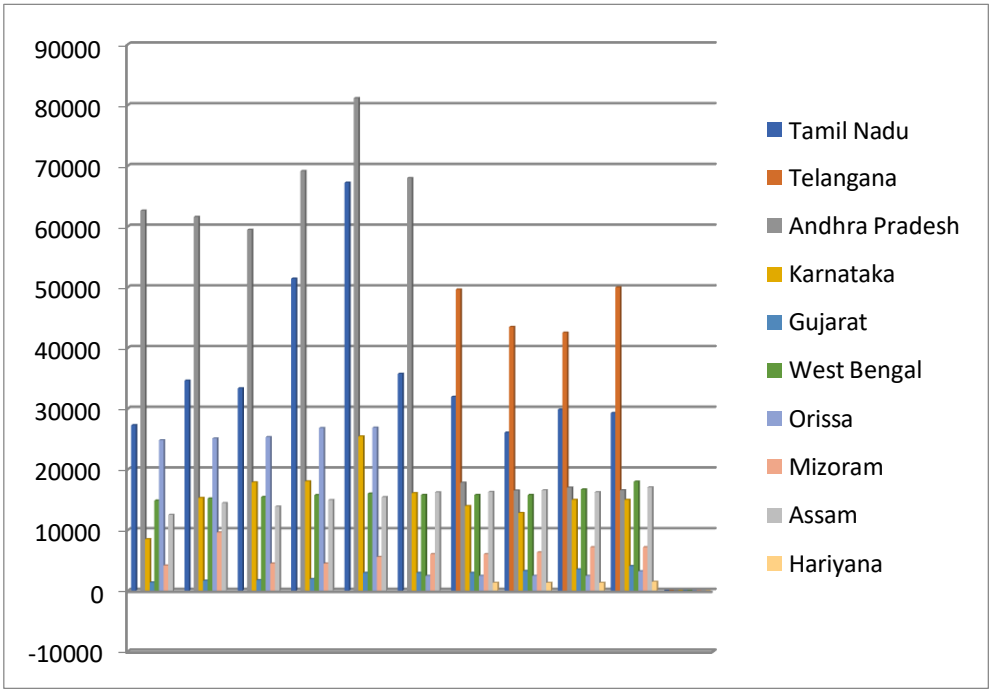
Table 1.11 State wise turmeric areas under cultivation in India (area in Ha)

State	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR
Tamil Nadu	27300	34637	33368	51446	67246	35760	31970	26070	29880	29306	1.33
Telangana	NA	NA	NA	NA	NA	NA	49638	43480	42540	50000	2.33
Andhra Pradesh	62630	61607	59475	69159	81170	68000	17822	16530	17020	16570	-4.30
Karnataka	8520	15320	17872	18035	25439	16104	13975	12820	14990	14994	1.65
Gujarat	1380	1686	1759	1936	2971	2975	2975	3290	3550	4100	1.41
West Bengal	14870	15212	15464	15779	16029	15800	15800	15800	16710	18000	1.45
Orissa	24820	25110	25320	26830	26880	2480	2480	2480	2480	3233	-4.03
Mizoram	4180	9627	4500	4500	5580	6050	6050	6350	7200	7204	1.44
Assam	12529	14459	13883	14963	15450	16241	16309	16570	16270	17059	1.55
Haryana	NA	NA	NA	NA	NA	NA	1330	1330	1330	1500	1.25
Total Inc. Others	176670	195076	187535	232022	251824	194330	207570	178470	183480	193395	1.95

Source: Spices statistics-spices Board

Table 1.11 explains about the turmeric area under cultivation in different leading states in India. As on today Telangana is the leading state, which is 50000 ha area under cultivation of turmeric, next is the Tamil Nādu, which also cultivates in 29306 ha. of turmeric, next is the Assam, the CAGR is 1.55 per cent, the area under cultivation of turmeric steadily growing, which has cultivated in 17059 Ha., West Bengal also has the potentiality of turmeric cultivation and area under cultivation is 18000 ha in 2022-23. Area under cultivation of turmeric in Orissa is declined due to the weather condition, lack irrigation facilities and market issues. Mizoram also has the potentiality of turmeric, which has records growth rate of 1.44 per cent, which means 7204 ha of turmeric in 2022-23.

Graph no. 1.11 State wise turmeric areas under cultivation in India (area in Ha)



Source: The Researcher Reporter compiled and designed from Table no.1.11

The above Graph no.1.11 is explaining about the state wise Turmeric area under cultivation from 2014 to 2023. Out of all states in India, Andhra Pradesh was the highest in area under cultivation of Turmeric before the bifurcation of state. After the bifurcation from 2014 Telangana leads all times record of area under cultivation of turmeric and the CAGR is 2.30 per cent. Tamil Nādu is also a leading state of Turmeric in India which has CAGR recorded as 1.33 per cent. Karnataka CAGR is 1.65 per cent, Gujarat area of turmeric cultivation CAGR is 1.41 per cent. The growth of the area of turmeric mostly depends on the climatic conditions, soil condition and market availability and prices and demand for the product.

1.1.14 State wise turmeric productions in India (production in MT)

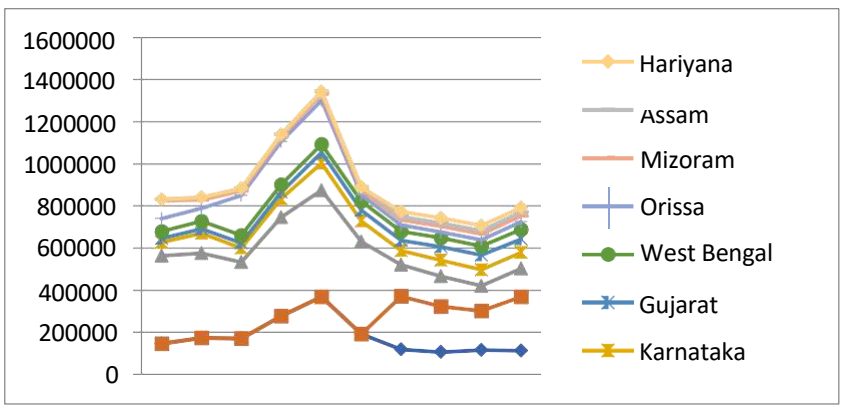
Table 1.12 State wise turmeric productions in India (production in MT)

State	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR
Tamil Nadu	146008	172334	169311	277980	368413	190100	118000	105000	115350	112590	-4.18
Telangana	NA	NA	NA	NA	NA	NA	252061	216270	184290	255000	2.99
Andhra Pradesh	416060	403228	364044	466928	506865	439000	151906	143230	121120	134122	-5.03
Karnataka	64720	93817	65780	90448	128245	100000	65406	76780	76490	76490	1.83
Gujarat	18640	23305	25015	28468	50493	50493	50493	64070	69250	65500	2.30
West Bengal	34600	35372	36390	38300	38950	42000	42000	42000	42410	45500	1.81
Orissa	60340	61500	189350	202920	209080	30000	30000	30000	30000	35759	-4.07
Mizoram	83500	39855	22500	22500	29239	22990	22990	25130	27820	27816	-4.37
Assam	8630	10497	9719	10623	13440	15429	15782	16340	16180	17025	1.73
Haryana	NA	NA	NA	NA	NA	NA	23680	23840	23840	22000	2.04
Total Inc. Others	880155	894590	927912	1268280	1398862	986690	1092628	846250	967060	1051160	2.81

Source: Spices statistics-spices Board

Table 1.12 explains about the turmeric production state wise in India. The production of turmeric in Tamil Nādu is 146008 Mts in 2013-14, in 2017-18 the production is 368413Mts, and this is the highest production Graph recorded in this time. Later on, production has been declined continuously and it is recorded as 112590 Mts in 2022-23, which is very low productivity and its CAGR is -4.18. Telangana state is recorded growth percentage is as 2.99. Andhra Pradesh production levels are declined from 2013-14 to 2022-23, its compound annual growth rate is -5.03, this was happened due to weather conditions, marketing problems, pest and disease problems. The CAGR of Orissa and Mizoram is -4.07 and -4.37 per cent respectively. Production in Assam is steadily improving continuously, the production in 2022-23 recorded as 17025 Mts. The state of Haryana also picking up the turmeric cultivation, which has produced 17025 MTs in 2022-23.

Graph1.12 State wise turmeric productions in India (production in MT)



Source: The Researcher Reporter compiled and designed from Table no.1.12

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The above Graph no. 1.12 is explaining about the turmeric production state wise in India from 2014 to 2023. Out of all turmeric growing states the production growth rate in Telangana state has recorded a significant compound annual growth rate of 2.99 per cent. Other states like Karnataka recorded as 1.83 per cent CAGR, Gujarat 2.30 per cent CAGR, west Bengal 1.81 per cent CAGR. Most of the states the production in has gradually reduced in Tamil Nādu is recorded by -4.18 per cent, Andhra Pradesh 05.03 per cent, Orissa recorded as -4.07 per cent, this is because of less soil fertility, lack of modern input, uneconomic holdings, uncertain monsoons and lack of support services.

1.2 NEED AND IMPORTANCE OF STUDY

India is the largest producer, consumer and exporter of spices in world and producing different varieties of spices, exporting in the form of whole and value addition like crushed, powdered, oils and oleoresins to different nations. Today availability of quality and safe spices is very much important and the world is desperately needed of this. Particularly Chilli and Turmeric are the major spices contributing in the Indian spices basket and need to meet the global standards. India, being one of the fast-developing countries, is eager to improve the exports volume & quantity, but statistical figures for the financial year 2021-22 & 2022-23 the pepper exports volume is 28% lesser than previous years, Chilli 16%, Ginger is 16%, Turmeric is 16%, coriander is 7% and fenugreek 31% reveal that our export earnings growth showing not much incremental trend and some cases in lesser than for the last many years.

The researcher wants to study the issues related spices production, trading, supply chain and logistics management, global norms on spices trade and government support to spices industry and suggest to the policy makers for concrete solutions to the problems. Where in more income generation can be done for the farmers with a integrated approach.

1.3 REVIEW OF LITERATURE:

Since the researcher selected the research area, the research reporter reviewed a lot of literature related to the research area. About 10 PhD Thesis 99 Research Papers and Articles, 11 text books on relative study. Lot of information reviewed from a review of research studies and committee reports covering the areas of the present study viz. Production and trading scenario, history and development of spices trade, problems and prospects of spices trade, supply chain and logistics management system, impact of the global norms on spices trading and institutional support for cultivators and traders, World Trade Organization Agreements (WTO) and Free Trade Agreements (FTAs) on the spices industry is attempted here.

Karma L Bhutia (2019) in his research article he analyzed about North Eastern India with its diverse topography ranging from plains of Assam and Tripura to mountainous regions of Sikkim and Arunachal Pradesh possesses great diversity of flora and fauna, including varieties of Capsicum species. Although, Northeastern India is rich in genetic diversity of C. species, information about biotic and abiotic stresses and the source of resistance, breeding approaches to improve the chilli landraces of NE India, ethno-pharmacological applications, capsaicin/capsaicinoid content and other useful compounds of many landraces are still largely unexplored. This review article highlights about the various research work carried out so far in chillies of NE India, related to genetic diversity study and tissue culture techniques, etc. The researcher ignored the area under cultivation, production, productivity and consumption chilli and global requirements for chilli exports in this article.[6]

M. Chinnadurai (2019) in his research paper explained about Turmeric is the major spice crop in India. This paper attempts to estimate the cost and economic returns of turmeric cultivation among various size categories (marginal, small, semi medium, medium and large), of farmers in Erode district of Tamil Nadu, which is one of the major turmeric growing region in India. The results of the study showed that of all the size categories, the economic returns realized by large farmers were comparatively higher. Besides ensuring reasonable price to the farmers, the study suggested for value addition, like boiling, drying and grading of rhizomes in order to achieve maximum returns in turmeric cultivation. In this article the researcher ignored about the production and marketing opportunities for the product and quality aspects turmeric and turmeric products.[7]

M Karthikeyan (2019) in his case study he emphasized that farmers in the developing countries are mainly based on agriculture and it is one of the major economic sources for farmers. India is one of the country have lot of resources and agro climatic conditions for organic farm production. Organic food trade is increasing in the world day by day. India is one of the major distributors of organic food to world among South Asian countries. Organic food trade has increased in India more rapidly. This study has taken India has case study to investigate the data of the organic land and production in India and the world, the study also analyze the trading opportunities for organic products from India to world and find to understand contribution of South

[6] Karma L Bhutia, Nangsol D Bhutia and VK Khanna, Rich Genetic Diversity of Capsicum Species in Northeast India, as a Potential Source for Chilli Crop Improvement, Journal of Agriculture and Forest Meteorology Research JAFMR, 2(2): 77-83, Published March 26, 2019.

[7] M. Chinnadurai, V. Kavitha*, S. Angles and R. Sangeetha "Economics of turmeric cultivation in Erode district of Tamil Nadu Centre For Agriculture and Rural Development Studies,Tamil Nadu Agricultural University, Coimbatore-641 003, Tamil Nadu, India.Received: 03-08-2018 Accepted: 17-10-2018 Agric. Sci. Digest., 38(4) 2018: 293-296

Asian organic sector; taking India as example to the world. The SWOT analysis here emphasis the value of Indian organic sector and the policy implications in domestic and international level.[8]

Pavithra and Nayak (2018) The present study attempts to assess the benefits and perception of farmers in online marketing of dry chilli in Hubballi and Byadgi regulated markets, about 60 online dry chilli farmers and 60 traditional farmers were selected. The descriptive statistics used to analyze the data. Total returns obtained by traditional farmers with Rs.30,585/acre and comparatively less than online farmers were Rs.34,525/acre. Percentage price of commodities across markets in online marketing was more than traditional marketing price. In online marketing the infrastructures like lot entry, adequacy and time price information, wider market area, better price and SMS alert were adequate, gate entry, storage, computers, e-payment were partially adequate. Grading and cold storage were inadequate. Maximum number of traditional farmers preferred progressive farmers for market information followed by friends as source of information. In this article the researcher ignored e-nam system and e-marketing channel completely.[9]

Ajai kumar B *at al*.(2018) wide-ranging research within the last numerous decades has revealed that the major risk factors for most chronic diseases are infections, obesity, alcohol, tobacco, radiation, environmental pollutants, and diet. It is now well recognized that these factors induce persistent diseases through induction of inflammation. However, irritation could be either acute or chronic. Acute inflammation persists for a short duration and is the host defense alongside infections and allergens, while the chronic inflammation persists for a long time and leads to many chronic diseases together with cancer, cardiovascular diseases, neurodegenerative diseases, respiratory diseases, etc. The researcher ignored to discussion about the pesticide residues, aflotoxin and Sudan chemical causing the health effects of human kind.[10]

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[8] M Karthikeyan, Zhou Deyi and Meetha Ram "Analysis of trading opportunities and market trends of organic food products in southAsia to the world: A case study of India" International Journal of Multidisciplinary Research and DevelopmentOnline ISSN: 2349-4182, Print ISSN: 2349-5979; Impact Factor: RJIF 5.72 Received: 17-01-2019; Accepted: 19-02-2019Volume 6; Issue 3; March 2019; Page No. 153-158

[9] Pavithra and Mahantesh R. Nayak "Benefits and Perception of Dry Chilli Farmers in Online Marketing: Experiences from Karnataka State, India"Asian Journal of Agricultural Extension, Economics & Sociology28(4): 1-9, 2018; Article no.AJAEES.45760ISSN: 2320-7027

[10] Ajaikumar B. KunnumakkaraEmail author, Bethsebie L. Sailo, Kishore Banik, Choudhary Harsha, Sahdeo Prasad, Subash Chandra Gupta, Alok Chandra Bharti and Bharat B. Aggarwal "Chronic diseases, inflammation, and spices: how are they linked" Journal of Translational Medicine 201816:14,Published: 25 January 2018

A. J. Kadte at all (2018) Present study was conducted to access the socio-economic distinctiveness of turmeric growers and cost and returns of turmeric production in Sangali district of Maharashtra. Multistage sampling design was used. From Sangali district, six villages from Miraj and Palus tehsil were selected randomly. The information pertaining to the objective was collected from 60 samples of turmeric growers from selected villages. In this article the researcher ignored the problems of the farmers related to production, post harvest management and marketing issues.[11]

P. S. Kale at all (2018) Present study was performed to access the Seasonal indices of monthly arrivals and prices of turmeric in Sangali district of Maharashtra. Multistage sampling design was used. Sangali district was selected purposively because turmeric is grown on large scale in the district and six villages from Miraj and Palus tehsil were selected randomly. The information pertaining to the objective was collected from 60 samples of turmeric growers from selected villages, data pertaining to agricultural year 2022-23. Here the publisher ignored about the value addition of the turmeric, availability of export quality requirements, domestic trade and consumption.[12]

Meena Narendra Kumar *et al.* (2017) the current study was performed on the 90 farmers during 2013-14 in Shirol and Hatkanangale tahsils of Kolhapur district in Maharashtra state. The present study was studied marketing costs, margins and price spread of Green Chilli. The Producer Wholesaler-Retailer- Consumer was the major marketing channel and the producer's contribute to in consumer's rupee was found to be 64.83% in Channel-I, 67.43% in Channel-II and 80.32% in Channel-III. Per quintal cost of marketing of green chilli was highly acquired by retailer pursued by wholesaler/commission agent and village trader. The most important marketing problems were high commission charges (86.67%), high transport charges (86.67%), and price fluctuations (84.44%), in market. In this article the publisher not suggested about which marketing channel is suitable to the farmers who are growing the green chilli, he ignored about Farmers Producer organization to get the better price and bargaining powers.[13]

Sourish Sen *at al*. (2017) This analytical reading on "detection of food adulterants in chilli powder, turmeric powder and coriander powder by means of physical and chemical

[11] A. J. Kadte at all "Economics of Turmeric Production in Sangli District of Maharashtra, India"Int.J.Curr.Microbiol.App.Sci (2018) Special Issue-6: 2279-2284

[12] P. S. Kale1**, D. S. Perke and A. J. Kadte "Dynamics of Arrivals and Prices Behaviour of Turmeric in Sangli District of Maharashtra, India" Int.J.Curr .Microbiol.App.Sci (2018) Special Issue-6: 2275-2278

[13] Meena Narendra Kumar1, Gawade B.B,Dhage Anil Mohan, Shinde H.R,Kumar Rajesh And Gurjar G.N."A Study Of Marketing Of Green Chilli In Kolhapur District Of Maharashtra" Issn: 0975-3710&E-Issn: 0975-9107, Volume 9, Issue 9, 2017, Pp.-3958-3961.

methods." Was visualize and carried out with the objective of identifying the incidence of adulteration in chilli powder, turmeric powder and coriander powder (the major spices used for cooking in India). Various samples of the above confirmed spices were collected from Vellore. In this the researcher totally ignored about whether the products are having cross contamination, fungus, any unwanted colours mixed and pesticide residues are available by testing pesticide residue test, aflotoxin, mycotoxin and Sudan test.[14]

Tim Surmount at *al* (2017) The researcher in his paper mention that there are currently over 170 synthetic cannabinoids monitored by the European Union Early Warning System, making it the single largest group of new psychoactive substances, often marketed as "legal" substitute to cannabis. The Internet, coupled with cheap and competent shipping, has allowed countries like China and India to become the chemical and pharmaceutical wholesalers and retailers to the world. These companies ship synthetic cannabinoids to Europe, where they are processed and packaged into a range of products, smokable herbal combination being the most common one. We found that the return on costs varies between 3.3 and 24.4 after the first production and rises to a range between 5.5 and 42.5. By implementing a basic monetary model, our estimations show that profits in this type of business are considerable. In this article the researcher totally ignored to study the production, productivity, quality aspects and food safety measures and market demand in various places. **Ann M.Kemprph, (2016)** In April and May 2016,in this research article stated that the state of Mississippi competent an extraordinary outbreak of severe response to the drug generally referred to as "Spice." After abundant calls to the Poison Control Center, it became clear that health care providers were mostly extraordinary with the category of artificial cannabinoids. This review article briefly highlights cannabinoid effects, chemical characteristics, and deed for this often-dangerous category of drugs of abuse. In this article the researcher ignored the production and productivity of natural cannabis, quality of the synthetic cannabis and marketing for cannabis and demand product. [15]

Patricia Uberoi (2016) this article takes a critical look at the new Chinese 'One Belt, One Road' (OBOR) or 'Belt and Road Initiative' (BRI) for 21st century Eurasian connectivity and economic incorporation from the perception of the projected Bangladesh–China–India–Myanmar

[14] Sourish Sen, Partha Sarathi Mohanty and Suneetha V,"Detection of Food Adulterants in Chilli, Turmeric and Coriander Powders by Physical and Chemical Methods" Research journal of Pharmacy and technology. 10(9):3057-3060 · September 2017

[15] Ann M.KempRPh, MDabMolly S.Clark PhD, ABPPcThomasDobbsMD, MPH" Top 10 Facts You Need to Know About Synthetic Cannabinoids: Not So Nice Spice"The American Journal of Medicine Volume 129, Issue 3, March 2016, Pages 240-244.e1

Economic Corridor (BCIM-EC). The BCIM-EC is a sub-regional cooperation mission that aims to link the land-locked provinces of southwest China with eastern India and the Bay of Bengal through northern Myanmar, India's northeast region, and Bangladesh. However, within months of being mooted in May 2013, the BCIM-EC was yoked to another connectivity plan, the China–Pakistan Economic Corridor (CPEC), and the two encompassed within President Xi Jinping's grand vision for a new overland and maritime Silk Road. As of now, India has (i) endorsed the BCIM-EC, (ii) rejected the CPEC and (iii) maintained studied silence on the OBOR proposal per se. Where does that conundrum leave the BCIM-EC? And to what extent, if at all, can India leverage OBOR to its own benefit. In this article the researcher totally ignored about the country requireedments and needs bilateral agreements.[16]

Kanthe (2016) the researcher analytically mentioned that due to globalization there is a greater than ever need for agricultural marketing. This study consists of marketing of turmeric in Sangli district. In Sangli procuring and trading facility and online marketing is available. Recognizing potential customer and trading facility is a problem. Agricultural marketing systems and products are needed to be modernized and reoriented to meet the needs arising from the globalization process, new initiatives and measures will be required to be identified and attended to by globalization and agricultural marketing. In this article the researcher totally ignored the quantity of material available in the market and quality of spices available to meet the international standards.

Shree Kanungo (2015) Turmeric is grown as a Kharif crop in India. The crop-harvesting season starts offevolved between give up of January and March in India. The united states of america is the main producer, customer and exporter of turmeric in the world. It has close to monopoly in this commodity. Indian turmeric has been regarded to the world on account those olden times. India accounts for 78% of world turmeric production and it contributes 60% to the world market. Major turmeric developing states are Andhra Pradesh (57%), Tamil Nadu (23%), Karnataka (6%) and Orissa (4%). In this article the researcher left out the first-class standards required for worldwide exchange.[17]

Marijke vander at al. (2015) in his research presentation he pointed about **t**ropical spices has long been utilized in ordinary remedy and cuisine. New archaeological evidence highlights

[16] Patricia Uberoi" Problems and Prospects of the BCIM Economic Corridor", Volume: 52 issue: 1, page(s): 19-44, January 21, 2016;

[17] Shree Kanungo"Influence of Market Arrival on Price Formation of Turmeric inKandhamal District of Odisha"IOSR Journal of Business and Management (IOSR-JBM) e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 17, Issue 1.Ver. I (Jan. 2015), PP 01-05

temporal modifications in the nature and scale of the antediluvian spice change and in the historical usage of these plants. Furthermore, a find out about of their 'materiality' highlights that the have an impact on of spices extends beyond their fabric properties. Here the botanical the rest of spices recovered from archaeological excavations at a port energetic in the Roman and medieval Islamic spice trade are evaluated. Here the researcher completely unnoticed in his find out about that demands and supply of excellent spices and types spices need in cutting-edge scenario.[18]

A. Siva Sankar (2014) in his research thesis find out that 'Domestic and Export Competitiveness of essential Agricultural Commodities in Andhra Pradesh', worked on the presentation of regulated agricultural advertising system as it genuinely analyses the extent of market course of farmers and the competitiveness of agricultural commodities both in the domestic and worldwide markets. Except chillies and turmeric, the other foremost commodities exhibited advantageous traits in prices. Researchers stated that farmers were now not in a role to reap higher returns from the agri-business. Lack of sufficient storage facilities, scientific grading facilities, processing facilities, expert transportation facilities, bad advertising and marketing statistics community etc., are nevertheless historic and everyday problems affecting our home trade. Here the researched omitted the problems faced with the aid of the farmers like, in enough savings facilities, too many market intermediaries and lack of recognition about the fee brought spices.[19]

Kalidas (2014) in their research analysis learn about concluded nearly all farmers promote their produce to the wholesalers and in addition propose that efforts should be made to take up better packing techniques and Produce at farm level. Here

the researcher unnoticed the extra cost addition and specific marketing channel for selling of the produce after harvesting.[20]

Yogesh, M. S (2014) in this analytical paper assignment to understand the growth of Indian export and importing spices, The statistics of export and import for eight years from the year 2005-06 to 2018-19 of essential spices such as Cumin, Ginger, Fenugreek, Chilli, Cardamom, Curry powder, Coriander, Turmeric, Oil & Oleoresins, Garlic & Mint merchandise for analysis.

[18] MarijkeVander Veen Jacob Morales, "The Roman and Islamic spice trade: New archaeological evidence"Journal of Ethnopharmacology Volume 167, 5 June 2015, Pages 54-63 Marketing. 24(1): 26-37.

[19] Dr.A. Siva Sankar and Dr. K. Nirmal Ravi Kumar "Domestic And Export Competitiveness Of Major Agricultural Commodities In Andhra Pradesh– A Case Study, International Journal of Advanced Research (2014), Volume 2, Issue 2, 196-205

[20] K. Kalidas & K. Akila (2014), Micro level investigation of marketing and post harvest losses of tomato in Coimbatore District of Tamilnadu. Journal of Stored Products and Post harvest Research, 5(1), pp.1-7

Compound Annual Growth Rate tool is used to analyze the statistical data. India is acknowledged as the domestic of spices and boasts of a lengthy history of buying and selling with the historical civilizations of Rome and China. Here the researched only concentrates about the export and import only, he did no longer strive the vicinity underneath cultivation, productions of primary spices in India and its home consumption levels.[21]

Meena (2014) in their research article concluded that there was mild disparity between proper fee and forecast expenses of mustard seed and mustard oil. The forecasted cost of mustard seed and oil showed an developing fashion of fees in chosen markets. The lookup solely included about the forecast costs and completely ignored the present domestic and worldwide prices of the spices whole, grounded and fee delivered spices.[22]

Bhavani Devi *(2014)* in this analytical report there was growing style within the costs of chillies within the chosen market and was once located to be statistically imperative at five per cent stage of consequence. The seasonal index used to be most in Dec with 108.52, whereas in Gregorian calendar month it truely was once with 104.60 and additionally the worth indices ranged from ninety two.52 to 102.94. That chilly prices rectangular measure subjected to high irregular versions for the duration of the amount of study. Here the scientist no longer studied the whole spices unfold for the final 10 years to search out out the rating style and arrivals chilly into the APMC markets. [23]

Karthik (2013) In their research review studied the resource-use potency and technical potency of turmeric production. Primary information were collected from ninety turmeric growers spreading over 3 blocks in Dharmapuri district of Tamilnadu. The study discovered that planting material, nitrogen, potash, gathering value, natural action value, machine hours and irrigation had a positive and important influence on turmeric yield. Non-availability of labour had been reportable the foremost production constraint by the turmeric growers. Here the scientist utterly unheeded the foremost constraints long-faced by the farmers square measure spurious seeds, in

[21] Yogesh, M. S & S. Mokshapathy"Growth Of Indian Export And Import Of Spices" International Journal of Humanities, Arts,Medicine and Sciences (BEST: IJHAMS), ISSN 2348-0521Vol. 2, Issue 9, Sep 2014, 41-46.

[22] G. Mohan Naidu*, V. Meena Kumari And V. Srikala1 "Behaviour Of Marketarrivals And Prices Of Red Chillies(Capsicum Annuum)" vol. 14 no. 1, 2014 pp. 511-519

[23] I Bhavani Devi, M. Srikala* and T. Ananda"Price behaviour of chillies in Guntur market of Andhra Pradesh, India"DOI: 10.18805/ijare.v50i5.3750 Page Range: 471-474

ample credit facilities, lack of awareness concerning the market info and different government programs designed for farmers.[24]

Sajith (2013) the researcher studied the promoting of Bharat spices as a challenge in India. 3 districts of Kerala particularly Idukki, Wayanadu and Malabar were studied as these districts had the favorable agro-climatic conditions for spice cultivation and were in shut proximity to the markets and located out that low productivity within the spice sector is one amongst the intense issues facing the Indian spice business. Poor product quality at farm level, insufficiency of legal provisions, inadequate surplus for exports light quantities of quality spices were the another drawback obstructive affordable worth realization by the turn out. The investigator unnoticed here the farmer's problems like market linkage, sufficient credit convenience, middle man involvement, sufficient cold chain issues. [25]

Kiruthika, (2013) the research writer has created a study entitled "The political economy of production of turmeric in India: A case study of Erode district of Tamilnadu". During this study, in sight of the economic importance of turmeric in each national and farm economy and therefore the issues visage by farmers in production and selling of turmeric was obsessed with the particular objective to check the political economy and input use potency in production of turmeric in Erode district of Tamilnadu. The findings of the study and therefore the conclusions drawn have gotten bound specific implications for the policy problems. Hence, the USDA of the regime and therefore the development agencies should organize for coaching programs to form the farmers conscious of applicable use of inputs. Here the research worker neglected the number of output and quality material offered, whether or not its domestic value or international trade costs and he conjointly not touched regarding the assembly and productivity of turmeric in his study.[26]

S.B. Gowdappa (2013) in their analytical study 'Technological Gap in Chilli Cultivation perceived by Farmers', studies about the technological gap in adoption of Chilli farming practices in Gulbarga district of Northern Karnataka during 2012. By following the simple random sampling, a sample size of 120 respondents was selected from six villages and ex-post-facto research design was used for the study. The findings exposed that 45.83% of farmers had medium

[24] V. Karthick, T. Alagumani and J.S. Amarnath" Resource–use Efficiency and Technical Efficiency of Turmeric Production in Tamil Nadu — A Stochastic Frontier Approach" Agricultural Economics Research Review Vol. 26(No.1) January-June 2013 pp 109-114

[25] Sajith Mohan, Sheena. S.Rajan, Unnikrishnan.G "Marketing of Indian Spices as achallenge in India" International Journal of Business and Management InventionVolume 2, Issue 2, February. 2013, pp.26-31.

[26] Kiruthika, N. "The economics of production of turmeric in India: A case study ofErode district of Tamilnadu", Journal of Innovative Research and Solutions (JIRAS),Volume.1- Issue No.1- July –Dec 2013, pp.23-30.

technological gap followed by high technological gap (30.83%) about the Chilli crop growing practices. The researcher not touched the important elements for technology gap that is better and remunerative prices for even they follow best practices and marketing linkage facility also missed in this study.[27]

Julia Meaton *at al* (2013)Value chain analysis (VCA) has been used by an ongoing project in south-west Ethiopia to explore how a spice, korerima, can be developed to increase forest value and enhance sustainable forest livelihoods. The Ethiopian government has identified the spice sector as having economic growth potential within its strategy for commercializing agriculture but the VCA identifies significant challenges that need to be addressed to achieve this. In this research they ignored to study the demographic conditions of the people living in forest areas, forward and backward linkages, formation groups for better implementation of programs.[28]

Aloysius Edward. (2013); in their research article 'Price Discovery Process and Volatility Spill over of Chilli spot and Futures Prices Evidence from National Commodity and Derivative Exchange Ltd (NCDEX)', authors talked about the importance of the commodity derivatives. As around 57 per cent of population is employed in agriculture sector, they talk about the agriculture role if India wants to achieve 8–10 per cent growth. India is among the top five producers of most of the commodities besides being the major consumer of agriculture, bullion and energy products. This paper discusses on chilli production, export and import trends. It also examined the price discovery mechanism and causality in between and futures markets using Co integration and Vector Error Correction Model (VECM) for the period from 1st April 2006 to 31st March 2013 for the National Commodity and Derivatives Exchange Ltd. In this article the researcher not touched about the infrastructural facilities and knowledge about the future trade to the farmers in the villages.[29]

Soumya Mukesh (2013) In his research article, 'The Role of Derivatives in the Commodity Market', discussed the history of commodity by-product market in India. The Author examined about the reintroduction of commodity spinoff markets and the cutting-edge trends, sturdy boom

[27] S.B. Goudappa, G.S. Biradarand Rajeev Bairathi"Technological Gap In Chilli Cultivation Perceivedby Farmers" Raj. J. Extn. Edu. 20 : 171-174, 2012

[28] Julia Meaton Biniyam Abebe Adrian P. Wood "Forest Spice Development: the Use of Value Chain Analysis to Identify Opportunities for the Sustainable Development of Ethiopian Cardamom (Korerima)"04 October 2013 https://doi.org/10.1002/sd.1563

[29] Aloysius Edward .J and Narasimha Rao T.V"Price Discovery Process and Volatility Spillover of Chilli spot and Futures PricesEvidence from National Commodity and Derivative Exchange Ltd (NCDEX)",IJEMR –December 2013-Vol 3 Issue 12 .and prices of green chillies in Punjab. Indian Journal of Agricultural

workable of the market, the genuine increase path, and the attitude of the coverage creator and the effectiveness of the regulatory mechanism. Author said that spend immediately in the agricultural products and commodities offers the investor a share in the commodity mechanism of the country's production and consumption.. Here the researcher overlooked to contact the factors about fee fluctuations and infrastructure facility and administration talent available.[30]

Biradar (2013) in their research analytical study, 'Socio Economic Profile of Chilli Farmers and their constrains in Chilli farming in North Eastern districts of Karnataka', concentrating on technological gap in adoption of chilli cultivation practices in Raichur and Yadgir districts of North Eastern Karnataka at some stage in 2017-18 based on most place below chilli cultivation. And the foremost submission made via the respondents have been minimal aid fee be fixed for chilli (86.67%), accompanied via market must be nearer, (65.83%), must furnish accurate satisfactory of inputs at right time at suited rate (54.16%).Here the researcher completely overlooked the production, consumption and export portion and first-rate and quantity reachable in the market.[31]

Shivaraja (2012) studied the value of cultivation of chilli in Haveri district of Karnataka; the effects printed that place under chilli in Haveri district used to be displaying a decreasing vogue over the years. The whole value of cultivation of chilli per hectare was worked out to be 39343.92. The internet return per hectare received by using farmers was 19589.86.[32]

Mahendra Dev (2012) in his research paper ' Small Farmers in India: Challenges and Opportunities', examines the roles and challenges of small protecting agriculture in India. It cover up trends in farming growth, cultivation patterns, participation of small conserving agriculture, productiveness overall performance of smallholders, connecting small holders with markets collectively with price chains, position of small holders in desirable food protection and employment generation, differential insurance policies and institutional assist for small holders and challenges and future preferences for small preserving agriculture including data needs.[33]

[30] Soumya Mukesh (2013) "The Role of Derivatives in the Commodity Market" ASM's International E-Journal of Ongoing Research in Management and IT, e-ISSN: 2320-0065, INCON VIII- 2013, pp.1-8.

[31] Biradar, G. S.; Chandrgi, D. M.Socio Economic Profile of Chilli Farmers and their Constraints in Chilli Cultivation in North Eastern districts of Karnataka.Research Journal of Agricultural Science . Sep-Dec2013, Vol. 4, p661-666. 6p.

[32] Shivaraja (2012) "Production And Value Addition To Chilli In Northern Karnataka - An Economic Analysis"

[33] S.Mahendra Dev "Small Farmers in India: Challenges and Opportunities" WP-2012-014

Falgun A. and Kaneriya (2012) has presented an article entitled "Marketing of Spices". The article concluded that, as per the terminology on spices organized by means of the Bureau of Indian Standards, there are sixty-three spices produced in India. Today, India has a unique function in the global spice situation as the greatest producer, patron and exporter of spices and spice products. Indian spices market is already developed and developing. There are so many opportunities and scopes to boost spices market in overseas also.[34]

Mary (2012) in her thesis "Role of Spices board in the cultivation and export of spices:A study with particular reference to Kerala" she studies the origin and growth of spices Board, cultivation, marketing practices, organic farming , value addition and trends, problems of growers and traders. In this research thesis the researcher not touched about demand and supply of spices, domestic and international trade trends, and quality standards needed for this.[35]

Singh (2012) he carried out in their analytical study that learns about on manufacturing and marketing of turmeric in Punjab. For this find out about a pattern of 15 growers which have been selected randomly from the listing of turmeric grower taken from FAPRO. The consequences of learn about published that human labour, costs on suckers and computing device labour were the fundamental fee contributing 31, 30 and 23percent of the whole variable cost. The complete variable value came out to be `66304 per hectare while gross return on an average state of affairs had been estimated as `137322 per hectare on the sample farms. Hence return over variable cost got here out to be `71078 per hectare. The benefit-cost ratio was 2.07 which indicated that rupee one invested would yield greater than double the amount. Further the research revealed that the constraints confronted through the turmeric growers were; extreme infestation of weeds, seed availability, shortage of FYM and labour, lack of marketing statistics and tremendously unstable expenditures.[36]

Nitin W. Jaswante (2012) presented an article entitled "Economics of turmeric expenditures with recognize to time series". This paper describes the implementation of the time Series to study the trend of 5 year costs of turmeric. The nature of information indicates fluctuation in the prices. It suggests its Cyclical Nature and Seasonal variant generally by using gazing the massive data. So, in total it is a five 12 months cycle. Three year's fees go up and two years prices

[34] Falgun A and Kaneriya"Marketing of Spices".2012.

[35]Mary P.U " Role of Spices board in the cultivation and export of spices:A study with particular reference to Kerala" PhD thesis from The Cochin College, Kerala,2012.

[36]Singh Et Al "An Economic Analysis Of Turmeric Cultivation In Punjab"2012

go down. It can be utilized with the aid of farmers for sowing purpose. So, that economically they will be benefitted.[37]

Shree Kanungo, (2012) in this research paper has made a learn about entitled "Marketing of Turmeric and Economic development at Kandhamal. It is discovered from the above analysis that Turmeric has a awesome export plausible and it can be a perennial source of foreign exchange hunt. But we have not been able to take advantage of this scope on account of the unorganized advertising practices accompanied in Kandhamal, Orissa. Kandhamal stands to be the solely nation subsidized geared up advertising channel working under the ambience of the cooperative society . The introduction of a advertising chain in imparting the facility for advertising the uncooked turmeric and turmeric products enlarge the employment doable and assist in generation of extra income which will sooner or later change the fashionable of dwelling of the tribals of Kandhamal. This can also be a mainstay of the tribal development.[38]

C. Tholkappian and P.B. Rukmani devi (2012) in their article entitled "Economic Analysis of Organic and Convectional Turmeric Cultivation of Erode District in Tamilnadu", concluded that, the organic farming organic turmeric has been determined quite profitable in the study location and has presented a number of advantages as compared to these by traditional farming. Although organic requires extra human labour, price of cultivation has been located lower due to financial savings on chemical fertilizers, irrigation, seeds and agrochemicals. Cultivation of turmeric with natural farming device is costing Rs.33,630 per acre. This is Rs.1203 per acre greater than the value of cultivation underneath conventional agriculture. It has been suggested that organic farming should acquire prime interest from all the stakeholders to recognize its full achievable in growing profitability and imparting the much sought after sustainability of agriculture.[39]

Jajetiravi (2012) in their research paper stated that farmers switched to cotton from chilli due to the fact of cotton expenditures have been extra secure than chilli prices. Farmers have been probable to shift to cotton or cereals due to lower returns from chilli..[40]

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[37] Nitin W. Jaswante **"**Trends in arrivals and prices of turmeric in major markets of marathwada region"2012

[38] Kanungo,Shree.. 2012. Marketing of turmeric and economic development at kandhamal. The International Research Journal of Economics and Business Studies. 1(6):37-40

[39] C.Tholkappian and PB. Rukmani devi "Economic Analysis of Organic andConvectional Turmeric Cultivation of Erode District in Tamilnadu" IBMRD'sJournal of Management & Research, June 2012, pp.28-34.

[40] Jijetiravi At All "A Study On Market Dynamics Of Byadgi Chilli In Karnataka" 2012

Krishnan (2012) in his research thesis "Impact of WTO on spices sector in India-an econometric analysis" he critically analysed regarding trends in area, production and productivity of spices, director and magnitude of export of spices, major determinants of spices production and impact of reforms non spices. In this research report he ignored to study the major spices exports quality, hygienic , food safety matters, domestic and international consumption.[41]

Hoogar (2012) in their research journal they carried out a survey regarding expansion of Bt cotton over chilli. Study published that drastic enlarge in Bt cotton region was observed in Haveri district which is one of the vital crops cultivated in the district.[42]

Mane et al. (2011) the researcher investigated the economics of turmeric production in Sangli district of Maharashtra; the effects printed that use of hired human labour used to be extra than household human labour in turmeric production. The use of hired human labour, bullock labour and computer labour, elevated with an extend in farm size. Whereas, the use of seed, FYM, nitrogen, phosphorus, potash, household human labour diminished with an expand in farm size. Per hectare internet earnings was once 352053.97 in small farm followed by way of 344388.94 and 333662.36 on medium and massive farm, respectively. The output-input ratio was once 2.23 on small farm observed by means of that of 2.21 and 2.18 on medium and massive farm, respectively. Per quintal value of production in turmeric used to be 1475.75 on small farm followed by1485.46 and 1501.09 on medium and large farm, respectively.[43]

Dr. Kedar nath Mukherjee (2011) In their research review mentioned about the influence of commodity derivatives on commodity market and he said that without the well-established fact towards the requirement of market primarily based instrument, there is continually been a doubt, as expressed by using one-of-a-kind bodies, on the usefulness and suitability of futures contract in developing the underlying agricultural commodity market, specially in agricultural primarily based financial system like India. He made an attempt to re-validate the have an impact on of futures trading on agricultural commodity market in India. ve. The experiential findings considerably shows that comparative gain of futures market in disseminating information, leading

[41] S.Krishnan " Impact of WTO on spices sector in India-an econometric analysis" PhD thesis from Manhatma Gandhi University, Kottam, Kerala,2012.

[42] Hoogar "Study On Market Dynamics Of Byadgi Chilli In Karnataka"2012

[43] Mane et al. (2011) Economics of Turmeric Production in Sangli District of Maharashtra, India ISSN: 2319-7692 Special Issue-6 pp. 2279-2284

to a vital charge discovery and chance management, that can again help to correctly enhance the underlying commodity market in India.[44]

Angles (2011) in research paper they take a look at the manufacturing and export overall performance of turmeric in India from 1974-75 to 2013-14 and determined that boom in area, manufacturing and productiveness from1974-75 to 1990-91 (pre-liberalization period) have been 3.41, 7.97 and 4.40 per cent, respectively and from 1991-92 to 2013-14 (post-liberalization period) have been 1.88, 3.42 and 1.50 per cent, respectively. The growth price in place production and productivity were found greater at some stage in pre liberalization length than post liberalization duration due to steadiness in region under turmeric. It was once also recorded that growth charges in the durations were advantageous and significant.[45]

Bhardwaj(2011) in their research article carried out a find out about on challenges and constraints of advertising and export of Indian spices. Judgmental and Snowball sampling approach used to be utilized for choosing pattern shape universe. The pattern size was decided based totally on availability and constraints and discovered out that low productivity, terrible product quality, insufficiency of felony provisions, disappearing of indigenous variety, terrible post-harvest dealing with and agricultural extension used to be no longer market-oriented had been the everyday problems. The problems of exporters have been inadequate surplus for export and inadequate portions of quality spices.[46]

Manivannan (2011) in his research review has made 'An Analysis on Production And Marketing of Turmeric and Chilli in Erode District'. The learn about deals with the production and advertising of Turmeric and Chilli in Erode district. The Turmeric and Chilli growers struggling with problems on a number aspects like monsoon failures, lacks of technology, storage problem, troubles with personal vendors and intermediaries. To study the factors influencing production and marketing of Turmeric and Chilli. The chi-square test additionally indicates the relationship between location of land allocated exclusively for Turmeric and Chilli cultivation and quantity of Turmeric and Chilli produced.[47]

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[44] Dr. Kedar nath Mukherjee"Impact of Futures Trading on Indian

[45] Angles et al(2011) Impact of Globalization on Production and Export of Turmeric in India â€“ An Economic Analysis" ISSN 0974-0279

[46] Bhardwaj et al (2011) "Challenges and Constraints of Marketing and Export of Indian Spices in India International Conference on Technology and Business Management March 28-30, 2011 739

[47] Dr. L. Manivannan, "An Analysis on Production and Marketing of Turmeric and Chilli in Erode District" International Journal of Research in Computer Application & Management, Volume No: 1, Issue No. 5,July, 2011, pp.88-90.36

Mane (2011) in this research paper the researcher carried out a study at some point of the 12 months 2009-2010. Multistage sampling format was once adopted for the decision of district, tehsil, villages and cultivators. The 60cultivators had been chosen for existing study with equal distribution in small, medium and giant farms groups. The results of study published that use of employed human labour was once greater than family human labour in turmeric production. The output-input ratio was 2.23 on small farms followed by using 2.21and 2.18 on medium and giant farm, respectively. Per quintal value of production in turmeric was`1476 on small farm accompanied by `1485 and `1501 on medium and massive farm, respectively.[48]

S.Angles (2011) in their research paper entitled "Impact of Globalization on Production and Export of Turmeric in India – An Economic Analysis", the study analyze of the price of boom in export and path of exchange in turmeric in India has published that the growth of turmeric export is fine but the route of trade offers a warning. The liberalization and globalization had a well-defined affect on the turmeric export and this gives a wonderful signal. Appropriate export promotion strategies and insurance policies have to be advanced to hold the market share of Indian turmeric.[49]

Senthil kumar (2011) in their research review about entitled "contact of interntional on Production and Export of studied the issues in spices production and advertising (Turmeric and Chilly) in Erode District. Due to negative literacy, they have been very weak in advertising and marketing their products. The majority of spices (turmeric and chilly) growers depended solely on intermediaries to sell out their products.[50]

Gyati Riku (2011) estimated the increase fee in area, manufacturing and productivity of ginger in Meghalaya throughout 1998-99 to 2013-14, the consequences of the find out about printed that the region under ginger (2.35%) and production (1.58%) confirmed a tremendous growth charge while the productiveness of ginger confirmed a declining style over the yr (-0.78%).[51]

[48] Mane et al "Economics of turmeric production in Sangli district of Maharashtra,Agriculture Update | Vol. 6 | Issue 2| May, 2011 | 34-37

[49] S. Angles, "Impact of Globalization on Productionand Export of Turmeric in India – An Economic Analysis" Agricultural EconomicsResearch Review, Vol. 24, July-December 2011, pp.301-308.

[50] C. Senthil Kumar "An Analysis on Production and Marketing of Turmeric and Chilli in Erode District" International Journal of Research in Computer Application & Management, Volume No: 1, Issue No. 5,July, 2011, pp.88-90.36

[51] Gyati Riku et al. (2011) estimated the growth rate in area, production and productivity of ginger in Meghalaya.

Veeranna gouda (2011) studied the increase rate state of affairs of chilli in northern Karnataka. The study published that northern Karnataka as a entire registered advantageous compound increase rate for region (13.76%), manufacturing (13.88%) and productiveness (12.20%). These registered values had been no sizable at each ten and 5 per cent degree of significance.[52]

Meena *et al.* (2011) studied the trends of arrivals of rapeseed-mustard that showed good sized expand over a length of time. In Alwar market, the style of arrivals of rapeseed-mustard confirmed a non-significant expand over a duration of time. With regard to vogue in prices, a widespread upward jostle in prices of rapeseed-mustard in all the chosen markets viz. Alwar, Khairthal, Sri Ganganagar and Raisinghnagar markets used to be witnessed.[53]

Thirumalesh (2011) In his thesis " A study on the economic efficiency of chilly growing formers in Kurnool District" the research reporter critically analysed about the existing literature efficiency of chilliis & Turmeric, social and economic status of chilli growing farmers, resource allocation for chilli growing areas and marketing efficiency of chilli growing farmers. In his PhD thesis he totally ignored about the area and production, quality aspects and traders and exports information also neglected.[54]

Raviachandran and Bhanumathy (2011) in their analytical study suggested that linear vogue in chilli arrivals and costs used to be observed which had inferred that there is reducing fashion in arrivals and increasing style in prices. The average price index was once excessive (109.35) lean season and it used to be less in peak season which used to be 97.[55]

Suresh Dhas (2011) in his thesis "Cost benefit analysis of chilly cultivation in Ramanathapuram District" he studied on chilli cultivation practices and socio-economic conditions of chilli growers, analysed trend, growth of area, production and productivity of chilli growers, he estimated the cost-benefit structures in production of chilly cultivation, he critically analysed structural differences chilly. In this research thesis the reporter totally omitted the chilli quality aspects like

[52] Veeranagouda et al. (2011) studied the growth rate scenario of chilli in northern Karnataka.

[53] Mane U. S., R.B. Changule, P.L. Kolekar and S.H. Gharge (2011). An economic analysis of turmeric arrivals and price behaviour in Sangali district of Maharashtra. International Journal of Commerce and Business Management, 4 (2): 224-227.

[54] Bulla Tirumalesh "A study on the economic efficiency of chilly growing formers in Kurmool District" PhD thesis from Sri Krishna Devaraya University,Anantapur,2011.

[55] Ravichandran, S and Banumathy, V. (2011). A study on trend in area, production and price movement and marketing strategies of chilli in Guntur district, Andhra Pradesh. Indian Journal of Agricultural Marketing. 25: 64-71.

Aflotoxin, sudan, pesticide residues, salmonella and other micro organisms which are more important for international trade. [56]

Rohatash K. (2011), the researcher has made a research on "Challenge sand Constraints of Marketing and Export of Indian Spices in India" and it concluded that the Spices of India are being attracted by means of the consumer's, both in the home as nicely as in the international market. Several types of spices are grown in India for the reason that time immemorial, it is because of this he United States is regarded to the world as "The Home of Spices". India is the biggest producer as properly as the customer of the spices in the world. On the one hand they have to deal with heaps of small scale farmers (usually via intermediate traders) who favor a appropriate price for their produce. On the different hand, exporters need to deliver merchandise that complies with best necessities and increasingly with social and environmental standards of unstable markets. This requires costly fantastic management systems and training of farmers.[57]

Ramanathan. G. (2011) the researcher has made a study entitled "Performance and prospects of turmeric exports in India". The study attempts to look at the export performance of turmeric in India. The consequences of the learn about indicated that export of turmeric in extent and fee have been effective and big with 6.52 per cent and 12.72 per cent per annum from 1990-91 to 2005- 06, respectively. The item- wise exports of turmeric printed that the biggest share used to be of powdered structure i.e.42 per cent in global trade. U.K. was the principal destination of powdered structure of turmeric contributing 17 per cent in price of complete exports. U.S.A. used to be the biggest importer of dried turmeric and accounted for 19 per cent of the whole cost of exports. The primary vacation spot of oleoresins of turmeric used to be USA accounting for 17 per cent of the cost of exports.[58]

Krishnadas M. (2010) In their analytical study he has made a find out about entitled "Performance and potentialities of turmeric exports in India". The study tries to observe the export overall performance of turmeric in India. The consequences of the learn about indicated that export of turmeric in his find out about "Production and Export Performance of Major Indian Spices - An Economic Analysis" The revealed that the growth in location beneath chilli was determined to be negative, while production confirmed growing increase due to elevated productivity. Productivity

[56] S.Suresh Dhas "Cost benefit analysis of chilly cultivation in Ramanathapuram, District" PhD thesis from Alagappa University, Karaikudi, Tamilnadu, 2011.

[57] Rohatash. K. Bhardwaj, B. K. Sikka, Ashutosh Singh, M. L. Sharma, N. K. Singh, Rahul Arya, "Challenges and Constraints of Marketing and Export of Indian Spices in India", International Conference on Technology and Business Management, March, 2011, pp. 28-30.35

[58] Ramanathan. G. (2011) Has Made A Study Entitled "Performance And Prospects Of Turmeric Exports In India".

and area should be stabilized through crop insurance plan scheme for spices to shield the producers from charge fluctuations. Appropriate measures ought to be taken to increase and stabilize the export income from spices.[59]

Ishwara (2010) in his research review he stated that in Byadgi vicinity have been coldstoragestorages storing red chilli, Chilli seeds, Chilli powder, Tamarind, Jeera, Dania, Turmeric, Sunflower, ginger, Channa, Flower seeds etc,. However 80 per cent of each cold storage was once filled with the red chilli due to the existence of widespread and sizeable pink chilli market yard in Byadgi. It is famous as the 2d biggest chilli dealing market in the country. Chilli businessmen and farmers growing pink chilli are the foremost clients of coldstoragestorage units.[60]

Singh(2010) in his review article he published that the expenses of chilli in Amritsar market exhibited an growing vogue the place as in Patiala market it confirmed the declining vogue for the duration 1994-95 to 2005-06. The seasonal nature of chilli crop creates glut in the market at some stage in the publish harvest season which leads to sharp fall in expenses and impacts the produce adversely in each the Amritsar and Patiala market.[61]

D.Srinivasa Rao (2009) the research reporter in his thesis "An Econometric analysis of spices exports from India" he analytically studied about the trends in growth and instability of Indias spices, major factors determining the exports of spices, very significant external that influencing the instability and spurious regression by tackling the non-stationary problems. In this research thesis the reporter has not mentioned about the area under cultivation of spices, production details, trading scenario of spices and their problems.[62]

Muruganandhi (2008)in their research journal it is learn about on "A Study on the Direction of Trade in the Indian Turmeric Exports: Markov Approach" observed ant the wonderful and great increase in export quantity and fee which shows that there exists desirable demand for the Indian Turmeric in the overseas markets. Moreover, the greater unit cost fluctuations had created increased instability in the export cost and the USA and Malaysia were steady markets for Indian Turmeric and others had been regarded to be non secure with low transitional chance

[59] KRISHNADAS M."Production and Export Performance of Major Indian Spices – An Economic Analysis"See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/215461029

[60] ISHWARA P., (2010), Entrepreneurial opportunities in food processing units (with special references to Byadgi red chilli cold storage units in the Karnataka state), Annals of the University of Petrosani, Economics, 10(1), 2010, 119-128

[61] Singh, G., Chahal, S.S and Kataria, P. 2010. A study on behaviour of arrivals

[62] D.Srinivasa Rao "An Econometric analysis of spices exports from India" PhD thesis from Nagarjuna University, Guntur 2009.

intention. It was recommended that the gorgeous positioning and pricing techniques ought to be used to toughen India's function in the unstable markets.[63]

Vandana (2008) the researcher has reported that chilli cultivation depended on farmer saved seeds. The farmers largely depend upon two primary regions for grant of seeds – one in Karnataka itself referred to as Byadgi and the other was once Guntur (Andhra Pradesh). The researcher here he ignored the quality of seeds and germination percentage and production quantity.[64]

Shivashankar.K (2007), in his thesis 'Marketing of Dry Chillies In Karnataka-A Management Appraisal', researcher cited that Agricultural advertising in India has now not received as lots interest as that in the discipline of agricultural production. For the farmer, disposal of his produce has end up as essential as the adoption of modern-day production technological know-how in enhancing yield levels.. Researcher rates that 'the instability in yield and expenses extra in the case of industrial crops, which has posed a serious trouble in generating steadiness in profits of the farmers'. In this the researcher neglected the core area of area and production and domestic and foreign market trends.[65]

V **Nagesh Kumar (2005)** the research in his analytical study he attempted to map the one of kind elements that are possibly to form the pattern and magnitude of India's exports over the coming two decades. According to him the factors that affect the demand for exports are: growth overall performance of World Economy and key buying and selling regions, WTO agreements, Preferential Trade Arrangements, trade prices etc. The factors that affect the supply of exports are: infrastructural bottlenecks, increase of domestic demand, overseas direct investment, technological up gradation, tariff and non-tariff barriers.[66]

S.Angels and S.B.Hosamani (2005) examined the instability in area, production and productivity of turmeric in selected South Indian states viz. Andhra Pradesh, Tamil Nadu, Karnataka and Kerala thinking about the length from 1979-80 to 1998-99. Hazell's decomposition model used to be used for the analysis. The future development programmes should envisage stabilization of yield, which would stabilize production. Evolving area specific varieties, adoption of modern cultural practices and intensive cultivation were some of the recommendations for

[63] Muruganandhi D "A Study on the Direction of Trade in the Indian Turmeric Exports-Markov Chain

[64] VANDANA SHIVA, 2008, Seeds of Suicide, the Ecological and Human Costs of Globalisation of Agriculture, Research Foundation for Science, Technology and Ecology, 2008.

[65] Shivashankar K,' Marketing Of Dry Chillies in Karnataka-A Management Appraisal.' Ph.D.

[66] Nagesh Kumar 'Mapping of India's Export performance' RIS Discussion Paper, 37/2005, New Delhi. (2005)

stabilizing productivity of turmeric.In this article the researcher completely omitted the value addition and extraction of oils for better marketing.[67]

Suryavanshi (2005) in his thesis "A study of Marketing of Turmeric in sangli District-problems and products" he studied about the turmeric cost of cultivation and marketing, profitability of the turmeric, channel of turmeric marketing and price spread, arrivals and prices of turmeric in APMC, impact of forwarding exchange, price stability, stock mobility and reduction cost of distribution of turmeric. In this thesis the researcher totally uncared about the area, production, the domestic and foreign market supply and demand, quality parameters needed for international trade.[68]

Bhullar (2005) in their research article he studied the developments in manufacturing of dry chillies in India and observed that Andhra Pradesh, Karnataka, Maharashtra and Orissa put together account for 75 per cent of the whole Indian production. Punjab state occupied 3.10 per cent of vicinity and was ranked eighth in the course of 1974-77, which lowered significantly to only0.46 per cent in 1998-2001. Production-wise, Punjab accounted for 4.61 per cent of production at some point of 1974-77, which fell to 0.74 per cent during 1998-2001. There has been sizeable enchancment in the productivity of chillies at 1945 kg per ha, followed through Punjab at 1688 kg per ha Rajasthan at 1064 kg per ha and Arunachal Pradesh at 1272.7 kg per ha and Gujarat 786 kg per ha.[69]

Lokesh and Chandrakanth (2004) in their research he performed study on economics of manufacturing and advertising of turmeric in Karnataka, the consequences of the study published that whole fee 'A' of neighborhood range and increased variety of turmeric cultivation were 21, 791 and 31, 959 respectively. The net advantage cost ratio is 1.06 and 1.29 at a charge of 2200 and 2360 per quintal of local and multiplied types of turmeric rhizomes.[70]

Mehtha and Madhur (2004) in their analytical way of work made a try to develop a framework towards a short-term forecasting mannequin for India's export via international locations and commodities. Individual country/commodity analysis takes into account the

[67] S. Angles and S. B. Hosamani, "Instability in area, production and productivity of turmeric in select South Indian states", Madras Agriculture Journal. 92 (4-6)April-June 2005: pp. 271-278.

[68] B.R.Suryavanshi ""A study of Marketing of Turmeric in sangli District-problems and products" PhD thesis from Department of commerce & management, Shivaji Univerisity,2005.

[69] BHULLAR, A. S., 2005, Estimating, export competitiveness of chillies from Punjab state. Agricultural Marketing, April-June, 2005, 36:43.

[70] Lokesh G. B. and M. G. Chandrakant (2004) Economics of Production, Marketing of Turmeric in Karnataka. Indian Journal of Agricultural Marketing, 18 (2): 32-44

country/commodity clever characteristics such as non-tariff barriers, language differences, location/distance differences, preferential and different trading arrangements etc. Apart from the above noted country/commodity specific traits export performance may be affected through the demand conditions, variations in the degree of the sensitiveness of prices, which can't be captured at an combination level. For illustration purposes, the estimation of econometric sub-model for India's export to USA is stated. This model constructing workout is a very useful guide for inspecting and forecasting the export overall performance of India by way of u . s . and commodity.[71]

Philip (2003) in this research thesis "Marketing of spices –A study with special reference to pepper and Cardamom" he fatally analysed marketing systems of spices, influencing factors spices by producers, traders and exporters, role of spices board in marketing of spices and global economic scenario of spices. In research report the researcher not addressed the major issues like quality, hygienic factors and supply chain issues and organic produce demand in the global market. [72]

Kathirvel, (2003) has critically mentioned in his article that "the frequent practice of traditional technique of harvesting turmeric" is to moist the crop after elimination of the foliage and the turmeric rhizomes are dug out after a week with the aid of skilled labour with a one of a kind fork type of pick out axe. Harvesting turmeric rhizomes with electricity tiller based harvesting is exceptionally not pricey as sixty five percent value saving is completed when in contrast to guide digging".[73]

Singh et.al (2001) have studied in the advertising of chillies have recognized the three one-of-a-kind channels and worked out that the fee spread and farmers share of the consumer's rupee. They have found out that the price spread point out that the intermediaries present in the advertising channel charge a high margin of profit as in contrast to the service they have rendered.[74]

Subramannyam (2001)in his research report "Marketing of chillies in Andhra Pradesh-A case stidy of Guntur Regulated market" he cortically examined the marketing practices of spices chillies in

[71] Mehtha, Rajesh and Mathur, Parul 'India's Export by Countries and Commodities: On The Estimation of a Forecasting Model Using Panel Data', RIS Discussion Paper No.84/2004 38.

[72] Philip A.P "Marketing of spices –A study with special reference to pepper and Cardamom" PhD thesis from St.Domini's college, Kanjirapally, Kerala, 2003.

[73] Kathirvel, "The general practice of conventional method of harvesting turmeric" Business line- Feb 25, 2003, p.3

[74] Angles A (2001) Production and export of turmeric in South India: An economic analysis. M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Dharwad.

India, production, proportion and supply chain storage and selling of chillies. Assessed the chilli growers and grading, marketing and price behavior, Regulated markets and different market services. In research report neglected production, value addition of spices, organic spices and their important in the international trade.[75]

Angles (2001) in his journal they viewed the extend in performance of turmeric in important south Indian states over the length from 1979-80 to 1998-99 by using using the exponential increase features of the shape Yt = abt. the learn about printed that the growth costs in area, manufacturing and productiveness of turmeric in Andhra Pradesh, Tamil Nadu, and Karnataka were registered optimistic and essential . While growth rate of area used to be negative (-0.02%) in Kerala but in manufacturing and productiveness of turmeric were recorded advantageous and sizable growth. The boom quotes in place (2.07%), production (6.57%) and productivity (3.78%) of turmeric in India had been registered effective and significant. But the labour availability was inadequate and labour wage used to be very high. Hence, the farmers opted for plantation plants where there was no want of more labour in the course of the year. As a consequence, the vicinity below turmeric used to be.[76]

Sudarsan M.R.(2000) in his article 'White pepper a simple price addition to pepper', analyzed different techniques of fee addition to pepper for better expenses and exploiting foreign market opportunities. The paper says about distinct techniques of white pepper production, which are retting, steaming and milling. These techniques are plenty labour and time saving when in contrast with the standard methods. According to him, conversion of black pepper into white pepper is a easy price addition process, which the producers themselves can practice for making the pepper production greater profitable.[77]

Jose (2000) in their research paper 'Geographical variations in spice use', describe the geographical differences in spice use giving clear indicators for improving export market of Indian spices. They argue that spice consumption is directly correlated to the temperature stages and cultural historical past of the country. Hot local weather regularly produces massive microbial population in foodstuffs. Since spices have anti-microbial use of spices is greater in tropical climate. The spice use per recipe is extra in such countries. The paper also establishes that spices

[75] SEV Subramanyam “Marketing of chillies in Andhra Pradesh-A case stidy of Guntur Regulated market” PhD thesis from Sri Krishna Devaraya Univerisity, Anantapur,2001.

[76] Sudarsan, M.R., "White pepper a simple value addition to pepper", Spice India,Vol.V, June, 2000, pp.10-12.

[77] Jose, K.P and Roy, C.M., "Geographical differences in spice use", S~ice India,Vol. V111 .August 2000, pp. 16-1 8.

are effective towards all micro organisms causing toxic effect to foodstuffs and their use is indispensable in decreasing food borne ailments and poisoning. [78]

John (2000) in his thesis 'A find out about of the export traits of Kerala', evaluates the growth, commodity elements and locations of export exchange such as spices. He has identified the contemporary practices and practical troubles of exporters in everyday and studied the tendencies in the export markets of pepper and cardamom. The learn about encompasses all the foremost gadgets of export from Kerala and depicts the declining export increase rate of Indian pepper and cardamom in the global market.[79]

Satya Sundaram (2000) in his research article he Says that India Produces 63 sorts of Spices on Two million hectares with price exceeding Rs.42000 million (two million tonnes a year). However, solely a limited quantity is exported as the bulk of the produce is meant for home consumption our domestic market for spices is big whole estimated manufacturing in 1997-98 used to be at three million tonnes with an annual boom rate of 10 percent and with restricted scope for area expansion (2,359 million hectare). The world trade in spices by way of 2001 is projected to be 6,25,000 tonnes price at 83 billion. But, quantity wise this is only 15.56 percent of the Indian production imagined (4.018 million tonnes).[80]

M.G.Kerutagi (2000) in his analytical review of article labored out the expenses and returns of turmeric manufacturing in Belgaum district of Karnataka. The whole cost of cultivation of turmeric used to be 75, 579.94 per hectare in that, value of seed material accounted for 33.54 per cent of the total price observed by using marketing value (14.3%).The gross returns have been 2, 08, 428 per hectare and the internet returns have been 1, 32, and 848.06 per hectare. Benefit: Cost ratio was 2.76 which showed the profitability of investment in the turmeric production.[81]

Patil P.R. (2000) in their research paper they investigated the economics of production and advertising of turmeric in Sangli district (Maharashtra). The sample constituted 60 turmeric growers from Sangli district. The study revealed that the complete price of cultivation was once 235224.84 per hectare with yield of 134.84 quintals. While, per hectare internet income was once 87723.63. The Output- input ratio at value 'C' used to be 1: 1.30. The per hectare use of inputs viz.

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[78] John, K.C., " A stu& of the export trnde of Keralaa, Unpublished PbD. Thesis, Thiruvananthapuram: University of Ke.rala,2000.

[79] Dr. I. Satya Sundaram, “Spices Striving Hard to lead globally”, Facts for you, February 2000, Vol.20., No:5, P.13

[80] M.G. Kerutagi, Y.K. Kotikal, N.C. Hulamani, G.K. Hiremath "Costs and Returns of Turmeric Production in Belgaum District of Karnataka" Journal of FARM SCIENCES, Vol 13, No 1 (2000)

[81] Patil, P. R.Economics Of Production And Marketing Of Turmeric In Sangli District [Maharashtra] 101pp,2000.

human labour was once 457.76 man days and bullock labour was at 27.57pairdays. The use of different inputs required have been seed 1521.98 kg per hectare, Farm-yard manure35.51 cartloads and of chemical fertilizers i.e. Nitrogen, Phosphorus and Potash 130.21, 61.35 and21.56 kg/ha, respectively. Average advertising cost used to be located to be 395.27 per quintal. On the complete the items viz. Hamali, market charges and fee charges have been found to be principal items of advertising cost.[82]

Patel (2000) in their research review published that all markets have round 40 to 75 per cent of the total market arrivals of rapeseed-mustard in height marketing season. Whereas expenses had been lower by Rs. 20 to 60 per quintal over mid and lean advertising and marketing season in Mehasana district of Gujarat. two Singh et al. (2000) adopted linear equation and moving average strategies to observe the fashion as properly as seasonal variant of arrivals and charge of rapeseed-mustard in Haryana from 1985-86 to 1995-96. The findings of the study showed ordinary tendency of rising, while the arrivals indicated higher fluctuations from year to year in all markets.[83]

Patil (2000) in his research report he has analyzed the conditions worked out per quintal fee of advertising of turmeric to be Rs. 396.27. Market fees, hamali, commission charges, weighing charges, etc., jointly share about 64 percentage of the advertising and marketing cost. The transportation expenditure was once about 24 percentage of the whole advertising cost.

Sreekumar (1999) in his article 'World alternate in spices- Import and Re-export of pepper' has analyzed the world change of pepper comparing the world demand and supply. He arrived at a logical conclusion that many countries are importing and re-exporting pepper with or besides cost addition, and making benefit out of such transactions. This learn about throws a whole lot light into the market forces in the international spices alternate and recommendations the areas where India can listen greater for better marketing of pepper.[84]

Peter (1999) in his article 'Making of the world leader', asserts a vibrant future of Indian spices in the mild of the data pertaining to to the global production and demand of the spices. He estimates an annual boom rate of I I percent for black pepper and 5 percent for cardamom. his opinion the world village in the new millennium will witness perceptible adjustments in the meals habits, dietary patterns and values, which would provide adequate scope for the spices sector, supplied we are in a position to produce and furnish as per the changing exceptional requirements

[82] Patel, Anil (2000). Market integration and pattern of Market arrivals of rapeseed –

[83] Patil, 2000. Economics of production and marketing of turmeric in Sangli dist. unknown thesis submitted to M.P.K.V., Rahuri.

[84] Sreekumar, B., " World trade in spices- Import and Re- export of Pepper ", Suite India ,Val. Xl 1, 1999, pp.17-19.

of the buyers. In his opinion the fundamental coverage decisions taken via the Central Government will assist to boost manufacturing and export of spices in the years to come.[85]

Agarwal and Dhaka (1998) the researcher in his journal studied the relationship between the arrivals and fees of spices in Rajasthan. The study printed that, arrivals of chillies have been higher in February and the fees of dry chillies had been additionally higher in February when the first lot of new chillies arrived in the market. Prices reached top level in September when arrivals have been low. The pattern of market arrivals of cumin and coriander seed additionally printed the existence of seasonality. The correlation coefficient analysis indicated that the relationship between arrivals and prices of subsequent months have been terrible and significant, indicating thereby that charge affected the arrivals extra in subsequent months than corresponding month.[86]

Mani and Chako jose (1997) the research reporter has performed a study about on export of cardamom noted that the cardamom yield was once low and there have been typical fluctuations in discipline during the find out about period. The learn about found that the trend in the export of cardamom has come down substantially due to excessive fee of production, low nice and advantageous entry of Guatemala in this trade. The predominant problems confronted in the Indian cardamom exports were low productivity, Taxes associated issues, re-plantation problem, high price of export duty per-shipment issues and limited storage amenities in the ship.[87]

Nagaraja (1997) in his research paper analyzed the route of change of Indian horticultural commodities exports with the aid of using first order Markov system which helped in figuring out the features and losses in export value. It revealed that different fresh fruits, vegetables and processed fruits and greens export altogether retained 68.5 per cent; onion and garlic retained 68.5 per cent and 24 per cent, respectively. The effects indicated that' grapes, onion and mango juice sustained their unique share of 59.8 and 49 per cent, respectively. Here the researcher ignored about the location ,production, productivity, marketability, domestic and worldwide consumption levels, quantity and best of gadgets available.[88]

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[85] Peter, KV., "Makings of a global leader", The survey of Indian Agriculture, Chennai: Hindu1 999, pp. 81-83.

[86] Agarwal N L and Dhaka J M 1998, Relationship between arrivals and prices of spice crops in Rajasthan. Indian Journal of Agricultural Marketing, 12(3): 152-153.Agricultural Commodity Market"MPRA Paper No. 29290, posted 15. March 2011 10:13 UTC

[87] Mani and Chako jose " Trends in the exports of cardamom problems and prospects" Agricultural Situation In India,1997 Vol 8 No 8 pp.106-111

[88] Nagaraja, H., "Export performance and prospects of selected fruits, vegetables and processed fruits in India : Aneconomic analysis". Ph.D. Thesis, University of Agricultural Science, Bangalore, Karnataka, India 1997.

D.C. Sangliene and H.K. Chamuah (1997), in their article, "Problems and Prospects of Spices Production for Export in Meghalaya with Special Reference to Turmeric and Ginger" determined the solely trouble that arose in Jaintia hills used to be the inclusion of turmeric as anointer crop in mandarin orange orchards. The exercise is no longer beneficial as it deteriorates the best of the produce. Here the researcher now not mention about the area, manufacturing and productivity of this crop, pest and disease management, pre and publish –harvest management of this range of turmeric**.**[89]

M.R. Naidu (1997), in their research paper he found about entitled, "Price-Spreads of Turmeric and Chillies in Regulated Markets at Guntur District, Andhra Pradesh - A Comparative Study" determined the existence of commission retailers at chillies regulated market while it used to be eradicated totally at the turmeric market. It was once additionally found that marketing prices and margins had been abnormally high in chillies marketing. Regarding marketing margin, the margin in appreciate of chillies was once normally higher than that of turmeric.In this article the researcher not touched upon the factors influencing the price spead of chllies in the mandies that are unwanted drawings samples, lack storage facilities, lack boarding and lodging facilities and lack market information additionally have an impact on the prices.[90]

Kasar (1996) in his research studied the behavior of price and arrivals of purple chillies in Maharashtra seasonal indices of arrivals of pink moist chillies begin in October and stop in April, where as that of crimson dry chillies start in May and quit in September. The arrivals of red moist chillies had been maximum all through December to March when the corresponding fees have been tremendously low. The arrivals of crimson moist chillies were low for the duration of October, November and April when the prices were exceptionally at higher level. In this article the researcher disregarded to discussion about the area, manufacturing and productivity of crimson wet chilli handy in this market, market potencial to this products, domestic and international consumption stages and essential constraints of the farmers also ignored.[91]

Mamatha (1996) in their review article estimated the boom charge of production and export of selected spices for the period from 1970-71 to 1991-92. The spices considered have been chillies, turmeric, pepper, and ginger. She determined that the positive growth rate in appreciate

[89] D.C. Sangliene and H.K. Chamuah, "Problems and Prospects of Spices Production for Export in Meghalaya with Special Reference to Turmeric (Lankadong) and Ginger (Nadia)", Indian Spices, 1997, pp.51-53.

[90] Naidu, M.R. and anumanthaiah, C.V., "Price spread of turmeric and chilies regulated marketing inGuntur District, Andhara Pradesh – A comparative study", Indian Journal of Agricultural Marketing, Vol. 52, NO.2, 1997, pp:95-68.

[91] Kasar, D. V., R. C. Raut and V. Rasane (1996). Behaviour ofprices and arrivals of red red chillieses – A case studyfrom Maharashtra. Indian.J.Agric.Marketing,10(3):78-81.

of production and export of the particular spices was once typically due to the expanded home manufacturing and demand for these spices in the international markets. Here the researcher overlooked to point out about the pre and post-harvest measures taken through spices Board and kingdom horticulture departments and National Horticulture board and have an impact on the schemes and training programs.[92]

Nambiar (1994), in his article, "Export Potential of Spices and Spices Products from North Eastern Region" determined the'Lakadong Variety' of turmeric grown in Meghalaya was once an vital variety because of its high curcumin contents (6.5% to 7.4%). This variety used to be in demand in the oleoresin industry. In this article the researcher totally not noted the area, manufacturing and productivity this range turmeric in this area and the availability of fabric for export also no longer cited.[93]

Hiremath (1994) in research analysis they studied increase quotes for chillies in Dharwad district and located that the growth charge with admire to area was greater (5.9%) which was intently accompanied with the aid of production (5.18%) and productivity (0.011%). All these parameters showed effective boom rate with appreciate to chillies in Dharwad district. In this article the researcher no longer touched about the consumption of chilli in domestic and export orientation and he additionally not point out about the volume and satisfactory requirements of chilli accessible in this district.[94]

Lan Hempbill (1992) in their research journal they studied the possibilities for spices from India in the Australian market. Australians have now developed a liking for spicy food and snack meals which consist of chilli, turmeric powder and spicy flavors in their ranges. Items on supermarket cabinets from sauces to prepared frozen dinners comprise a ways more spices than ever before. Australia now imports in extra of 5000 tonnes of spices such as turmeric. Here the research no longer point out the quantity wished this market and fine standards required for human consumption and international norms Australian market.[95]

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[92] Mamatha, B.G., "Techniques for measuring export competitiveness of agricultural Commodities". SeminarReport, Department of Agricultural Economics, University of Agricultural Sciences, Bangalore 1996.

[93] O.T.S. Nambiar, "Export potential of spices and spices products of North East Region" A journal ofexport potential of spices and spices products of North East Region, Published by Spices Board,Gundahati, September 1994, pp.56-57.

[94] HIREMATH, A.P., 1994, Production and marketing of chillies in Karnataka – An economic analysis. M.Sc. (Agri) thesis (Unpub.), University of Agricultural Sciences, Dharwad.

[95] Lan Hambill, "The Australian market and opportunities for spices including turmeric from India", Paper presented at World Spice congress, Goa November 1992.

Lakshmanachar (1992) the research reporter studied the possibilities of turmeric export change in India. The prospects for turmeric export in most developed nations are related to their home production of curry powder and the first-class possibilities for turmeric will be the place the meals processing industries in the importing countries have the scope to promote individual meals products. Unlike many spices, turmeric is being more and more familiar in its ground shape by importers in developed countries. As long as producers can supply ground turmeric of assured satisfactory and cleanliness and free of adulteration, the prospects for it have to stay good. Here the researcher totally not noted problems confronted with the aid of the farmers at pre and post-harvest practices and supply chain and logistics management of spices.[96]

Yugandhara Y Bapat (1992) in their research analysis they analyzed the scope of futures buying and selling in turmeric at Sangli. He found that turmeric possesses all the characteristics which are required in a commodity to be traded in future market. The most dominant one, which gives upward jostle to future buying and selling of turmeric at Sangli, is the „Adequate Storage Facility". Another essential aspect responsible for turmeric future buying and selling at Sangli, is the availability of banking amenities which provide liberal loans. In this article the researcher completely overlooked the area, production and productiveness of the commodity, existing advertising structures and expertise and awareness of the farmers of this location.[97]

Senthilvasan (1991) in this analytical study he performed a find out about on advertising and marketing of turmeric through farmers at Erode, Periyar district, Tamil Nadu and concluded that the turmeric farmers had been going through some troubles while advertising their turmeric produce through a number of advertising agencies. The learn about cautioned that the rapid settlement of income proceeds, pledge mortgage preparations and pre-harvest economic assistance were indispensable to improve the overall performance of turmeric farmers in the market yard. Here the researcher completely neglected the satisfactory and extent available, need and demand for domestic and worldwide trade. And he additionally no longer touched about value addition of turmeric for getting better demand and prices.[98]

Ramesh (1990) in his thesis 'Volume of trade and its effects on the economic development of Kerala', made a complete study of the role of alternate in Kerala's economy, which include the structure and composition of Kerala's foreign change and the interstate commodity flows. Spices

[96] Lakshmanchar, M.S., "Marketing of Ginger and Turmeric in India", paper presented at World spice congress, Goa, November 1992.

[97] Yugandhara Y. Bapat, "Nature of future trading in commodities", Commerce, Vol.158, No.3, 1992, pp: 37-39.

[98] Senthilvasan K.G., "Marketing of Turmeric ar Erode – A Case study", Unpublished M.Phil dissertation, Bharathiar University, Coimbatore, 1991, p.83.

are prominent export products and therefore their alternate significance has been mentioned in detail. This study factors out the scope and potentials of the spices of Kerala and also highlights the comparative benefits of spices over the different agricultural merchandise of Kerala. In this article the author ignored to touch home consumption degrees and location and manufacturing of essential spices and best standards required for international trade.[99]

Eswara Prasad (1989) in this research article he analyzed the seasonal indices of arrivals and fees of turmeric in Guntur market for the length 1970-71 to 1985-86. The ratio to shifting common technique used to be adopted to calculate adjusted seasonal indices. The effects revealed that the indices of arrival have been greater all through March, April, May and June months in each bulbs and fingers, and at some point of these months the price indices have been on the decrease aspect in each case. The lower seasonal indices of arrivals of both bulbs and fingers could be discovered for the duration of September thru February. Consequently the indices were higher for the duration of this period in each the cases. Here the researcher definitely ignored the area, production and productiveness of turmeric in Guntur district and other important locations additionally.[100]

Prasad and Murthy (1989) in their analytical research study learn about analyzed the essential factors influencing the arrivals and costs of turmeric in Guntur market, Andhra Pradesh. The researchers discovered that the turmeric growers were pressured to dispose of their produce right now after harvest which would lead to the hassle of lower fee for their commodity. The study also recorded that lack of conserving potential of the turmeric growers and insufficient storage facilities in the market yard were the causes for decrease charge for the duration of the publish harvest period. In this article the lookup now not touched different essential which influencing the arrivals and costs that are inadequate savings facility, debts, commission agents, middlemen, undesirable drawing of samples and unhygienic stipulations in the market.[101]

Viji. I.C (1988) in this research paper he analyzed the export performance and prospect of India's main spices like pepper, turmeric, cardamom and ginger. The result confirmed that all the commodities exhibited appreciable boom rates each in volume exported and export earnings The performance of India‟s trade with the socialist international locations showed that they accounted

[99] Ramesh, B., "Volume of trade and its impacts on the economic development of Kerala", Unpublished Ph.D. Thesis, Calicut: Univenity of Calicut, 1990.

[100] Eswara Prasad, S., and Sreerama Murthy, T., "An analysis of arrivals and prices of turmeric in Guntur market, Andhra Pradesh", Vol. 53, No.3(1), January – June 1989, pp: 34-37.

[101] Eswara Prasad, Y., Sreeram Murthy, C. and Satyanarayana, G., (1989) "An analysis of arrivals and prices of Turmeric in Guntur market", Indian Journal of Agricultural Marketing, 3(1):34-37.

for a most important share of Indian turmeric, but their share in the exports of cardamom and ginger was surprisingly less. In this article the researcher totally left out the important factors influencing the farmers such as spurious seeds, pest and diseases problems, lack of irrigation facilities, marketing channels problems, inadequate credit facilities, lack of awareness about the authorities' schemes and programs.[102]

Baby Jacob (1985) in his thesis 'Export improvement of Kerala', studied the export performance of Kerala, examining the developments and problems and made a complete evaluation of the then prevailing export policies of the Government. The overall performance of pepper and cardamom, being main export items have been evaluated properly and remedial solutions had been advocated to the issues of predominant export objects such as Turmeric, pepper and cardamom. In this the researcher totally ignored the constraints of the farmers in cultivation and advertising elements of spices.[103]

Periyasamy (1985) in this analytical study the performance of regulated market in Gobichetti palayam taluk, Erode district, Tamil Nadu and revealed that the organizational shape and operational efficiency of the regulated markets in the study vicinity were relatively significant. The study additionally recognized the applicable elements which impact the utilization attitudes of farmers in the regulated markets and these elements are ample storage facilities, method of sale and market yard provisions. In this find out about the researcher completely unnoticed the most important constrains confronted by means of the farmers in regulated markets like, undesirable pattern collection, too many/much involvement of middlemen, boarding and lodging amenities and transparency in weighing and display of market records in the regulated markets.[104]

Ashturkar (1983) in their research article they found out about highlighted the performance and profitability of turmeric change in Maharashtra country and published that the vicinity below turmeric cultivation had now not shown any substantial increase but, on the other hand, the quantum of turmeric manufacturing had elevated over the period of 15 years from 1960-61 to 1974-75. The learn about also mentioned that the value of manufacturing per quintal comes to Rs.368 and the farmers and internet income used to be Rs.282 while thinking about the fee per quintal of turmeric produce. The researcher no longer addressed the very vital thing, which decides

[102] Viji, I.C., "Export of Indian Spices: Performance and Prospects", India Journal of Agricultural Economics, Vol. 43, No.3, July-Sep, 1988, p.364.

[103] Jacob, Baby. Export development ofKerala, Ph.D. Thesis, Cochin: CUSAT. 1985.

[104] Periyasamy .V. "A study on performance of regulated market in Gobichettipalayam taluk., Erode District", Unpublished M.Phil Dissertation, Department of Economics, Gobi Arts College, 1985, pp: 76-77.

the charge elements of the farmers that is the demand and provide and domestic consumption and exports.[105]

Venkataraman (1980) in his research journal they studied the advertising gadget that exists for turmeric in Tamil Nadu. The study highlighted that the current fluctuating expenses of ginger and turmeric adversely have an effect on the growers and it is fundamental to evolve a nicely equipped advertising machine for turmeric in all the producing states. Side by side, more interest must be paid to the extraction and advertising and marketing of oils and oleoresins. Here the researcher absolutely disregarded the area, production and productivity of spices in this kingdom and advertising channels for fee introduced products of curry powder and oil and oleoresin.[106]

Sriraman and Balasubramanian (1969) in their research document studied the production and marketing of spices (turmeric and chilly) in Tamilnadu nation in involvement with unusual states. Further, they have analyzed the fee behavior of spices (turmeric and chilly) in the total sale and retail markets of the state. They have also appraised the performance of imports and exports of spices (turmeric and chilly). The document blanketed all the elements of manufacturing and advertising along with of advertising and processing. In this article the researcher ignored to attend the first-rate and extent of cloth handy and farmers issues like pre-harvest and put up harvest issues now not touched.[107]

1.4 IDENTIFICATION OF RESEARCH GAP

After going through the research reviews, the researcher has identified the gap that all researchers have concentrated only or any one area of research work that is; chili or Turmeric. Either they have concentrated on individual production aspects or marketing aspects or domestic trading or international trade or supply chain management of spices or Government programs and schemes or problems related to the farmers or traders or cold chain systems and exporters or storage facilities and infrastructure facilities. This does not cover the need for Integrated approach.

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[105] Asthurkar, B.W., Ambegaonkar, L.V., and Deole, C.D., "Performance and Profitability of Turmeric in Maharashtra" Financing Agriculture, Vol. XII(4), October-December 1983, p.31.4.

[106]Venkatraman, S., "A study on the Marketing System exists for turmeric in Tamil Nadu", Paper presented at National Seminar on Ginger and Turmeric, Calicut, 1980.

[107] Sriraman K. and Balasubramaniam S. (1969) "Reports of the Production and Marketing of Spices (turmeric and chilly) in Madras state". Madras University.

In this thesis. I tried to cover entire research gap by my research work **" Integrated Agriculture Practices & Food Value Chain: A Futuristic Approach for Sustainable Growth & Income of Farmers and Farmer Producer Organizations (FPOs)"** especially concentrating on Chilli and Turmeric production and trading scenario of India and Andhra Pradesh, studied the various problems, constraints face by farmers, traders and exporters of Andhra Pradesh in Chilli and Turmeric cultivation, production and marketing, studied the supply chain and logistics management, studied the global norms on spices trading, international trade quality aspects, analyzed performance of various Govt. schemes, programs and institutional support for spices trading. An integrated approach for value addition and generation of income to the farmers can be suggested based on the above research and gaps.

1.5 Statement of the Problem

India, which is called the land of spices, once had almost exclusive monopoly in the global spices trade. But its leading position is falling by the entry of new spice producing and exporting countries. During 2022-23 chilly area under cultivation is 814790 Ha, production is 2302670 MT's, Domestic consumption is 1858770 MTs and exports are 443900 MT's and Turmeric area under cultivation is 224260 Ha, production is 1107920 MT's and domestic consumption is 1000620 Mt's and exports are 107300 Mt's.

India has lot of scope for expansion of area, production and exports, because of certain pre and post-harvest challenges faced by the farmers, traders and exporters. These were lack irrigation facility, soil nutrition and fertility problem, lack of good seed and seed material, lack of sufficient credit facility, storage facility, entrepreneurship skills, infrastructure facilities. Other issues like Aflatoxin, Sudan, Salmonella, pesticide residue, Mould and Mycotoxins. There are other issues chemical, physical, biological, psychological ergonomic and safety hazards. There are other challenges like tariff barriers, political instability and environment, global norms and ethics.

This was the factor, which inspired the researcher to go deep into the prospects and problems spices trade in Andhra Pradesh with special emphasis on Chilli and Turmeric and give the policy suggestions to the Government.

The prospects and problems of the sector can be analyzed from the following

1. What is the chilly and Turmeric production and trading scenario in India?
2. What are all prospects of the spices sector in India?
3. What are the basic problems in spice cultivation and trading in India?

4. What are the existing supply chain and logistics management system?

5. What are the global norms on spices-on-spices sector?

6. What is the institutional support for the industry?

These questions need immediate attention and analyses in the absence of which our precious spices will disappear from the international trade and will receive an unnatural death in the fast-changing global economic scenario and create income generation to the farmers and FPOs (Farmer producer organizations).

1.6 Objectives of the Study

The major objective of the study is to evaluate the present production and trading system of spices and find out the critical issues hindering the growth and development of the spices sector. However, the following are the specific objectives of the study.

1. To know the Chilli and Turmeric total production and trading scenario of India and especially in Andhra Pradesh.
2. To study the various problems, constraints of the farmers and traders of Andhra Pradesh in Chilli and Turmeric.
3. To access or evaluate the existing supply chain and logistics management of the selected spices.
4. To identify the global norms on spices trading with related to Chilli and Turmeric, how for these selected spices meet the global norms and study the issues.
5. To analyze the trade performance of various Govt. schemes, programs and institutional support for spices trading.
6. To offer policy suggestions to the stake holders of the spices industry for developing policy document enlarge.

1.7 Hypotheses of the Study

Based on the objectives of the study the following major hypotheses were formulated and tested.

H 01: Whether there is **NO** significant difference between the production problems faced by chilly farmers in different regions. OR whether there is **great significant difference** between the production problems faced by chilly farmers in different regions.

H 02: Whether there is **NO** significant difference between the production problems faced by turmeric farmers in different regions. OR whether there is **significant difference** between the production problems faced by turmeric farmers in different regions.

H 03: Whether there is **NO** significant difference between the marketing problems faced by chilly farmers in different regions. OR whether there is **significant difference** between the marketing problems faced by chilly farmers in different regions.

H 04: Whether there is **NO** significant difference between the marketing problems faced by turmeric farmers in different regions. OR whether there is **significant difference** between the marketing problems faced by turmeric farmers in different regions.

H 05: Whether there is **NO** significant difference between the procurement & trading strategies of the domestic traders with respect to age OR whether there is **significant difference** between the procurement & trading strategies of the domestic traders with respect to age

H 06: Whether there is **NO** significant difference between the procurement & trading strategies of the domestic traders with respect to Type of organization OR whether there is **significant difference** between the procurement & trading strategies of the domestic traders with respect to type of organization.

1.8 Research Methodology

1.8.1 Sample Selection

The respondents of the study consist of spices cultivators, commission agents, cold storage owners, domestic traders and exporters. The details of spices cultivators, Commission Agents, Cold storages, domestic traders and exporter's details were collected form Department of Horticulture, Department of Marketing, Charmer of commerce, Market Yards and Spices Board of India. The sample respondents of the study selected from two leading chilly and Turmeric growing districts each in Andhra and Rayalaseema regions respectively. (Table 1.12)

Table 1.13 Sample selection design.

S.No	Region	Category	District	Mandal	Villages		respondents	Total
1	Andhra	Chilly Growers	Guntur	Bollapalli	Gummanampadu		15	90
					Vellaturu		15	
				Veldurthi	Veldurthy		15	

					Sirigiripadu		15	
				Amaravati	Dharanikota		15	
					Munugodu		15	
	Rayalaseema		Kurnool	Chippagiri	Chippagiri		15	90
					Yruru		15	
				Kowthalam	Bandinahal		15	
					Upparahal		15	
				Yemmiganuru	Kaluvatla		15	
					Kadimetla		15	
	Andhra	Turmeric growers	Guntur	Kolluru	Kiskindapalem		15	90
					Juwadapalem		15	
				Kollipara	Kollipara		15	
					Thummuluru		15	
				Duggirala	Pedakonduru		15	
					Veerlapalem		15	
	Rayalaseema		Kadapa	Mydukuru	Settivaripalli		15	90
					N.Mydukuru		15	
				Duvvuru	Bayanapalli		15	
					Kanagaduru		15	
				Kajipeta	Chemmullapalli		15	
					Sannupalli		15	
2	Andhra & Rayalayaseema	Domestic traders	Guntur Kurnool Guntur Kadapa				786	125
3		Exporters	Guntur Kurnool				125	25

			Kadapa			
4		Commission agents	Guntur Kurnool Kadapa		760	110
5		Cold storage owners	Guntur Kurnool Kadapa		306	50
	Total					**670**

Source: The research reporter compiles the table from Primary data**.**

1.8.2 Questionnaire design

A structured interview schedules were prepared separately for chilly and turmeric producers, commission agents, cold storage owners, domestic traders and exporters and collected the relevant data on prospects and problems of spices trade in Andhra Pradesh with special emphasis on chilli and turmeric.

1.8.3 Scaling techniques

All the interview schedules were prepared multiple choices on 5-point scale. All the interview schedules prepared separately for chilly and turmeric producers, commission agents, cold storage owners, domestic traders and exporters.

1.8.4 Pilot study

In order to obtain an overall view of the practical problems of the above-mentioned groups and also to make the schedule of interview more accurate and relevant, a pilot study was conducted. 20 spices producers, 10 each from chilly and turmeric producers and 10 spices traders, 5 each from chilly and turmeric traders and 5 exporters, 10 commission agents, and 5 cold storage owners' agencies were interviewed for the pilot study. The responses and opinions collected from them helped a lot to get an overview of the sector and also to locate the major defects of the draft schedule of interview. Based on the findings of the pilot study, the final schedule of interview was prepared.

1.8.5 Sampling techniques

A stratified random sampling was adopted for the collection of data from the sample respondents. Sample data were collected from spices producers, traders, spices exporters, commission agents and cold storage owners using the schedule of interview.

1.8.6 Data sources

The present study is analytical and descriptive in nature. Both primary and secondary data will be used for the study.

1.8.6.1 Primary data

Primary data were collected from chilli and turmeric growers, commission agents, cold storages, domestic traders and exporters directly using a structured interview schedule. (Annexure I-VI)

1.8.6.2 Secondary data

The secondary data has collected from spices statistics, Spices Board (Ministry of Commerce & Industry, Government of India), RBI Hand book on all India statistics, ITC statistics, FASTART, statistics of DGFT, Department of Horticulture (Government of AP), trade year book by the food and agricultural statistics, internal trade statistics year book by UNO, UNCTAD publications, other reports, books and periodicals.

1.8.7 Data analysis methods and statistical tools

After Data Collection, the following data analysis tools were used and analyzed by using of MATHSTAT- Analysis. The Various data analysis tools used in this Research work. Along with these, Line Graphs, Charts and Segmental representations have been used for analytical purposes.

These are:

1. Simple Percentage Analysis
2. Mean
3. Standard deviation
4. Anova
5. Chi-Square
6. CAGR
7.

MS-Excel, SPSS 17.0 and used for the analysis the data.

The Formulated hypotheses were examined at significant level of (0.05%)

Simple Percentage Analysis

The expression of data in terms of percentages is one of the simplest statistical devices used in the interpretation of business and economic statistics. Percentages are useful chiefly for the purpose of aiding comparison. A percent is the number of hundredth part one number. Using algebraic notation in which percentage (%) represents the number of parts of 100, i.e. the percent. b0 represents the base used for comparison, b1 represents the given data to be compared with the base and then the percentage of the given number in the base may be defined as:

$$p\% = \frac{b1}{b_o} \times 100$$

Generally, percentages are recorded with one decimal place. Sometimes to grasp the relationships, whole percentages are shown. Percentages need not be calculated if the absolute numbers are micro, especially if the base is appreciably less than 100.

Mean

Mean is the average of the data, which is the sum of all the observations divided by the number of observations. Mean describes the sample with a single value that represents the center of the data. Many statistical analyses use the mean as a standard measure of the center of the distribution of the data. Mean can prove to be an effective tool when comparing different sets of data; however, this measure can be influenced by the impact of extreme values.

The arithmetic mean (or simply mean) of a sample x1, x2,x3,.....,xn usually denoted by ¯x , is the sum of the sampled values divided by the number of items

$$\boldsymbol{X} = \frac{\boldsymbol{x_1 + x2 \quad + x_3 + \cdots \ldots \ldots . + x_n}}{\boldsymbol{n}}$$

Standard deviation

In statistics, the standard deviation (SD, also represented by the lower-case Greek letter sigma σ or the Latin letter s) is a measure that is used to quantify the amount of variation or dispersion of a set of data values.[1] A low standard deviation indicates that the data points tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values.

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{N}}$$

ANOVA

The analysis of variance frequently referred to by the contraction ANOVA is a statistical technique specially designed to test whether the means of more than two quantitative populations are equal. Basically, it consists of classifying and cross classifying statistical results and testing whether the means of a specified classification differ significantly. In this study, ANOVA has been used to analyse the various kinds of problems faced by the respondents.

Assumptions

- The samples must be independent.
- The populations from which the samples were obtained must be normally or approximately normally distributed.
- The variances of the populations must be equal.

ANOVA: Analysis of Variance was used for testing the hypothesis formulated. For this test, the significance level of $p< 0.05$ was taken.

Sources Of Variation	**Sum Of Squares**	**Degree Of Freedom**	**Mean Sum Of Squares**	**Ratio Of F**
Between Groups	SS(B)	k-1	$\frac{SS(B)}{k-1}$	$\frac{MS(B)}{MS(W)}$
Within Groups	SS(W)	N-k	$\frac{SS(W)}{N-k}$	
Total	SS(W) + SS(B)	N-1		

SS(B) = Sum of squares between groups

SS(W) = Sum of squares within groups

k-1 =Degrees of freedom between groups

N-k= Degrees of freedom within groups

N-1= Total number of degrees of freedom

MS(B) = Mean square between groups

MS(W) = Mean square with in groups

Total Variation

The total variation (not variance) is comprised the $SS(T) = \sum(X - \overline{X_{GM}})^2$ the sum of the squares of the differences of each mean with the grand mean. There is the between group variation and the within group variation. The whole idea behind the analysis of variance is to compare the ratio of between group variance to within group variance. If the variance caused by the interaction between the samples is much larger when compared to the variance that appears within each group, then it is because the means aren't the same.

Between Group Variation

The variation due to the interaction between the $SS(B) = \sum n(X - \overline{X_{GM}})^2$ samples is denoted SS(B) for Sum of Squares Between groups. If the sample means are close to each other (and therefore the Grand Mean) this will be small. There are k samples involved with one data value for each sample (the sample mean), so there are k-1 degrees of freedom. The variance due to the interaction between the samples is denoted MS(B) for Mean Square Between groups. This is the between group variation divided by its degrees of freedom. It is also denoted by S_b^2.

Within Group Variation

The variation due to differences within individual $SS(W) = \sum df.\, s^2$ samples, denoted SS(W) for Sum of Squares Within groups. Each sample is considered independently, no interaction between samples is involved. The degree of freedom is equal to the sum of the individual degrees of freedom for each sample. Since each sample has degrees of freedom equal to one less than their sample sizes and there are k samples, the total degrees of freedom is k less than the total sample size: df = N - k. The variance due to the differences within individual samples is denoted MS (W) for Mean Square Within groups. This is the within group variation divided by its degrees of freedom. It is also denoted by $S_w^2$and it is the weighted average of the variances (weighted with the degrees of freedom).

The F values are calculated as follows:

$$F = \frac{\text{MS(B)}}{\text{MS(W)}}$$

The calculated values of F are compared with the table values. If calculated value of F is greater than the table value at pre-assigned level of significance, the null hypothesis is rejected, otherwise accepted.

Chi-square Test

The χ^2 test (pronounced as chi-square test) is one of the simplest and most widely used non-parametric tests in statistical work. The symbol χ^2 is the Greek letter Chi. The quantity χ^2 describes the magnitude of the discrepancy between theory and observation. It is employed in this study to evaluate the level of satisfaction of the respondents. It is defined as:

$$\chi^2 = \frac{\sum(O - E)^2}{E}$$

Were,

O refers to the observed frequencies and

E refers to the expected frequencies.

Steps to determine the value of χ^2 , the steps required are:

i) Calculate the expected frequencies. In general, the expected frequency for any cell can be calculated from the following equation: $E = \frac{RT \times CT}{N}$

E = Expected frequency

RT = the row total for the row containing the cell

CT = the column total for the column containing the cell

N = the total number of observations.

ii) Take the difference between observed and expected frequencies and obtain the squares of these differences, i.e. obtain the values of $(O-E)^2$

iii) Divide the values of $(O-E)^2$ obtained in step (ii) by the respective expected frequency and obtain the total $\sum ((O-E)^2/E)$. This gives the value of χ^2 which can range from zero to infinity. If χ^2 is zero it means that the observed and expect frequencies completely coincide. The greater the discrepancy between the observed and expected and frequencies, the greater shall be the value of χ^2

The Calculated value of χ^2 is compared with the table value of χ^2 for given degrees of freedom at a certain specified level of significance. If, at the stated level (generally 5% level is selected), the calculated value of χ^2 is more than the table value of χ^2, the difference between theory and observation is considered to be significant, i.e., it could not have arisen due to fluctuations of

simple sampling. If, on the other hand, the calculated value of χ^2 is less than the table value, i.e., it is regarded as due to fluctuations of simple sampling and hence ignored.

Compound Annual Growth Rate (CAGR)

Compound annual growth rate (CAGR) is the rate of return that would be required for an investment to grow from its beginning balance to its ending balance, assuming the profits were reinvested at the end of each year of the investment's lifespan.

CAGR= ( )

Where EB= Ending balance

BB= Beginning balance

N= number of years

1.9 Scope of the Study

In India, we produce and trade more than fifty types of spices and export them to more than 150 countries around the globe. A study about the Prospects and problems of all these spices is far beyond the scope of the study. Chilli and Turmeric have dominating role in terms of significance in the global market as well as in domestic production.

In terms of value all other items of spices are far below the Chilli and Turmeric because it occupies 55 per cent exports in quantity and procures more than 35 per cent of the foreign exchange earnings from spices export. Chillies and Turmeric are the major commercial crops in Andhra Pradesh having much economic significance and a peculiar method of marketing. Chilli and Turmeric and the value-added products from these two constitute the lion's share of the spices production and trade. So, this study is confined to these two items of spices only.

1.10 Limitations of the Study:

The study is based on variables related with prospects and problems of spices cultivars, commission agents, cold storages, domestic traders and exporter's and it is impossible to have complete precision in such studies.

The study covers only two spices viz. Chillies and Turmeric and the findings may not be relevant to other spices. Further this study is based on the responses obtained from spices producers, domestic traders, exporters, commission agents and cold storage owners of three districts of Andhra Pradesh State and hence generalization need not be fully accurate.

1.11 CHAPTERISATION OF THESIS

Chapter -1. This chapter covers the introduction, Need and importance of the study, Review of literature, identification Research gap, statement of the problem, objectives of the study, hypotheses and research Methodology.

Chapter -2 This chapter covers meaning of spices, important land marks of spices, top spices producing countries, origin of spices, uses of spices, origin of chilli and turmeric, production and trading scenario of chilli and Turmeric in Andhra Pradesh, India and Global.

Chapter -3 This chapter covers supply chain and logistics management, harvesting and farm level processing of chillies, Marketing of chillies, Harvesting, post-harvest and value addition of chilli and turmeric, Problems of chilli and Turmeric farmers and traders, perceptions of growers, traders, exporters, commission agents and cold storage on problems of spices trade.

Chapter -4This chapter covers introduction, global quality norms for export of spics from India, major quality control areas, HACCP, role of spices board quality control.

Chapter -5 This chapter covers major government institutions supporting for spices growers, exports in India, role of spices board for export promotion and other initiatives like contract farming, national crop insurance program, e –Nam, IPM program, and perceptions of stakeholders about govt. schemes and program.

Chapter -6 This chapter covers research findings and observations, major policy suggestions, further research suggestion and conclusion.

CHAPTER -2

SPICES PRODUCTIOIN AND TRADING SCENARIO OF INDIA AND ANDHRA PRADESH-A CONCEPTUAL FRAME WORK

Spices once call over as 'ancient gold' have taken part in important role in the history of growth, assessment and trade. Spices were the first article of commerce between the East and the West. The farming and use of spices go back to the foundation of history. Spices trade is the oldest familiar trade to man. Spices were the predictable items of overseas trade. Spices have had a superior impact on global trade than any other food ingredients. As Hendry N. Ridley (1981) points out "the history of agricultural and use of spices may be the most fanatical story of any vegetable product". Many spices have medicinal properties and have profound effect on human health, since they affect many functional processes. Spices are being made use of every day in the family at all events of sorrow, gladness and festivals in one or other forms.[108]

India, also known as 'the land of spices' is the biggest producer, consumer and exporter of spices in the world. Each Indian home is prepared with some significant spices, which are used as home medicine for common ailments. It was due to spices trade that ancient commercial ties survived between India and the Middle East. There had been a flourishing trade in spices consecutively between the Indians and the Greeks, the Romans, the Arabs, the Portuguese, the Dutch, the French and the British the whole time the period of recorded history. The prosperity generated by spices trade was also accountable for the historic voyages of discovery. "Fragrant cloves with their woody overtones, heady sweet cardamom, pungent black pepper, the nutmeg whose intricate flavors burst forth when grated, all these and other aromatic seasonings of vegetable origin were once so very much priced, that they were accurately counted out grain by grain" (Wendy Huttan, 1998).[109]

Spice export was consistently moving up during the last one decade with Compound Annual Growth Rate in quantity 9.07% and in value 14.50%. The country commands 61% in global and 39% in India in terms of value. In the total spices export earnings during 2017-18 Out of all spices chilli contributes 43.18% in quantity and 23.74% in value, next cumin contributes 13.97% in quantity and 13.49% in value, next turmeric contributes 10.44% in quantity and 5.78% in value, next is the Garlic contributes 4.57% in quantity and 1.73% in value. Value added spices contribute a lot. Mint products 2.09% in quantity and 18.01% in value, Spices Oils and oleoresin

[108] Ibrahim YC, "production and export performance of Major Indian spices – an economic analysis" PhD theis 2015.
[109] D. Srinivasa rao "an econometric analysis of spices Exports from India" PhD thesis 2009.

contributes 1.67% in quantity and 14.85% in value, curry powder contributes 2.93% in quantity and 3.44% in value. Fennel contributes 3.36% in quantity and 1.44% in value. India is land of spices and Indian spices are more quality and hygienic have more demand in international market.[110]

2.1 Meaning of Spices[111]

Table No.2.1 meaning of spices

S.No	According to	Meaning
1	Chambers Twentieth Century Dictionary	"Spice is an aromatic and pungent vegetable material used as a condiment and for seasoning food".
2	Webster's Dictionary	" any of the a variety of aromatic vegetable foodstuffs as pepper, cinnamon, nutmeg, mace, allspice, ginger etc; such condiments together supplement, or alter the excellence of a thing mainly to a small degree; spices modify the taste of food, give zest or pleasant flavouring or a delight in".
3	Rosengarten (1969) an specialist in spices	'The Book of Spices' wrote that "spices were appreciated as the basic component of incense, balms, preservatives, ointment, cosmetics, medicines and antidotes alongside poison; it was merely later that they were second-hand in food".
4	The Standard ISO 676: 1995 of the International Organization for Standards (ISO)	as "vegetable products or mixtures thereof free from superfluous matter, used for flavouring, seasoning and imparting aroma in foods; the term applies equally to the products in the whole form or in the ground form".

2.1.1 Important Land marks in the History of Spices at a Glance[112]

Table No.2.2 Important land marks in the History of Spices at a Glance

Remarks about the important and use of spices in Vedic texts	6000BC
Pyramid age remarks about spices in Egyptian history and the use of spices in 'Mummies' as preservative.	6000-2100 BC

[110] Spices Board annual reports 2018-19
[111] Thomas TP "problems and prospects of spices Trade in Kerala" PhD thesis,2009.
[112] Ibrahim YC" Export performance of Indian spices "PhD thesis 2015.

Charaka and Susrutha mentioned the use of pepper in medicine	1550-600 BC
A Chinese envoy visited the Malabar Coast in search of pepper	1st Century
Chinese traveler Suleiman visited the Kerala coast recorded the black better cultivation and trade with China.	851AD
China imports large quantity of pepper from Malabar Coast and Java	1200AD

2.1.2 Different varieties of Spices[113]

Of the 109 spices listed by the ISO (ISO 676), India grows 62 varieties of spices as per their fittingness in diverse agro- climatic background and friendly situations, available in various parts of the country from sea level to the dry temperate zone deep in the Himalayas. However, out of these only 52 items of spices are coming beneath the purview of Spices Board. In addition to the 52 items of spices under the preview of the spices Board, the subsequent varieties of spices are also grown in India. (Annexure-VII)

2.1.3 Top Spices Producing Countries in the world[114]

Table No.2.3 Top Spices Producing Countries

Spice	Largest Producer	Second Largest Producer	Spice	Largest Producer	Second Largest Producer
Cardamom	Guatemala	India	Nutmeg	Indonesia	Grenada
Ginger	India	China	Cinnamon	Indonesia	China
Turmeric	India	Pakistan	Cloves	Indonesia	Madagascar
Chilli Pepper	India	China	Saffron	Iran	Spain
Cumin	India	Turkey	Pepper	Vietnam	India
Vanilla	Indonesia	Madagascar			

2.1.4 Origin of Spices and Geographical Distribution[115]

The majority of spices originated in the Asiatic tropics, in the latitude belt lying between 250 N and 100 S of Equator, while the other quarters of the globe have produced comparatively few items of spices. Thus, we have the following distribution:

From Asia are derived pepper, cardamom, cinnamon (natives of south India and Ceylon) nutmeg and mace, cloves, clove-bark, turmeric, ginger, greater galangal from the Malay Archipalego, Cassia-bark and lesser galangal from China. Africa gave grains of paradise,

[113] www.indianspices.com
[114]Krishna Das .M" production and export performance of Major Indian spices – an economic analysis" PhD thesis 2010.
[115] J.S.Pruthi, Spices and condiments, page no.48.

Madagascar Ravensara aromatic, while the American tropics gave only vanilla, capsicums and pimento. The colder climates of northern Europe and Asia produced but few – coriander, cumin, caraway seed and mustard and root (Henry N. Ridley, 1981). The Mediterranean area including North Africa and the Middle East has supplied most culinary herbs and seeds such as bay leaves, coriander, cumin, dill, fennel, fenugreek, rosemary and sage.

India is said to be the oldest place where spices were available since time immemorial. Indian tropics have given spices like pepper, cardamom, chilli, turmeric, ginger, nutmeg, mace, basil, coriander, cassia, mustard, sea same, garlic and tamarind to the world. These spices are confined to different states. For example, black pepper is produced in Kerala, Karnataka and Tamilnadu, and the major cardamom growing states are Kerala, Karnataka, Sikkim and Tamilnadu. Turmeric is mostly confined to Andra Pradesh and Tamilnadu. Likewise, Andhra Pradesh, Maharashtra, Orissa and Tamilnadu are the major chilli growing states, though chilli produced in Bihar is considered to be the most pungent. Ginger is produced mainly in Kerala and Meghalaya, while Andhra Pradesh and Rajasthan are the major producers of coriander.

2.1.5 Importance of spices in human life[116]

Spices from India have been the soul of worldwide cooking since time immemorial. Indians have been well versed with rising spices and also with their cookery and medicinal application of much prior to the rest of the world. The attraction of these spices has led to historic explorations, wars and invasion and the country carry on to retain its stature as the Spice basin of the planet.
The gift of Indian spices to healthiness benefits has been well recorded since Vedic times. Some of the accepted spices and their health profit are as follows:

Figure No.2.1 Importance of spices in human life

[116] The above table composed from information of https://food.ndtv.com › food-drinks › health-benefits-of-38-important-spices.

Table No.2.4 Importance of spices in human life

S.No.	Spices	Health benefits
1	**Ginger**	Ginger helps to relieve common colds. It is also most commonly known for its quick relieving effects on heartburn, nausea, upset stomach, diarrhoea, motion and morning sickness. It has been found to be a beneficial anti-inflammatory, due to its high levels of ginger-ale, making it a great natural remedy for headaches, minor body aches and even some cases of arthritis.
2	**Turmeric**	Studies have shown that turmeric helps prevent Alzheimer's disease and joint inflammation. It also helps in minimizing liver damages caused by taking excessive alcohol consumption or regular use of pain-killers. A warm glass of milk mixed with turmeric helps in cold and cough. It is also an antiseptic.
3	**Cloves**	The antiseptic and antibiotic properties of clove oil are used in medicines especially in dentistry, oral and pharyngeal treatments. It has wider applications in preparations of toothpaste and mouthwashes, soaps and perfumes. It is also reported to help diabetics in sugar assimilations.
4	**Asafoetida**	This flavouring agent has wonderful health benefits as it helps indigestion. It is useful in the treatment of respiratory disorders like cough, asthma and bronchitis. It has been proved useful in the treatment of health problems concerning women such as unusually painful and excessive menstruation. It is also used in medicines because of its antibiotic properties.
5	**Cumin**	Cumin is known to relieve from digestive problems, reduce chances of anemia and alleviate common cold. Antiseptic properties of cumin can help fight flu by boosting the immune system. Cumin helps control stomach pain, indigestion, diarrhea, nausea and morning sickness. Cumin also contains a good amount of iron.
6	**Cinnamon**	It is helpful for diabetics as it helps in digestion of sugar. It has astringent; stimulant and carminative properties and can check nausea and vomiting. Cinnamon is also an anti-inflammatory,

		improves cardiovascular health, increases metabolic rate, helps control and regulate blood sugar, and has anti-microbial effects.
7	**Black Cardamom**	Black cardamom eases out digestive problems and reduces flatulence; it is known to provide relief from throat problems, chest congestion, and gum infection. Due to its anti-inflammatory properties and the fact that it can alleviate muscle spasms, black cardamom is a saving grace for asthmatics. It is a great ingredient for respiratory problems.
8	**Saffron**	Saffron has the ability to treat depression, prevents loss of vision, and improves memory. The stigma of the flower can provide relief from digestive issues with the help of its Anti-inflammatory, antioxidant and anti-depressant properties. In medicine, saffron is used in fevers, melancholia, and enlargement of liver and spleen. In Ayurvedic medicine it is used to heal arthritis, impotence and infertility.
9	**Nutmeg**	Nutmeg has anti-bacterial properties. It helps in fighting tooth decay, Alzheimer's and improves memory. It can also release the tension in muscles.
10	**Black Pepper**	Black pepper has the ability to increase the production of hydrochloric acid that the stomach needs to help indigestion. It is also anti - bacterial in nature, reduces blood pressure and contains iron that is beneficial for the body.
11	**Garlic**	Garlic with its antiviral and antibacterial properties helps in boosting immunity and keeps one looking fresh and healthy. Garlic's ability to fight infections and bacteria makes it an effective cure for warts and skin problems. Garlic's antibacterial and anesthetising properties can help cure toothaches.

2.1.6 Most important uses of spices[117]

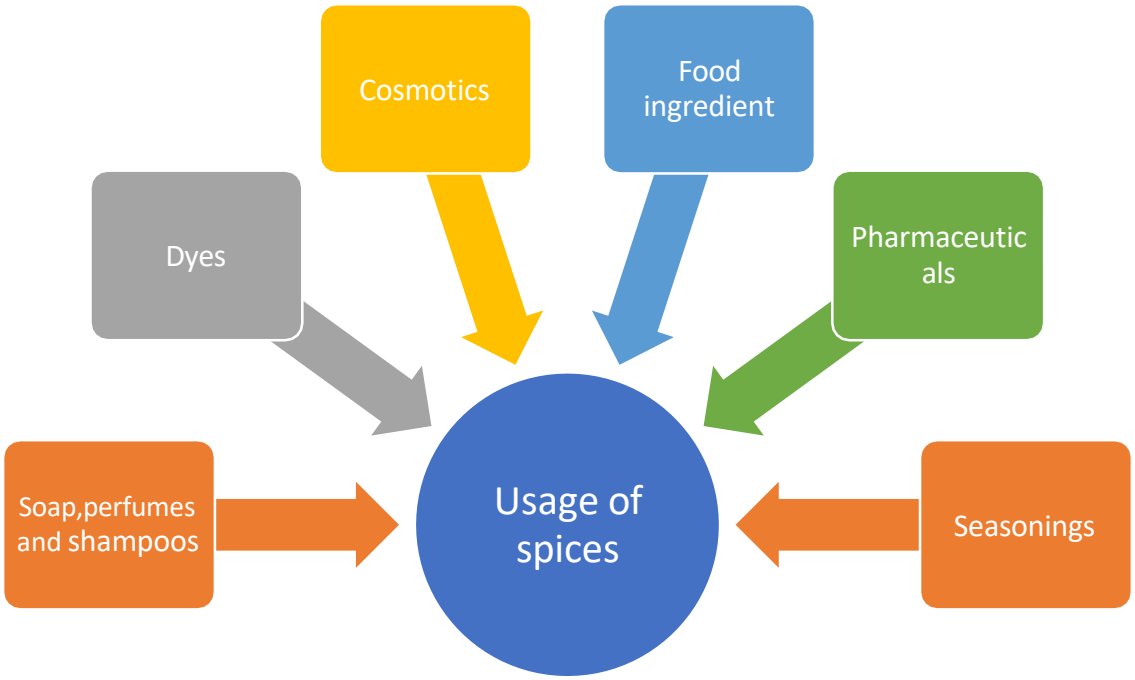


Figure No.2.2 most important uses of spices

2.1.6.1 Spices dyed garments: Spices dyed garments are arranged with the help of a dying method where the spices, herbs and other native process are predetermined in Ayurvedic method so as to accomplish greatest eco-friendliness and clinical efficiency excellence in the cloth. Major spices used to make such garments are cardamom, cinnamon, turmeric, nutmeg and clove.

2.1.6.2 Pharmaceutical industry: Major spices are used in pharma industry to make the medicine for major diseases called cancer, skin allergens, stomach pains, liver and brain problems. The spices used are turmeric, cinnamon, cardamom, gingers and garlic.

2.1.6.3 Cosmetic industry*:* Most of the spices are used in cosmetics. These spices are very good for health and physical and body also. Cinnamon, turmeric, saffron and other spices are used in preparation cosmetics industry;

2.1.6.4 Spice-flavored chocolates: Spices now find their way into supplementary components apart from cooking. There are chocolates now accessible laces with conventional Indian spices. Chilli,

[117] Composed from Indian brand equity foundation reports.

cardamom, cloves, cinnamon and cumin are some of the flavors which are used in chocolates as well as in the warmth sector.

2.1.6.5 Spices used in personal care products: personal care products such as beauty creams, directness oils, bathing bars, shower gels and shampoos all flavored with spices are also accessible in India nowadays.

2.2 HISTORY/REGION/ ORIGIN OF CHILLI [118]

Chillies are known from pre-historic times in Peru. They are believed to have originated in the tropical America. It is also said that chillies have originated in the Latin American regions of the New Mexico and Guatemala as a wild crop around 7500BC, as per the remains of the pre-historic Peru. The people native to these places domesticated this crop in and around 5000 BC, Chilli is said to be the first ever domesticated crop in America. The three species C. annuum, C. frutescens and C. chinense evolved from a common ancestor located in the North of the Amazon basin (NW-Brazil, Columbia). Further evolution brought C. annuum and C. frutescens to Central America, where they were finally domesticated (in México and Panamá, respectively), whereas C. chinense moved to the West and was first put to cultivation in Perú. Two other species were first cultivated in Western South America: C. baccatum in the Peruvian lowlands and C. pubescens at higher elevations, in the Andes (Perú, Bolivia, Ecuador).

At that time, chillies were cultivated by the farmers together with a primary crop to protect the primary crop from any damage from birds. Columbus carried chilli seed to Spain in 1493. The cultivation of chilli and Capsicum spread rapidly from Spain to Europe. The Portuguese brought capsicum from Brazil to India during the year 1584. Chillies became popular in the whole of Asia rapidly and native Asians started cultivating this crop as well. The south Asian climate suited this crop, and since its introduction in the 16 century has been increasingly cultivated in south Asia. Chillies are the cheapest spices available in India and are eaten across all groups of people. The most important chilli growing states in India are Andhra Pradesh, Maharashstra, Karnataka and Tamil Nadu, which together constitute nearly 75 per cent of the total area. Andhra Pradesh tops the list in dry chilli production followed by Telangana, Tamil Nadu, Maharashtra, Orissa and Karnataka

[118] Girish Kumar.KS and Y.S.Rao "Chilli- the crop with great export potential in India, Page no.1-2.

2.2.1 Scientific Classification of chilli

Table 2.5 Scientific Classification of chilli[119]

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Solanales
Family	Solanaceae
Genus	Capsicum

2.2.2 Botanical Description of chilli[120]

Chilli is a fruit of the plants 'Capsicum annuum' and 'Capsicum frutecens' that come from the genus 'Capsicum,' belonging to the family of 'Solanaceae,'which also includes tomato and potato. Capsicum is derived from the Greek word "Kapsimo" meaning "to bite."Genus Capsicum is divided into three sections by Hunziker - Monotypic Tubocapsicum, Pseudoacnistus and Capsicum. All the species in the genus have n=12 except C. ciliatum and C.scolnikianum which have n=13. genus Capsicum includes 22 wild species and three varieties as well as five domesticated species and their wild relatives. In general, domesticated species have larger but fewer fruits than its wild counterparts though seed per plant is about the same.

Chilli Plant is an annual sub-herb and the fruits vary in shape, size, colour and degree of pungency. Capsicum plants are herbaceous or semi-woody annuals or perennials. The leaves are ovate, tapering to a sharp point, measuring up to 15 cm, dark green on the upper surface and pale green on the lower surface. The flowers are small, white and borne singly or in clusters of 2 or 3 in the axils of the leaves. The fruits are of diverse shapes and sizes depending upon the variety.

2.2.3 Importance:

Pungency in chilli is due to the alkaloid "capsaicin" contained in the pericarp and placenta of fruits, it produces mild to intense spice when eaten. Capsaicin is a potent inhibitor of substance P, a neuropeptide associated with inflammatory processes. The hotter the chili pepper, the more capsaicin it contains. The hottest varieties include Naga Jalokia, habañero and Scotch bonnet peppers. Jalapeños are next in their heat and capsaicin content, followed by the milder varieties,

[119] V.A.Parthasarathy,"Major spices –production and processing,Indian institute of spices rerearch,Calicut page no.228.

[120] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post harvest technology,Indin counsel Agriculture Research page no.10

including Spanish pimentos, and Anaheim and Hungarian cherry peppers. Capsaicin is being studied as an effective treatment for sensory nerve fiber disorders, including pain associated with arthritis, psoriasis, and diabetic neuropathy. When animals injected with a substance that causes inflammatory arthritis were fed a diet that contained capsaicin, they had delayed onset of arthritis, and also significantly reduced paw inflammation.

2.2.4 Weather and soils[121]

Chilli requires warm and humid climate for its best growth and dry weather during the maturation of fruits. Chilli crop comes up well in tropical and subtropical regions, but it has a wide range of adaptability and can withstand heat and moderate cold to some extent. Black soils which retain moisture for long periods are suitable for rain-fed crop whereas well drained chalka soils, deltaic soils and sandy loams are good under irrigated conditions. Chilli is generally sown through either nursery bed (seed rate 2.6 kg/ha) or by direct sowing (seed rate 7.5 kg/ha). Normal sowing season under Kharif is July-August and the crop is generally ready for harvest in January/February.

2.2.5 Popular chilli varieties grown in Andhra Pradesh.[122]

In India, only two species viz., Capsicum annum and Capsicum frutescence an known and most of the cultivated varieties belong to the' species Capsicum annum. Considerable research work has 'been carried out at Regional Agricultural Research Station, Acharya N G Ranga Agricultural University, Lam Guntur to evolve high yielding and pest and disease resistant verities. Some of the varieties developed here have gained popularity throughout India. Some varieties that are popular in Andhra Pradesh are given in Table.

Table 2.6 Popular chilli varieties grown in Andhra Pradesh

S.No.	Name of the Variety	Length of Pod (cm)	Seed Content (%)	Yield (t/ha)
Improved Varieties				
I.	G-4	6.5 - 7.0	44	1.064/3.0*
2.	G-5	7-8	38-40	1.176/5.0*
3	Sindhur	3-3.5	46	1.144/5.0*
4.	N.P.46A	9.2	38	1.2/6.0*
5.	Jwala	8-9	35	---

[121] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post-harvest technology, Indian counsel Agriculture Research page no.7

[122] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post-harvest technology, Indian counsel Agriculture Research page no.12.

6.	Aparna	9-10	--~	---
7.	Kiran	8.3	---	1.82/4.0*
8.	LCA235	8.9	45	2.0/4.0-4.5*
9.	K2	5-6	45	---/6.0*
Improved Strains				
I.	LCA304	7- 8	42	2.5/6.5*
2.	LCA324	7- 8	43	2.5/6.0*
3	LCA334	7- 8	40	2.7/6.5*

*Yield under irrigation

2.2.6 Composition of Chilli[123]

Although the composition of chilli varies depending upon the variety, chillies generally contain about 7% stalk and calyx, 53% pericarp and 40% seeds Important biochemical constituents of colour and pungency are concentrated in pericarp.

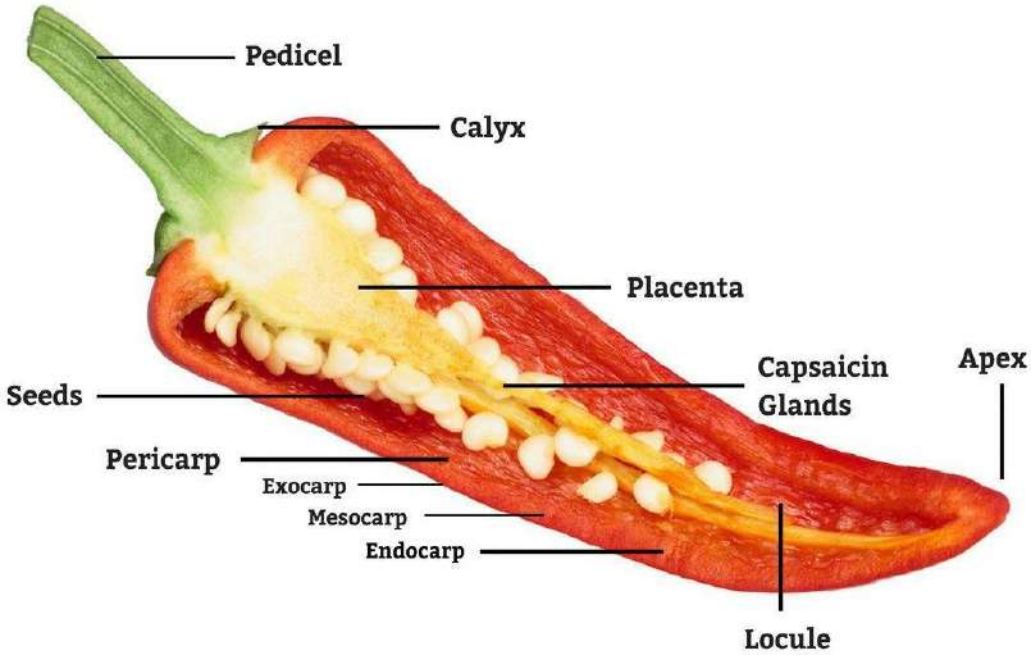


Figure 2.3 Components of chilli pod

2.2.7 Various components of a chilli pod

The pericarp contains almost all of the pungency whereas the chilli seeds contain only traces of pungency. Pericarp contains an inner sheath known as dissepiments (present to an extent

[123] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post-harvest technology, Indian counsel Agriculture Research page no.9.

of 2-3% of the whole chilli). The pungency of the pericarp is mostly concentrated in the dissepiments.

2.2.8 Biochemical properties of chilli[124]

Major biochemical components in chilli are represented by a group of constituents known as oleoresin. Oleoresin represents the complete flavour profile of the spice. It consists of the volatile essential oil and non-volatile resinous fraction. Hence, oleoresin can be designated as the true essence of the spice and can replace whole or ground spice without impairing any flavour characteristics. Among other things, oleoresin consists colour component, capsanthin and pungency component, capsaicin. The oleoresin content in chillies varies depending upon the variety, the extractable content using Ethylene Dichloride ranges from 6.8 to 18.0%. It varies from 29.52 (Kalyanpur Red No.l) to 111.52 (G-4) when expressed in terms of ASTA units.

The red colour of chillies is mainly due to carotenoid pigments. Although nearly 37 colouring pigments have been isolated from capsicums, capsanthin is the major pigment of chillies, constituting about 35% of total chillies. Pigment content of chilli is 0.2 to 0.5%.

The pungent principle of red chillies represents a group of compounds called capsaicin and its analogues or capsaicinoids. It is reported that a maximum amount of capsaicin was found in the inner walls (Placenta and dissepiment) of chilli pods. About 90% of the capsaicin in chillies has been noticed in placenta, connecting seeds with pericarp. Among components of chilli, placenta has highest pungency next being pericarp and third, seed.

The color of chillies generally varies from 38 to 157 ASTA units depending upon the variety, whereas the capsaicin content varies from 0.19 to 0.88%. For example, Byadagi variety has highest colour value of 156.9 ASTA units whereas Bird eye has only 41.7 ASTA units. Scotch Bonnet variety has highest capsaicin content of 0.878% and lowest ASTA colour value of 38.25. Bird eye variety has fairly high capsaicin content of 0.589% whereas Byadagi variety has almost negligible amount of capsaicin. Paprika varieties have very low capsaicin content. Generally, the varieties with high capsaicin content have lower colour values.

2.2.9 Chemical quality parameters of chilli

Table No. 2.7 Chemical quality parameters of chilli

[124] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post-harvest technology, Indian counsel Agriculture Research page no.10.

Varity of chilli	Moisture (%)	Capsaicin (%) (MFB*)	Total Extractable colour(ASTA Units, MFB)	Ascorbic Acid (mg/100g)(MFB)	Oleoresin (%) (MFB)
BRRed	8.8	0.61	1,248	58.2	8.6
G4	9.0	0.44	896	54.6	8.4
Pant C1	10.2	0.42	1,144	62.8	9.8
Sp 14/5	8.5	0.36	1,052	32.4	12.2
Jwala	8.5	0.68	2,542	86.4	10.6
Musalwadi	9.2	0.28	1,500	32.4	12.4
CO 2	10.0	0.28	256	60.8	11.6
CA 960/1-3	8.8	0.423	158	42.4	6.2
S/118-2	9.2	0.40	394	52.6	6.2
SP 47	10.2	0.50	856	28.9	8.4
K 1	8.6	0.27	278	28.1	8.6
K 2	10.4	0.32	258	32.7	9.2
618 -126	10.0	0.42	245	61.6	9.87
CO 1	9.6	0.42	262	58.5	11.3
CO 3	9.8	0.30	158	51.7	10.5
Mean	9.39	0.409	749	59.6	9.7
SED	0.04	0.062	0.188	0.096	0.045
Cd at 5%	0.09	0.135	0.380	0.201	0.052

*MFB Moisture Free basic

Source: post-harvest profile of chilles.

2. 2.10 Nutrition value of Chilli

Table 2.8 Nutrition value of Chilli

Value {Per 100 gms}		
Parameters	**Chillies Dry**	**Chillies (Green)**
Moisture	10.000 gm	85.700 gm
Protein	15.000 gm	2.900 gm
Fat	6.200 gm	0.600 gm
Minerals	6.100 gm	1.000 gm
Fibre	30.200 gm	6.800 gm
Carbohydrates	31.600 gm	3.000 gm
Energy	246.000 K cal	29.000 K gm
Calcium	160.000 mg	30.000 mg
Phosphorus	370.000 mg	80.000 mg
Iron	2.300 mg	4.400 mg

Vitamins		
Carotene	345.000 µg	175.000 µg
Thiamine	0.930 mg	0.190 mg
Riboflavin	0.430 mg	0.390 mg
Niacin	9.500 mg	0.900 mg
Vitamin C	50.000 mg	111.000 mg
Minerals & Trace Elements		
Sodium	14.000 mg	--
Potassium	530.000 mg	--
Phytin Phosphorus	71.000 mg	7.000 mg
Magnesium	--	272.000 mg
Copper	--	1.400 mg
Manganese	--	1.380 mg
Molybdenum	--	0.070 mg
Zinc	--	1.780 mg
Chromium	--	0.040 mg
Oxalic Acid	--	67.000 mg
Caloric values		
Chilli (Dry)	297	
Chilli (Green)	229	

Source: The National Institute of Nutrition, Hyderabad.

2.3 HISTORY AND ORIGIN OF TURMERIC[125]

Turmeric, with its brilliant yellow colour, has been used as a dye, medicine, and flavouring since 600 BC. In 1280, Marco Polo described Turmeric as "a vegetable with the properties of saffron, yet it is not really saffron." Indonesians used Turmeric to dye their bodies as part of their wedding ritual. Turmeric has been used medicinally throughout Asia to treat stomach and liver ailments. It also was used externally, to heal sores and as a cosmetic. Turmeric has been used for many centuries. Due to its ancient origin, its actual place of origin cannot be ascertained, but however it has been grown in many parts of South Asia and South East Asia.

[125] https://www.ncbi.nlm.nih.gov/books/NBK92752

In South Asia, India is a major producer, consumer and exporter of turmeric whereas Java, Sumatra are the major producers in Indonesia. Apart from this turmeric is also now grown in Philippines, Japan, Korea, China, Sri Lanka, Nepal, East & West Africa, Caribbean Islands and Central America.

Figure 2.4 Turmeric green fields

2.3.1. Botanical description of turmeric

Table 2.9 Botanical description of turmeric

Indian Name	: Haldi
Botanical Name	: Curcuma longa
Family Name	: Zingiberaceae
Parts Used	: Rhizomes
Habitat	: Southern Asia

Source: Turmeric package of practices, Spices Board India

2.3.2 Economic use of Turmeric[126]

Turmeric is one of the multi-use products which have many valuable properties and uses. It is extensively used in food, textile, medicine and cosmetic industries. The curry powder is one of the indispensable ingredients in the Indian foods, which contains 5 to 30 per cent of the turmeric powder in its total content. Turmeric has colouring property because of the curcumin content and hence it is used as a natural colouring agent for food stuffs, jellies and fruit drinks. The dye made out of turmeric is used in cosmetic industries for its unique properties such as skin clearing property. It checks growth of hair and adds beauty to the face. Turmeric plays a prominent role in

[126] Post-harvest management of Turmeric-FAO UNA page no.14

the medicinal industries, serving as an ingredient for the preparation of valuable drugs for many of the disorders in human beings.

Figure No.2.5 Turmeric whole and powder

A number of cultivars are available in India and are known mostly by the name of region where they are cultivated. The important varieties in India are: Alleppey Finger (Kerala), Erode and Salem turmeric (Tamil Nadu), Rajapuri and Sangli turmeric (Maharashtra) and Nizamabad Bulb (Telangana). In Tamil Nadu, the important varieties cultivated are Erode local, BSR-1, PTS-10, Roma, Suguna, Sudarsana and Salem local. Among these varieties, 70 to 75 per cent was occupied by the local varieties. In domestic and international markets, Salem turmeric has established itself as the best quality turmeric and it fetches the higher price compared to the price of Erode turmeric. The superior quality of Salem turmeric is due to good soil conditions and less cross contamination.

2.3.3 Characteristics of improved varieties of Turmeric

Table 2.10 Characteristics of improved varieties of Turmeric

Variety	Average yield(fresh) (ha)	Duration (Days)	Dry recovery	Curcumin content (%)	Oleoresin (%)	Essential Oil (%)
Suvarna	17.4	200	20.0	4.3	13.5	7.0
Suguna	29.3	190	12.0	7.3	13.5	6.0
Sudarsana	28.8	190	12.0	5.3	15.0	7.0
IISR Prabha	37.47	195	19.5	6.52	15.0	6.5
IISR Prathibha	39.12	188	18.5	6.21	16.2	6.2
Co-1	30.0	285	19.5	3.20	6.7	3.2
Krishna	9.2	240	16.4	2.8	3.8	2.0
Sugandham	15.0	210	23.3	3.1	11.0	2.7
BSR-1	30.7	285	20.5	4.2	4.0	3.7

Roma	20.7	250	31.0	9.3	13.2	4.2
Suroma	20.0	253	26.0	9.3	13.1	4.4
Rajendra Sonia	4.8	225	18.0	8.4	-	5.0
Ranga	29.0	250	24.8	6.3	13.5	4.4
Rasmi	31.3	240	23.0	6.4	13.4	4.4

Source: Turmeric cultivation, IISR Calicut.

2.3.4 Demographic profile of Andhra Pradesh

Table No.2.11 Demographic profile of Andhra Pradesh

Description	2021	2001	Description	2021	2001
Approximate Population	8.46 Crores	7.62 Crore	Total Child Population (0-6) age	91,42,802	1,01,71,857
Actual Population	8,45,80,777	7,62,10,007	Male Population (0-6)age	47,14,950	51,87,321
Male	4,24,42,146	3,85,27,413	Female Population (0-6) age	44,27,852	49,84,536
Female	4,21,38,631	3,76,82,594	Literacy	67.02%	60.47%
Population Growth	10.98%	13.86%	Male Literacy	74.88%	70.32%
Percentage of total population	6.99%	7.41%	Female Literacy	59.15%	50.43%
Sex Ratio	993	978	Total Literate	5,05,56,760	3,99,34,323
Child Sex Ratio	939	961	Male Literate	2,82,51,243	2,34,44,788
Density/km2	308	277	Female Literate	2,23,05,517	1,64,89,535
Density/mi2	796	718	Area mi2	1,06,195	1,06,196
Area (Km2)	2,75,045	2,75,045			

Source: websitecensus2011@co.in

2.3.5 Demographic details of Guntur, Kadapa and Kurnool

Table No. 2.12 Demographic details of Guntur, Kadapa and Kurnool

Description	Guntur District		Kurnool District		Kadapa District	
	2021	2001	2021	2001	2021	2001
Population	48.88 Lakhs	44.65 Lakhs	40.53 Lakhs	35.29 Lakhs	28.82 Lakhs	26.02 Lakhs
Male	24,40,521	22,50,279	20,39,227	17,96,214	14,51,777	13,18,093
Female	24,47,292	22,14,865	20,14,236	17,33,280	14,30,692	12,83,704

Population Growth	9.47%	8.72%	14.85%	18.72%	10.79%	14.78%
Area Sq. Km	11,391	11,391	17,658	17,658	15,359	15,359
Density/km2	429	392	230	200	188	169
Proportion to Andhra Pradesh Population	5.78%	5.86%	4.79%	4.63%	3.41%	3.41%
Sex Ratio (Per 1000)	1003	984	988	965	985	974
Child Sex Ratio (0-6 Age)	945	959	938	958	918	951
Male Literacy	74.79	71.24	70.1	65.96	77.78	75.83
Female Literacy	60.09	53.74	49.78	40.03	56.77	49.54
Male Population (0-6 Age)	2,54,833	2,74,754	2,61,217	2,74,560	1,72,902	1,74,638
Female Population (0-6 Age)	2,40,896	2,63,531	2,45,022	2,63,046	1,58,684	1,66,025
Literates	29,60,441	24,55,965	21,27,161	15,92,172	17,16,766	14,20,752
Male Literates	16,34,726	14,07,402	12,46,369	10,03,659	9,94,699	8,67,054
Female Literates	13,25,715	10,48,563	8,80,792	5,88,513	7,22,067	5,53,698

Source: web site-Censes@nic.in

2. 3.6 Spice-wise Production in India from 2013-14 to 2022-23 (in MT's)

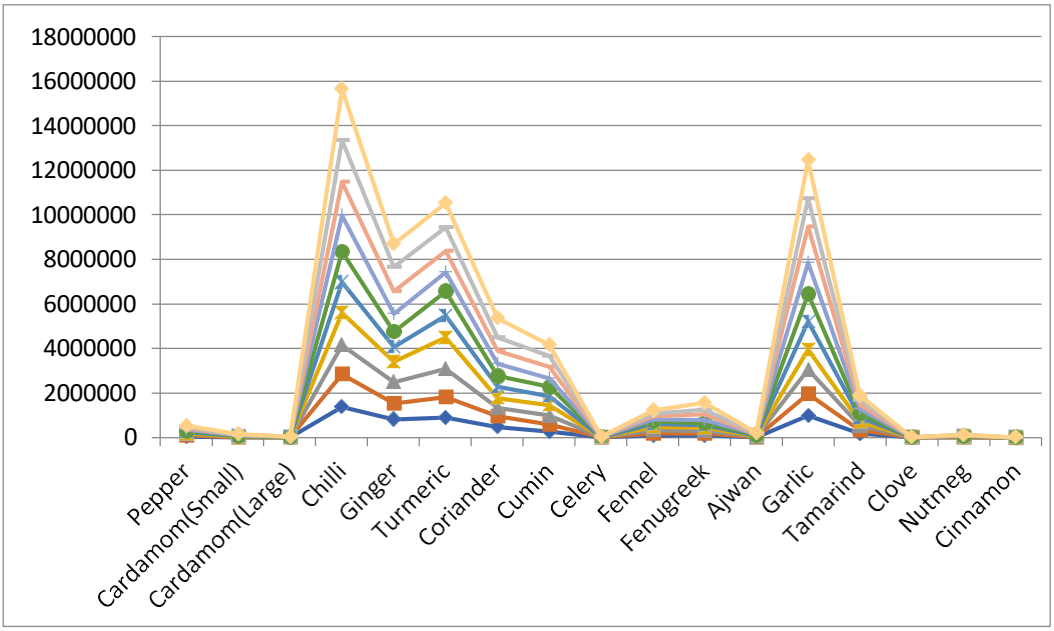
Table no.2.13 Spice-wise Production in India from 2013-14 to 2022-23 (in MT's)

Spices	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Pepper	50000	50000	48000	43000	65000	37000	70000	48500	57000	64000	2.78%
Cardamom(Small)	11000	10075	10380	15000	14000	16000	18000	23890	17990	20640	7.24%
Cardamom(Large)	4300	4180	3918	3860	4145	4465	4850	5315	5572	5430	2.63%
Chilli	1381531	1470352	1299191	1448215	1378400	1376400	1621480	1497440	1872010	2302670	5.84%
Ginger	831607	708256	937043	924417	669350	683160	795820	1025110	1081430	1043130	2.55%
Turmeric	894590	927912	1268280	1398862	986690	1092630	846250	967060	1051160	1107920	2.40%
Coriander	471515	501485	372366	428687	503240	496240	546800	572990	609350	866800	7.00%
Cumin	283000	303943	403744	462645	394330	445030	372290	503260	485480	500380	6.54%
Celery	5329	5248	4609	5271	5510	5510	5510	5510	5510	5510	0.37%
Fennel	114277	83576	125710	144112	142940	135930	78570	129350	124610	148640	2.96%
Fenugreek	97533	88979	127850	121775	112870	110530	134100	248350	220160	311280	13.76%
Ajwan	18301	8950	19327	28050	26620	26610	17180	16010	13820	27940	4.81%
Garlic	1003758	975404	1085740	898438	1260210	1221380	1424860	1603500	1271220	1716920	6.15%
Tamarind	194087	125524	203936	182089	189980	191750	200390	190780	190700	199860	0.33%
Clove	1002	764	963	1035	1060	1060	1260	1200	1220	1230	2.30%
Nutmeg	11362	11271	12088	12138	12730	13210	14400	15170	15460	14060	2.40%
Cinnamon	363	30	36	37	50	50	50	70	70	80	-15.47%
Total incl.oth	5387092	5286552	5933126	6324920	5801114	5833870	6169900	6901780	7075500	8413980	5.08%

Source: Compiled data from spices Board statistics.

If we closely observer the table the pepper production has been increased comparatively 2013-14 to 2022-23. Small cardamom also increased from 11000MT's to 20640 MTs in 2022-23. Another import spices is chilli which has very significant growth rate of 3.60 CAGR from 2013-14 1381531 MT's to 2022-23 at 2302670 MT's. Ginger is another important spice grown in India which has export potentiality also. 2013-14 production was 831607MT's and in 2022-23 was 1043130MT's with 2.91 CAGR. Turmeric production also recorded 2.91 CAGR and production in 2013-14 894590MT's and 1107920 MT's in 2022-23. Coriander has very significant growth rate of 3.19 CAGR, Cumin has 2.91 CAGR, Fennel recorded as 2.19 CAGR, Garlic has very significant growth rate of production from 2013-14 to 2022-23 with 3.47 CAGR and another spices clove has not much significant growth rate with 0.83 CAGR.

Graph No.2.1 Spice-wise Production in India from 2013-14 to 2022-23 (in MT's)



Source: The research reporter compiled and designed from Table no.2.13

The above Graph .2.1 is explaining about the spice wise production in India from 2013-14 to 2022-23. Even though chilli is the highest production in all spices but it compound annual growth rate from 2014 to 2023 is 5.84 per cent. Fennel recorded very significant CAGR of 2.96 per cent. Coriander also has very significant growth rate with CAGR of 6.54 per cent. Garlic has recorded very significant growth of 6.15 per cent. All most all spices have very significant growth rate, this is because of the good weather conditions, timely availability of rains, pest and disease management.

2. 3.7 Spices wise share in total spices exports in quantity and value in 2022-23:

Table No.2.14 Spices wise share in total spices exports in quantity and value in 2022-23

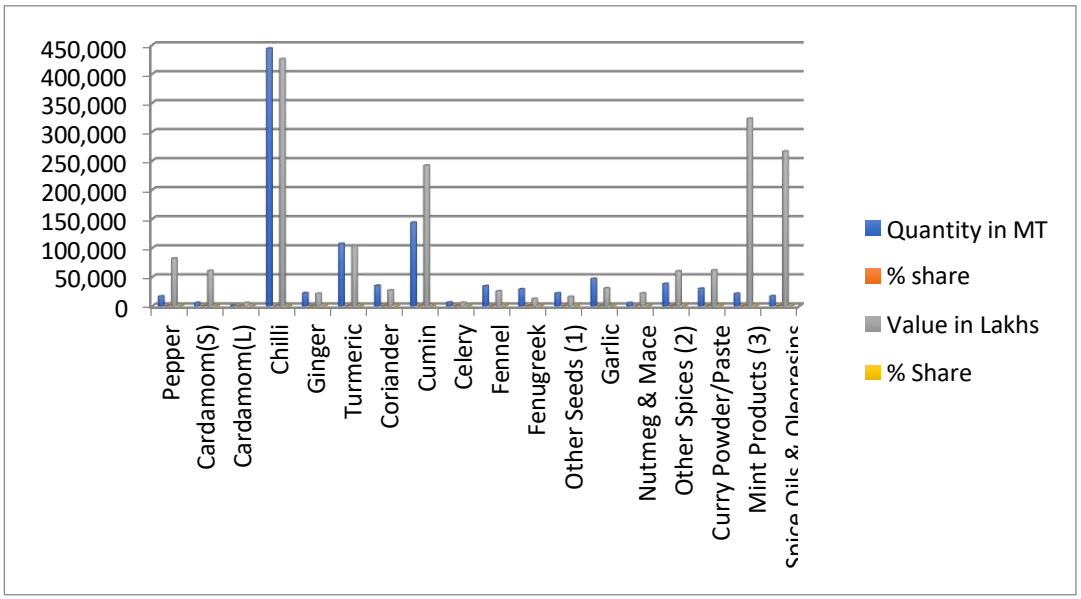
Spice	Quantity in MT	% share	Value in Lakhs	% Share
Pepper	16,840	1.64%	82078	4.58%
Cardamom(S)	5,680	0.55%	60908	3.40%
Cardamom(L)	760	0.07%	5646	0.31%
Chilli	4,43,900	43.18%	425633	23.74%
Ginger	22,605	2.20%	21606	1.21%
Turmeric	1,07,300	10.44%	103567	5.78%
Coriander	35,185	3.42%	27274	1.52%
Cumin	1,43,670	13.97%	241800	13.49%
Celery	6,480	0.63%	5950	0.33%
Fennel	34,550	3.36%	25907	1.44%
Fenugreek	29,280	2.85%	12689	0.71%
Other Seeds (1)	22,175	2.16%	16045	0.89%
Garlic	46,980	4.57%	30936	1.73%

Nutmeg & Mace	5,500	0.53%	22094	1.23%
Other Spices (2)	38,305	3.73%	60193	3.36%
Curry Powder/Paste	30,150	2.93%	61620	3.44%
Mint Products (3)	21,500	2.09%	322836	18.01%
Spice Oils & Oleoresins	17,200	1.67%	266172	14.85%
TOTAL	10,28,060	100.00%	1792955	100.00%

Source: Spices Statistics of Spices Board.

Above table no. 2.14 is explaining about the spices wise export in quantity and value during 2022-23. Out of all spices chilli contributes 43.18 per cent in quantity and 23.74 per cent in value, next cumin contributes 13.97 per cent in quantity and 13.49 per cent in value, next turmeric contributes 10.44 per cent in quantity and 5.78 per cent in value, next is the Garlic contributes 4.57 per cent in quantity and 1.73 per cent in value. Value added spices contribute a lot. Mint products 2.09 per cent in quantity and 18.01 per cent in value, Spices Oils and oleoresin contribute 1.67 per cent in quantity and 14.85 per cent in value; curry powder contributes 2.93 per cent in quantity and 3.44 per cent in value. Fennel contributes 3.36 per cent in quantity and 1.44 per cent in value. India is land of spices and Indian spices are more quality and hygienic have more demand in international market.

GraphNo.2.2 Spices wise share in total spices exports in quantity and value



Source: The research reporter compiled and designed from Table no.2.14

The above Graph.2.2 is explaining about the spice wise share in total spices exports in quantity and value in 2022-23. India is highest producer, consumer and exporter of spices. Chilli is the highest share in foreign currency value in lacks and quantity in MT's. Next highest spice share in exports is cumin in quality and value. Turmeric also shares good amount in value and quantity of exports.

Remaining other spices also contribute a lot for getting the foreign currency. It helps the nation's development. This is because of the quality, safety and purity of Indian spices.

2.3.8 District-wise area and production of various spices in Andhra Pradesh in 2022-23

Table No.2.15 District-wise area and production of various spices in Andhra Pradesh in 2022-23

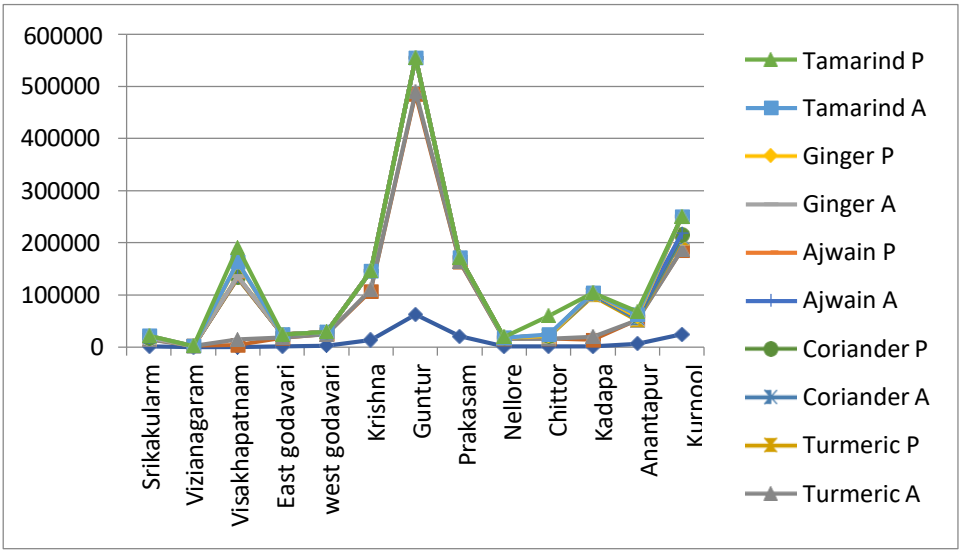
(Area in Ha and production in MT, s)

District	Chilly		Turmeric		Coriander		Ajwain		Ginger		Tamarind	
	A	P	A	P	A	P	A	P	A	P	A	P
Srikakularm	1892	13244	253	3036	38	76			139	3475	13	91
Vizianagaram	351	2457										
Visakhapatnam	593	4151	9913	118956	572	1058			1675	25125	1583	28500
East Godavari	2230	15610	558	6696	71	142			17	26		
west Godavari	3147	22029	325	3900	5	10			66	990		
Krishna	13441	94087	2999	35988								
Guntur	63107	421721	5422	65064								
Prakasam	22004	142027	672	8064								
Nellore	2104	14728	180	2160							25	375
Chittoor	1996	13972	402	4824	913	826					2336	35040
Kadapa	1740	12180	6512	78144	2394	3788	174	174				
Anantapur	6455	45185			3087	5174					2619	6809
Kurnool	24570	160930	1685	20220	3135	5270	3135	31350				
Total	**143630**	**962321**	**28921**	**347052**	**10215**	**16344**	**3309**	**31524**	**1897**	**29616**	**6576**	**70815**

Source: Department of Horticulture, Govt. of Andhra Pradesh.

The above table no.2.15 is explaining about the district wise area and production of various spices grown in Andhra Pradesh in 2022-23. In India, Andhra Pradesh is very important state for cultivation, production, processing and export of Indian spices. These spices may be the Chilli, Turmeric, and coriander, Ajwain, Ginger and Tamarind. Out of 13 districts in AP major area and production centers are Guntur with area of 63107Ha and production is 421721 MT's, Next is the Kurnool district which has 24570 ha and production is 160930MT's. Third one is Prakasam with area of 22004 Ha and production is 142027MT's. Coming to Turmeric Visakhahapatnam plays a vital role with area of 9913Ha and production is 118956MT's.Next is the Kadapa with the area of 6512 Ha and production is 78144MT's. Third one is the Guntur distict with area of 5422Ha and production is 65064. Other spices area and production is not much predominant.

Graph No. 2.3 District-wise area and production of various spices in Andhra Pradesh in 2022-23



Source: The research reporter compiled and designed from Table no.2.15

The above Graph no.2.3 is explaining about the district wise area and production of various spices in Andhra Pradesh in 2022-23. Andhra Pradesh is the best suitable place for spices cultivation based on its climatic conditions, soil conditions, environmental conditions and more over the support from the government, marketing facilities and attitude of the famers also place big role. Chilli, Turmeric, coriander, Ajwain, ginger and Tamarind are main spices growing in Andhra Pradesh. Chilli, turmeric and tamarind are main predominant spices grow in Andhra Pradesh.

2.4 CHILLI AND TURMERIC PRODUCTION SCENARIO OF ANDHRA PRADESH AND INDIA.

2.4.1 Year-wise area, Production and productivity of Chilli in Guntur and Kurnool Districts.

Table No.2.16 Year-wise area, Production and productivity of Chilli in Guntur and Kurnool Districts.

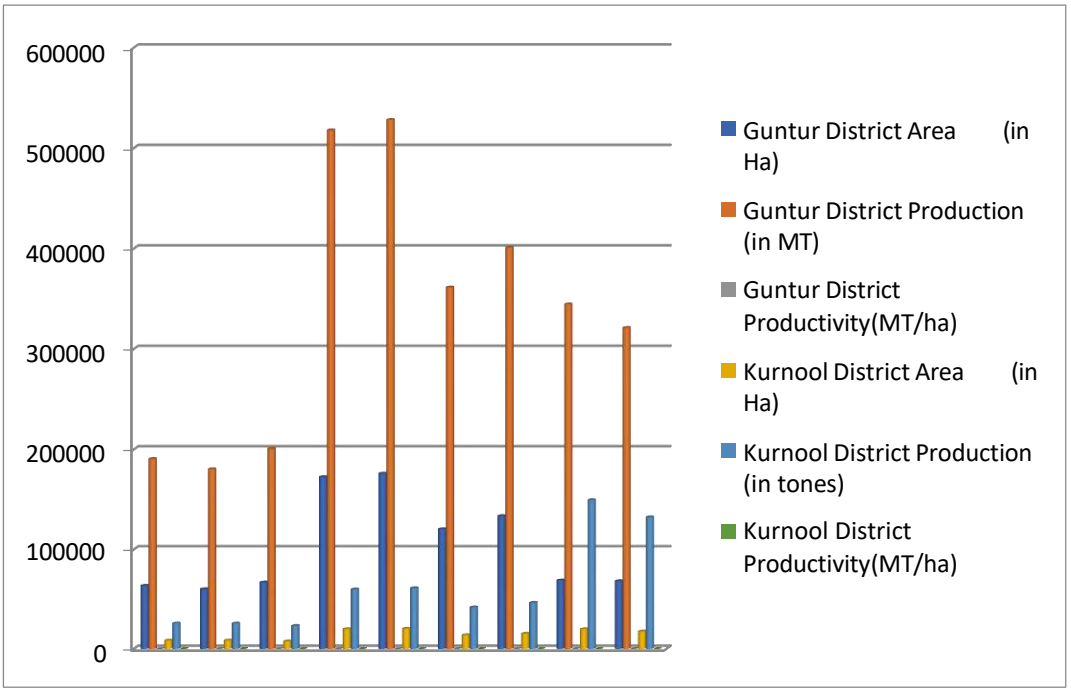
Year	Guntur District-Andhra region			Kurnool District-Rayalaseema Region		
	Area (in Ha)	Production (in MT)	Productivity (MT/ha)	Area (in Ha)	Production (in MT)	Productivity (MT/ha)
2013-14	63573	190719	3	8550	25650	3
2014-15	60173	180519	3	8550	25650	3
2015-16	66928	200784	3	7750	23250	3
2022-23	172634	517902	3	19990	59971	3
2017-18	176087	528260	3	20390	61170	3
2018-19	120470	361411	3	13950	41850	3
2019-20	133722	401166	3	15485	46454	3
2020-21	68927	344635	5	19965	149738	7.5
2021-22	68261	321244	4.71	17680	132600	7.5

2022-23	87114	485089	5.57	26477	198577	7.5
Average	101789	353172.9	3.628	15878.7	76491	4.35
CAGR	3.56%	10.93%		13.38%	25.53%	

Source: Department of Horticulture-Govt of AP

Table 2.16 is explaining area, production and productivity of chilly in Guntur and Kurnool districts of Andhra Pradesh. In Andhra Region Guntur is the hub for chillies. In Rayalaseema region Kurnool is the main place for chilli cultivation. Productivity of chilli in Guntur and Kurnool districts from 2013-14 to 2022-23 is 3 MT per Ha in both the districts. In 2020-21 onwards productivity levels are increased 5 MT per Ha in Guntur district and 7.50 MT per Ha from Kurnool district till 2022-23.Area and production is less in Kurnool district but productivity is very satisfactory. In Andhra region compound annual growth rate of chilli area is 3.56% and production is 10.96%. In Rayalaseema region compound annual growth rate of chilli area is 13.38% and production is 25.53%. The difference because of bad weather and irrigation conditions, soil conditions, pest and disease management problems in Andhra Region.

Graph .2.4 Year wise area, Production and productivity of Chilli in Guntur and Kurnool District



Source: The research reporter compiled and designed from Table no.2.16

The above Graphno.2.4 is explaining about the year wise area, production and production of chilli in Guntur and Kurnool districts of Andhra and Rayalseema regions. In all years area, production and productivity is highest in Guntur in Andhra Region comparatively Kurnool district in Rayalaseema region. Even in Guntur district also area and production has some fluctuations year after year. We can observe same scenario in area and production and productivity in Kurnool district

also. Compound annual growth rate in area is 3.56 per cent and production 10.93 per cent in Guntur district and area 13.38 per cent and 25.53 per cent in Kurnool district respectively.

2.4.2 Year-wise area, Production and productivity of Turmeric in Guntur and Kadapa Districts.

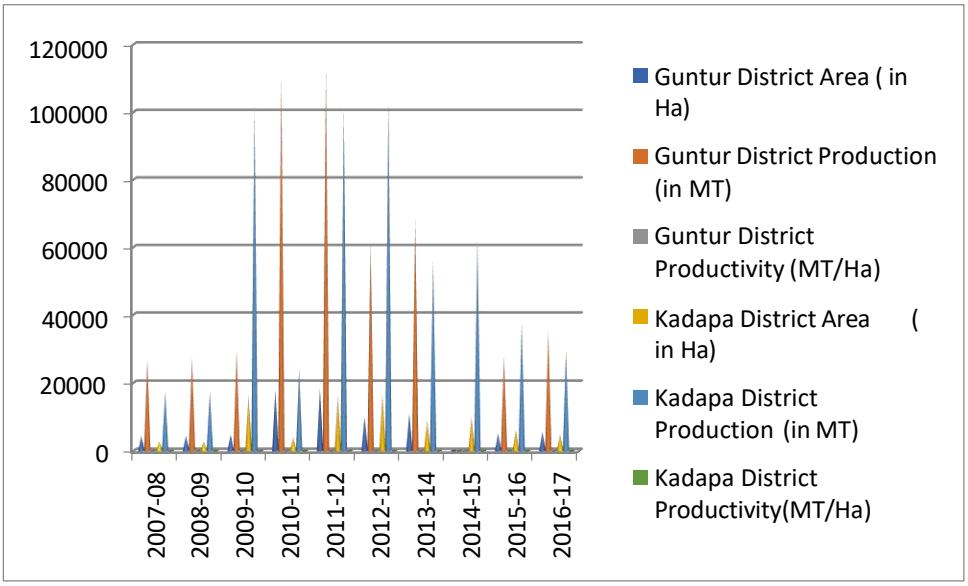
Table No.2.17 Year-wise area, Production and productivity of Turmeric in Guntur and Kadapa Districts.

Year	Guntur District			Kadapa District		
	Area (in Ha)	Production (in MT)	Productivity (MT/Ha)	Area (in Ha)	Production (in MT)	Productivity(MT/Ha)
2013-14	4318	26772	6	2800	17360	6.2
2014-15	4394	27243	6	2800	17360	6.2
2015-16	4704	29165	6	16326	101221	6.2
2022-23	17897	110963	6	3874	24019	6.2
2017-18	18255	113182	6	16326	101221	6.2
2018-19	9888	61306	6	16653	103249	6.2
2019-20	10976	68049	6	9020	55924	6.2
2020-21	0	0	0	10012	62076	6.2
2021-22	5038	27710	6	6250	37500	6
2022-23	5511	35047	6	4918	29508	6
Average	8098.1	49943.7	5.4	8897.9	54943.8	6.16
CAGR	2.75%	3.04%		6.46%	6.07%	

Source: Statistics from Dept. Of Horticulture, Govt. of AP.

Table no.2.17 is explaining about the area, production and productivity of turmeric in Guntur district and Kadapa Districts. Region wise in Andhra Guntur is good for Turmeric and in Rayalaseema, Kadapa is main source for turmeric. Both the areas have very good marketing facilities for the farmers. Area under cultivation of turmeric in Guntur district in 2013-14 is 4318ha and production is 26772. In Kadapa district 2800Ha and production is 17360, Productivity is 6.2 MT per Ha. In Guntur district area and production growth is very significant up to 2017-18. Later on area and production trend is in declined because of drought like situation, lack of irrigation facilities, lack of credit issues, pest and disease management problems. From 2013-14 the turmeric area and production in improved by 16326ha and 101221MT's.This was again area and production is declined subsequent years from 2019-20 to 2022-23. In Guntur district productivity is very stable from 2013-14 to 2022-23. Compound annual growth rate of Guntur district area 2.75% and production 3.04% and Kadapa district area 6.46% and production 6.07%.

Graph .2.5 Year wise area, Production and productivity of Turmeric in Guntur and Kadapa Districts.



Source: The research reporter compiled and designed from Table no.2.17

The above Graph.2.5 is explaining about the year wise area, production and productivity of turmeric in Guntur and Kadapa districts of Andhra Pradesh. Turmeric is one of the important and major crop which grows in grows in Andhra Pradesh. There is up and down in area and production of Guntur and Kadapa districts. It is observed that productivity is the same in both the districts. Turmeric is mainly used in cosmetics, pharmaceutical and medicinal industry. Indian turmeric has more demand based on color, size, curcumin content, oil and oleoresins.

2.4.3 Year - wise area, production and productivity of chilli and Turmeric in Andhra Pradesh

Table No.2.18- Year wise area, production and productivity of chilli and Turmeric in Andhra Pradesh (Area in Ha, Production in MT and Productivity MT/ha)

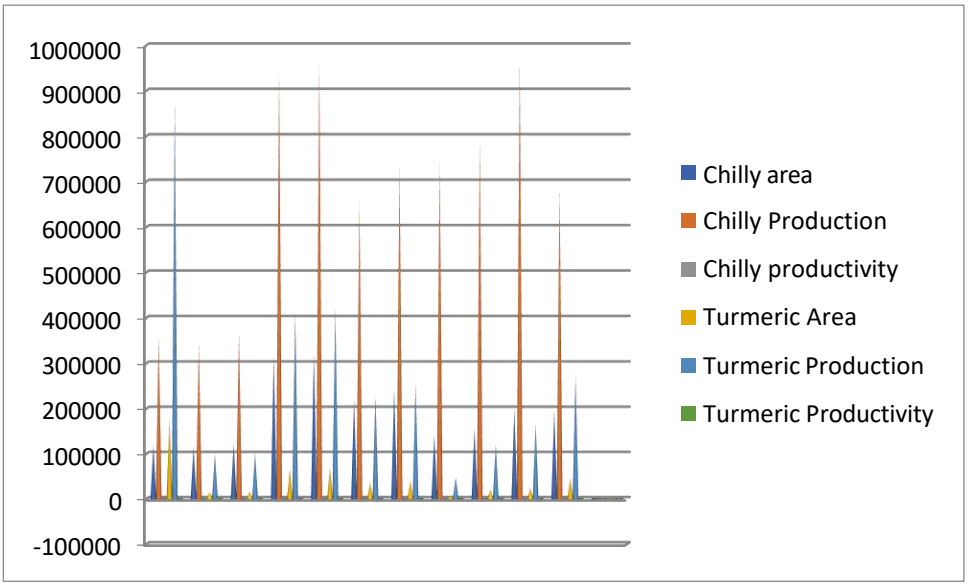
Year	Chilly			Turmeric		
	area	Production	productivity	Area	Production	Productivity
2013-14	119685	358837	3	17667	88015	4.98
2014-15	114520	345060	3.01	15958	98940	6.2
2015-16	122254	366762	3	16487	102216	6.2
2022-23	315342	946026	3	66800	414159	6.2
2017-18	321649	964946	3	68136	422442	6.2
2018-19	220057	660172	3	36906	228817	6.2
2019-20	244263	732790	3	40966	253987	6.2
2020-21	142624	742888	5.21	6701	48165	7.19
2021-22	156068	793488	5.08	20835	121439	5.83

2022-23	199503	968934	4.86	24398	166326	6.82
AVERAGE	195597	687990	3.62	47386	273665	6.2
CAGR%	5.84%	11.67%	5.51%	-19.75%	-16.90%	3.56%

Source: Statistics from Dept. of Horticulture, Govt. of AP.

The above table no.2.18 is explaining about the year –wise area, production and productivity of chill and turmeric from 2013-14 to 2022-23. Chilli area of cultivation highest recorded in 2017-18 321649 ha and 315342 Ha in 2016-17. Production was highest recorded in 2022-23 as 968934 MT's and in 2017-18 was 964946. Productivity was recorded highest in 2017-18 and 2022-23. Turmeric area highest recorded was in 2022-23 with 68136 Ha and 66800ha in 2017-18. Production was 422442 in 2017-18 and 414159 in 2022-23. Productivity was highest in 2020-21. Compound annual growth rate of chilli area 5.84 per cent, production 11.67per cent and turmeric area -19.75per cent, and production is 16.90 per cent and productivity is increased 3.56 per cent. Area, production and productivity are depending on the various factors, such as soil fertility, water, pest and disease management, market and infrastructure facilities availability.

GraphNo.2.6 Year - wise area, production and productivity of Chilli and Turmeric in Andhra Pradesh



Source: The research reporter compiled and designed from Table no.2.18

The above Graphno.2.6 is explaining about the year wise area, production and productivity of chilli and turmeric in Andhra Pradesh from 2014 to 2023. There are significant fluctuations in area and production in chilli and turmeric in Andhra Pradesh. This is because of soil fertility, inadequate quality of seeds, inadequate resources, insufficient financial facilities, lack of go-downs, and lack of input facilities, marketing and prices issues, middleman and marketing conditions in Andhra Pradesh.

2.4.4 Year-wise chilli and turmeric area, production and productivity in India

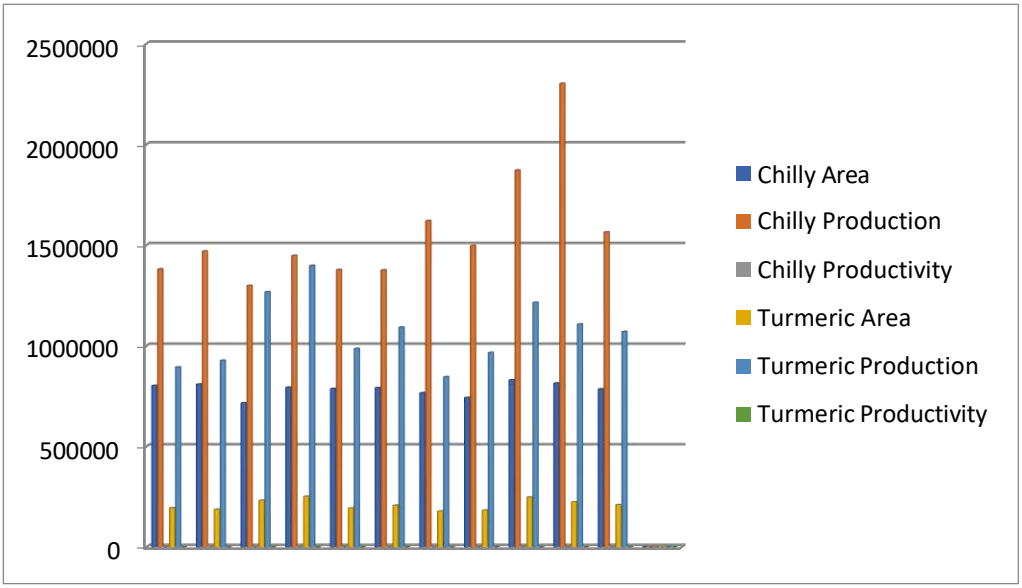
Table No.2.19 Year-wise chilli and turmeric area, production and productivity in India (Area in Ha, production in MT and productivity MT/Ha)

Year	Chilly			Turmeric		
	Area	Production	Productivity	Area	Production	Productivity
2013-14	802896	1381531	1.72	195076	894590	4.59
2014-15	809699	1470352	1.82	187535	927912	4.95
2015-16	716428	1299191	1.81	232022	1268280	5.47
2022-23	793921	1448215	1.82	251824	1398862	5.55
2017-18	787530	1378400	1.75	194330	986690	5.08
2018-19	791930	1376400	1.74	207570	1092628	5.26
2019-20	766620	1621480	2.12	178470	846250	4.74
2020-21	742950	1497440	2.02	183480	967060	5.27
2021-22	830770	1872010	2.25	248050	1215520	4.9
2022-23	814790	2302670	2.83	224260	1107920	4.94
Average	785753	1564768.9	1.99	210262	1070571	5.09
CAGR%	0.16%	5.84%	5.69%	1.56%	2.40%	0.82%

Source: Horticulture statistics, Dept. of Agriculture, Govt. of India

The above table no.2.19 is explaining about the area, production and productivity of chilly and Turmeric in India from 2013-14 to 2022-23. India is the land of spices and spices bowl of world. India is the largest producer, consumer and exporter of spices. If we closely analyze the data, chilly area under cultivation for the last 10 years 2022-23 is highest area of cultivation, because of the demand for Indian chilli and less area cultivation in previous years and Compound annual growth rate chilli area is 0.16 per cent and production is 5.84 per cent. Turmeric area, production and productivity in 2022-23 recorded highest area under cultivation with 251824ha and production recorded in the same year with 1398862 MT's and productivity also very significant in the same year. CAGR is Turmeric area 1.56 per cent and productivity is 2.40 per cent. This is because of previous year records and good rains, farmers shown interest with best agriculture practice and availability of market.

GraphNo.2.7 Year-wise chilli and turmeric area, production and productivity in India



Source: The research reporter compiled and designed from Table no.2.19

The above Graphno.2.7 is explaining about year wise chilli and turmeric area, production and productivity in India from 2014 to 2023.There is significant difference in area, production and productivity of chilli and turmeric year by year. The average area, production and productivity of chilli is 785753 ha, 1564769 MT's and 1.99MT and turmeric is 210262 ha, 1070570MT and 5.09Mt respectively. Compound annual growth rate of chilli area is 0.16 per cent, production is 5.84 per cent and productivity is 5.69 per cent and turmeric area is 1.56 per cent, productivity is 2.40 per cent and productivity is 0.82 per cent respectively. This difference in area, production and productivity is lack of availability of fertile soil continuously, discriminate use of pesticides and chemicals, reduction of soil fertility, insufficient quality plant material, insufficient financial facilities, marketing issues, storage problems, and pest and disease management issues.

2.4.5 State-wise share of area and production of Turmeric 2022-23

Table No. 2.20 State-wise share of area and production of Turmeric 2022-23

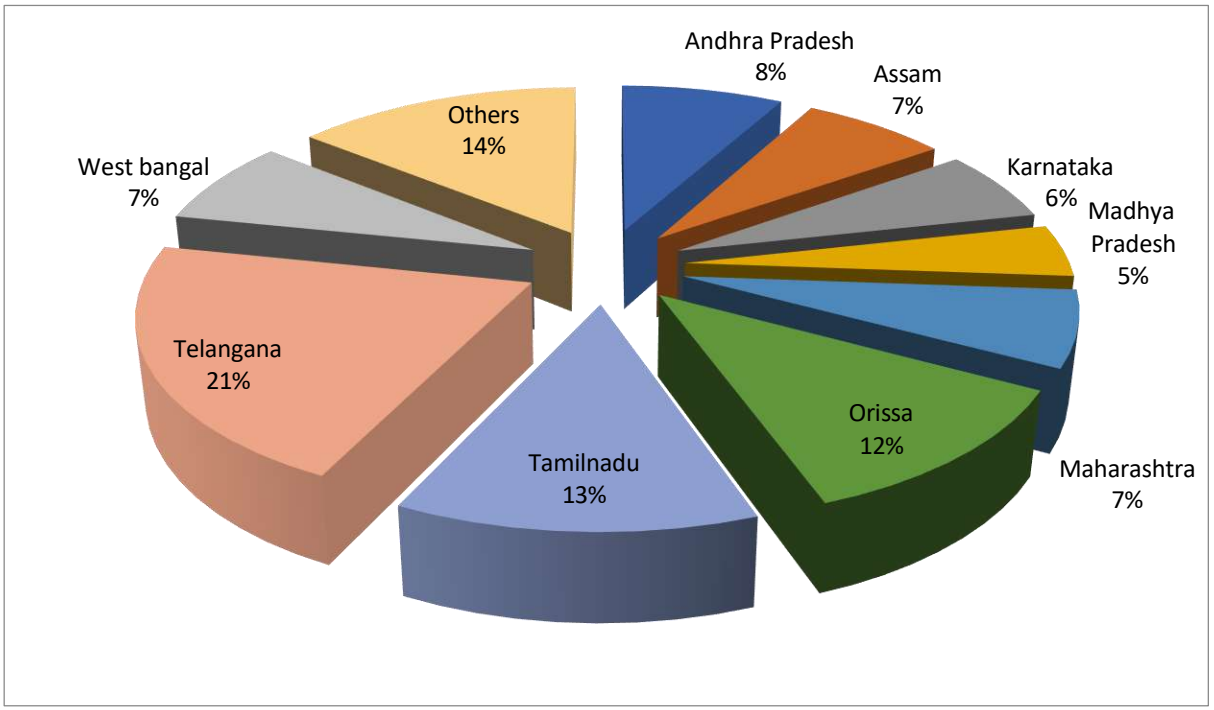
State	Area (in Ha)	% Share	Production in MT's	% Share
Andhra Pradesh	19180	8.06	79730	7.73
Assam	17110	7.19	19170	1.86
Karnataka	14990	6.3	76490	7.41
Madhya Pradesh	10950	4.6	39050	3.78
Maharashtra	15880	6.67	190090	18.42
Orissa	27860	11.71	54500	5.28
Tamilnadu	30000	12.61	116000	11.24
Telangana	50150	21.07	294560	28.55
West bangal	18000	7.56	45500	4.41

Others	33840	14.22	116720	11.31
Total	**237960**	**100**	**1031810**	**100**

Source: Horticulture statistical. Dept. of Agriculture

The above table no.2.20 is explaining about the turmeric area and production in India during 2022-23. If we thoroughly examine the data of turmeric area and production, Telangana has recorded highest area 50150 Ha with 21.07 per cent share. It is because of the soil suitability, weather and irrigation conditions, market, and water availability of resources and farmer's interest. Telangana occupies first position in production with 28.55 per cent because of the good feasible conditions and support from the Government and NGO's. Maharashtra occupied the second position with 18.42 per cent; third one is Tamil Nādu with 11.24 per cent. Andhra Pradesh again stands in fourth position with 7.73 per cent. Next is the Tamil Nādu with 12.61 per cent, Orissa with 11.71 per cent stands in third position. Andhra Pradesh stands fifth position with 8.06 per cent. The government should take the initiative to expansion of the turmeric area and production**.** Maharashtra and Madhya Pradesh also play significant contribution in area and production.

Graph No.2.8 State-wise share of area under cultivation of Turmeric 2022-23.

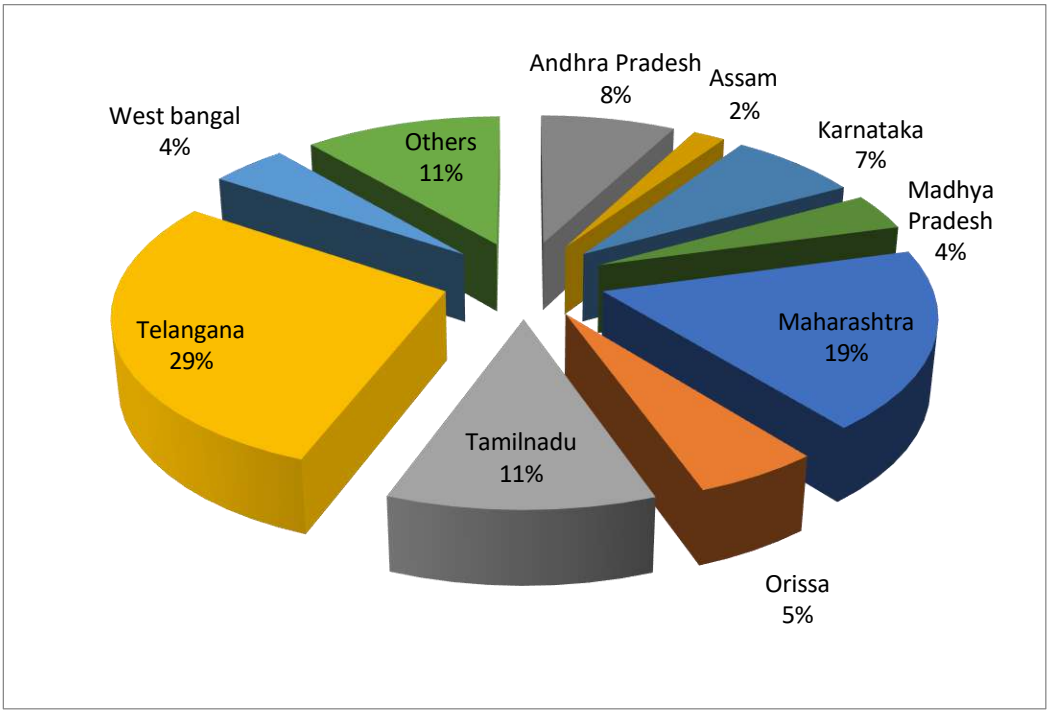


Source: The research reporter compiled and designed from Table no.2.20

The above Graphno.2.8 is disseminating about the state wise area under cultivation of turmeric in India during 2022-23. Out all turmeric growing states Telangana places first position with 21 per cent in area under cultivation, it is because of suitability of soil pH, irrigation facilities, average acres, willingness of the farmers, availability of infrastructure facilities, 13 per cent of turmeric area grown in Tamil Nādu, 12 per cent of turmeric area grown in Orissa, 8 per cent of area covers in

Andhra Pradesh and 7 per cent in Maharashtra and 6 per cent Karnataka and 5 per cent in Madhya Pradesh. There is scope for expansion of area under cultivation of turmeric in Andhra Pradesh but marketing is the major issue and it should be addressed in good manner.

GraphNo.2.9 State-wise share of production of Turmeric 2022-23



Source: The research reporter compiled and designed from Table no.2.20.

The above Graph.2.9 is explaining about the state wise production share of turmeric in India during 2022-23. Telangana area is stands first in production of turmeric along with the area under cultivation. Maharashtra produces 19 per cent, Tamil Nādu produces 11per cent and Andhra Pradesh produces 8 per cent only. Andhra Pradesh need to be increased in area and production, it has great potentiality for area expansion and production improvement with the help of the availability of pure seeds, fertile land, irrigated facilities, modern equipment, scientific methods, modern pre- and post-harvest technology.

2.4.6 Year-wise production share of chilli and Turmeric in India and Andhra Pradesh

Table No.2.21 Year-wise production share of chilli and Turmeric in India and Andhra Pradesh

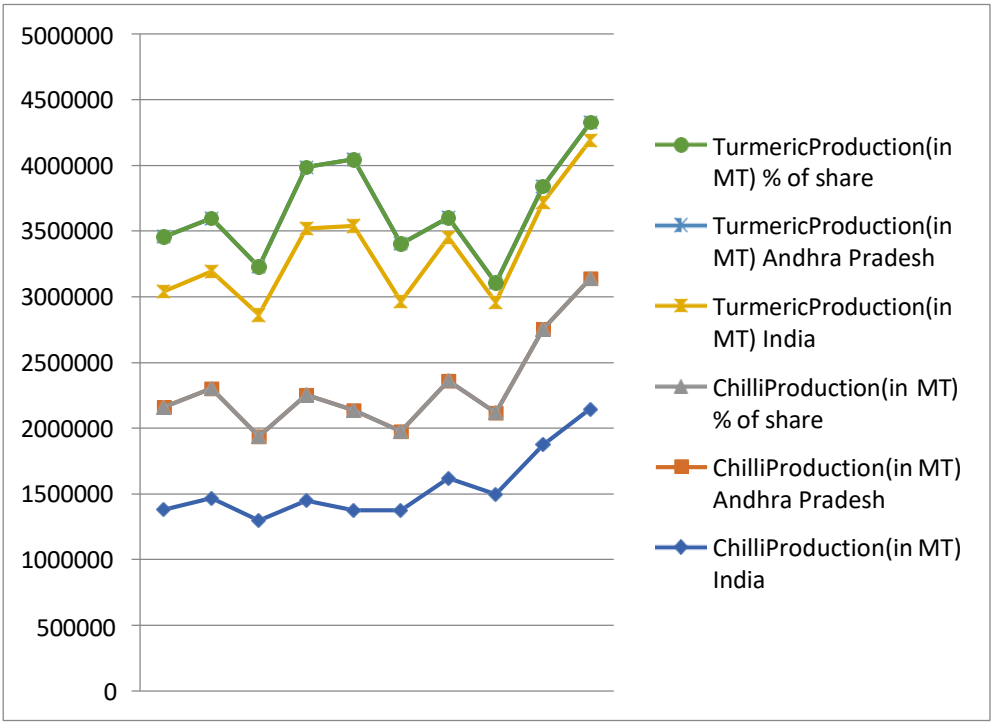
Year	Chilli Production(in MT)			Turmeric Production(in MT)		
	India	Andhra Pradesh	% of share	India	Andhra Pradesh	% of share
2013-14	1381531	781671	56.58	880155	416060	47.27
2014-15	1470352	830990	56.52	894590	403228	45.07
2015-16	1299191	638298	49.13	927912	364044	39.23
2022-23	1448215	804204	55.53	1268280	466928	36.82
2017-18	1378400	761000	55.21	1398862	506865	36.23

2018-19	1376400	601990	43.74	986690	439000	44.49
2019-20	1621480	739620	45.61	1092628	151906	13.90
2020-21	1497440	618420	41.3	846250	143230	16.93
2021-22	1872010	883000	47.17	967060	121120	12.52
2022-23	2149230	992900	46.2	1051160	134122	12.76
Average	1549425	765209	49.70	1031359	314650	30.52
CAGR%	5.03%	2.69%		1.99%	-11.82%	

Source: Spices Board Statistics.

The above table no.2.21 is explaining about the year wise chilli production in Andhra Pradesh and India and contribution of Andhra Pradesh in Chilli Production. Definitely Andhra Pradesh is the highest producer of Chilli in India. But if we closely examine the table, it is noticed the down fall of production for the last 10 years is clearly indicating. In 2013-14 was 56.58% and it was come down 49.13% in 2015-16 and again little improved in 2022-23 and totally came down 46.20 in 2022-23. If closely examine the turmeric This is because of lack of good seed availability, cost of the seeds, lack of pest and disease management, lack of water resources, labor availability, input and output supply and lack market and infrastructure facilities in the market yards and other reasons.

Graph No.2.10 Year-wise production share of chilli and Turmeric in India and Andhra Pradesh



Source: The research reporter compiled and designed from Table no.2.21.

The above graphs no.2.10 is explaining about year wise production of chilli and turmeric share of Andhra Pradesh in India. The production share of chilli in Andhra Pradesh is very significant, but

there are slight differences in year by year. Even though Andhra Pradesh is the highest producer of chilli, there are other states like Madhya Pradesh, Telangana, Orissa, Tamilnadu and Karnataka also occupying the and increasing the production year by year. Before bifurcation of state Andhra Pradesh was occupies first position in production, later on Telangana occupies the first place. There is a need of the hour to improve the production and export the quality material to the international market**.**

2.4.7 District wise area under cultivation of Chilli in Andhra Pradesh from 2013-14 to 2022-23

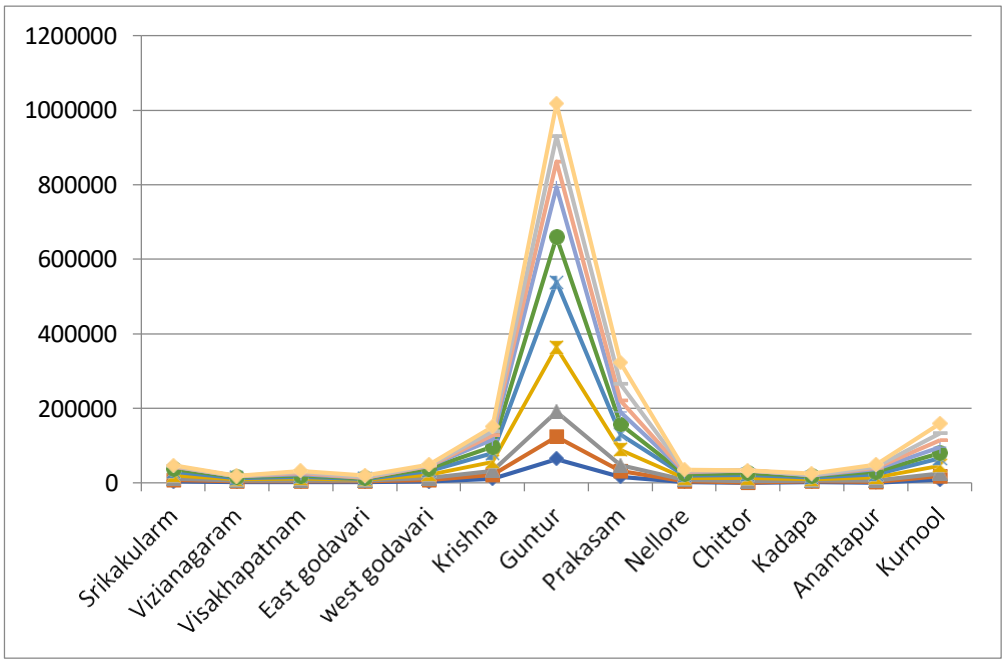
Table No. 2.22 District wise area under cultivation of Chilli in Andhra Pradesh from 2013-14 to 2022-23 (in Ha)

District	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Srikakulam	3630	3630	3630	9363	9550	6534	7253	73	1892	1892	-6.98%
Vizianagaram	1935	2060	1436	3704	3778	2584.8	2869	0	0	396	-16.16%
Visakhapatnam	1860	1970	1970	5081	5183	3546	3936	3436	3436	535	-12.93%
East Godavari	2445	2445	876	2260	2305	1576.8	1750	0	2351	2893	1.89%
west Godavari	4214	4214	3730	9621	9814	6714	7453	0	1557	2196	-6.99%
Krishna	10744	10744	9512	24535	25026	17121.6	19005	11250	10146	11575	0.83%
Guntur	63573	60173	66928	172634	176087	120470.4	133722	68927	68261	87114	3.56%
Prakasam	15758	15758	15758	40646	41459	28364.4	31484	32238	43855	57453	15.46%
Nellore	2364	2364	2363	6095	6217	4253.4	4721	2400	2084	2104	-1.29%
Chittoor	413	413	3242	8362	8530	5835.6	6478	0	306	306	-3.28%
Kadapa	3039	1039	1625	4192	4275	2925	3247	835	1000	1759	-5.89%
Anantapur	1160	1160	3434	8858	9035	6181.2	6861	3500	3500	4803	17.10%
Kurnool	8550	8550	7750	19990	20390	13950	15485	19965	17680	26477	13.38%
Total	119685	114520	122254	315342	321649	220057.2	244263	142624	156068	199503	5.84%

Source: Department of Horticulture, Govt. of Andhra Pradesh.

The above table no.2.22 is explaining about the district wise area under cultivation of chilli in Andhra Pradesh from 2013-14 to 2022-23. Chilly is the important spice in Andhra Pradesh which grows in many districts. Based on the soil condition and suitability some district will contribute very significant manner. Prakasam has very significant and compound annual growth rate is 15.46 per cent and in 2013-14 as 15758 ha and in 2022-23 as 57453 Ha. Next is the Guntur district has recorded with 3.56 per cent CAGR from 2013-14 with 63573 Ha to 81114 Ha in 2022-23. Krishna and East Godavari also some area under chilli cultivation. This chilli grown in AP will be exported from India

Graph.2.11 District wise area under cultivation of Chilli in Andhra Pradesh from 2013-14 to 2022-23 (in Ha)



Source: The research reporter compiled and designed from Table no.2.22

The above Graph no.2.11 is explaining about the district wise area under cultivation of chilli in Andhra Pradesh. Andhra Pradesh has two regions namely Andhra and Rayalaseema. In Andhra region Guntur district occupies the first position of area under cultivation of chilli. But the compound annual growth rate is 3.56 per cent. Another district is prakasam which occupies second position with 15.46 per cent of CAGR. In Rayalaseema region Kurnool district has significant area under cultivation of chilli with compound annual growth rate of 13.38 per cent. There a lot of scope for area expansion of chilli in both the regions of Andhra Pradesh.

2.4.8 District wise area under cultivation of turmeric in Andhra Pradesh during 2013-14 to 2022-23

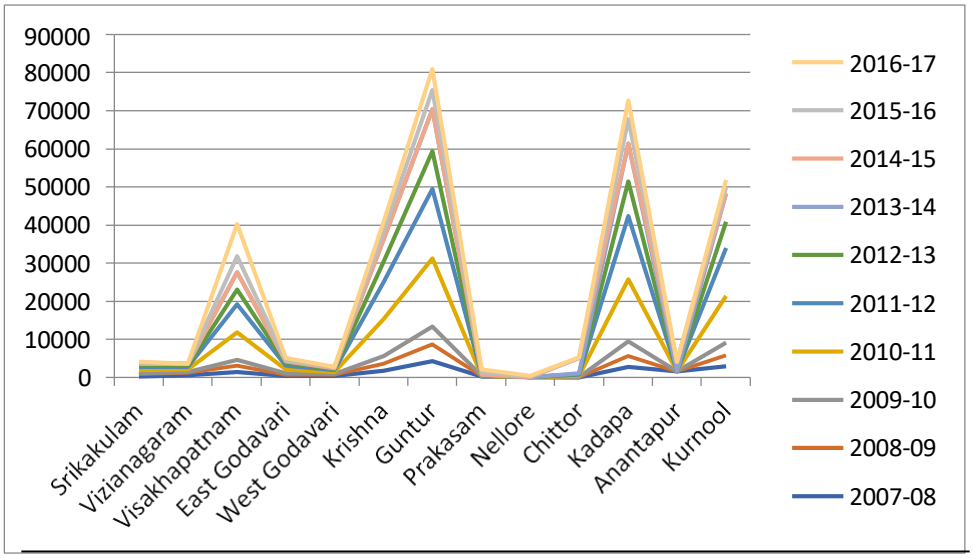
Table No. 2.23 District wise area under cultivation of turmeric in Andhra Pradesh during 2013-14 to 2022-23 (in Ha)

District	2013-14	2014-15	2015-16	2022-23	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Srikakulam	356	567	215	793	809	438	486	8	245	245	-4.07%
Vizianagaram	575	659	192	695	709	384	426	0	50	0	-100.00%
Visakhapatnam	1530	1583	1583	7193	7337	3974	4411	129	4181	8317	20.70%
East Godavari	420	420	283.5	1024	1045	566	628	0	158	558	3.21%
West Godavari	377	377	143	518	528	286	317	0	210	0	-100.00%
Krishna	1785	1884	2024	9665	9859	5340	5927	0	2071	2344	3.07%
Guntur	4318	4394	4704	17897	18255	9888	10976	0	5038	5511	2.75%

Prakasam	225	225	0	91	92	50	56	0	720	599	11.49%
Nellore	72	72	0	0	0	0	0	35	150	144	8.01%
Chittoor	55	77	68	290	295	160	178	4004	78	78	3.96%
Kadapa	2800	2800	3874	16326	16653	9020	10012		6250	4918	6.46%
Anantapur	1604		0	0	0		0	2525	0	0	-100.00%
Kurnool	2900	2900	3400	12308	12554	6800	7548		1684	1684	-5.86%
Total	**17017**	**15958**	**16486.5**	**66800**	**68136**	**36906**	**40966**	**6701**	**20835**	**24398**	4.08%

Source: statistics from Department of Horticulture, Govt. of AP.

The above table no.2.23 is explaining about the district wise area under cultivation of Turmeric in India from 2013-14 to 2022-23. Turmeric is another important spice growing in Andhra Pradesh. The turmeric growth depends on the soil content, water availability, pest and disease management, market and variety of spice. Out 13 districts Visakhapatnam has recorded highest Compound annual growth rate 20.70 per cent the area in 2006-07 was 1530Ha and 2022-238317 Ha and this is very significant. Next is the Kadapa district also has very potentiality for turmeric growth. In 2006-17 area was 2800 Ha and in 2022-23 as 4918Ha. Krishna also contributes with CAGR 3.07%.This turmeric is used for domestic consumption as well as for International trade also.



Graph No.2.12 District wise area under cultivation of turmeric in Andhra Pradesh during 2013-14 to 2022-23 (in Ha)

Source: The research reporter compiled and designed from Table no.2.23.

The above graph no.2.12 is explaining about the district wise area under cultivation of turmeric in Andhra Pradesh during 2007 to 2017. Turmeric is very important spices used in many ways in cooking, pharmaceutical, oil extractions, colors, flavors and other places. Andhra Pradesh has divided into two regions and 13 districts and out of 13 districts Guntur, Krishna, Kadapa and Visakhapatnam are the major turmeric

growing districts. These districts are suitable for cultivation of turmeric based on their soil condition, PH, fertility of the land, availability of irrigation facilities, availability of seeds and important factors.

2.4.9 District wise production of turmeric in Andhra Pradesh during 2013-14 to 2022-23

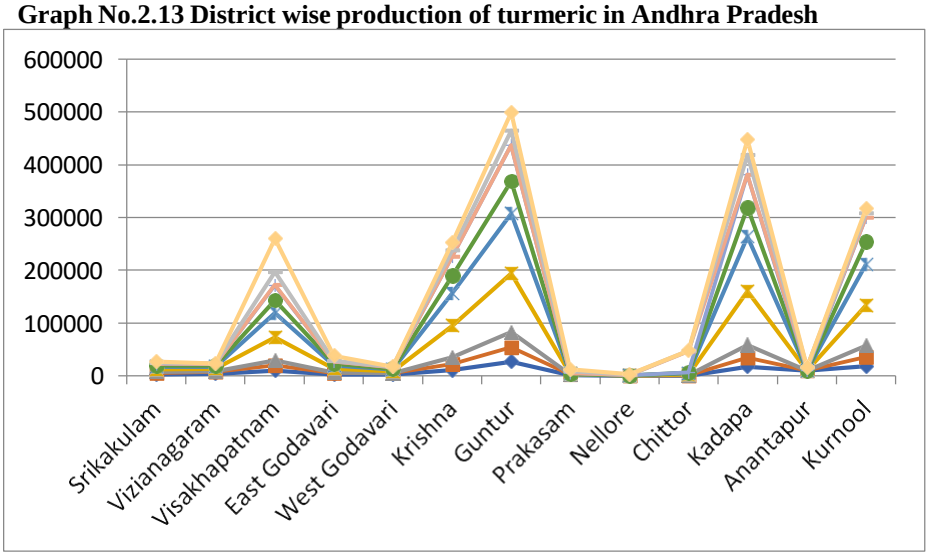
Table No.2.24 District wise production of turmeric in Andhra Pradesh during 2013-14 to 2022-23 (in MT's)

District	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	CAGR%
Srikakulam	2207	3515	1333	4915	5014	2716	3014	56	1960	1960	-1.3%
Vizianagaram	3565	4086	1190	4309	4395	2381	2643	0	300	0	-100.0%
Visakhapatnam	9486	9815	9815	44596	45488	24639	27349	979	25090	62377	23.3%
East Godavari	2604	2604	1758	6352	6479	3509	3895	0	790	10044	16.2%
West Godavari	2337	2337	887	3209	3274	1773	1968	0	1575	0	-100.0%
Krishna	11067	11681	12549	59925	61124	33108	36750	0	12426	14064	2.7%
Guntur	26772	27243	29165	110963	113182	61306	68049	0	27710	35047	3.0%
Prakasam	1395	1395	0	561	572	310	344	0	4320	3594	11.1%
Nellore	446	446	0	0	0	0	0	525	900	864	7.6%
Chittoor	341	477	422	1796	1831	992	1101	40040	448	448	3.1%
Kadapa	17360	17360	24019	101221	103249	55924	62076	0	37500	29508	6.1%
Anantapur	9945	0	0	0	0	0	0	6565	0	0	-100.0%
Kurnool	17980	17980	21080	76310	77836	42160	46798	0	8420	8420	-8.1%
Total	105505	98940	102216.3	414158	422444	228817	253987	48165	121439	166326	5.2%

Source: Department of Horticulture, Govt. of AP

The above table no.2.24 is explaining about the Turmeric production in Andhra Pradesh from 2013-14 to 2022-23. Visakhapatnam has recorded growth rate from 2013-14 with 9486 MT's and 2022-23 as 62377 MT's and Compound Annual Growth Rate is 23.3%. Kadapa recorded as 6.1%, Guntur recorded as 3.0%, Krishna 1.43. other places are not having significant for the turmeric production. Visakhapatnam is the ideal place for turmeric growth, because of weather condition, soil suitability, pest and disease management, water availability and market facility.

Graph No.2.13 District wise production of turmeric in Andhra Pradesh



Source: The research reporter compiled and designed from Table no.2.24

The above Graphno.2.13 is disseminating about the district wise production of turmeric in Andhra Pradesh. Out of all spices turmeric is one of the important spices which earn lot of foreign currency to India. Turmeric is growing mainly in Telangana, Andhra Pradesh, Karnataka, Tamil Nādu, Maharashtra, Orissa and Assam. Turmeric price depends on the size, color, flavor, curcumin content percentage and other important chemical factors. The production of the turmeric depends on the quality of seeds, soil conditions, irrigation facilities, pest and disease management, post-harvest management, marketing management and value addition of the turmeric. Mostly government policies and programs and schemes also influence the production.

2.4.10 State-wise share of area and production of chilli 2022-23

Table No.2.25 State-wise share of area and production of chilli 2022-23

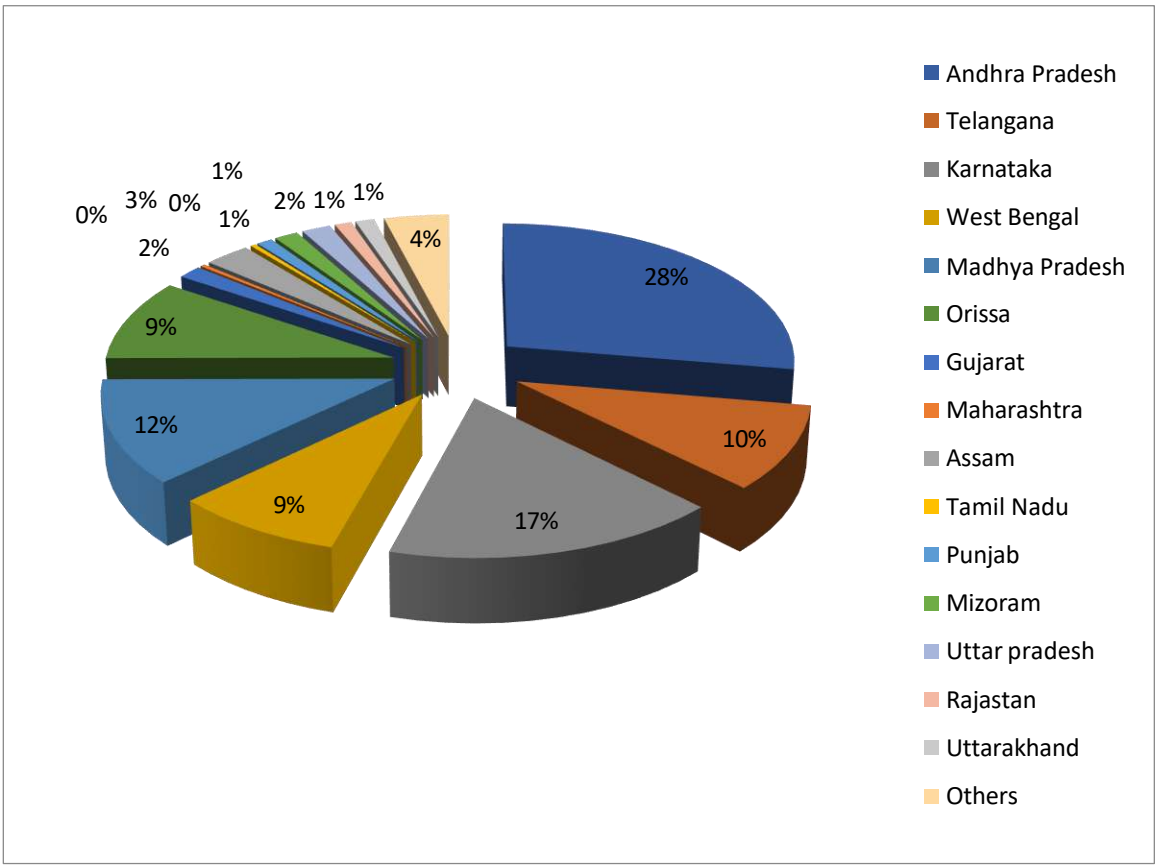
State	Area (in Ha)	% share	Production (in MT)	% share
Andhra Pradesh	209350	27.67	992900	46.2
Telangana	73780	9.75	340800	15.86
Karnataka	127600	16.87	260140	12.11
West Bengal	65120	8.61	100340	4.67
Madhya Pradesh	90980	12.03	244550	11.38
Orissa	71700	9.48	69170	3.22
Gujarat	11350	1.5	22070	1.03
Maharashtra	2340	0.31	6200	0.29
Assam	21700	2.87	20610	0.96
Tamil Nadu	2530	0.33	1900	0.09
Punjab	7500	0.99	14080	0.66
Mizoram	11200	1.48	10920	0.51
Uttar Pradesh	13640	1.8	12580	0.59
Rajasthan	8060	1.07	13340	0.62
Uttarakhand	9000	1.19	7200	0.34
Others	30629	4.05	32210	1.5
Total	756479	100	2149010	100

Source: Horticulture statistical division, Department of Agriculture.

The above table no.2.25 is explaining about the area and production share of chilli producing state in India during 2022-23. Out all listed states Andhra Pradesh occupies

no. one in area of cultivation with 27.67 per cent and production 46.2 per cent. Next one is the Karnataka state with 16.87 per cent area and production 12.11 per cent. Next is the Madhya Pradesh area with 12.03% and production share is 11.38 per cent. Telangana and Orissa also contributing in chilli area and production with 9.75 per cent and 9.48 per cent in Area and 15.86 per cent and 3.22 per cent of Production. There is a share of other states but not very significant.

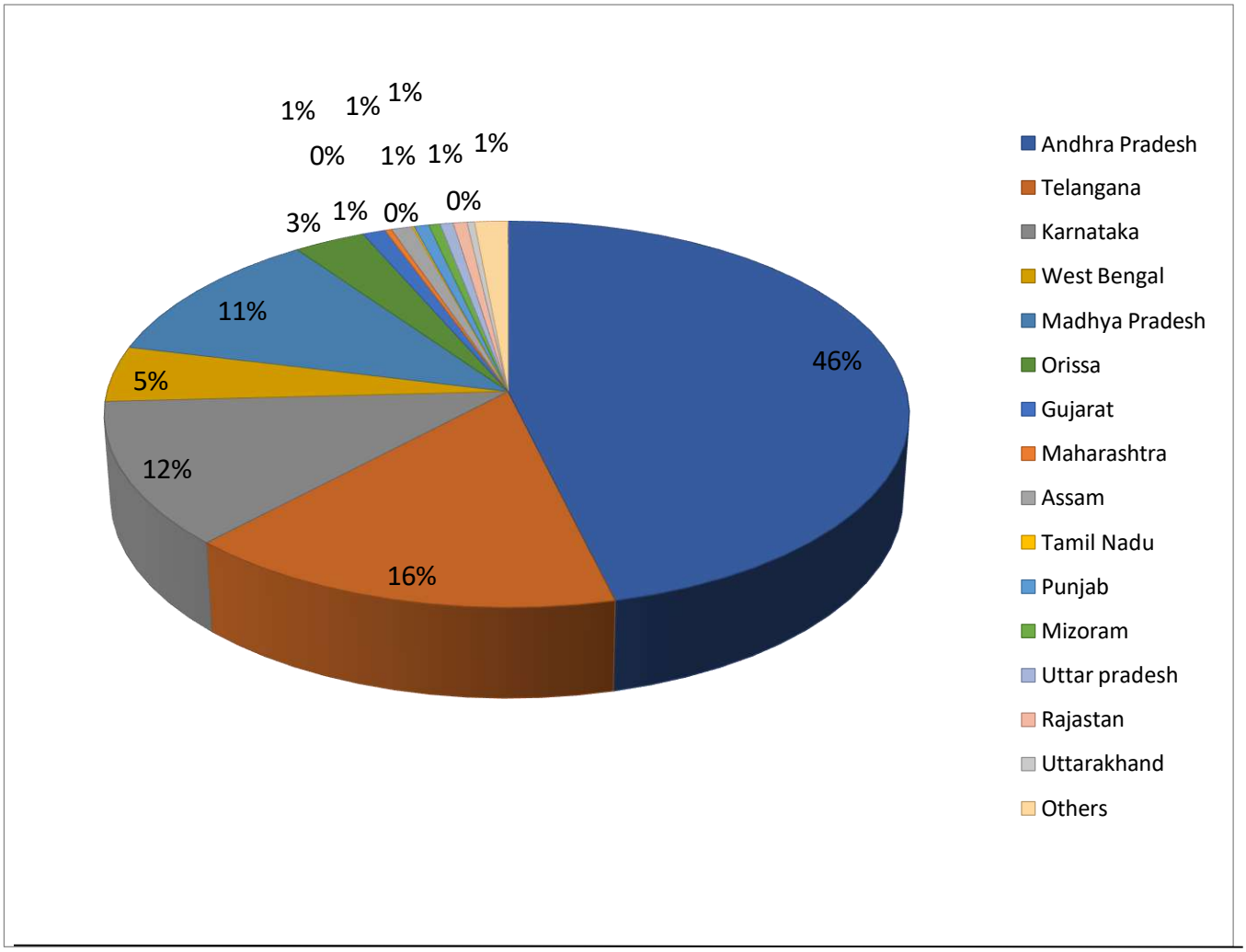
Graph No.2.14 State-wise share of area under cultivation of chilli in 2022-23



Source: The research reporter compiled and designed from Table no.2.25.

The above Graph no.2.14 is talking about the chilli area under cultivation during 2022-23 in India. There are different spices grown in different states of India based on the soil and weather conditions. Chillies grows almost all states, but Andhra Pradesh takes a lead with 27.67 per cent, next is Karnataka with 16.87 per cent, Madhya Pradesh occupies third position with 12.03 per cent. Orissa also growing the chilli. Chilli area expansion depends on the availability of demand and price of the product. Other states also contribute in area under cultivation of chilli.

Graph no.2.15 State-wise share of production of chilli 2022-23



Source: The research reporter compiled and designed from Table no.2.25.

The above Graph no.2.15 is explaining about the state wise share of production of chilli in 2022-23. Out of all chilli growing states in India, Andhra Pradesh occupies very significant share of production with 46.2 per cent. In production Telangana takes lead of send position of production with 15.56 per cent. Karnataka shares 12.11 per cent, Madhya Pradesh shares the production of 11.38 per cent and other states also occupy their positions in production.

2.5 CHILLI AND TURMERIC TRADING SCENARIO OF ANDHRA PRADESH AND INDIA

2.5.1 Year-wise all other spices and chilli exports share in quantity and value from India

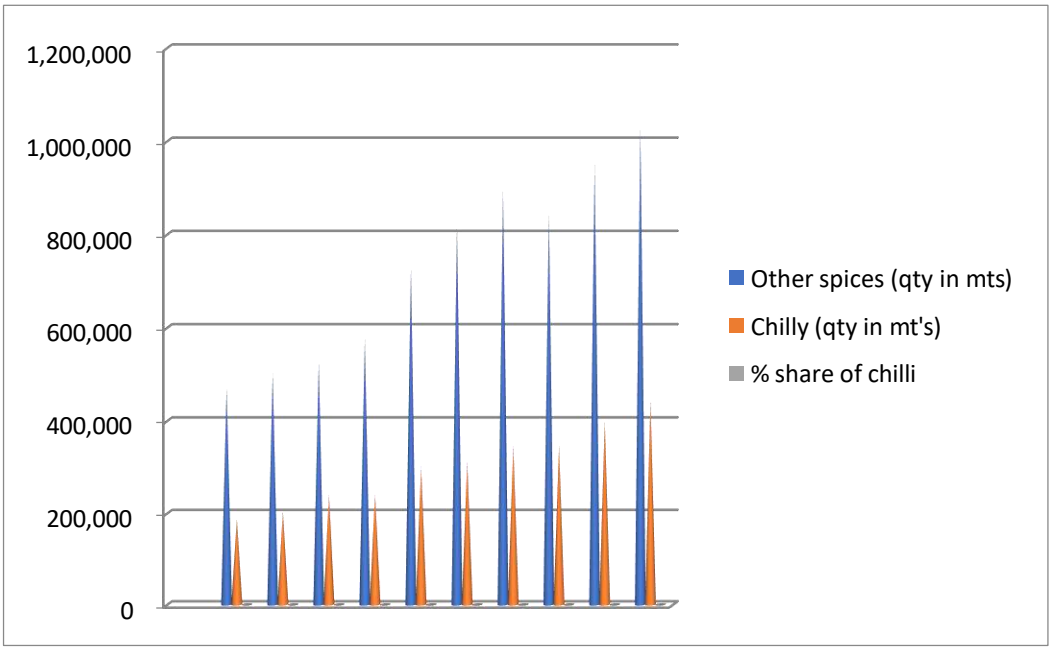
Table No.2.26 Year-wise all other spices and chilli exports share in quantity and value from India

Year	Other spices (Qty in MT's)	Chilly (Qty in mt's)	% share of chilli	Other spices(in value)	Chilli (value in lakhs)	% share of chilly
2014-15	4,70,520	1,88,000	40	530025	108095	20.39
2015-16	5,02,750	2,04,000	41	556050	129173	23.23
2016-17	5,25,750	2,40,000	46	684071	153554	22.45
2017-18	5,75,270	2,41,000	42	978342	214408	21.92
2018-19	7,26,613	3,01,000	41	1211276	238061	19.65
2019-20	8,17,250	3,12,500	38	1373539	272227	19.82
2020-21	8,93,920	3,47,000	39	1489968	351710	23.61
2021-22	8,43,255	3,47,500	41	1623823	399744	24.62
2022-23	9,47,790	4,00,250	42	1766461	507075	28.71
2023-24	10,28,060	4,43,900	43	1792955	425633	23.74
Average	630312	258125	37	1021355	237405	20.44
CAGR%	9.07%	10.02%	0.81%	14.50%	16.45%	1.70%

Source: Spices Board India statistics

The above table no.2.26 is explaining about the year wise all other spices and chilli exports share in quantity and value from 2014-15 to 2023-24. The share of chilli export quantiy in other spices is very significant. India is the largest producer, consumer and supplier of chilli to different nations. Chilli also most occupied 40 per cent out of all spices. In value also chilli place main role and it occupies around 25 per cent. Indian chillis are very famous and have more demand in the international market. Compound annual growth rate of quantity of other spices is 9.07% and chilli is1002% and CAGR in value other spices 14.50 per cent and chilli 16.45 per cent.

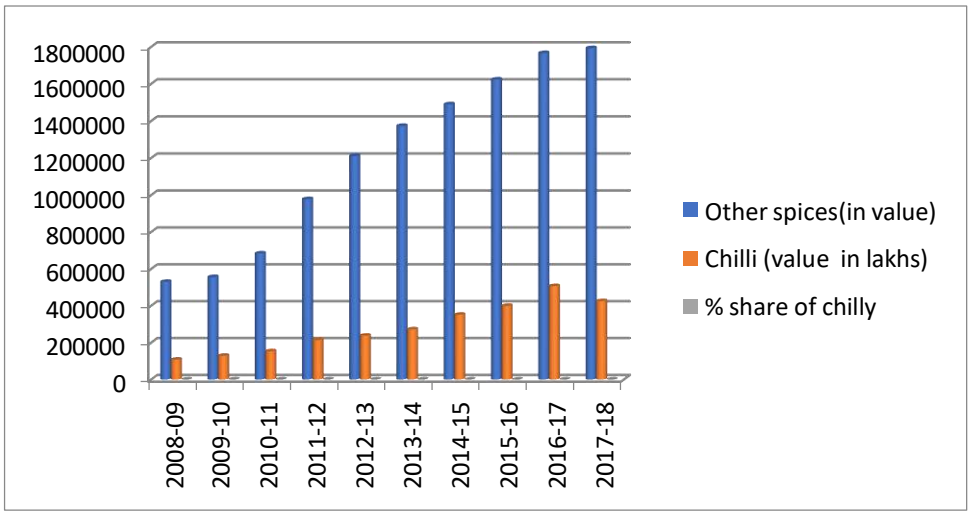
Graph No.2.16 Year-wise all other spices and chilli exports share in quantity from India



Source: The research reporter compiled and designed from Table no.2.26.

The above Graph no.2.16 is discussing about year wise chilli and other spices share in quantity from India. Exports are the back bone to any country. India is the largest producer, consumer and exporter of spices. Indian produces different verities of spices and spices products and exports the same. India is the hub for the spices. Chilli is the major export commodity in the spices. Out of all spices exports from India, chilli shares around 40 of share in quantity which is very significant. An average export quantity of other spices is 630312 MT's and chilli is 258125 MT's with 37 per cent share. Compound annual growth rate of other spices are 9.07 per cent and chilli is 10.02 per cent.

Graph No.2.17 Year-wise all other spices and chilli exports share in value from India



Source: The research reporter compiled and designed from Table no.2.26.

The above Graph no.2.17 is discussing about the year wise exports of chilli and other spices in value. India is spice bowl of the world. We export different forms of spices it may be the whole, powder, crushed, semi cutting, and stem and without stem, spices oils, oleoresin and soaps, chalk lets and creams. Chilli exports shares an average 20.44 per cent in value with compound annual growth rate of 1.70 per cent. Chilli quantity wise almost 40 per cent occupied and value wise almost 22 to 23 per cent. The chilli and other spices exports mostly depends on the quality, safety and purity of spices and also size, colour, flavour, extraneous matter , chemical parameters, aflatoxin levels, Sudan, salmonella and factors like completion, prices, marketing and infrastructure facilities.

2.5.2 Year -wise share of other spices and turmeric exports in quantity and value.

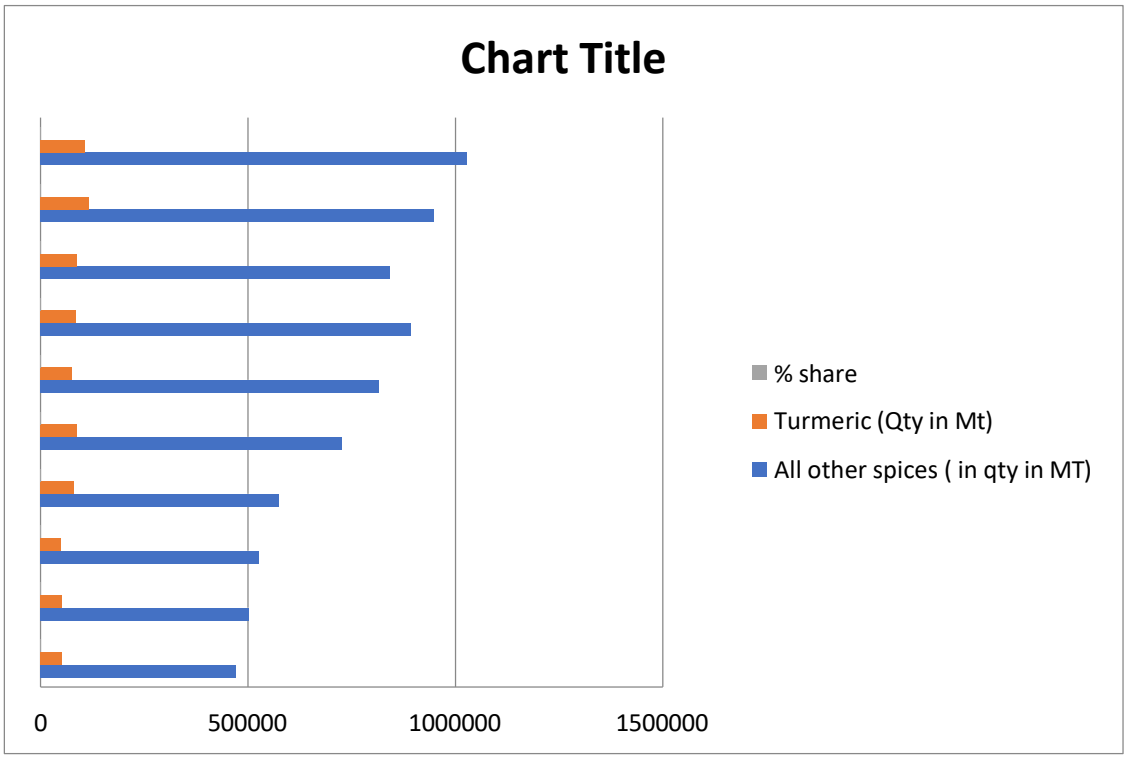
Table No.2.27 Year -wise share of other spices and turmeric exports in quantity and value.

Year	All other spices (in qty in MT)	Turmeric (Qty in Mt)	% share	Other spices (value in lakhs)	Turmeric (value in lakhs)	% share
2014-15	470520	52500	11.16	530025	24858	4.69
2015-16	502750	50750	10.09	556050	38123	6.86
2016-17	525750	49250	9.37	684071	70285	10.27
2017-18	575270	79500	13.82	978342	73434	7.51
2018-19	726613	88513	12.18	1211276	55488	4.58
2019-20	817250	77500	9.48	1373539	66676	4.85
2020-21	893920	86000	9.62	1489968	74435	5
2021-22	843255	88500	10.5	1623823	92165	5.68
2022-23	947790	116500	12.29	1766461	124189	7.03
2023-24	1028060	107300	10.44	1792955	103567	5.78
Average	674737	73826.3	10.96	1065710	63535	6
CAGR%	9.07%	8.27%	-0.74%	14.50%	17.18%	2.35%

Source: Spices Board India statistics

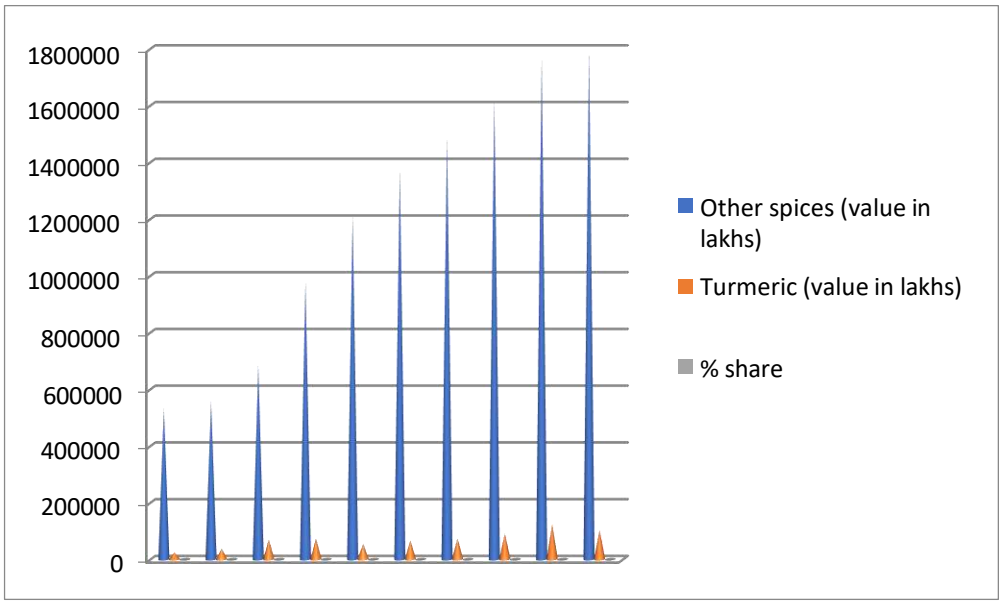
The above table no. 2. 27 are explaining about the share of other spices and turmeric exports in quantity and value from 2014-15 to 2023-24. If we closely observe the data there significant decrease in quantity and value. An average 10.96 per cent of share turmeric occupies in quantity and 6 per cent in value. India is the leading country in production, consumption and exports of Turmeric. Turmeric will be used in many areas like cosmetics, medicine, curries and other colours. Compound annual growth rate in quantity of other spices is 9.07 per cent and turmeric 8.27 per cent and in value other spices 14.50 per cent and turmeric is 17.18 per cent. The share of turmeric is year by year is reducing because of several reasons lack of good seeds, lack water and soil, pest and disease management, market facility and demand and supply also from other competitive countries.

Graph No.2.18 Year -wise share of other spices and turmeric exports in quantity.



Source: The research reporter compiled and designed from Table no.2.27.

The above Graph no.2.18 is explaining about the year wise exports share of turmeric and other spices. Turmeric is one of the important spices which exports and occupies prominent place in spices export basket. Indian turmeric has very significant demand by its colour, size, shape, appearance and extractable curcumin content. An average turmeric exports quantity from India is 73826 MT's with 10.96 per cent of share with other spices 674737 MT's. Compound annual growth rate of other spices 9.07 per cent and turmeric 8.27 per cent.



Graph No.2.19 Year -wise share of other spices and turmeric exports in value.

The above Graph no. 2.19 is talking about the year wise exports of turmeric share and other spices in value from 2014 to 2024 from India. Any country growth depends on their exports of their agriculture and allied and engineering products. Indian turmeric has very potential in international market because of its medicinal value, use in cosmetics and pharmaceutical industry, colour and extraction of oils and oleoresins. Comparatively other spices turmeric occupies very small share with an average value of 6 per cent share. Compound annual growth rate of other spices 14.50 per cent and turmeric 17.18 per cent.

2.5.3 Year-wise chilly value added products exported from India

Table 2.28 Year-wise chilly value added products exported from India (Qty in MT)

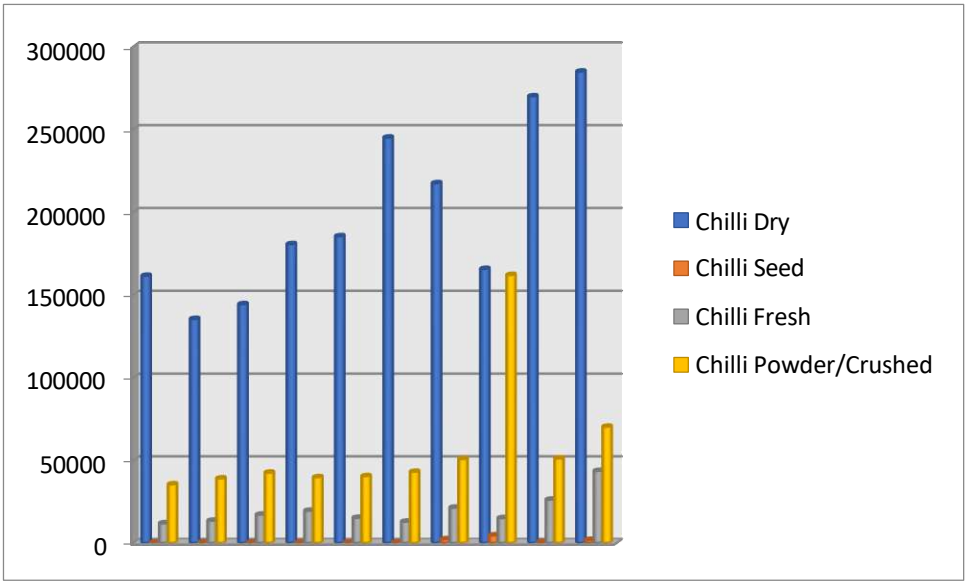
Year	Chilli Dry	% share	Chilli Seed	% share	Chilli Fresh	% of share	Chilli Powder/Crushed	% share
2013-14	161416	77.27 %	236	0.11%	11832	5.66%	35403	16.95 %
2014-15	135318	71.98 %	334	0.18%	13384	7.12%	38964	20.73 %
2015-16	144263	70.72 %	244	0.12%	17053	8.36%	42441	20.80 %
2016-17	180502	75.21 %	352	0.15%	19426	8.09%	39720	16.55 %
2017-18	185286	76.88 %	199	0.08%	15150	6.29%	40365	16.75 %
2018-19	244856	81.34 %	330	0.11%	12828	4.26%	42999	14.28 %
2019-20	217296	74.55 %	2197	0.75%	21288	7.30%	50686	17.39 %
2020-21	165553	47.71 %	4544	1.31%	15007	4.32%	161897	46.66 %
2021-22	269744	77.62 %	564	0.16%	26142	7.52%	51051	14.69 %
2022-23	284697	71.13 %	1823	0.46%	43488	10.87 %	70241	17.55 %
Average	198893.10	72.44 %	1082.30	0.34%	19559.80	6.98%	57376.70	20.23 %
CAGR %	6.51%	-0.92%	25.50%	16.75 %	15.56%	7.51%	7.91%	0.39%

Source: spices Board statistics

Table no.2.28 is explaining about the chilly value-added products exports from India from 2013-14 to 2022-23. In 2013-14 chilly dry exports were 161416 MT's, which has 77.27 per cent, chilly seeds 236MT's, which has 0.11 per cent, chilli fresh is 11832 MT's which has 5.66 per cent, chilly ground is 35403 MT's which has 16.95 per cent. The compound annual growth rate of chilli dry is 6.51 per cent, chilli seed 25.50 per cent, chilli fresh 15.56 per cent and chill ground is 7.91 per cent. In 2020-21 there is a significant growth in chilli ground 161897 MT's, in 2021-22 chilly dry 269744MT's, 2022-23 chilly

dry 284697 MT's with 71.13 per cent, chilli seed 1823 MT's with 0.43 per cent, fresh chilli 43488MT's with 10.87 per cent and chilly ground 70241 MT's with 17.55 per cent. So, value added products are more demand and good for earning foreign currency.

Graph No. 2.20- Year wise chilly value added products exported from India (Qty in MT)



Source: The research reporter compiled and designed from Table no.2.28.

The above Graph no.2.20 is discussing about the chilli value added products exports from India from 2014 to 2023 quantity in MT's. Indian chilli has more demand in international trade by its pungency, colour, size, quality, safety and purity, free from any chemical, physical and microbiological contaminates. An average chilli exports in the form of dry is 72.44 per cent, seed 0.34 per cent, chilli fresh 6.98 per cent and ground 20.23 per cent. Compound annual growth rate of chilli export various forms dry 6.51 per cent, seed 25.50 per cent, fresh 15.68 per cent and ground 7.91 per cent.

2.5.4 Year wise area, production, domestic consumptions and exports of chilly from India during 2013-14 to 2023-24

Table no.2.29 Year wise area, production, domestic consumptions & exports of chilly from India 2013-14 to 2023-24

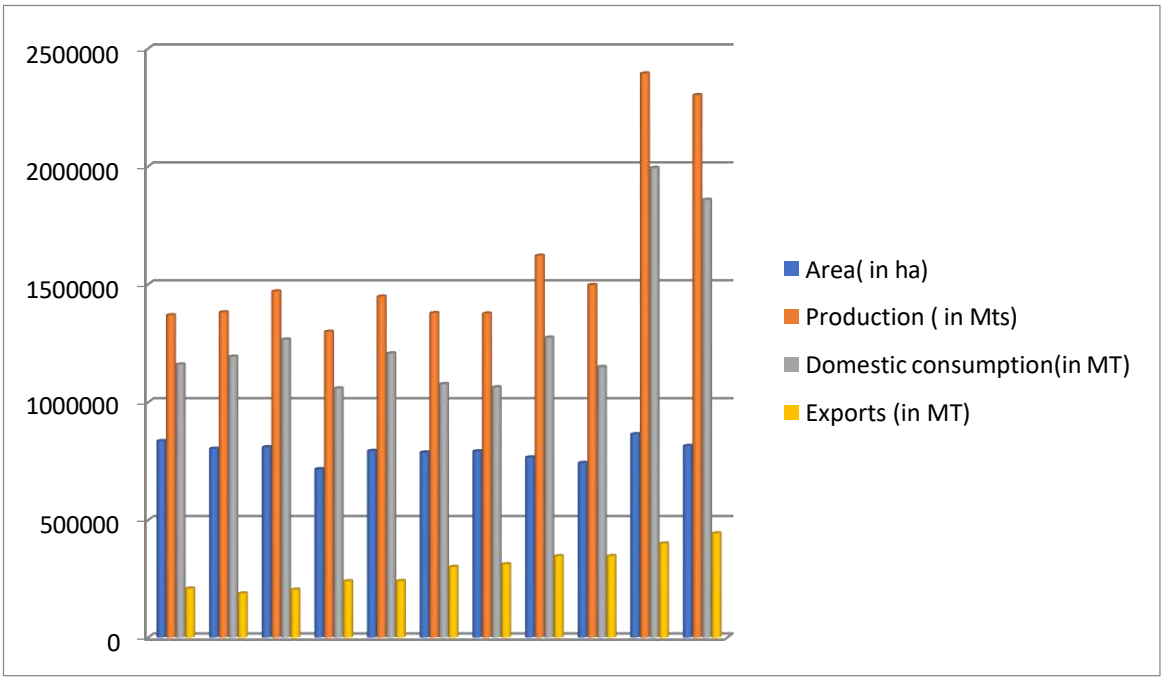
Year	Area (in ha)	Production (in MT)	Domestic consumption (in MT)	% share	Exports (in MT)	% share
2014-15	802896	1381531	1193531	86.39	188000	13.61
2015-16	809699	1470352	1266352	86.13	204000	13.87
2016-17	716428	1299191	1059191	81.53	240000	18.47
2017-18	793921	1448215	1207215	83.36	241000	16.64
2018-19	787530	1378400	1077400	78.16	301000	21.84

2019-20	791930	1376400	1063900	77.30	312500	22.70
2020-21	766620	1621480	1274480	78.60	347000	21.40
2021-22	742950	1497440	1149940	76.79	347500	23.21
2022-23	864730	2394320	1994070	83.28	400250	16.72
2023-24	814790	2302670	1858770	80.72	443900	19.28
Average	8726831	17539398	14305248	81.56	3234150	18.44
CAGR%	0.16%	5.84%	5.05%		0.10	

Source: Spices Board statistics

The above table no.2.29 is explaining about the area, production, domestic consumption and exports of chilli from 2014-15 to 2023-24. If we closely observe the area under cultivation of chilli for the last 10 years, there are fluctuations year by year. In 2013-14 area under cultivation of chilli is 835337 Ha and it was reduced in 2016-17 at 716428Ha and it is increased 2022-23 as 864730Ha.Compound Annual Growth Rate of chilli area under cultivation is 0.16%. Production is increased year by year and in 2014-15 production was 1381531 MT's, in 2018-19 production was reduced by 1376400 and there is a significant growth rate in 2023-24 as 2302670 MT's and compound annual growth rate is 5.84%. There are some fluctuations in the domestic consumption also in 2014-15 it was 1193531 and it was reduced in 2019-20 as 1063900 and in 2022-23 domestic consumption was increased by 1994070MT's and compound annual growth rate is 5.05%. The price part is exports and exports are increasing year by year in 2014-15 was 188000 MT's and 2018-19 exports were 301000 and there is significant growth in 2023-24 as 443900MT's and CAGR is 0.10%.

Graph No.2.21 Year wise area, production, domestic consumptions and exports of chilly from India during 2014-15 to 2023-24



Source: The research reporter compiled and designed from Table no.2.29.

The above Graph no. 2.21 is explaining about the area, production, domestic consumption and exports of chilli from India during 2014-15 to 2023-24. Indian spices have more demand in international markets. India exports around 15 to 20 per cent every year. Remaining chilli is used domestically in different forms like whole, ground, crushed and oils and oleoresins. There is lot scope for exports chilli, turmeric and other spices form India. But we need control chemical, physical and biological contaminants which rejects our spices exports from India.

2.5.5 Year wise area, production, domestic consumption and exports of turmeric from India

Table No.2.30 Year wise area, production, domestic consumption and exports of turmeric from India (Qty in MT's)

Year	Area in Ha	Production in MT	Domestic consumption (in MT)	% share	Exports in MT	% share
2014-15	195076	894590	842090	94.13	52500	5.87
2015-16	187535	927911	877161	94.53	50750	5.47
2016-17	232022	1268280	1219030	96.12	49250	3.88
2017-18	251824	1398862	1319362	94.32	79500	5.68
2018-19	194330	986690	898177	91.03	88513	8.97
2019-20	207570	1092630	1015130	92.91	77500	7.09
2020-21	178470	846250	760250	89.84	86000	10.16
2021-22	183480	967060	878560	90.85	88500	9.15
2022-23	193390	1051160	934660	88.92	116500	11.08
2023-24	224260	1107920	1000620	90.32	107300	9.68
Average	182370	943343	874442	92.7	68901	7.3
CAGR%	1.56%	2.40%	1.94%	-0.46%	8.27%	5.72%

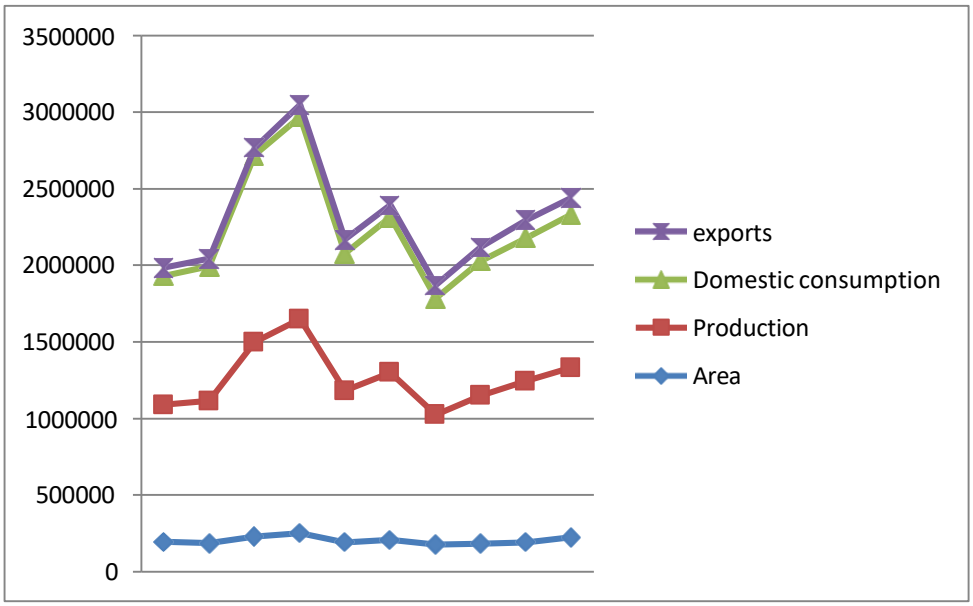
Source: Spices Statistics-Spices Board

The table no.2.30 is explaining about the year–wise turmeric area, production, domestic consumption and exports from 2014-15 to 2023-24. If we closely observe the data for the last 10 years area under cultivation of Turmeric is changing year by year and this shows the mentality of the farmers. Generally farmers increase the area whenever the price is increased and reduced the area price and demand is reduces. In 2014-15 area was 195076 ha and it is reduced in 2020-21 at 178470 ha and again it is increased in 2023-24 as 224260 Ha.

There are lot fluctuations in production also; it is because of lack of quality seed, water, pest and disease management and market facility and post harvest management. In 2014-15 production was 894590MT's and 2023-24 very significant growth was there 1398862 MT's and later stage production was reduced and compound annual growth rate is 2.40 per cent. There is lot fluctuation in Domestic consumption also. In 2017-18 domestic consumption was 1319362 MT's and it is 760250 MT's in 2020-

21 and it is 1000620MT's in 2023-24 and compound annual growth rate is 1.94 per cent. Exports are increasing year after year and in 2022-23 maximum exports were 116500 and CAGR is 8.27 per cent.

Graph No.2.22 Year wise area, production, domestic consumption and exports of turmeric from India



Source: The research reporter compiled and designed from Table no.2.30.

The above Graph no.2.22 is talking about the area, production, domestic consumption and exports of turmeric from India. Indian turmeric has very good market and demand by its variety, quality, size, color, shame and other factors. It is used in medicine, pharmacy, cosmetics and coloring agent and used in cooking also. Indian only 5 to 7 per cent of turmeric is exporting and remaining product is used in domestic markets. World market demands chemical, pesticides, fungicides free organic materials.

2.5.6 Country-wise chilly exports from India from 2015-16 to 2023-24

Table No. 2. 31 Country-wise chilly exports from India from 2015-16 to 2023-24

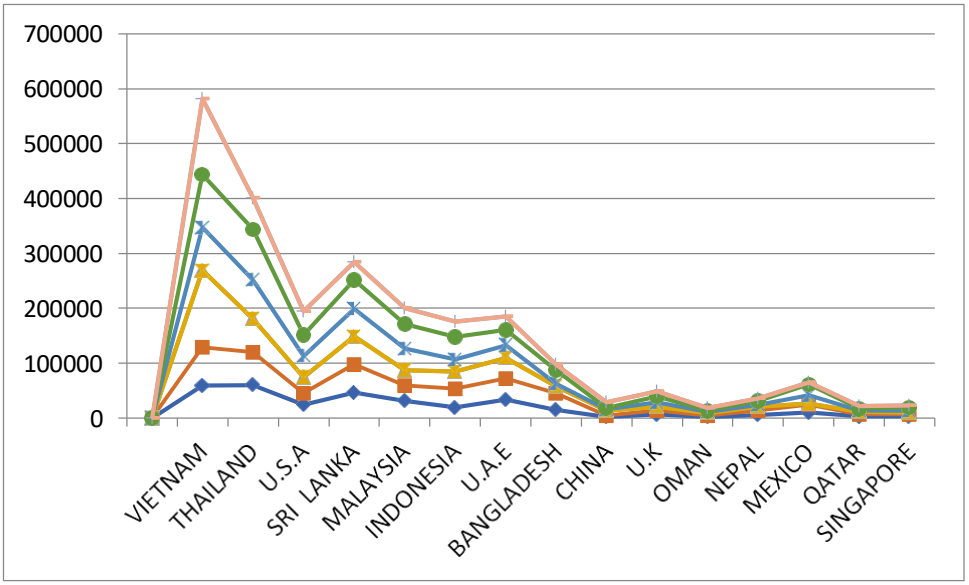
COUNTRY	2015-16 Quantity	2022-23 Quantity	2023-24 Quantity	CAGR %	2015-16 Value	2022-23 Value	2023-24 Value	CAGR %
VIETNAM	58843	70012	140552	54.55%	78560	95928	138379	32.72%
THAILAND	59916	60009	60725	0.67%	70671	93097	56584	-10.52%
U.S.A	24074	20795	30164	11.94%	37846	39175	42643	6.15%
SRI LANKA	46509	51393	51292	5.02%	50120	52053	32706	-19.22%
MALAYSIA	30994	28792	27703	-5.46%	40031	44189	29374	-14.34%
INDONESIA	19856	33394	32096	27.14%	22116	40934	27764	12.04%
U.A.E	33786	38417	36800	4.37%	23690	28698	24084	0.83%
BANGLADESH	14426	30440	12868	-5.55%	5614	23720	10276	35.29%
CHINA	2029	2400	9373	114.93%	2211	2723	9767	110.18%

U.K	6695	6833	6984	2.14%	8715	10305	9160	2.52%
OMAN	2227	2235	5174	52.42%	2072	2531	3913	37.42%
NEPAL	5168	8812	6637	13.32%	4143	7043	3871	-3.34%
MEXICO	10589	13106	3103	-45.87%	14719	20310	3842	-48.91%
QATAR	3571	3365	4471	11.89%	2696	3566	3726	17.56%
SINGAPORE	3432	3278	3275	-2.31%	4315	5086	3507	-9.85%
TOTAL	347500	400250	443900	13.02%	393170	507076	425633	4.05%

Source: Spices Board statistics

The table no.2.31 is explaining about the country-wise chilli exports from India. In 2015-16 China imported 2029 MT's and in 2023-24 was 9373 MT's and there is significant compound annual growth rate 114.93 per cent and value also significant of CAGR 110.18 per cent. In 2015-16 Vietnam imported 58843 MT's and in 2023-24 it was 140552 MT's, and CAGR is 54.55 per cent and CAGR in value is 32.72 per cent. Thailand is another important market for Indian Chillies. In 2015-16 it was 59916 MT's and 2023-24 it was 60725MT's, Indonesia imports Indian chillies and in 2022-23 33394MT's and in 2023-24 was 32096MT's. India earns 27764 Lakhs of foreign currency by exporting chillies to Indonesia. Mexico is another important market but exports in quantity and values are reduced. This is because of quality standards and Mexico is importing chillies from China and Indonesia and Thailand. Over all compound annual growth rate is 13.02 per cent in quantity and 4.05 per cent in value.

Graph no.2.23 Country-wise chilly exports from India from 2015-16 to 2023-24



Source: The research reporter compiled and designed from Table no.2.31.

The above Graph no.2.23 is explaining about the country wise chilli exports from India during 2015-16 to 2023-24. India is the largest producer, consumer and exporter chillies. Indian chilly has more demand than any other countries by its colour, size, pungency, flavour, look and other chemical, physical and

biological parameters. We export chilli to the entire globe. Vietnam is the biggest importer of Indian chillies and its compound annual growth rate is 54.55 per cent in quantity and 32.75 per cent in value. Indonesia also an important country with CAGR of 27.14 per cent in quantity and 12.04 per cent in value. China also an important importer of Indian spices which CAGR is 114.93 per cent in quantity and 110.18 per cent in value.

2.5.7 Country -wise exports of chilli from India during 2023-24.

Table No.2.32 Country -wise exports of chilli from India during 2023-24

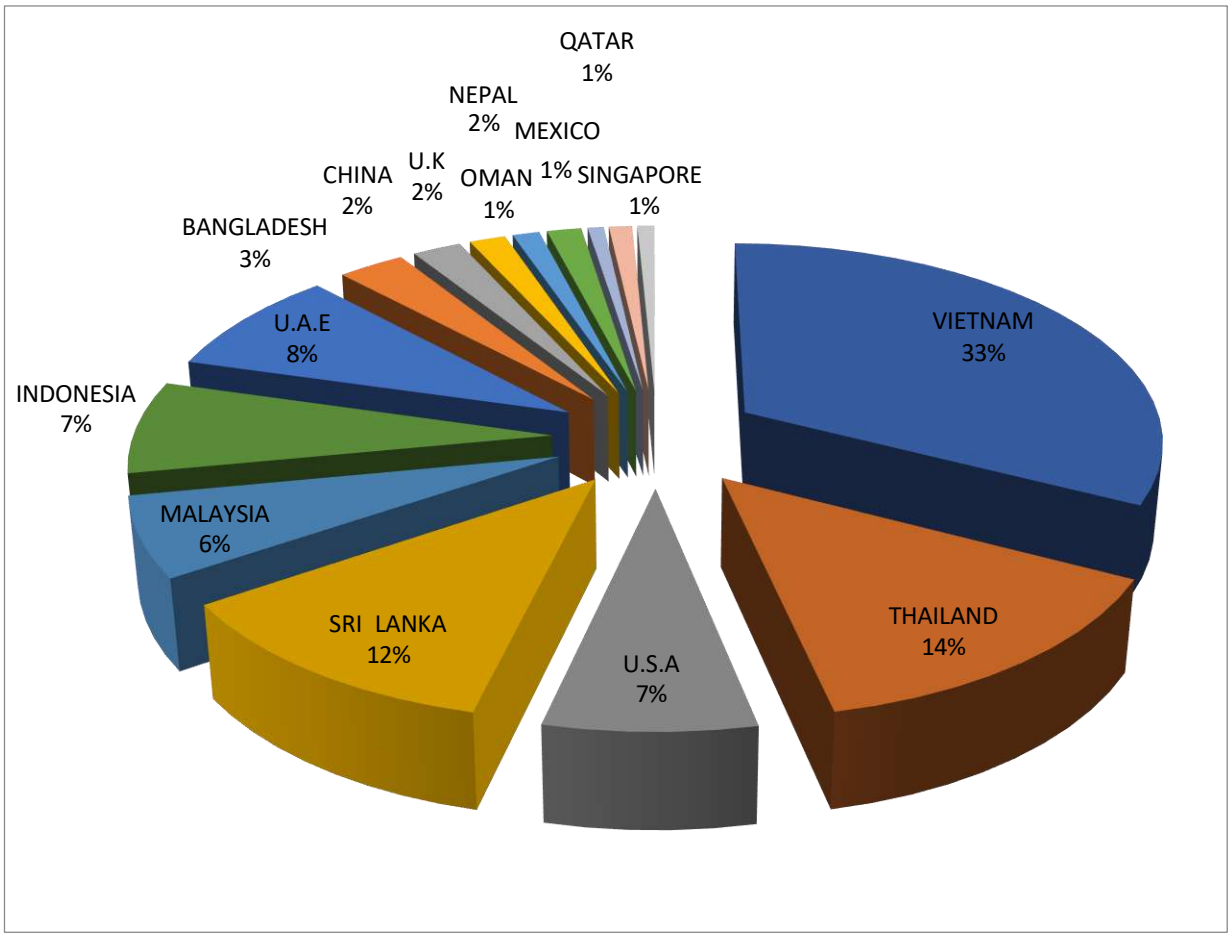
Country	Quantity in MT's	% share	Value in Lakhs	%share
VIETNAM	140552	31.66	138379	32.51
THAILAND	60725	13.68	56584	13.29
U.S.A	30164	6.80	42643	10.02
SRI LANKA	51292	11.55	32706	7.68
MALAYSIA	27703	6.24	29374	6.90
INDONESIA	32096	7.23	27764	6.52
U.A.E	36800	8.29	24084	5.66
BANGLADESH	12868	2.90	10276	2.41
CHINA	9373	2.11	9767	2.29
U.K	6984	1.57	9160	2.15
OMAN	5174	1.17	3913	0.92
NEPAL	6637	1.50	3871	0.91
MEXICO	3103	0.70	3842	0.90
QATAR	4471	1.01	3726	0.88
SINGAPORE	3275	0.74	3507	0.82
TOTAL(INCL.OTHERS)	443900	100.00	425633	100.00

Source: spices Board statics

The table no.2.32 is explaining about the chilli exports from India during 2023-24. Indian chillies are very famous in quality and safety and many countries will import from India. Vietnam is the major market for Indian chillies 31.66 per cent quantity. Other countries importer 13.68 per cent to Thailand, 6.80 per cent to USA, 11.55 per cent to Sri Lanka, 6.24 per cent to Malaysia,7.23 per cent to Indonesia and Bangladesh 2.90 per cent. In value 32.51 per cent of chilli value to Vietnam, 13.29 per

cent of Thailand, 10.02% of value USA,7.68% to Sri Lanka, 6.90 per cent of Malaysia, and 6.52 per cent Indonesia.

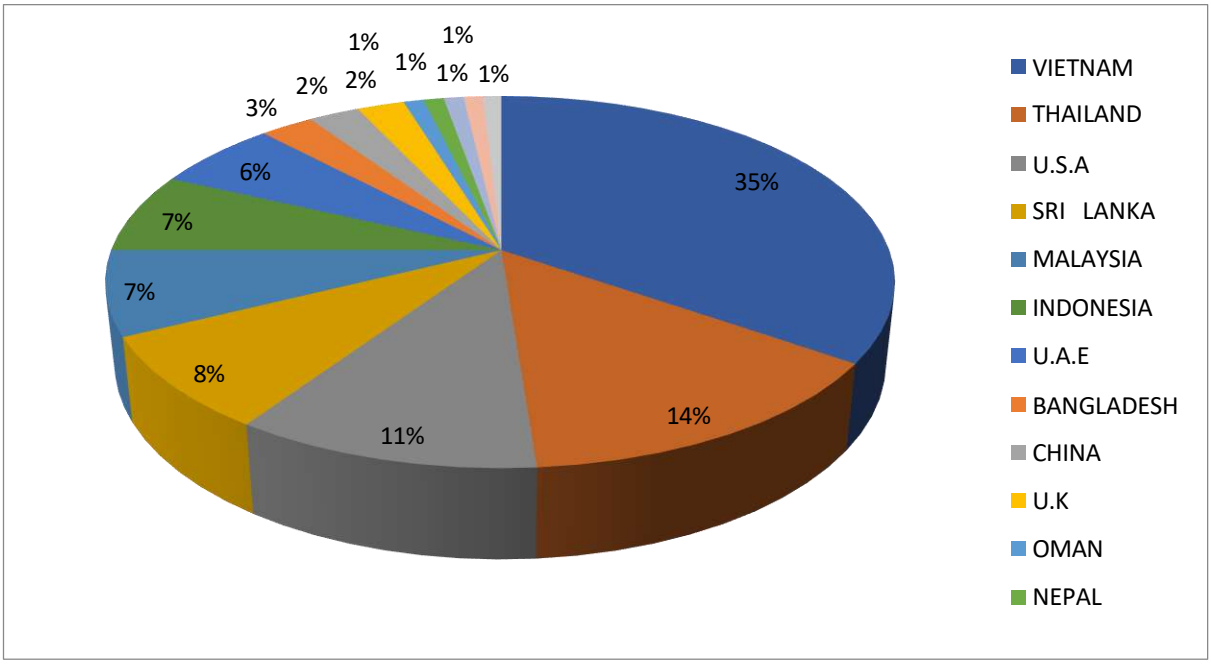
Graph No.2.24 Country -wise exports of chilli in quantity from India during 2023-24



Source: The research reporter compiled and designed from Table no.2.32.

The above Graph no.2.24 is talking about the chilli exports from India to various nations and its share in quantity during 2023-24. Out of all importing nations Vietnam has imported 31.66 per cent of Indian Chilly from India. The Indian chilli has more demand by its quality, purity and variety available in the market. More over its colour, pungency, size, physical, chemical and biological factors also influence the buyer to purchase or not. Thailand imports 13.68 per cent of chilli, Sri Lanka imports 11.55 per cent, UAE imports 8.29 per cent and Indonesia imports 7.23 per cent. Based on the country demand each country imports Indian chilly in the form of whole, powder, crushed, oils and oleoresins, colours and pungency.

Graph No.2.25 Country -wise exports of chilli in value from India during 2023-24



Source: The research reporter compiled and designed from Table no.2.32.

The above Graph no.2.25 is explaining about the chilli exports form to different countries in value during 2023-24. During 2023-24 India earns 4256.33 crores by exporting India chilli. 32.51 per cent from Vietnam, 13.29 per cent from Thailand, 10.02 per cent from USA, 7.68 per cent from Sri Lanka, 6.90 per cent from Malaysia and 6.52 per cent from Indonesia. Each nations economic growth rate depends on the its exports. India exports different spices in the form of whole, powder, blended, masalas, ready to eat and ready cook, oils and oleoresins to all nations.

2.5.8 Country -wise exports of Turmeric in 2023-24

Table No.2.33 Country -wise exports of Turmeric in 2023-24

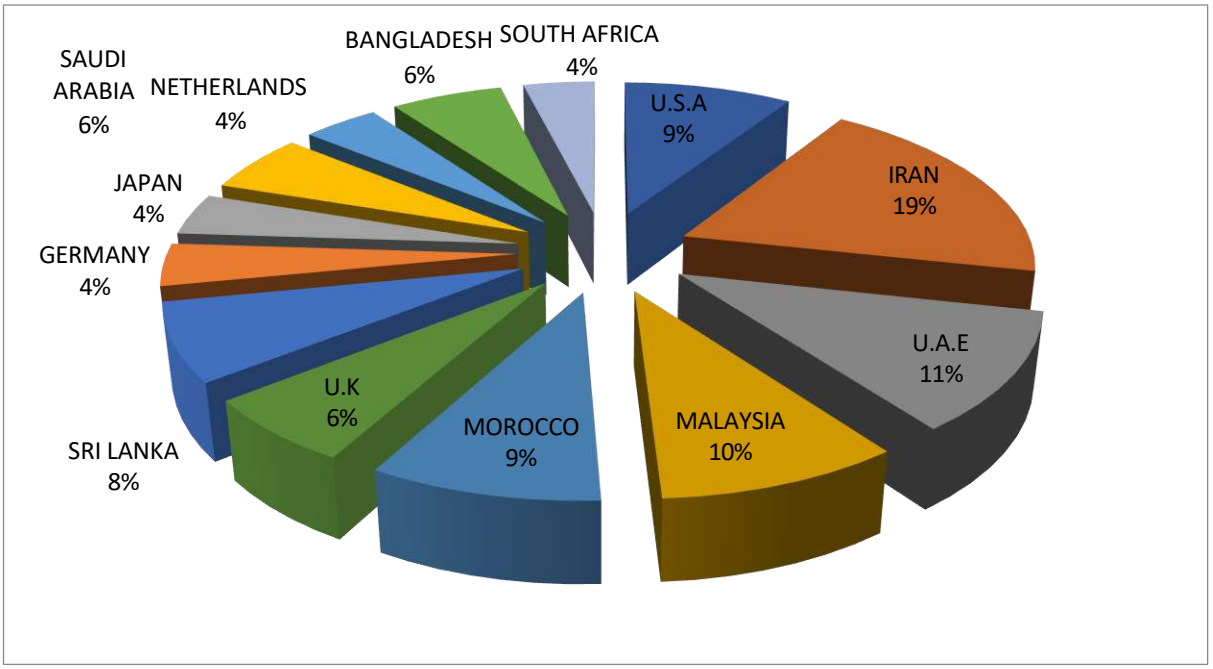
Country	Quantity in MT's	%share	Value in Lakhs	%share
U.S.A	6434.75	6.00	11158.83	10.77
IRAN	13431.4	12.52	10290.83	9.94
U.A.E	7952.3	7.41	6548.91	6.32
MALAYSIA	6562.12	6.12	6104.92	5.89
MOROCCO	6220.14	5.80	4911.81	4.74
U.K	4417.28	4.12	4878.4	4.71
SRI LANKA	5252.54	4.90	4462.32	4.31
GERMANY	2872.23	2.68	3644.75	3.52
JAPAN	2835.11	2.64	3392.81	3.28
SAUDI ARABIA	4006.5	3.73	3379.36	3.26
NETHERLANDS	2897.17	2.70	3336.95	3.22
BANGLADESH	4276.8	3.99	3190.19	3.08

SOUTH AFRICA	2735.78	2.55	2812.19	2.72
TOTAL	107300	100.00	103567.6	100.00

Source: Spices Board statistics division.

The above table 2.33 is explaining about the country-wise turmeric exports during 2023-24. Turmeric is one the important spice, which has very good value and demand in international market. Mostly it will be used in cosmetics, pharmaceuticals and other areas. Iran is the main importer of Indian Turmeric. In 2023-24 Iran imported Turmeric worth of 13431.4 MT's with 10290.83 lakhs. Next is UAE with 7952.3MT's with 6548.91 lakhs. USA also an important place where turmeric is used more 6434.75 MT's with 11158.83lakhs value. Malaysia is 6562.12 MT's with 6104.92 lakhs value. Sri Lanka, 5252.54 MT's, Germany 2872.23MT's, Saudi Arabia 4006.5MT's and value of 3379.36lakhs, Netherlands 2897.17 MT's with 3336.95 lakhs value, Bangladesh 4276.8 MT's with 3190.27lakhs and south Africa 2735.78MT's with 2812.19 Lakhs worth turmeric has been exported.

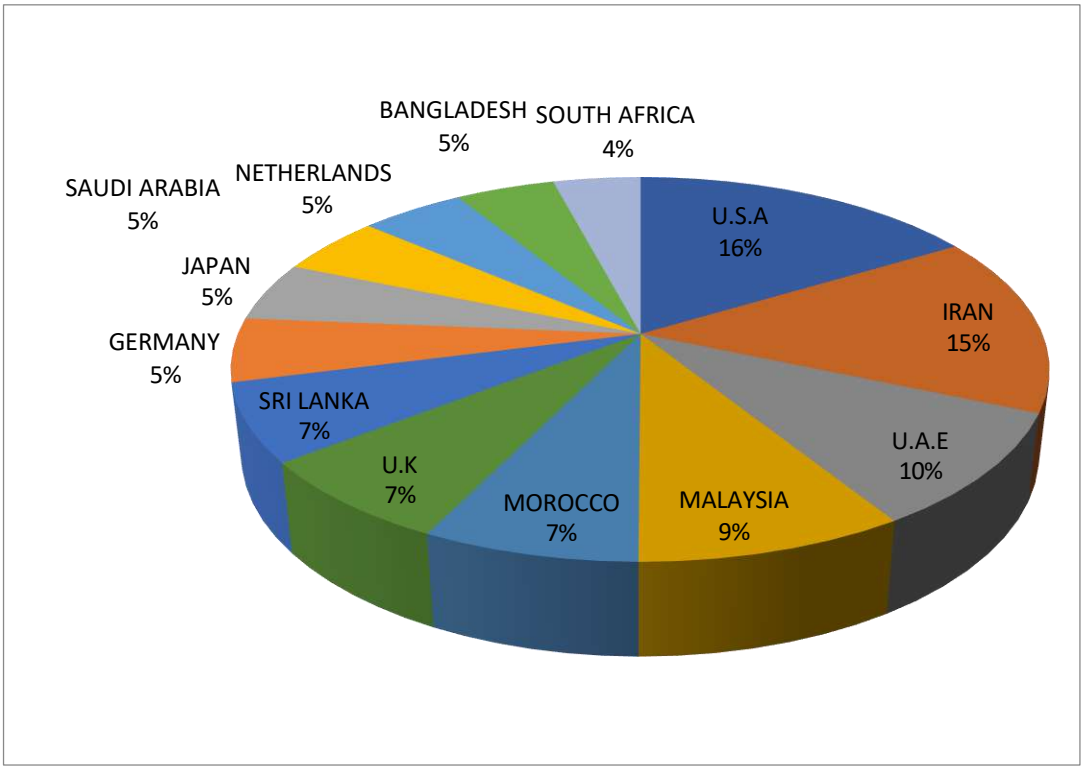
Graph no.2.26. Country -wise exports of Turmeric Quantity in MT's in 2023-24



Source: The research reporter compiled and designed from Table no.2.33.

The above Graph no.2.26 is explaining about the country wise turmeric exports from India during 2023-24. Turmeric is one of the important spices which grows in India and exports to various nations. Turmeric is used mainly colouring agent, pharmaceutical industry, cosmetics industry and food industry. Iran is the main market for Indian turmeric which imports 12.52 per cent of Turmeric from India, next is the UAE with 7.41 per cent, Malaysia 6.12 per cent, USA imports 6 per cent of Turmeric from India. Other nations like UK, Sri Lanka, Germany, Japan, Saudi Arabia, Netherlands and Bangladesh imports India Turmeric.

Graph no.2.27 Country -wise exports of Turmeric value in lakhs in 2023-24



Source: The research reporter compiled and designed from Table no.2.33.

The above Graph no.2.27 is discussing about the turmeric export in value from India during 2023-24. India is the spices hub for the world. India is the number one production, consumption and exports. Turmeric is the golden spice and it has lot of value in market. USA imports 10.77 per cent value of turmeric imports from India. Subsequently the Iran also imported 9.94 per cent value of turmeric; UAE's share is 6.32 per cent, Malaysia 5.89 per cent share. Other countries like Morocco, UK, Sri Lanka, Germany, Japan, and Saudi Arabia are main important nations for importing turmeric and India getting lot foreign currency by exporting quality, purity and safe turmeric to different nations.

2.5.9 Country-wise exports of value added products

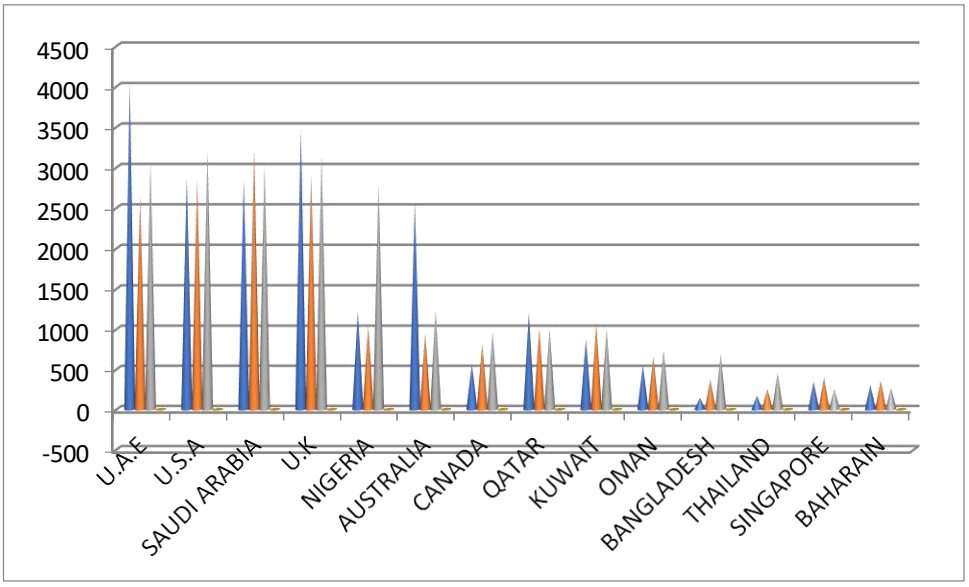
Table no.2.34 Country-wise exports of value added products (quantity in MT, value in lakhs)

Country	2015-16	2022-23	2023-24	CAGR%	2015-16	2022-23	2023-24	CAGR%
	Quantity				Value			
U.A.E	4041.81	2634.66	3050.59	-13.12%	8599.68	6537.2	7391.42	-7.29%
U.S.A	2872.05	2855.34	3221.59	5.91%	6488.74	7078.47	7244.01	5.66%
SAUDI ARABIA	2849.65	3211.54	3025.04	3.03%	6280.07	7171.29	6847.79	4.42%
U.K	3466.14	2912.74	3145.72	-4.73%	5894.76	5884.33	5671.12	-1.92%
NIGERIA	1219.68	1041.78	2793.65	51.34%	2055.76	1571.29	4340.2	45.30%
AUSTRALIA	2569.51	945.16	1234.18	-30.70%	3969.87	2225.12	3105.99	-11.55%
CANADA	561.15	813.27	968.93	31.40%	1339.77	2341.16	2607.12	39.50%
QATAR	1200.44	1017.29	998.32	-8.81%	3026.22	2770.29	2562.35	-7.98%
KUWAIT	876.35	1069.58	1000.68	6.86%	2076.23	2560.98	2216.27	3.32%
OMAN	549.32	657.65	741.59	16.19%	1635.45	1886.59	2137.86	14.33%
BANGLADESH	142.43	374.04	689.6	120.04%	324.78	900.86	1567.41	119.68%
THAILAND	167.71	255.01	452.37	64.24%	397.25	640.19	1087.92	65.49%
SINGAPORE	346.33	396.57	251.4	-14.80%	730.18	1076.13	633.14	-6.88%
BAHARAIN	300.49	360.85	272.68	-4.74%	694.63	828.69	628.55	-4.88%
TOTAL	26550	28500	30150	6.56%	53174.5	59910.43	61619.55	7.65%

Source: Statistics from Spices Board India.

The above table no.2.34 is explaining about the country wise exports of value added products from India. It shows that out of all countries Nigeria is the main market which shows the compound annual growth rate 51.34 per cent of value added spices exported like garam masala, chicken masala, meat masala and other value added products. In 2023-24 UAE imported 7391.42 lakhs lakhs from India. USA also good market for value added products in 2015-16 6488.74 lakhs and in 2022-23 is 7078.47 lakhs. Australia also a good market for value added products in 2015-16 3969.87 lakhs and in 2023-24 is 3105.99. It was reduced because of quality aspects and consumption levels. Thailand is another important market for value added spices 65per cent in quantity and value 65.59 per cent. Oman is another market where our Indians are residing more and importing more value added spices.

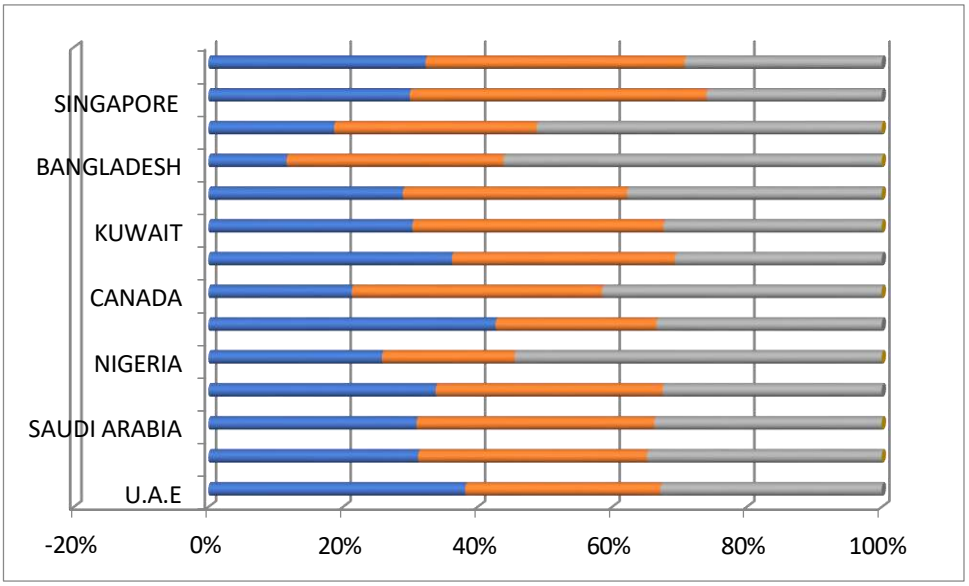
Graph no.2.28 Country-wise exports of value added products (quantity in MT)



Source: The research reporter compiled and designed from Table no.2.34.

The above Graph no.2.28 is disseminating about the value added spices exported from India to various nations quantity in MT's during 2015-16 to 2023-24. If we closely observe the Graph compound annual growth rate of Nigeria is 51.34 per cent, Canada CAGR is 31.40 per cent, Bangladesh's CAGR is 120.04 per cent, and Thailand's CAGR is 64.24 per cent. India produces number of spices and exports in the form of whole, powder, oils and oleoresins and value added spices. Value added spices have more demand in foreign nations because they are ready to eat and ready to cook.

Graphno.2.29 Country-wise exports of value added products (value in lakhs)



Source: The research reporter compiled and designed from Table no.2.34

The above Graphno.2.29 is taking about value added spices exports in value in lakhs. UAE reduced the annual growth rate of -729 per cent in value. Nigeria CAGR is 45.30 per cent, Canada CAGR is 39.50 per cent, Bangladesh CAGR is 119.68 per cent, Thailand CAGR is 65.49 per cent, Singapore and Bahrain has noticed CAGR is negative position. India earns foreign currency by exporting value added spices from India.

2.5.10 Country wise exports of value added spices during 2023-24

Table No.2.35 Country wise exports of value added spices during 2023-24

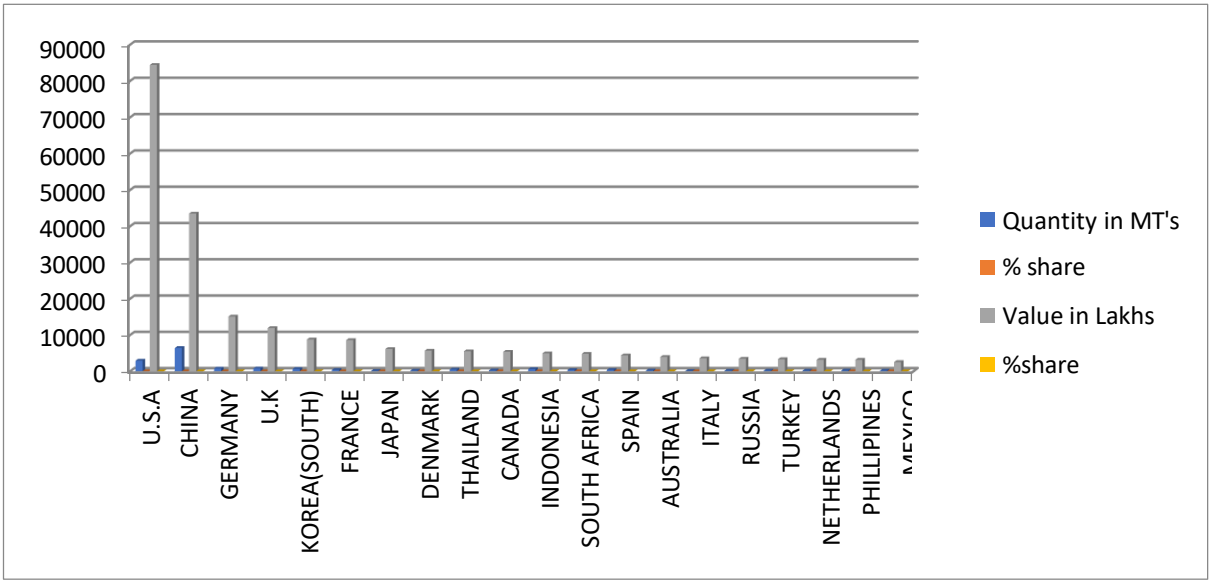
Country	Quantity in MT's	% share	Value in Lakhs	%share
U.S.A	2915	19%	84413	36%
CHINA	6413	42%	43483	19%
GERMANY	732	5%	15081	6%
U.K	763	5%	11919	5%
KOREA(SOUTH)	620	4%	8759	4%
FRANCE	350	2%	8588	4%
JAPAN	110	1%	6133	3%
DENMARK	169	1%	5655	2%
THAILAND	459	3%	5496	2%
CANADA	225	1%	5354	2%
INDONESIA	589	4%	4933	2%
SOUTH AFRICA	345	2%	4808	2%
SPAIN	359	2%	4371	2%
AUSTRALIA	205	1%	3942	2%
ITALY	75	0%	3587	2%
RUSSIA	142	1%	3449	1%
TURKEY	174	1%	3326	1%
NETHERLANDS	152	1%	3169	1%
PHILLIPINES	189	1%	3166	1%
MEXICO	165	1%	2540	1%
TOTAL(INCL.OTHERS)	15151	100%	232172	100%

Source: spices board statistics

The above table no.2.35 is explaining about the country wise exports of value added spices like oils and oleoresin from India during 2023-24 in quantity in MT's and value in lakhs. India has exported 6413 MT's with 15081 lakhs value to China, 2915 MT's with 84413 lakhs value to USA. Here one thing we can observe the exports to USA and China. Quantity is double the USA and value is less than USA. USA has more value. 732 MT's with 15081 lakhs to Germany, 763MT's with 11919 lakhs to UK.620

MT's with 8759 lakhs value to South Korea. Thailand, Indonesia and Canada are the good markets for oils and oleoresin.

Graph no.2.30 Country wise exports of value added spices during 2023-24



Source: The research reporter compiled and designed from Table no.2.35

The above Graph.2.30 is discussing about the country wise value added spices from India during 2023-24. India exported 42 per cent in quantity to China and 19 per cent in value, USA imported 19 per cent share in quantity and 36 per cent share in value of added spices. Germany and UK imports 5 per cent in quantity and 6 per cent in value respectively. Russia, Turkey, Netherlands, Philippines and Mexico's share is one per cent in quantity and one per cent in value.

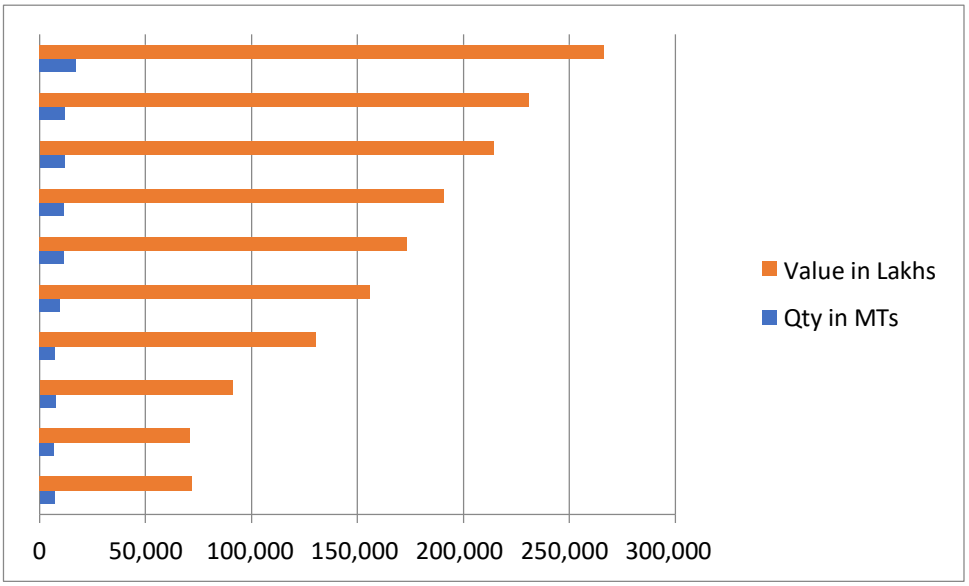
2.5.11 Year wise exports of oils and oleoresins from India

Table no.2. 36 Year wise exports of oils and oleoresins from India

Year	Qty in MT's	Value in Lakhs
2014-15	6,850	72050
2015-16	6,750	70875
2016-17	7,600	91062
2017-18	7,265	130438
2018-19	9,515	155888
2019-20	11,415	173325
2020-21	11,475	191090
2021-22	11,635	214255
2022-23	12,100	230775
2023-24	17,200	266172
Average	**10,181**	**1,59,593**
CAGR	**10.77%**	**15.63%**

Source: Spices Board statistics

Table 3.36 is explaining about the year wise exports of value-added spices like oil and oleoresin form India. Oils and oleoresin are contributing a lot in Indian spices economy. The compound annual growth rate is very significant in quantity 10.77 per cent and in value 15.63 per cent. During 2014-15 the quantity exported was 6850MT's and value gained was 72050.00 lakhs, 2016-17 the export quantity was 7600 MT's and 91062.45 in lakhs. From 2019-20 onwards the exports oil and oleoresin industry is good in international market point of view. In 2019-20 11415MT's exported and 173324.85 was the value.2021-22 the quantity exported was 11635 MT's and value is 214225.00. During 2022-23 the quantity exported was 12100 MT's and value exported was 230775.In 2023-24 the export quantity is 17200MT's and 266172 Lakhs in value.



Graph No.2.31 Year wise exports of oils and oleoresins from India

Source: The research reporter compiled and designed from Table no.2.36

The above Graph no.2.31 is explaining about the exports of oils and oleoresins from India 2014-15 to 2023-24. If we closely observe the graph oils and oleoresin exports in quantity and value. Every year there is growth rate of exports in quality and value also. Average oils and oleoresin is 10181 MT's and 159593 lakhs. The compound annual growth rate is 10.77 per cent in quantity and 15.63 per cent in value. There is a significant growth rate in oils and oleoresin exports. This is because of demand in the world for the products by its quality, purity and safety

2.5.12 Year wise Curry Power Exports from India

Table No. 2. 37 Year wise Curry Power Exports from India

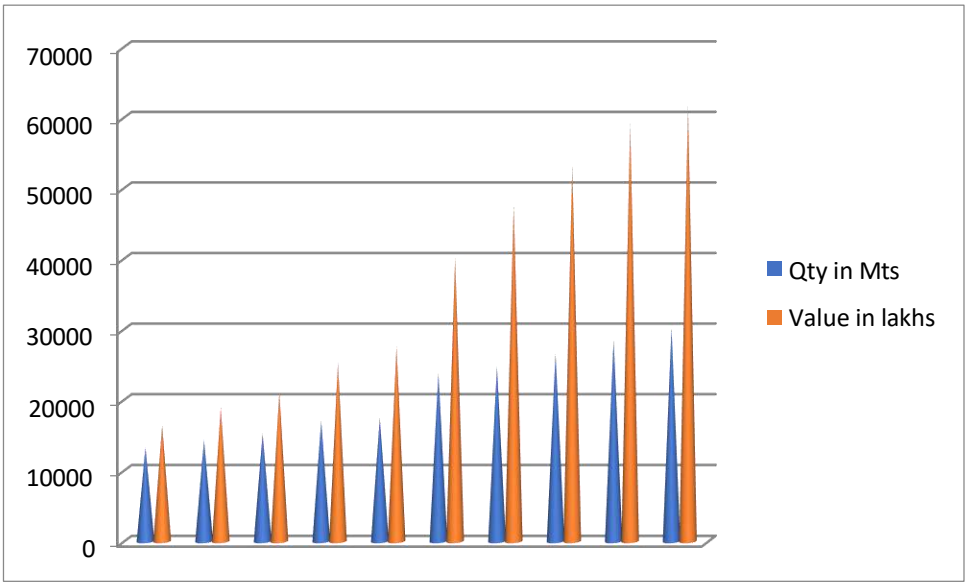
Year	Qty in MT's	Value in lakhs
2014-15	13250	16375

2015-16	14300	18919
2016-17	15250	21051
2017-18	17000	25208
2018-19	17436	27516
2019-20	23750	40132
2020-21	24650	47626
2021-22	26550	53175
2022-23	28500	59190
2023-24	30150	61620
Average	**21084**	**37081**
CAGR%	**9.57%**	**15.86%**

Source: spices board statistics

Table 3.41 is explaining about the curry powder exports from India year wise from 2014-15 to 2023-24. Curry powder exports are main contribution in to the spices earnings. In 2014-15 the quantity of exports was 13250 MT's and the value was 16375 lakhs. The growth of the curry powder exports in termers of quantity and value is steadily increasing. In 2013-14 the exported quantity was 23750MT's and value is 40132.03lakhs. In 2015-16 the quantity was increased by 26550MT's and value is 53174.50 lakhs. Finally in 2023-24 the exported quantity of curry powder was 30150MT's and value is 61620lakhs. The average exports every curry powder 21084 MT in quantity and 37081 lakhs in value. The compound annual growth rate of curry powder exports in quantity 9.57 per cent and value 15.86 per cent.

Graph No.2. 32 Year wise Curry Power Exports from India



Source: The research reporter compiled and designed from Table no.2.37

The above Graph no.2.32 is explaining about the curry powder exports from India during 2014-15 to 2023-24. Value added spices like powders, crushed chillies, oils and oleoresins, blended spices and curry powders. It has lot of demand in international trade by its nature of products availability, quality, functionality, colour, taste, flavour, pungency and other reasons. Year by year curry powder export in quantity and value is increasing very significantly. An average curry powder exports are 21084 in quantity and 37081 in value. The compound annual growth rate is 9.57 per cent in quantity and 15.86 per cent in value.

2.6 CHILLI AND TURMERIC PRODUCTION AND TRADING SCENARIO OF GLOBAL.

2.6.1 Region wise area under cultivation of chilly from 2013 to 2023

Table No.2.38 Region wise area under cultivation of chilly from 2007 to 2017 (Area in Ha)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	CAGR%
Africa	241847	259270	259969	267955	274298	282191	298256	297300	352043	393407	378764	5.11%
Eastern Africa	89532	91518	93325	95456	98372	103614	115774	110805	163416	200179	182711	8.25%
Middle Africa	18874	20233	20988	21253	22990	23933	24845	25518	26144	26920	27646	4.33%
North Africa	30785	32118	32729	33565	36343	32300	31854	31507	32034	32241	32523	0.61%
Southern Africa	10000	10000	10000	8539	8000	8500	8797	9464	9252	9109	8975	-1.19%
Western Africa	92655	105401	102927	109142	108594	113844	116987	120006	121198	124958	126908	3.56%
Americas	48589	49373	47991	45614	45375	43609	42088	42410	41070	42707	41490	-1.74%
Central America	37000	35381	34789	34335	33913	32500	32500	33373	33371	33098	32997	-1.26%
Caribbean	773	641	990	1063	1033	1177	1267	1143	1089	1222	1138	4.39%
South America	10816	13323	12059	10058	10274	9776	8165	7739	6456	8233	7202	-4.42%
Asia	1358194	1296410	1276416	1285897	1274748	1314223	1275501	1274807	1265157	1336997	1373710	0.13%
Central Asia	1918	1974	2010	2487	2201	2190	2199	2190	2220	2246	2249	1.78%
Eastern Asia	40000	41000	42000	43000	43125	43000	44000	44845	46198	46454	47212	1.86%
Southern Asia	1037767	971970	946590	957061	951228	983837	941208	937323	929343	987725	1021923	-0.17%
South-eastern Asia	271163	274322	278793	276738	270964	277496	280398	283002	279928	293118	294896	0.94%
Western Asia	7346	7144	7022	6610	7230	7700	7696	7447	7469	7452	7429	0.12%
Europe	44311	48978	52418	56475	61094	69747	64485	59040	61066	61735	62677	3.93%
Eastern Europe	36308	40979	44433	48637	53179	61768	56752	51547	53445	53808	54776	4.68%
Southern Europe	8003	7999	7984	7838	7915	7979	7734	7494	7622	7926	7901	-0.14%

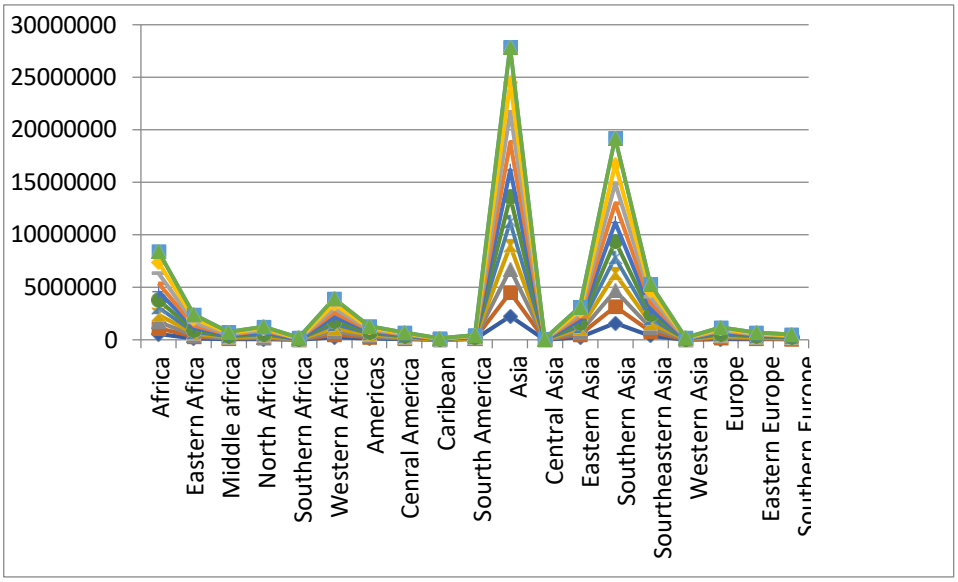
Source: FAO statistics

The above table no.2.38 is explaining about region wise area under cultivation of chilli in the world from 2013 to 2023. Along with India there are different nations are growing Chilli and Turmeric and consuming domestically and exporting to different national also. African region is one of the important areas where

chilli area under cultivation is more. In 2013 area was 241847 Ha and it is gradually increasing the area and finally in 2023 it is recorded as 378764 Ha and compound annual growth rate is 5.11 per cent. It is because of good weather and soil conditions, seed availability and water, pest and disease management is good. Eastern Africa also contributes more in chilli area in cultivation. In 2013 cultivated area was 89592 Ha and in 2023 it is recorded as 182711Ha with CAGR is 8.25 per cent. Middle Affric and North Africa also contributes more chilli area of cultivation. Asia and Eastern Asia also has signification contribution chilli cultivation.

In Asian region in 2013 chilli area of cultivation was 1358194 ha and in 2023 it is recorded as 1373710. Here one thing we can observe that out of all regions the area of chilli cultivation is highest in Asian region in 2023 is 1373710 Ha with compound annual growth rate is 0.13 per cent.

Graph No.2.33 Region wise area under cultivation of chilly from 2013 to 2023 (Area in Ha)



Source: The research reporter compiled and designed from Table no.2.38.

The above Graph no.2.33 is explaining about the region wise chilli cultivation in globe from 2013 to 2023. Even though chilli is growing all over the world based their climatic conditions, soil and natural conditions, Asian countries are growing more spices than any other nation. Based on the observation of the Graph Asian region has more area of cultivation because of its soil, weather, irrigation facilities, availability of seeds, good agricultural practises. But the compound annual growth rate is 0.13 per cent. Another important region of chilli area under cultivation is Africa, which has recorded 5.11 per cent of compound annual growth rate, Eastern Africa noted as 8.25 per cent CAGR. Middle Africa noted as 4.33 per cent and Western Africa has 3.56 per cent CAGR. In Eastern Europe, area under cultivation is less but growth rate year by year is 4.68 per cent recorded.

2.6.2 Country wise area under cultivation of chilli and share during 2023

Table No. 2.39 Country wise area under cultivation of chilli and share during 2023

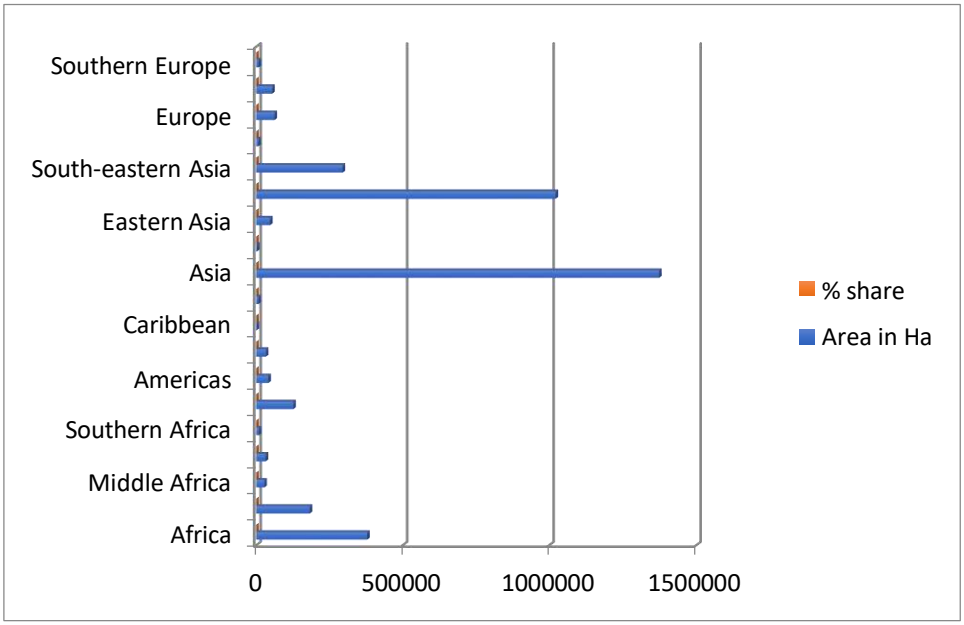
Country	Area in Ha	% Share
Africa	378764	10.20%
Eastern Africa	182711	4.92%
Middle Africa	27646	0.74%
North Africa	32523	0.88%
Southern Africa	8975	0.24%

Western Africa	126908	3.42%
Americas	41490	1.12%
Central America	32997	0.89%
Caribbean	1138	0.03%
South America	7202	0.19%
Asia	1373710	37.00%
Central Asia	2249	0.06%
Eastern Asia	47212	1.27%
Southern Asia	1021923	27.52%
South-eastern Asia	294896	7.94%
Western Asia	7429	0.20%
Europe	62677	1.69%
Eastern Europe	54776	1.48%
Southern Europe	7901	0.21%
Total	**3713127**	**100.00%**

Source: FAO statistics

The above table no.2.39 is explaining about the area under cultivation of chilli in different nations share. If we closely observe the table with 37 per cent of share Asian stands in first position, next is southern Asia with 27.52 per cent, African region stands third position with 10.20 per cent. South-eastern Asia also plays very good area under cultivation. Other nations have very limited area under chilli cultivation. Chilli is a tropical and sub-tropical plant need a combination of warm, humid yet dry weather. During the development stage it needs a warm and humid weather. On the other hand, a dry weather is suitable for fruit maturity. Temperature range of 20^0-25^0C is ideal for chilli.

Graph No. 2.34 Country wise area under cultivation of chilli and share during 2023



Source: The research reporter compiled and designed from Table no.2.39.

The above Graphno.2.34 is talking about the country wise area under cultivation of chilli and their share. By observing the graph Asian region is the highest area under cultivation of chilli and next is the south eastern region, African region also has the suitability of the soil, weather and other environmental for cultivation of chilli. India is the largest producer, consumer and exporter of chillies from India. Indian chillies have more demand in international trade because of its colour, pungency, size, variety, appearance, free from Aflatoxins, chemicals and biological contaminates. Quality and hygienic and safe spices or chilli is very important for exports.

2.6.3 Year–wise chilli area under cultivation and production in the world

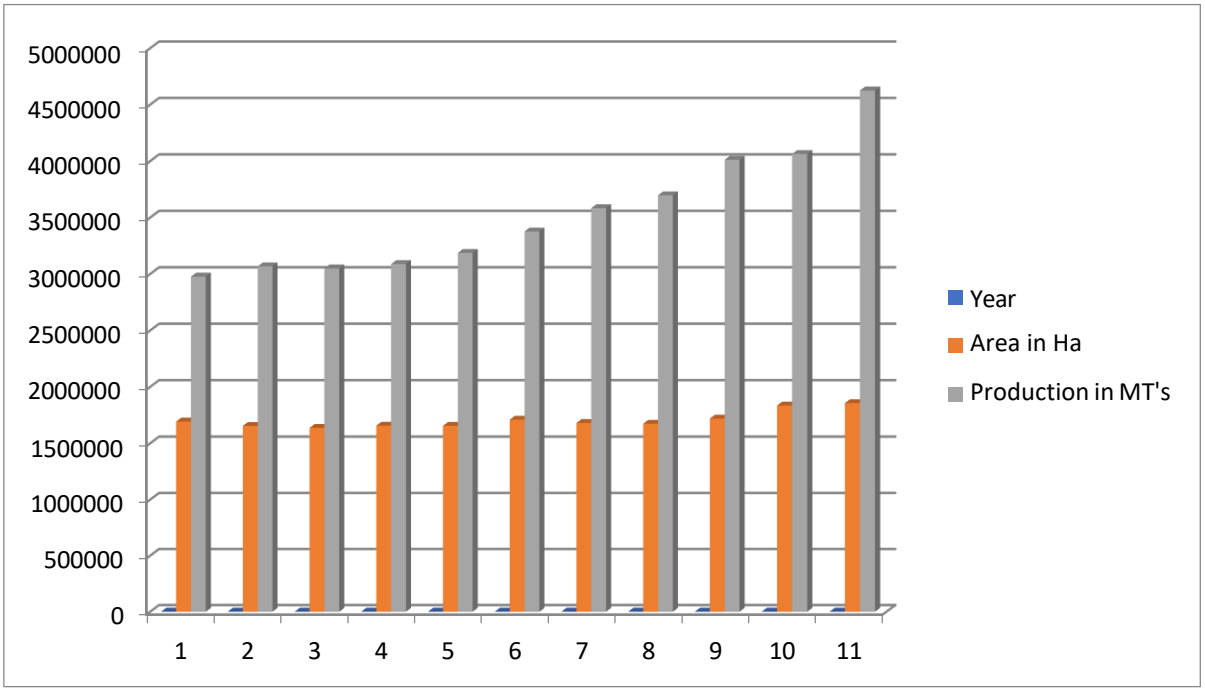
Table No.2.40 Year–wise chilli area under cultivation and production in the world

Year	Area in Ha	Production in MT's
2013	1692949	2977155
2014	1654034	3067845
2015	1636797	3049473
2016	1655942	3088249
2017	1655519	3187345
2018	1709773	3376757
2019	1680332	3583087
2020	1673558	3696985
2021	1719338	4011966
2022	1834846	4063368
2023	1856641	4625833
Average	**1876973**	**3872806**
CAGR%	**1.0%**	**5.0%**

Source: FAO statistics.

The above table 2.40 is explaining about the area under cultivation and production of chilli in the world from 2013 to 2023.There is a stable growth in area of cultivation. In 2013 area was 1692949 ha and there was no growth up to 2017 and in 2018 it was recorded as 1709773Ha and 2023 there is significant growth area of cultivation as 1856641 Ha with CAGR 2.80. Production also noticed in 2013 was 2977155 Ha and it was sturdily increasing the growth and in 2023 production was recorded as 4625833 MT’s. The area expansion and deduction depends on the soil conditions, timely rains, pest and disease management and marketing facilities.

Graph No.2.35 Year–wise chilli area under cultivation and production in the world



Source: The research reporter compiled and designed from Table no.2.40

The above Graph no.2.35 is giving a clear cut picture about the area in hectares and production in MT's in different time periods. There is no significant growth rate in area of cultivation in glove wise. But in production there is a significant growth subsequent years. Chillies need moisture for growth. It has been found that black soil which retains moisture is ideal in case they are grown as rain fed crops. Under irrigated conditions, the crop needs well-drained sandy loam with rich organic content. They can also be grown in deltaic soil under irrigated conditions. Out of all nations India produces a lot, consumes a lot and exports a lot to different nations in different form of chilli.

2.6.4 Area under cultivation of chilli during 2023-24

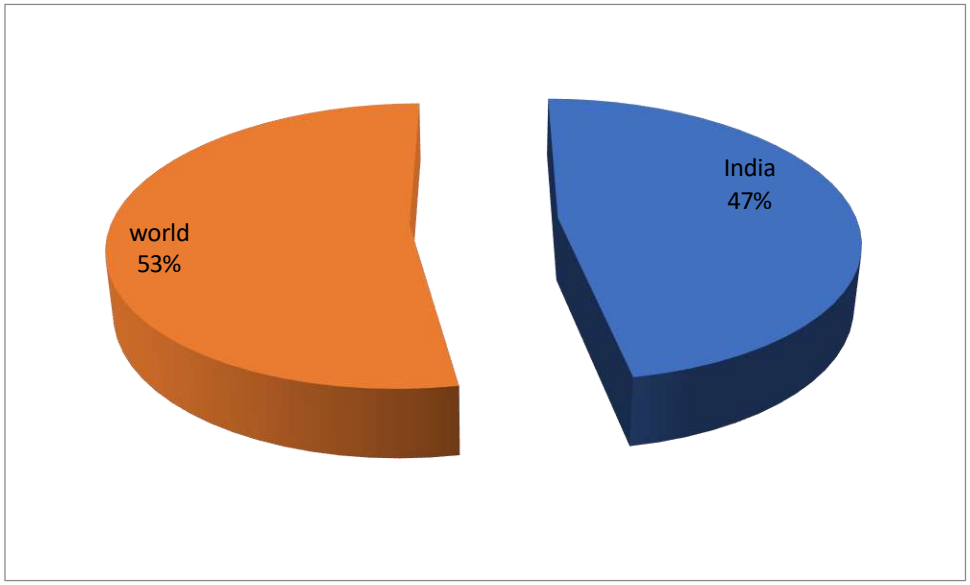
Table No.2.41 Area under cultivation of chilli during 2023-24

Nations	Area of cultivation (in Ha)	% share
India	8707072	47
world	9762657	53
Total	18469729	100

Source: FAO statistics

The above table no.2.41 is explaining about area under cultivation of chilli in 2023-24. India occupied 53 per cent of chilli area of cultivation and 47 per cent of other nation's area of chilli cultivation. It is because of India's soil conditions, suitability and sustainability of water, pest and disease management, post-harvest best practises, India become number one in production, consumption and exports of chilli.

148Graph No.2.36 Area under cultivation of chilli during 2023-24



Source: The research reporter compiled and designed from Table no.2.41.

The above Graph no.2.36 is talking about area under cultivation of chilli in 2023-24. India occupied 53 per cent of chilli area of cultivation and 47 per cent of other nation's area of chilli cultivation. India is the largest production, consumer and exporter of chilli. Indian chilli has more demand by virtue of colour, pungency, size, free form extraneous matter, and other parameters. It is because of India's soil conditions, suitability and sustainability of water, pest and disease management, post-harvest best practises, India become number one in production, consumption and exports of chilli.

2.6.5 Production of chilli during 2023-24

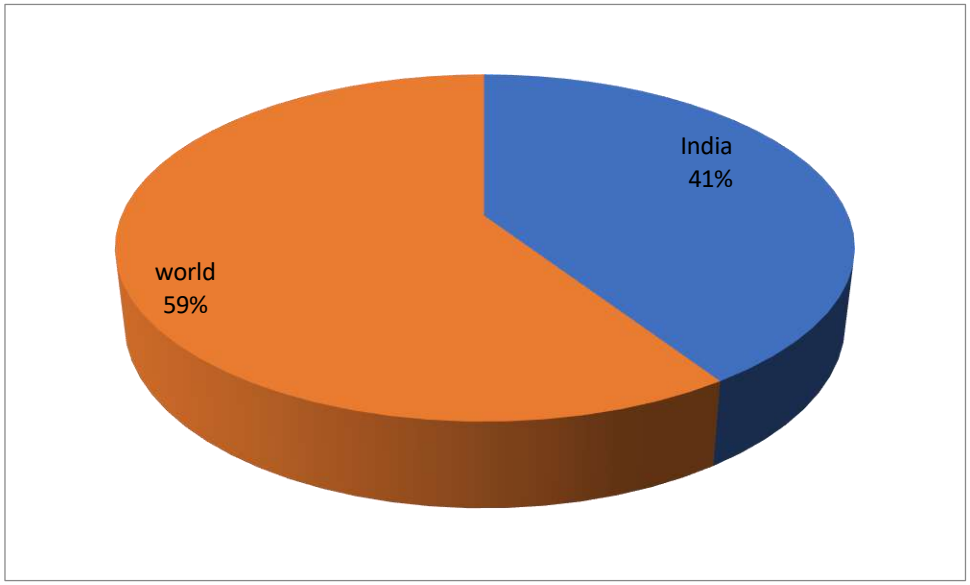
Table No.2.42 Production of chilli during 2023-24

Nations	Production (in MT)	% share
India	15776031	41
world	22952032	59
Total	38728063	100

Source: FAO statistics

The above table no.2.42 is explaining about the production of chilli in the world and India. India occupied 41 per cent of production in the world and all other countries are adjusted with 59 per cent of production. This is because of the good conditions of soil and weather and pest and disease management.

Graph No.2.37 Production of chilli during 2023-24



Source: The research reporter compiled and designed from Table no.2.42.

The above Graph no.2.37 is displaying about the production of chilli in the world and India. Out of all nations, Asian region occupies a very significant role in production of chill. In Asian region India stands first in area and production and productivity. India occupied 41 per cent of production in the world and all other countries are adjusted with 59 per cent of production. This is because of the good conditions of soil and weather and pest and disease management, availability of modern equipment used in pre and post-harvest management.

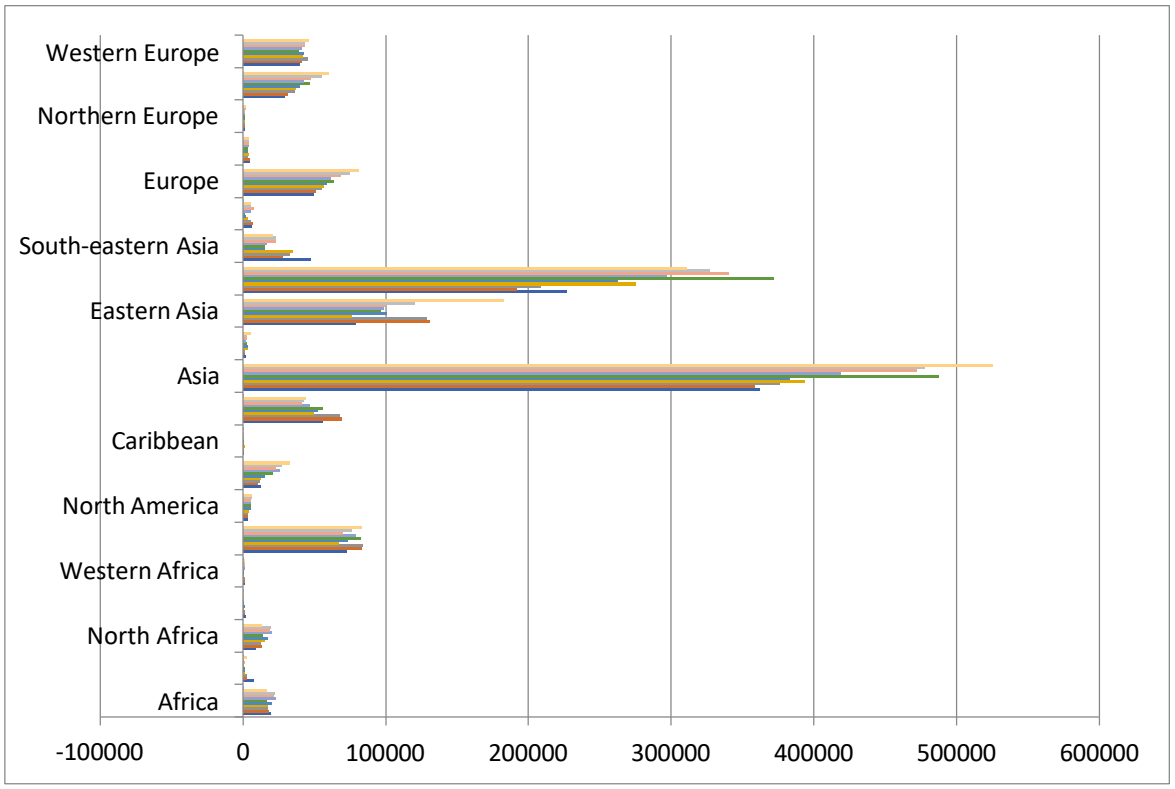
2.6.6 Region-wise exports of chilli (Quantity in MT's)

Table No. 2.43 Region-wise exports of chilli (Quantity in MT's)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	CAGR%
Africa	19587	17911	17741	17197	20476	16862	22524	21333	22081	16911	-1.62%
Eastern Africa	7187	2611	2394	989	1183	1515	595	981	538	2364	-11.62%
North Africa	8944	12984	12860	15397	17658	13871	20365	18571	19345	13059	4.30%
Southern Africa	2150	1279	1517	629	919	675	367	492	570	530	-14.41%
Western Africa	1304	1018	969	181	715	799	1196	1288	1618	917	-3.84%
Americas	72376	82946	83495	67006	73464	82905	78439	70004	75887	83007	1.53%
North America	3242	3069	3350	4007	5057	5658	5573	5608	6215	6548	8.12%
Central America	12818	10190	11861	12662	15201	20950	25791	22713	26949	32247	10.79%
Caribbean	564	555	617	931	593	462	430	428	204	448	-2.53%
South America	55752	69132	67667	49406	52613	55835	46645	41255	42519	43764	-2.65%
Asia	361532	358780	375961	393456	383323	487772	419260	472134	477968	525119	4.23%
Central Asia	1869	1564	1427	3263	3064	2446	1875	2262	3029	5199	12.04%
Eastern Asia	78712	130669	128809	76592	100849	96610	99030	99457	120311	182618	9.80%
Southern Asia	226931	191666	208182	275158	262601	371808	296955	340692	326561	310988	3.56%
South-eastern Asia	47449	28079	32497	35315	14787	15324	16267	22492	22690	20734	-8.79%
Western Asia	6571	6802	5046	3128	2022	1584	5133	7231	5377	5580	-1.80%
Europe	49649	50867	55165	56202	58818	63638	61094	68444	74698	81230	5.62%
Eastern Europe	4786	4492	3506	3938	3468	3415	3606	4168	4356	4406	-0.91%
Northern Europe	1057	994	1093	1205	1382	1621	1557	1714	2061	2160	8.26%
Southern Europe	29426	31158	36505	36768	39779	46887	42726	47709	54893	60295	8.30%
Western Europe	39514	40840	45524	41988	42772	39069	40786	43370	43268	46213	1.76%

Source : FAO statistics.

The above table no. 2.43 is explaining about the region-wise exports in quantity of chilli from 2013 to 2022. Exports from African region from 2013 to 2022 is reduced the exports compound annual growth rate -1.62 per cent, Eastern African also reduced the -11.62 per cent, North Africa exports good with CAGR 4.30 per cent, North American exports are very good growth 8.12 per cent , Central America is another important country of exports CAGR 10.79 per cent. Asian region is one of the important for chilli cultivation and exports. In 2013 chilly exports 361532 MT, in 2017 exports 383323 MT, in 2022 exports were 525119MT's. Europe region is another important place for exports of chilli, which has compound annual growth rate is 5.62 per cent, Northern Europe is 8.26% and southern Europe also @ 8.30%.



Graph no.2.38 Region-wise exports of chilli (Quantity in MT's)

Source: The research reporter compiled and designed from Table no.2.43.

The above Graph no. 2.38 is focusing on the region-wise exports in quantity of chilli from 2013 to 2022. Each nation wants export their surplus produce after using domestic consumption. Protection of domestic market also very important. Other local business people will get affected by the international trade. Exports quantity from African region from 2013 to 2022 is reduced, the compound annual growth rate is -1.62 per cent, Eastern African also reduced by -11.62 per cent, North Africa exports are good with CAGR 4.30 per cent. Central America is another important country where CAGR 10.79 per cent. Asian region is one of the important regions lot of chilli has been exported to different regions from 2013 to 2022. Europe region is another important continent for exports of chilli, which has compound annual growth rate, is 5.62 per cent. Any nation’s growth of exports depends on the availability and supply of quality and pure spices to free from any critical hazards and free from food borne illness and contaminants.

2.6.7 Region-wise chilli export value in the world (Value in 1000 US$)

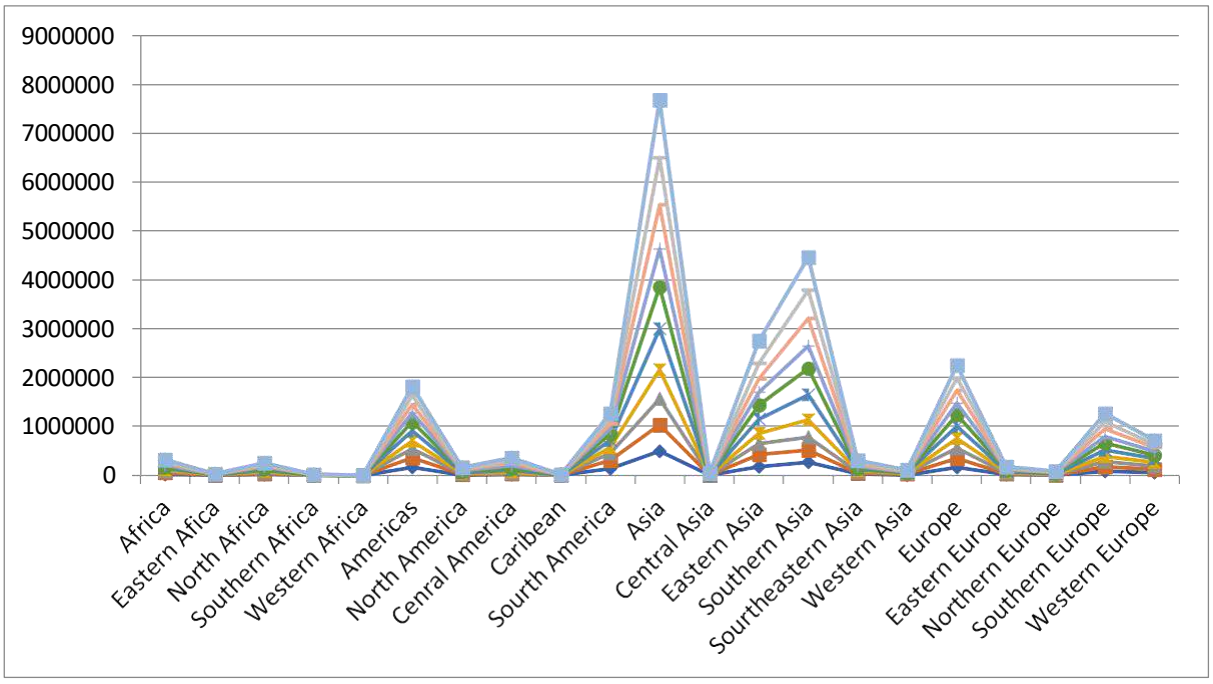
Table No.2.44 Region-wise chilli export value in the world (Value in 1000 US$)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	CAGR%
Africa	27616	27503	32183	26056	35271	30023	39290	37422	31462	32029	1.66%
Eastern Africa	6318	4537	5847	1619	2882	3917	1581	2455	1728	9152	4.20%
North Africa	16980	19507	23058	22971	29810	24060	36273	32834	27908	20351	2.03%
Southern Africa	3726	2752	2648	1280	2266	1616	924	1424	1162	1339	-10.75%
Western Africa	591	702	627	184	311	428	510	707	573	1168	7.86%
Americas	165278	201865	174451	160147	206001	193153	178422	170771	188745	179774	0.94%
North America	10407	10571	11961	13947	16698	18837	18728	19421	20257	20211	7.65%
Central America	18647	14594	17693	26479	40142	39337	51052	46305	56650	54328	12.62%
Caribbean	2448	2381	2016	3289	2679	2423	2305	2442	1419	2694	1.07%
South America	133776	174319	142781	116432	146482	132556	106337	102603	110419	102541	-2.91%
Asia	497272	539113	527547	594844	833029	859336	775764	901664	957999	1182783	10.11%
Central Asia	2263	1513	1665	3969	4809	4370	5807	5505	5469	6099	11.65%
Eastern Asia	177098	253513	223632	203911	295074	278354	262655	284894	315857	451440	10.96%
Southern Asia	268839	247742	268587	355632	502594	540468	463296	559695	584257	668104	10.64%
South-eastern Asia	34934	18551	19923	23762	25818	31541	31962	34130	39065	44620	2.76%
Western Asia	14138	17794	13740	7570	4734	4603	12044	17439	13350	12520	-1.34%
Europe	166492	189184	199240	202108	242330	237268	237546	261083	250265	268398	5.45%
Eastern Europe	16676	20389	16117	18052	18998	16826	17684	20000	18320	18322	1.05%
Northern Europe	6820	6195	6879	7156	9022	10212	10059	11172	11252	13141	7.56%
Southern Europe	81181	95268	109591	106109	131779	142840	132119	149721	153465	165189	8.21%
Western Europe	61815	67332	66653	70791	82531	67390	77684	80189	67228	71746	1.67%

Source: FAO Statistics

The above table no. 2.44 is explaining about the chilli exports regions value in US$ Africa region in 2013 has exported the chilli 27616US$ and in 2022 this 32029 and compound annual growth rate is 1.66 per cent. Eastern and Northern Africa exports value in cumulative average growth rate is 4.20 per cent and 2.03 per cent respectively. Except South America and all other American regions export value is increased from 2013 to 2022. America 0.90 per cent, North America 7.65 per cent, Central America 12.62 per cent CAGR. Except western Asia and all Asian regions export value was increased from 2013 to 2022. Export value of compound annual growth rate is 10.11 per cent, Central Asia 11.65%, Eastern Asia 10.96 per cent and southern Asia 10.64 per cent. Entire Europe region chilli export value from 2013 to 2022 is increased very significantly. The compound annual growth rate of Europe is 5.45%, Northern Europe 7.56 per cent and Southern Europe is 8.21 per cent. This is because of good market conditions and price and demand for the chilli.

Graph No.2.39 Region-wise chilli export value in the world (Value in 1000 US$)



Source: The research reporter compiled and designed from Table no.2.44

The above Graph no.2.39 is explaining about the region wise chilli export in different nations. Here the important point to notice is how the export trend is moving and which region has more scope for export of chilli from their region. Out of all regions Asian Region has lot of potentiality and scope for exports and it has exported also. The Compound Annual Growth rate is 10.11 per cent. Central Asia and eastern Asian countries also has exporter very significant amount chilli with CAGR of 10.96 per cent and 1064 per cent respectively. Reasons for the

less exports in other nations are mostly area of cultivation and production is less. Most of the countries don't use the chilli directly like Asian region countries.

2.6.8 Year-wise World and India Chilli exports

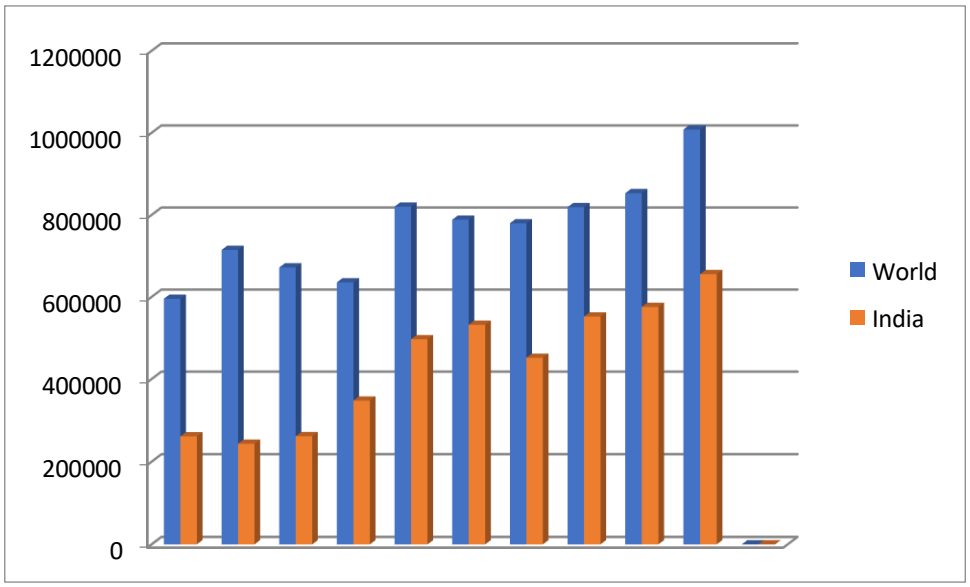
Table no.2.45 Year-wise World and India Chilli exports (value in 1000US$)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average	CAGR%
World	595597	714648	672007	635645	820170	788350	779518	818857	853022	1008177	741979.33	6.02%
India	261231	243304	261663	347806	497052	532149	451728	552271	575756	655603	413662.22	10.76%

Source: FAO Statistics

The above table no.2.45 is explaining about the exports value of India and remaining world of chilli from 2013 to 2022. In 2013 world chilli export value was 595597 US$ and it was increasing year after year and it is recorded 1008177US$ in 2022 and CAGR is 3.21. India's export value in 2013 was 261231US$ and year by year value was increasing and in 2022 it is recorded as 655603US$ with Compound annual growth rate of world is 6.02 per cent and India 10.76 per cent.

Graph no.2.40 Year-wise World and India Chilli exports (value in 1000US$)



Source: The research reporter compiled and designed from Table no.2.45.

The above Graph no.2.40 is show casing about the exports from India and remaining world in values of chilli from 2013 to 2022. India is the very competitive country to the other nations, because Indian cultivation practises, production, harvesting and storage and packing

system is different. In 2013 world chilli export value was 595597 US$ and it was increasing year after year and it is recorded 1008177US$ in 2022 and CAGR is 3.21 per cent. India's export value in 2013 was 261231US$ and year by year value was increasing and in 2022 it is recorded as 655603US$ with Compound annual growth rate of world is 6.02 per cent and India 10.76 per cent. World average exports are 741979.33 US$ and Indian average exports are 413662.22 US$.

2.6.9 Chilli exports during 2022-23 (Value in 1000US$)

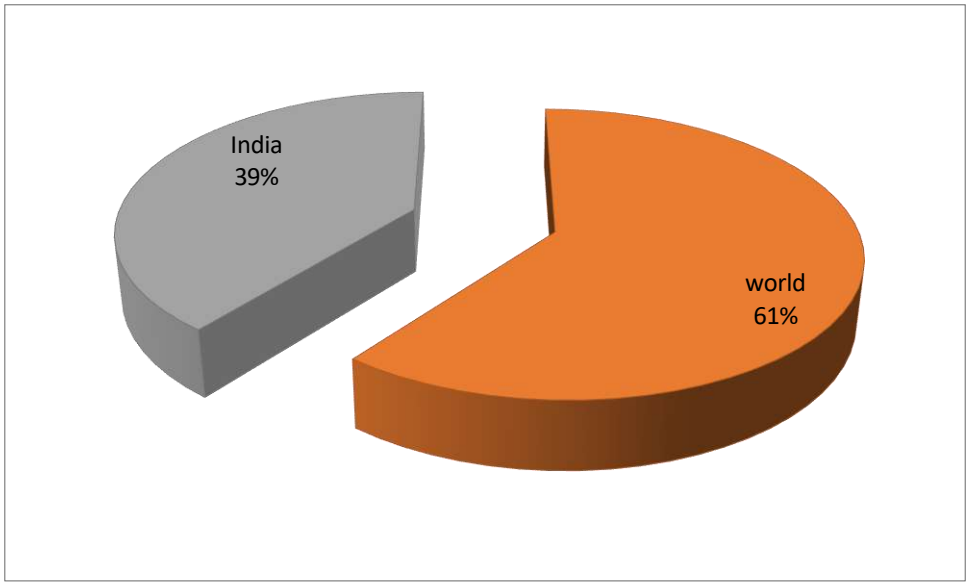
Table No.2.46 Chilli exports during 2022-23 (Value in 1000US$)

Markets	Value in USD	% share
World	1008177	61
India	655603	39
Total	**1663780**	**100**

Source: FAO statistics

Table No.2.46 is explaining about the export value (in USD) of chillies in 2022 in the world and in India. According to the Food and Agriculture Organisations of United Nations statistics India occupies 39% chilli exports value during 2022.

Graph No.2.41 Chilli exports during 2022-23 (Value in 1000US$)



Source: The research reporter compiled and designed from Table no.2.46.

The above Graph No.2.41 is showing about the export value (in USD) of chillies during 2022-23 in the world and in India. According to the Food and Agriculture Organisations of United Nations statistics India occupies 39 per cent and other world represents 61 per cent of chilli exports in value during 2022-23.This is because of quality, purity and safe chilli available in India with reasonable prices, with good infrastructure. They are also free from chemical, physical and biological hazards and contaminants.

CHAPTER – 3

SUPPLY CHAIN AND LOGISTICS MANAGEMENT PROBLEMS OF INDIAN SPICES – A STUDY OF SELECTED CHILLI AND TURMERIC

Supply Chain can be understood as a value-creation process, wherein all firms in a chain, link and align, to enhance the value of the chain as a whole (Porter, 1985). The process of value creation is achieved by firm operations, integration of processes, logistics and continuation of products through quality control. Value creation all over the chain is further improved by information flows, vertical combination and relationship management. Value creation occurs through operations, which include product transformation or processing product improvement i.e. cleaning, grading, grinding, packaging, sterilization and presentation (Woods, 2004). Value is created through the integration of processes along the chain, as the product moves from one point in the value chain to the other, as a seamless inter-connects of processes.

In logistics, value is added to the supply chain where the product is being transported from one point in the chain to the next position. Further value addition occurs where the quality preservation aspects such as cleaning, grading, grinding, packing, sterilizing and cold chain procedures are involved. The value creation process in a supply chain requires apparent information flows throughout the value chain and links up the suppliers and intermediary customers with market demands and supply.

3.1 Supply chain management in spices[127]

Most of the industries are embracing the concept of consumer products and services as supply chains. The supply chain starts with the procurement of basic raw materials and ends with the delivery of final produce to the consumer. Two broad principal explanations can be advanced for the growing interest in Agricultural Supply Chain Management (ASCM): the industrialization of agriculture and the uncertainty associated with variations in product quality and safety.

Agriculture involves a broad range of different enterprises comprising farmers, processors, traders, exporters, whole sellers and retailers. It relies on inputs from distinct

[127] https://www.supplychainopz.com

geographical locations and resources. In the case of fresh fruits and vegetables, mostly traders and retailers obtain their supply from different sources in order to meet up their marketing and production targets (Horvath, 2001).

Supply Chain Management (SCM) is a vital tool for integrating the activities of a variety of suppliers within the distribution chain, in order to promise the reliable delivery of quality guaranteed produce to the consumer (Ferentinos et.al, 2006). SCM focuses on humanizing the performance of the supply chain through the deliverance of guaranteed safe, attractive and good quality food in a cost-efficient manner for the consumer and other stakeholders (Fearne & Hughes, 2000). The growing transaction costs of rigorous agriculture and the intrinsic need to reduce it, lies at the heart of curiosity in agricultural SCM. The six essential requirements for an efficient supply chain between fresh produce growers and the foremost retail customers include: scale of operation, intentional alliances, production litheness, and continuity of supply, quality control and communication (Ziggers & Trienekens, 1999).

Supply chain administration is the procedure of managing the movement of the raw materials and parts from the establishing of manufacturing via transport to the consumer. In many organizations, operational grant chain decisions are made lots of times every day affecting how products are developed, manufactured, moved, and sold. The complexity of the grant chain varies with the size of the enterprise and the intricacy and quantity of objects manufactured, however most grant chains have elements in common, such as the following:

Supply Chain Management(SCM) in agriculture is defined as “The administration of association of agricultural commodities, from the farm via the rural and city markets to reap the doorsteps of quit consumer- both household and industrialized consumer; consists of a number players, starting from the agricultural producer, via the center men, free agents, whole marketers and traders, the bulk purchasers or procurers, traders, millers or intermediary processor, warehousing agents, or cold storage owners, area providers and domestic transporters, thru whom cloth eventually reaches either retail or bulk distribution machine for uncooked the use of up or the meals processing industries the place it goes thru the price addition approaches and strikes thru a distinct and a separate supply chain to attain the centered consumers”(Ramana & Ajoy, 2005).

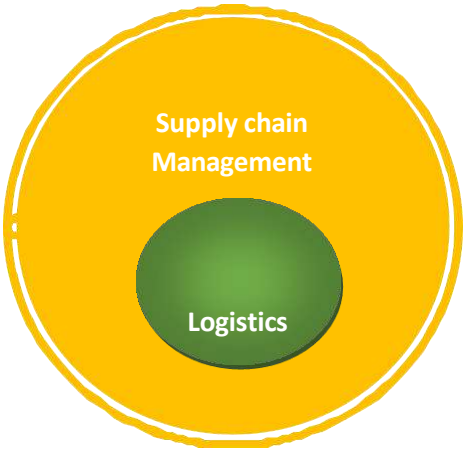
Since Indian farming is mixed and small in production per landholding, the product is gathered at village level and the produce replace process takes place in the AMC market in the attendance of commission agents appointed by government establishment. The wholesalers,

domestic traders, exporters, and intermediary processors acquire the produce from the market. Finally, the product reaches the finished users and food processors through the retail distribution system.

3.1.1 Logistics and Supply Chain Management[128]

Definition: - "Logistics typically refers to activities that take place within the limits of a single organization and Supply Chain refers to networks of companies that work together and organize their actions to deliver a product to market. Also, established logistics focuses its attention on activities such as procurement, distribution, maintenance, and inventory management. Supply Chain Management (SCM) recognize all of traditional logistics and also consist of activities such as marketing, new product development, finance, and customer service" - Michael Hugos.

Figure No.3.1 Logistics and Supply Chain Management



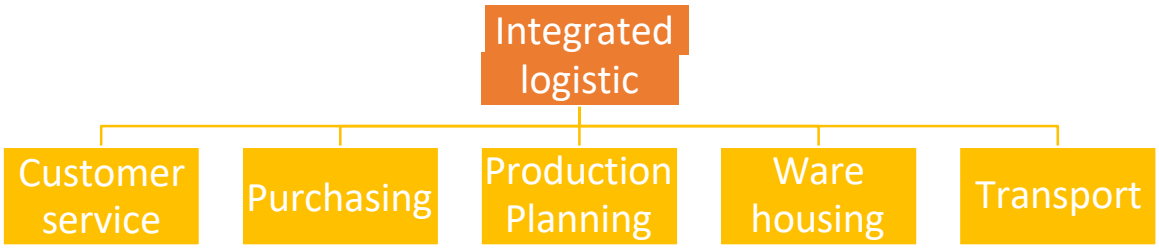
Supply chain administration is the manner of managing the motion of the uncooked materials and components from the establishing of manufacturing through transport to the consumer. In many organizations, operational furnish chain selections are made thousands of instances each day affecting how merchandise are developed, manufactured, moved, and sold. The complexity of the supply chain varies with the measurement of the enterprise and the intricacy and volume of gadgets manufactured, however most supply chains have factors in common, such as the following:

[130] https://www.supplychainopz.com

3.1.2 Logistics[129]

Definition:- "Logistics is about receiving the proper product, to the right customer, in the right amount, in the proper form, at the right place, at the right time, and at the proper fee (the 7 Rs)" - John J. Coyle et al

Figure No.3.2 Integrated Logistics



3.1.3 Logistics Management

Definition: - "Logistics Management offers with the educated and high-quality administration of day-to-day movement in producing the company's performed goods and services" - Paul Schoensleben.

3.1.4 Logistics Planning

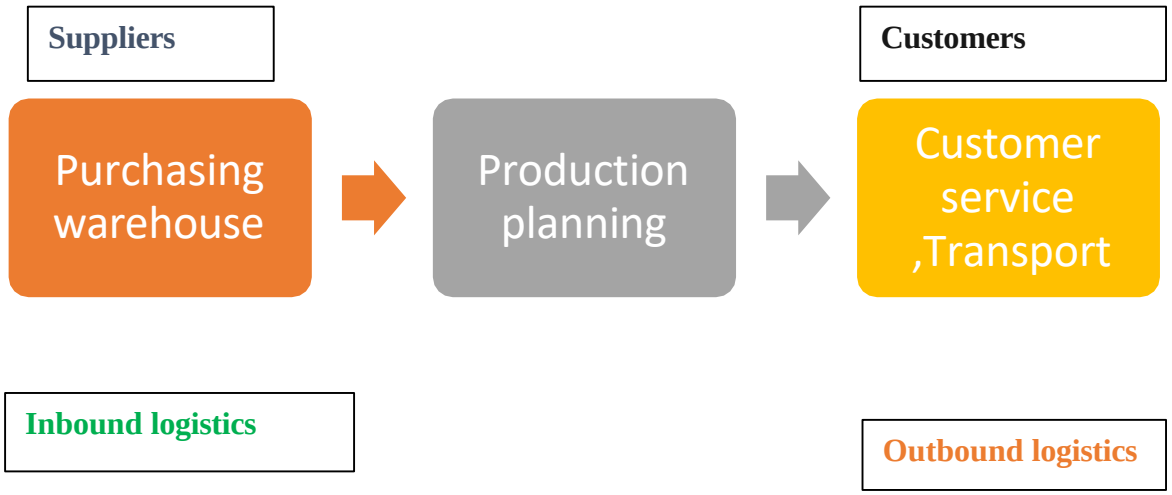
Logistics is the procedure that generates value by timing and positioning stock; it is the amalgamation of a firm's order administration, stock, shipping, warehousing, resources handling, and wrapping as integrated all through a facility network. Logistics planning provide to link and synchronies the largely supply chain as a nonstop process and is necessary for efficient supply chain connectivity**.**

3.1.5 Inbound Logistics and Outbound Logistics[130]

Definition: - "Inbound Logistics refers to movement of goods and uncooked materials from suppliers to your company. In contrast, Outbound Logistics refers to movement of completed items from your business enterprise to customers"

[129] https://www.supplychainopz.com
[130] https://www.supplychainopz.com

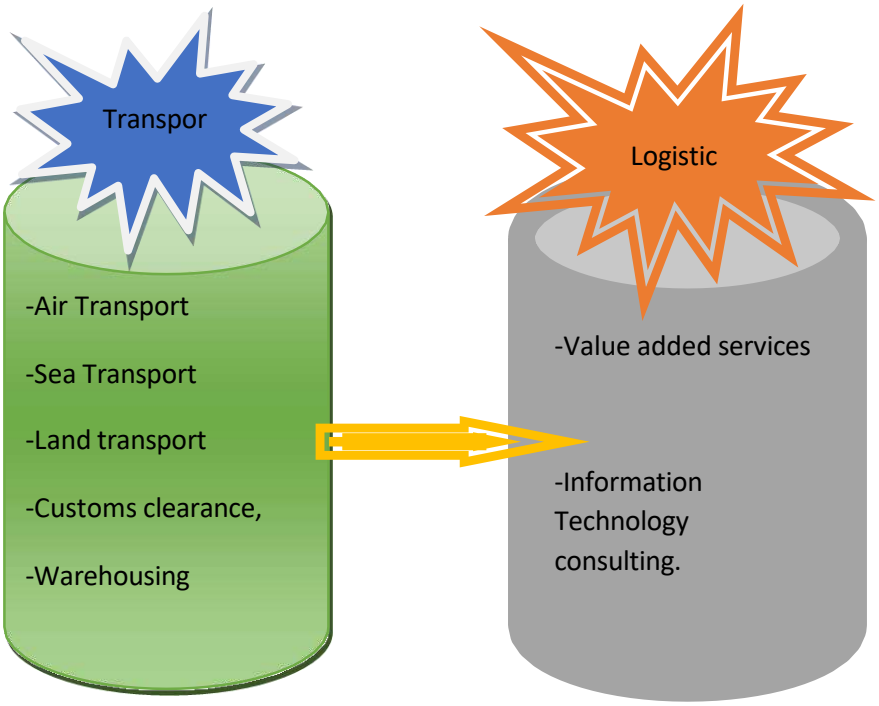
Figure No.3.3 Inbound and Outbound Logistics



3.1.6 Transport and Logistics.

Definition: - "Transport and Logistics refers to types of actions, namely, traditional services such as air/sea/land transportation, warehousing, customs clearance and value-added services which together with information science and consulting"

Figure No. 3.4 Transport and logistics



3.1.7 International Logistics[131]

Definition: -"International Logistics middle of interest on how to control and manipulate distant places movements successfully as a single commercial enterprise unit. Therefore, agencies need to try to connect the value of overseas product, services, marketing, R&D and turn them into aggressive advantage"

3.1.8 Supply Chain

Definition: - "Supply Chain is the complicated of groups that are concerned, thru upstream and downstream connections, in the exclusive tactics and activities that produce cost in the form of foodstuffs and services in the hands of the final consumer" - Martin Christopher

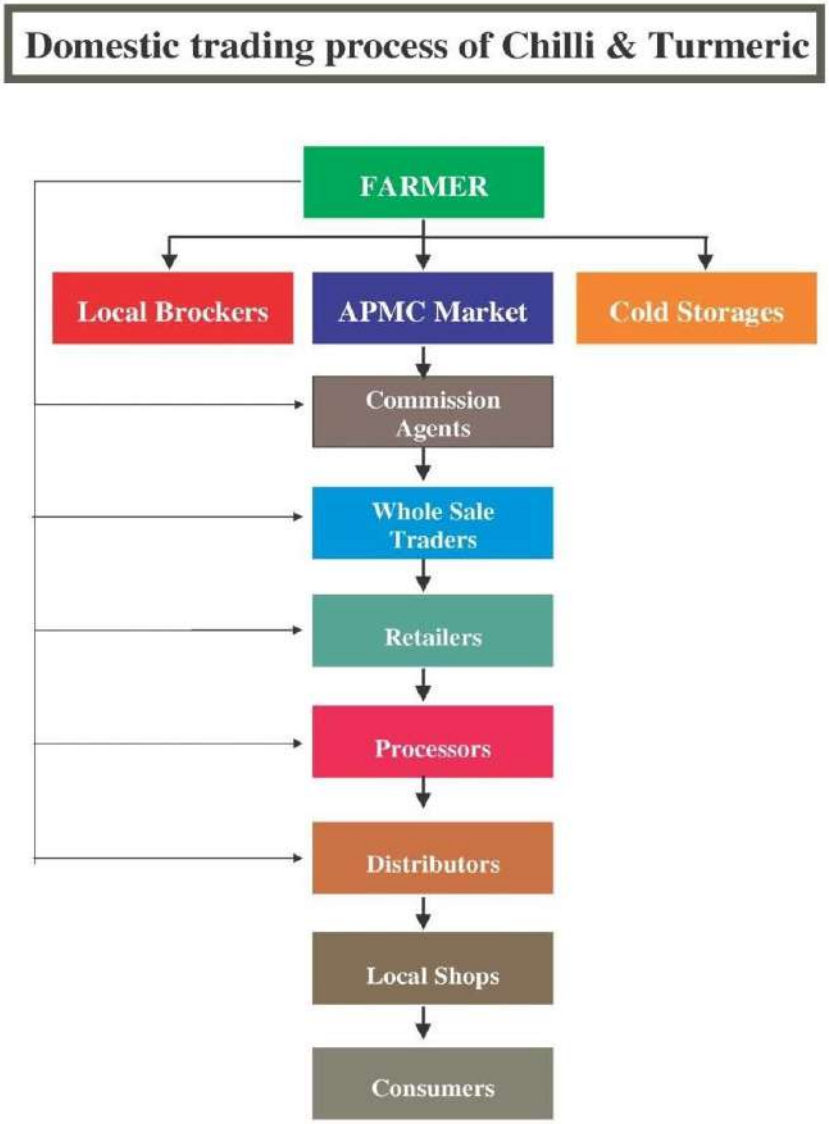
3.1.9 Supply Chain Management

Definition: - "Supply Chain Management (SCM) refers to the harmonization of production, inventory, location, and transportation amongst the applicant in a supply chain to attain the pleasant combine of receptiveness and effectiveness for the market being served" -Michael Hugos.

[131] https://www.supplychainopz.com

3.2 DOMESTIC TRADING PROCESS OF CHILLI AND TURMERIC132

Figure No. 3.5 Domestic trading process of chilli and Turmeric



[132] https://pt.slideshare.net/kuntalpatra01/chilli-cultivation-treding/5

3.2.1 Farmers:

In the domestic trading process farmers plays a main role. Farmer is the one who produces the products and sell their material in different places. Based on the need and demand for the product and better price availability to the produce. Generally, farmers sell their products at local buyers, APMC markets or keeping in the cold storages till getting the better prices.

3.2.2 Local buyer:

Local buyer is the one who purchase the goods/products from the village/field level. Generally local buyers will help the farmers in the form of financial support and with that courtesy farmers generally will sell their produce to the local buyer/broker. Here at village monopoly will be there and there are no other buyers and they don't get the bargaining to produce and local buyers sometimes will give the money after selling the products

3.2.3 APMC Market:

Agriculture Produce Market is place where farmers used visit and sell the produce. Mostly farmers will prefer to sell their produce in the market yards because more no. of buyers is available and will expect a better price in the market yards. Further they will get the amount immediately after selling their produce.

3.2.4 Cold storage:

Cold storage is the place where farmers store their chilli still getting better price. But very limited farmers will keep their produce in the cold storages. Most of the farmers will sell immediately or little later to pay their debts at local money lenders, private banks and commission agents. Farmers will get the loan and insurance facility on their produce kept in the cold storage. Cold storage benefits the farmer to retain the color, quality, pungency and other factors. Farmers have to pay the user charges for keeping their materials.

3.2.5 Commission Agent:

Commission agent is key person in entire marketing systems of agriculture or horticulture products. Commission agents are the licensed holders from APMC market yard. They are the mediators in between the farmers and traders/processor. Commission agents along with selling of the farmers material and they also lend the money to the farmers at the time of cultivation. Therefore, most of the farmers will come to the market yards and sell their produce. Commission agent will get the commission from the farmers by selling their produce.

3.2.6 Whole sale traders:

Most of the whole sale traders purchase the chilly from the market yard. Because of availability quality, quantity, assured prices, varies of items available in the market yards. Another advantage is they can get the credit nearly one month time, in case if they purchase, they have to pay the money immediately after purchase. In this case commission agents will pay the money on behalf of farmers.

3.2.7 Processors:

Most of the times spices have been supplied to the processor from whole sale dealers/distributers. The processor will do the value addition to their products. Like, Cleaning, grading, grinding, packing and storing

.

3.2.8 Supply to distributor:

After completion of entire production process and processor will supply the finished goods to the distributers and distributer will supply the material at malls, local markets and shops.

3.2.9 Local shops/malls:

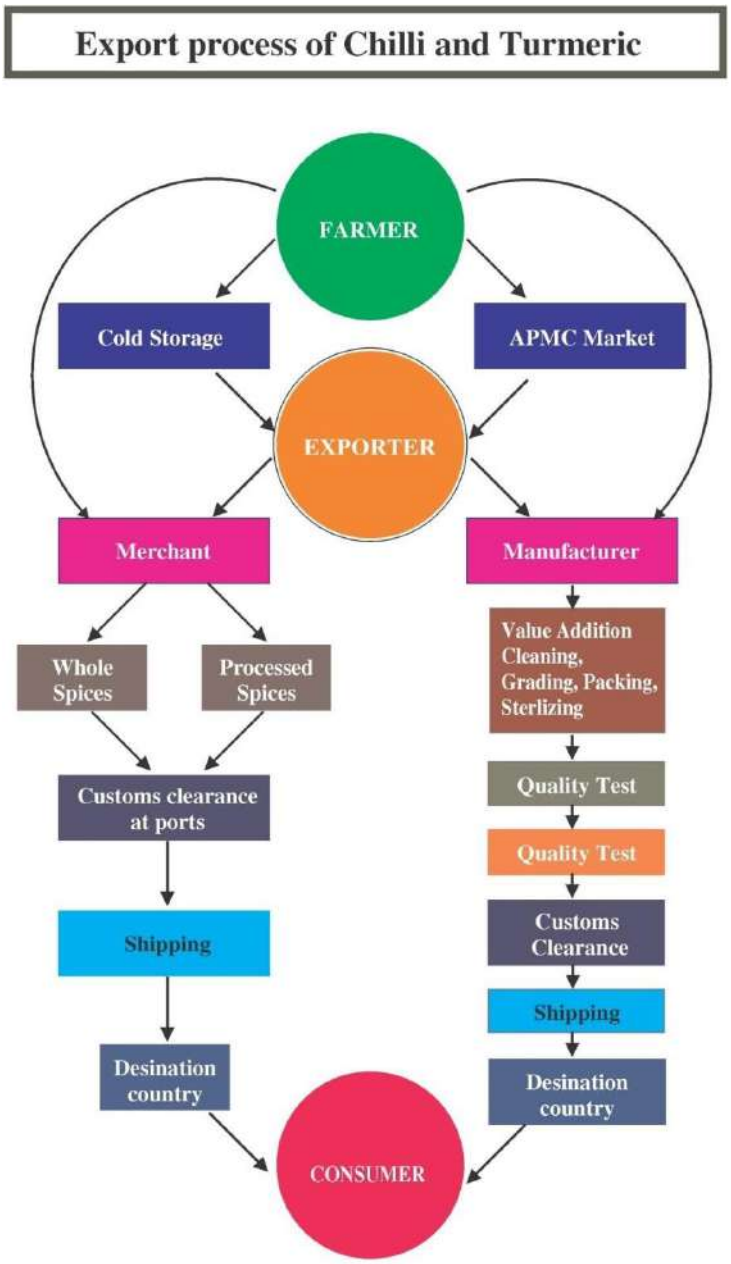
Local shops and malls are the places where generally consumers purchase the produce form local shops and malls. Here the consumers have more choice to purchase different variety of spices in the market.

3.2.10 Consumer:

Consumer is the king in the market. Without the consumer there is no business transaction in the market. Consumer has more choice and option to get the quality and hygienic material for consumption. In the market lot of verities of materials are available depends on the consumer taste, preference, affordability and need and requirement.

3.3EXPORT PROCESS OF CHILLY AND TURMERIC[133]

Figure no.3.6 Export Process of Chilly and Turmeric



3.3.1 Farmers:

The farmer who produce the chilli or turmeric with purpose of selling/supply to the domestic and international trade buyers or sellers. Mostly this kind of buyers will go for the contract farming with reputed companies like, M/s.ITC Ltd, M/s. Olam foods, M/s. Synthite and M/s.

[133] https://www.indiantradeportal.in/

Plant Lipids. These companies will provide all the inputs, technical guidance and support to the farmers with backwards and forward linkages.

3.3.2 Transportation:

In the international or foreign trade transportation places a vital role. Because the farmers generally use the same transportation facility for spices which is already used for transport of chemical and other non-food items without any cleaning or hygienic condition. There is lot chances to happened contamination while transport from farms to market, cold storage or any other place. Even from processing unit to destination port also. Here farmers/traders/processors should take lot of care and stringent mechanism to avoid the rejections from foreign buyers.

3.3.3 Cold storage:

In international trade cold storages place a vital role. In season both farmers and traders will store the material in the cold facility. The cold storages should have all international standards to maintain and retain the quality, flavor, aroma, pungency, color of the spices. They have to maintain the required temperature and coolness depends on the product. They should have latest equipment for loading and unloading the materials, so they can avoid the contamination chances which can occur.

3.3.4 APMC Market Yard:

APMC market is the one where most of the exporters will purchase or procure chilli or turmeric. India is the largest producer, consumer and supplier of most of the spices. APMC Guntur is largest market in the Asia. Lot of farmers, commission agents, traders and exporters used come for trading 365 days in the year. This is trusted place for farmers to sell and exporters to purchase. In the yard they will find verities of chilli and turmeric and large quantity also. The market yard should be very clean and neat will all facilities to the farmers and exporters.

Figure No.3.7 APMC Market Yard, Guntur

3.3.5 Commission:

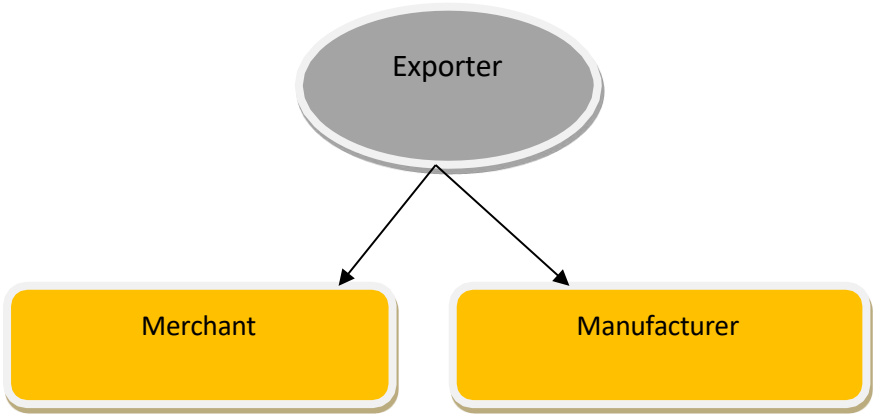
Since long time commission agents are playing vital role mediation in between the farmers and traders/exporters. They are the licensed persons, who sit and accommodate at the market yards. Most of the times they invest or lend the money on farmers and on trade/business. Even today farmers are getting loans from commission agents for their cultivation and after harvest they will bring the material to the market and sell the product through them and repay the money. Most of the traders will prefer to purchase the goods/spices through commission agents, because they have confidence on the commission agents that they can get the quality materials, time for payment and supply in all seasons.

Figure No.3.8 Commission agent shop at APMC

3.3.6 Exporters:

Exporter is the one who procure the spices from domestic or local market with necessary quality requirements prescribed by the foreign buyers and export the same in another country. Here international trade quality standards place very important role. The exporters should take care every step of processing process. Most of the cases exporters are two types one is merchant and another one manufacturer exporters.

Figure No.3.9 types of exporters



3.3.7 Merchant exporter:

"Merchant Exporter" means a person occupied in trading activity and exporting or proposes to export goods. Merchant exporter procures the material from a manufacturer and exports in his firm's name. Here merchant exporter procures the order from global market. Merchant exporter does not have own manufacturing unit or processing factory. Merchant Exporter can export the excisable goods either directly from the premises of the manufacturer, with or without sealing of the export consignments, or through his building under claim for rebate or under bond.

3.3.8 Manufacturer exporter:

"Manufacturer Exporter" means a person who manufactures goods and exports or plans to export such goods. The manufacturer exporter procures and process raw materials at his factory and exports finished products. Here, the manufacturer exporter acquires the export order and exports in their own name.

3.3.9 Quality testing:

As per the spices Board India norms it is mandatory all export consignment of Chilli and chilli containing products, Turmeric and turmeric containing products should be tested at their NABL accredited laboratories before exporting the spices. They test the presence of Aflatoxin, Sudan,

salmonella and pesticide residues tests. Each country has certain limitations of quality. After clearance they will issue the quality analysis certificate for exports.

Figure No.3.10 Quality Evaluation lab

3.3.10 Customs clearance at Ports:

After completion of every processing part next is the customs point. "Customs area" means the area of a customs station and comprises any area in which. Imported goods or exported goods are ordinarily kept before permission by customs authorities. Further "customs port" means any port appointed under clause (a) of section 7 to be a customs port.

3.3.11 Destination country:

India is the largest producer, consumer and exporters of spices from India. In 2023-24 India exported 79882 Mt of spices and 3024.22 lacks in value to USA, 206879 MT's in quantity and 226743 in value to Vietnam, 30659 in MT and 68138lakhs in value to Thailand and 67043 MT in QT and71037 lakhs in value to UAE, Germany, Malaysia, Saudi Arabia, Brazil Spain and nations.

3.3.12 International consumers:

Foreign nations will give at most importance to their citizen's health and life. Therefore, to protect their life and health, they import very quality and hygienic products to their nations by implementing very stringent norms and rules. Indian producers will follow the foreign nation's rules, norms and supply the material accordingly for getting the better prices to their products.

3.4 HARVESTING AND FARM LEVEL PROCESSING OF CHILLIES[134]

Farm level procedure in post-harvest phase involves on-farm harvesting, drying, grading and packing of chilli. The researcher visited the Chilli growing villages in Guntur and Kurnool districts of Andhra Pradesh to study the entire process and methods adopted by farmers.

Figure No.3.11 Harvesting and farm level processing of chillies

Flow chart showing on-farm level harvesting and post –harvest operations.

3.4.1 Harvesting:

Time of harvesting chillies depends on the reason for which it is grown. Most of the crop around Guntur in Andhra Pradesh is growing for the making of dry chilli. Few farmers grow different varieties for green chilli to make available to the local vegetable market. Predominantly when green chilli is grown around cities, the market is remunerative.

Figure No.3.12 chilli harvesting and grading

[134] https://www.researchgate.net

The best of green chilli is decided by means of its size, colour and pulpiness of fruit. Long, green, clean & shining and fairly plump fruits are preferred. Picking is phased out to normal intervals to meet the bazaar demand as nicely as when the fruits are properly developed and green.

Chilli crop flip into equipped for harvest in six to seven months after transplanting or direct sowing as the case may additionally be. Ripen fruits are handpicked at recurrent intervals, due to the fact hold maintain of the fruits for a long length on plants reasons wrinkles and fading of shade occurs. Harvesting of chillies is a labour-intensive operation and is carried out by typically women labour. During peak season, labour from some distance off locations migrates to the chilli growing areas and stay till season lasts. Make-shift shelters are straight round chilli developing areas for their stay.

The product is amassed in gunny baggage or in bamboo baskets and transported to the shut by means of yards through bullock carts or tractor trailers for drying. Depending upon whether the crop is irrigated or dry, whole harvest is phased typically in 3-6 pickings at an interval of 2-3 weeks. Number of workers, imperative per hectare per choosing is about a hundred twenty-five depending of the diversity and yield. The fee of harvesting is about Rs. 100/- per quintal of ripe fruit.

3.4.2 Drying

Open yard sun drying is extensively practiced. The drying ground is normally prepared with the aid of leveling empty fields in each season or from time to time the usage of cement concrete. Tarpaulin or polyethylene sheets are every so often unfolded to make a drying yard.

Figure No.3.13 Researcher explaining potential farmer on Batch wise drying

Open yard around fields or residential areas or in the blank fields is often used for education of drying yards. Depending upon the soil type, the flooring is organized using tractor and a leveling blade or manual spading to put together mud floor. The grass patches are eliminated and the land is leveled and compacted after sprinkling water, if necessary.

Some farmers use 8 x 6 m dimension high density polyethylene (HOPE) sheets of 250 gram/sq.cm density available in the nearby market as drying ground for chillies. Single sheet can take about 4-5 quintals of ripe product. About 8-10 sheets are imperative to dry produce of each choosing from one hectare.

3.4.3 Grading: -

Farm degree grading is very important for separate the Colour, glossiness, measurement and moisture content material are some of the sizeable elements that merchants think about when they purchase the produce from farmers. So, farmers grade the produce to meet the buyer's necessities. Grading at farmers' stage includes separation of any seen overseas matter, discolored pods (talu kaya), below size and curly pods. Also, fungus contaminated pods are alienated out so that infectivity in following processing and storage should be avoided. Grading is carried out in the course of drying itself or after drying with the aid of women labour depending upon the market requirement.

Figure No: Farm level Grading of Chillies for Farm gate sales

Figure No. 3.15 Manual grading of chilli whole

Figure No. 3.16 Mechanical chilli whole grading machine

3.4.4 Packing and Transportation: -

The dried pods are together, heaped and packed picking clever in gunny luggage commonly for the duration of morning time when the temperature is comparatively cooler as fully dried chillies turn out to be brittle causing sizeable breakage. Transport and cold shop costs are based on variety of gunny bags. To shop succeeding transport and cold store costs, farmers usually pack maximum extent of about 35-40 kg per gunny bag. A specific bamboo tripod stand is shaped and erected in the yards and gunny bag is held in between and a person tramples the pods by way of standing in the gunny bag, to achieve excellent compaction. The gunny bags are transported to market yard through the farmers or middlemen/traders or to cold storage units.

Figure No.3.17 packing of whole chilli

Figure No.3.18 Transportation of whole chilli

3.4.5 On-farm storage: -

Few farmers around Guntur store dried chillies on the farm as shade retention is poor in the ambient conditions. Even if the produce is stored, it is only for a shorter period said one or two months. The gunny bags are stacked away from walls on a wooden platform or on any improved platform covered with few gunny bags. A tarpaulin or gunny mat is used to cowl the baggage from light

3.4.6 Cold storage of chillies:-

Storage of chillies in cold shops is lengthily followed around Guntur location as the produce fetches premium rate due to magnificent upkeep of colour. The use of industrial cold storage units for chilli storage has now end up almost a prevalent exercise amongst farmers. For example, one of the largest clusters of cold storage units in Asia is in Guntur totaling one hundred seventy-five (175). The capability of each cold storage unit varies from 50,000 to 1.5 lakh bags. Current capacity of the cold storage units in and around Guntur is about 100-125 lakh luggage (each bag is about 35-40 kg capacity). Guntur chilli market yard is the principal in Asia. Product from about 7-8 nearby districts come to this yard for sale. Annual sales at this

market yard are about 80-90 lakh baggage of Chilli. A variety of cold shops have additionally been hooked up in the important chilli growing areas of Andhra Pradesh.

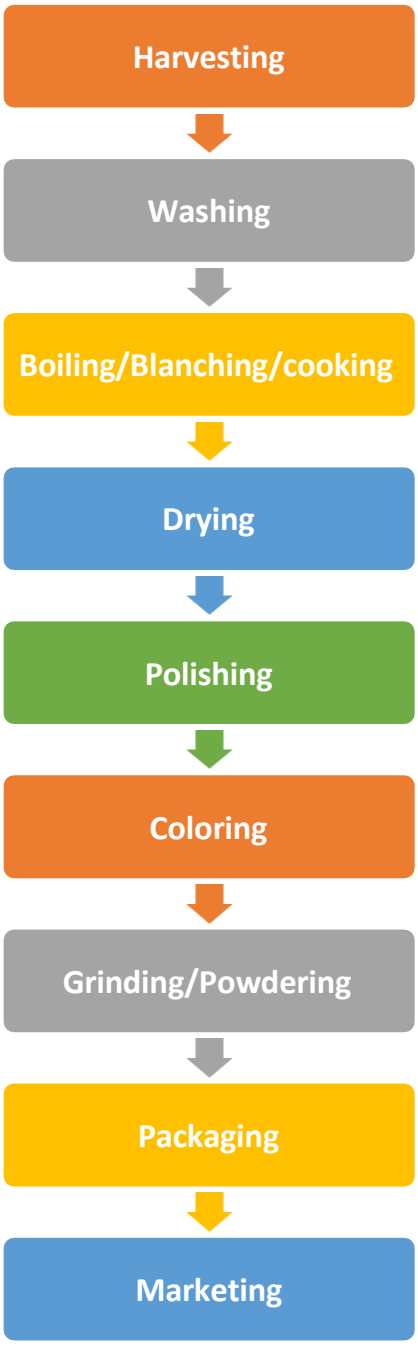
Figure No.3.19 Cold storage unit

3.5 HarvestING and processing of Turmeric[135]

In India, different places, unique methods and equipment are used for processing of turmeric, but the standard method consists of the following steps:

[135] https://www.researchgate.net

Figure No. 3.20 Turmeric processing flow chart



Source: Major spices production and processing by IISR

3.5.1 Harvesting:

The turmeric crop is ready for harvesting in about 7 to 9 months after sowing depending upon the variety. In India, sowing takes vicinity between June and July and harvesting is achieved from February to April. Late harvest is also practiced given that the crop does now not deteriorate by way of leaving it for some months underground.

Figure No. 3.21 Turmeric Harvesting

Before harvesting, the dry leaves and stem are cut shut to the ground. The land is irrigated, if required, to make effortless digging out the rhizomes, and ploughed in amid the rows if' the crop is planted on edge. Otherwise, a crowbar is used. The rhizome clusters are vigilantly lifted and adhering soil used to be indifferent by using soaking in water and further cleaned of roots and scales earlier than they are collectively in the curing yard. The curing great and the quantity of the cured and dried produce to the green produce depend generally on the variety. Mother-rhizomes supply a greater curing percentage than the fingers. The mom rhizomes and fingers are alienated. If need be, the farmer is stored for seed and the latter is cured for selling.

3.5.2 Washing

Rhizomes are separated after digging out from the soil. The globular mom rhizome and the longitudinal fingers are separated into lots. Root hairs and poorly developed and shriveled portions are then removed. These are washed, so that particles of soil, spray residues and non-useful particles connected with the rhizomes are removed. Rhizomes are stored soaked in water during the night. Later on, rhizomes are taken out and water is sprayed. This procedure can be-achieved by means of soaking and spraying equipment. Spraying is performed at low stress and wide-angle jet or with excessive strain jet. Mother rhizome is saved for seed while finger rhizomes are similarly processed and sold.

Figure No.3.22 Turmeric washing

3.5.3 Boiling/Blanching/Cooking

The next step of processing is boiling or blanching. Conventionally boiling is performed in metallic or mud pots alongside with percent water. But these days boiling is taking place in steam boilers, which offers great of the merchandise and it dries very quickly also and these come out with a one-of-a-kind satisfactory of flavour. Rhizomes are tested by means of urgent with fingers. If rhizomes are tender and inner coloration has come to be yellow as an alternative of purple then this system is said to be complete.

3.5.4 Drying:

Sun drying in particularly prepared toughened earth or cemented yards is the frequent practice. The cooked material is broadening two or three layers thick. Dispersal in single layers is averted to limit the bleaching impact from the sun. The stuff is rarely become to ensure uniformity in drying. Drying is slow, taking 10-15 days for completion, when efficaciously dried, the rhizomes grow to be hard, almost horny, brittle and of uniform yellow color. The moisture content material of the dried rhizomes is one of the lowly for spices; commonly being less than5%. The dry yield of the low moisture product is 20% on an average. Mother rhizome takes fairly greater time whilst finger rhizomes dry up speedily. Therefore, these are dried in my opinion also. After drying these end up hard and solid. Sooner or later dried turmeric holds 6% moisture.

Figure No.3.23 Turmeric drying

3.5.5 Polishing:

Dried turmeric has a bad seem and a difficult and slow outer surface with scales and root bits. The appearance of dried rhizomes is greater through rubbing them poignant ground or below the foot to take out the tough layer over them and small roots are detached. By this technique coloration of turmeric becomes tremendous or shining. Later aloof roots, mild garbage and thin layering are cleaned. Another bodily technique is tumbling the dried rhizomes placed in bamboo reed baskets along with granite stones when the pieces are each smoothened and polished. The produce is diagnosed in the exchange as 'polished turmeric'. Manual strategies supply low output round 20 kg for eight hours for two persons. 'Turmeric Mechanical polishing drums have been developed for dealing with massive quantities

Figure No. 3.24 Turmeric polishing

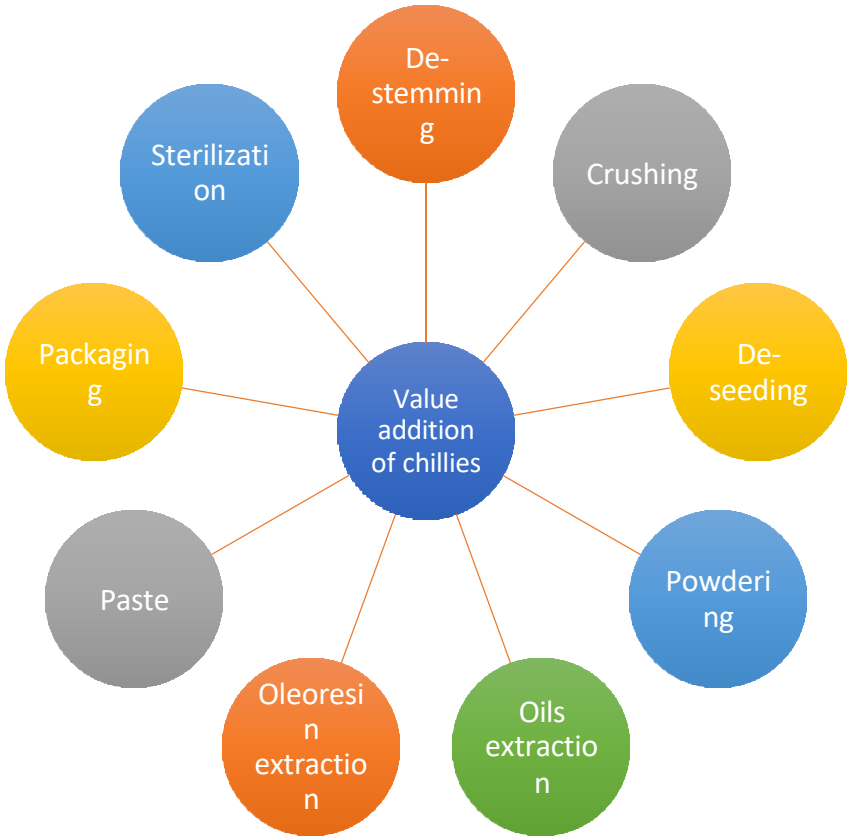
3.5.6 Coloring:

Exporting turmeric is given special colour by addition yellow so that powder and processed resources can give superior look and superiority by a dry or wet process, In the dry process, turmeric powder is supplementary to the polishing drum in the last 10 min, In the wet coloring process, turmeric powder is suspended in water and mixed inside by sprinkle inside the polishing basket. After coloring is absolute, these are dried for one week; Later on these rhizomes are reserved in sacks and closed for exporting.

Figure No. 3.25 Turmeric coloring

3.6 VALUE addition of Chilli[136]

Figure No. 3.26 Value addition of chilli



De-stemming

Some buyers/exporters prefer stem-less chilli for both domestic and international market. Hence de-stemming is carried out some times at farmers or trader's level. De-stemming involves removing the calyx and stalk portion of the chilli. De-stemming is highly labour intensive. Usually, women are engaged to de-stem the chilli. De-stemming charges are about Rs 3-4 /kg and people are also required to measure the quantity de-stemmed for paying, accounting etc. Presently mechanical de-stemming machines are available which are importing from China.

[136] http://agritech.tnau.ac.in/postharvest/pht_spices_valueaddtn.html

Figure No. 3.27 Manual De-stemming of chilly

Figure No.3.28 Mechanical de-stemming of chilly

Crushed chilli:

Chillies are crushed to produce pericarp and seed. Also, crushed chilli is in demand for subsequent oleoresin extraction as seed less and crushed chilli pericarp is used for oleoresin extraction and other value-added products such as chilli concentrates.

Figure No. 3.29 crushed chilli

De-seeding:

Deseeding is performed using chilli seed extractors or mechanical crushers. The product is separated by sieving to remove seeds and pericarp. Sometimes the chilli seeds are separated from pericarp by air categorization. Pericarp is further processed to produce i) oleoresin ii) high quality chilli powder and other value-added products such as chilli paste.

Chilli seed:

Processing of crushed chilli gives chilli seed as by-product which has an oil content of about 20%. Seeds are used for oil extraction in expellers or by solvent extraction and a by-product chilli seed cake is obtained. The solvent extracted residue (seed cake) has a protein content of 27-29% and can be used as a fertilizer or as animal feed. The chilli seed oil can be used as edible oil for pickles, cooking and industrial purpose. Sometimes chilli seed is blended in powder manufacture for increasing quantity and reducing pungency.

Grinding and sieving:

Grinding is the value addition to the chilli. In Guntur no. of grinding units are functioning depends on the demand for the products. The processing machines and premises should be very clean and neat. The latest machines like stainless steel used equipment should be used for processing. Grinding process will generate the employment to the peoples and more income to the processors also.

Figure no.3.30 Chilly grinding unit

Extraction of Oleoresin:

Most of the commercial Indian chilli varieties yield oleoresin of medium pungency and higher colour. But high pungency oleoresins are in demand in the foreign market for use in pharmaceutical industry. However, technology is now available commercially to extract oleoresin with one million SHU (Scoville Heat Units, units for pungency) and with minimal capsanthin (colour) and also for the production of high colour division with minimal capsaicin content (Reddy, 200I).

Figure No.3.31 Extraction of oleoresin

Chilli paste:

This is one kind of value of addition of fresh, dried or rosted red Chilli. By making this value addition traders will get good demand for their product and better price also. The paste may simply be seasoned with salt, or flavoured with garlic, onion, ginger or spices. It is used sparingly in Chinese, Indian and Mexican dishes.

Packaging:

Packaging of chilli powder is carried out depending on the market requirement. Packaging in individual polyethylene bags of size 250 g to 2 kg for supplying to retail market and in 30-50 kg bulk packing for export to other countries is generally followed. Manual sealing of polyethylene bags or mechanical heat-sealing machines are used.

Figure No.3.32 packing chilli

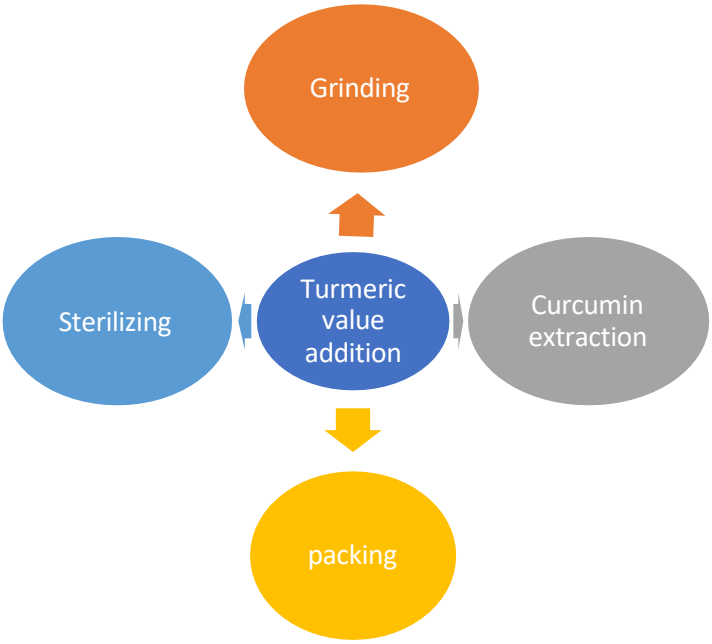
Sterilization:

A diversity of microbial reduction methods are regularly employed within the industry for decrease of pathogens. These techniques include: fumigants (ethylene oxide and propylene oxide), steam and irradiation. Each technique has reward and limits in effectiveness, quality impact and consumer receipt.

Figure No.3.33 Sterilization chilli powder

3.7 Value addition of Turmeric[137]

Figure No.3.34 Sterilization chilli powder



3.7.1 Grinding/Powdering:

Conventionally dried and polished turmeric are cut into pieces and beaten in mortar and pestle, after this is milled or ground with hand operated chakki. Hammer mill is also used for grinding, Powder should be so fine that it passes through 300-micron sieve and nothing is left over the sieve.

Figure No.3.35 Turmeric grinding unit

[137] http://agritech.tnau.ac.in/postharvest/pht_spices_valueaddtn.html

3.7.2 Curcumin extraction:

Turmeric is a spice widely used all the way through Asia and a main ingredient in curries. Due to its yellow color, it's from time to time referred to as Indian saffron. Turmeric contains numerous plant substances, but one group, curcuminoids, has the maximum health-promoting effects. Three notable curcuminoids are curcumin, dimethoxy curcumin and bisdemethoxycurcumin. Of these, curcumin is the most dynamic and most advantageous to health.

Figure No.3.36 Curcumin extraction unit.

3.7.3 Packaging:

Cured dried turmeric with moisture content of 15-30% is transported in gunny bags to assembling centers where it is further dried, polished and colored, if necessary. Dried turmeric is graded according to Agmark provision before bagging in physically powerful gunny bags generally in 65-75 kg lots. The bags are then transported to warehouses and port centers. Fumigation and prophylactic management are routinely given during warehousing and before ex· port. The color of turmeric has been found to be stable as long as it is not uncovered to sunlight.

Figure No.3.37 Turmeric packing machine

3.7.4 Major Spices Market Centers in India and Andhra Pradesh

Table 3.1 Major Spices Market Centers in India and Andhra Pradesh

Spices	Markets
Black Pepper	Cochin, Alleppey, Calicut, Nedumangad, Konni, Adoor, Pala, Alwaye, Thodupuzha, Chalakudy, Kasaragod-(Kerala); Bombay-(Maharashtra)
Cardamom	Cochin, Thodupuzha-(Kerala); Saklashpur, Mercara, Medikeri, Mangalore-(Karnataka); Bombay-(Maharashtra); Bodinayakkanur, Thevaram, Virudhunagar Cumbum, Pattiveerampatti-(Tamil Nadu)
Chillies	Virudhnagar, Tuticorin, Sankarankoil, Kovilpatti,Theni, Ariyalur, Ramnad-(Tamil Nadu); Guntur-(Andhra Pradesh)
Ginger	Cochin, Alleppey, Punalur, Adoor, Pala, Alwaye, Moovattupuzha, Thodupuzha, Calicut, Tellicherry-(Kerala)
Turmeric	Nizamabad, Guntur-(Andhra Pradesh); Sangi-(Maharashtra) Alleppey-(Kerala); Erode-(Tamil Nadu); Cudappah
Celery seed	Amritsar-(Punjab), Nadiad-(Gujarat); Saharanpur-(Uttar Predesh)
Coriander seed	Ramganj (Mandi) Baran,Kotta-(Rajasthan) ; Guntur, Varavakonda, Nandyal-(Andhra Pradesh); Thiruchirappilly, Virudhunagar-(Thamil Nadu)
Cumin seed	Unjha, Palan, Mohsana, Visnagar-(Gujarat); Jaipur, Kisangarh Kokri-(Rajasthan)

Fennel seed	Davangore-(Karnataka); Varanasi, Jaunpur-(Uttar Pradesh) Unjha, Visnagar, Nadiad, Vijapur-(Gujarat); Patna-(Bihar);
Fenugreek seed	Jodhpur-(Rjasthan); Varanasi, Hathras, Gorakhpur-(Uttar Predesh) Unjha, Idar, Visnagar-(Gujarat) Jaora,Indore, Khjner (Madhya Predesh)
Garlic	Hassan, Hubli, Gulbarga-(Karnataka); Nizamabad, Molerkotla-(Punjab), Varanasi,Jampur, , Hapur-(Uttar Pradesh) Jodhpur, Jaipur, Ramganj-Mandi, Bhawani- Mandi, Baran -(Rajasthan), Hyderabad-(Andhra Pradesh); Poona, Nasik-(Maharashtra); Bundi, Ramganj-Mandi Bhawani-Mandi (Rajasthan); Patna-(Bihar); Surat, Jamnagar, Ahmedabad Visnagar-(Gujarath); Nimach, Pipaliya, Mandhasaud-(Madhya Pradesh. Varanasi, Jaunpur-(Uttar pradesh)
Curry powder	Madras-(Tamil Nadu); Bombay-(Maharashtra);Cochin-(Kerala); Calcutta-(West Bengal); Banglore-(Karnataka)
Oils and Oleoresins	Madurai-(Tamil Nadu); Banglore-(Karnataka)

Source: Research Reporter compiles and designed the table Spices Board reports.

3.7.5 Assembling marketing for Chilies

Table No. 3.2 Assembling marketing for Chilies

States	Assembling Market
Andhra Pradesh	Guntur, Vijayawada, Cuddapah, Kurnool.
Telangana	Nizamabad, warangal
Maharashtra	Sangli, Nanded.Jalgoan, Nagpur, Satara, Dhulia,
Tamil Nadu	Tuticorin, Virudunagar, Erode,Salem, Coimbatore, Dindigal. Virudhunagar
Orissa	Berhampur, Cuttack, Churda Road,
Karnataka	Bangalpre, Mysore, Byadgi, Shimoga.

Source: Dept. of Agriculture marketing, Govt. of AP

3.7.6 Assembling markets for Turmeric

Table 3.3 A

State	Block
Andhra Pradesh	Jammalamdugu, Proddatur, Muddanaru, Kamalapuram, Lakkireddipalle, Rajampet, Rayachoti, Koduru.
	Piduguralla, Prattipadu, Ponnuru, Pallapatla, Repalle, Manglagiri, Puru, Vinukonda, Durgi.
Telangana	Boath, Mudhol, Nirmal, Utnur, Sirpur, Chinnur, Lakshettipet,
	Dubak,Mirdoddi,Siddipet,Sadaseopet,Zanirabad,Sangareddi,Narsapur,
	Madnur,Bodhan,Banola,Banswada,Kamareddi,Yellareddi,
Gujarat	Kapadwanj, Balasinor, Tharsa, Madhudha, Mehmedabad, Matar. Anand Sojitra,Umrath,Khambhat,Borsad,Sarsa,Tarapur,Undel,Vadtl Gujarat Sabarkantha Khedbrahma, Vijaynagar, Vadali, Idar, Bhiloda, Himatnagar, Prantij
Kerala	Thavinhal,Valatl,Hatika,Puthady,Kalpetta,Chegual,Thariode, Vallarimela,Koltappadi,Vayittri. Palakkad Tudikki,Mukkali,Korgad,Pallavur,Chittadi,Mudarachal, Parambikolam, Elattodu, Kollangod, Naitala, Chittur Idukki Painavu,Nadunkandam,Devikulam,Todupulai,Piramad. Kollam Tekku,Todi,Karupra,Veliyam,Kanur,Anchal,Pallinam, li i k Kerala Kozhikode Chekkiad,Valayam,Mariyur,Kottur,Pudipaddi,Vavad, Kuruvattur, Mavur, Olavanna.
Tamilnadu	Paramatti,Muntipalavau,Thantoni,Mayanur,Panjapatti, Kadavur, Kulittatai, Kadavur, Kulittatai, Krishnarayapuram Villupuram Avalurpettai,Gingee,Sankarapuram,Kallakkurichchi, Ulundurpettai, Tirukkovilur, Vlundurpetti, Vanum,Vallam Coimbatore Muttuppalaiyam,Avinashi,Tiruppur,Palladam,Udumallaippettai,Pollac hi l i Salem Mettur, Yercaud, Idappadi, Omalpur, Attur, Gangavalli, Sankagiri
Orissa	Dharamgarh, Bhawanipatna, Lanjigarh, Jayapatna Koraput Kotapad,Boriguma,Jaypur,Machhakund,Nandapur,Singpuru,Bagra, Rayisingi,Jalaput,Gupteshwar. Orissa Mayurbhanj Hemagiri, Banel,

Source: agriexchange.apeda.gov.in

3.8 PROBLEMS OF CHILLY AND TURMERIC GROWERS AND TRADERS[138]

Agriculture as a back bone for Indian economy also consider as a "way of life" among Indian masses because more than 50% of the Indian People's livelihood directly depend on it. However, from previous few years, it is on verge of declining in its growth and even showed negative growth rate in some years because of some realistic challenges faced by the farmers.

We stock grains and use food throughout the year. However, we hardly give a thought to the hard-work and dedication of farmers involved in the production of the crops. These food crops are cultivated to contribute to the overall growth in the sector of agriculture. Nevertheless, the problems faced by farmers go unnoticed in the entire process of extracting food and harvesting crops.

3.8.1 Major problems in production[139]

Fragmented land holdings - Indian landholdings are so small that makes little marketable surplus. This makes them to go for subsistence agriculture and also difficult for mechanization.

Absence of Grading: As a general rule, there is hardly any grading of the commodities to be marketed. Therefore, the purchaser has little, if any, confidence in the quality of the product(s). Of course, the British Government passed the Ag-ricultural Produce (Grading and Marketing) Act in 1937 to solve this problem. But nothing really has happened. As per the Act, licenses are issued on a selective basis to reliable merchants, under the supervision and control of the Government staff. The graded commodities are subsequently passed on to the market under the label of "AGMARK".

Inadequate Storage and Warehousing Facilities: The average Indian fanner does not have adequate storage facilities. Moreover, there are no satisfactory warehousing facilities in the market. For these two reasons the farmer has to sell his produce immediately after the harvest. He cannot wait to obtain better prices in the future. More-over, due to lack of storage facilities, farmers are unable to obtain loans from co-operative market-ing societies or even commercial banks against the security of the stored output.

Lack of Adequate Transport Facilities: India's railroad network is grossly inadequate com-pared to its needs. There are hardly 2.8 km of rail tract per 100 square km area in India. The condi-tion in rural areas is even worse. The road condi-tions in rural areas are really very

[139] https://www.researchgate.net/Kalsariya B N Junagadh Agricultural University | JAU · Department of Agricultural Extension.

bad. Even the rich cultivators, having surplus to dispose off, are often not interested in going to the mandis. Most rural roads are not good and cannot be used during the monsoon season.

Lack of Information: The market for ag-ricultural products in India is not perfectly competitive in the sense that the farmers do not usually get adequate information about the price that prevail in big and organized markets. Due to lack of communication facilities, the information about market prices rarely reaches the farmers.

Since most farmers are illiterate and ignorant, they take at face value whatever price rules in all parts of the mar-ket. Instead, lack of market information causes variations in market prices. Daily prices of some essential commodities are no doubt made public by the A.I.R. and T.V., but the number of radio sets and T.V. in rural areas is very small.

A Long Chain of Intermediaries: The number of middlemen and intermediaries between the farmer and the final consumer of most agricul-tural commodities is very large. Therefore, the to-tal margin going to the traders is quite a large part of the market price. Some of them, such as the dalals or commission agents, hardly perform any economic function. So, the farmer hardly gets anything compared to the effort put and expenses incurred.

Unethical Practices: Many fraudulent practices are observed in rural markets. The entire method of transaction is against the interest of the farmer. In the mandis, the farmer has to approach a broker (a dalal) to be able to dispose of his pro-duce to the arhitiya (Commission agent). These two intermediaries often use code words to settle the price under cover and not in open. Although they act for both the buyer and the seller, they serve the interest of the buyer than that of the seller by forming collusion with the arhitiya.

Moreover, false weights and measures are used and unnecessary deduction is made from the quoted price on the pretention that his produce is of inferior quality. Thus, the farmer is exploited in various ways and, the whole method of transaction is against the interest of the farmer. In short, most transactions are unfair and unethi-cal.

Multiplicity of Charges: A related point may be noted in this context. There is multiplicity of charges on the seller. Some of these are le-gitimate such as commission, carriage and weightiest, while others are not (such as charges for the arhitiya buyers' servants and apprentices, charity, religious festival and so on). In each case the seller has to pay more than the buyer.

Peasants are also to pay various indirect taxes such as octroi (a tax on the inter-State movement of goods), terminal taxes and municipal tolls. In theory, these are normally paid by the consumers because the demand for agricultural commodities is elastic. But in practice these are paid by the seller—the poor and helpless cultivator.

Lack of Proper Marketing Facilities: In very-recent times, the quantum of marketed sur-plus has increased significantly in certain areas due |td] the spread Of Green Revolution. But this has not been supported by a. corresponding in-crease in market yards and other ancillary facili-ties. Consequently, the farmer has been the lone sufferer.

Debt Obligation and Distress Sales: Finally, the average farmer is almost always in debt. So, he cannot wait after the harvest so as to obtain better prices in future. He has to make distress sales to the moneylender or the trader immediately after the harvest, for clearing his debt. This weakens the position of the farmer. His condition deteriorates further when, at a later date, he has to make dis-tress purchase from the open market by obtaining consumption loan.

So, the main point is that the farmer has to sell his produce at the wrong time, at a wrong place and at an unfavorable price. As a result, his revenue of farmers falls.

Looting Middle men - Most of the farmers are left with small volume of produce. Taking them to Government mandi will be a burden as transportation costs, storage costs add up. So, they sell it to middle men at distress price. The middlemen will make it to Mandi and get lucrative prices that are often not shared with farmers.

Gamble of Monsoon - Indian Monsoon is always a gamble of Monsoon. If it's doesn't rain farmers will be worst hit of drought and famine. You might think he will be happy if it rains adequately. But the answer is NO. Because in one extreme his crop would be flooded or he would not get good price due to high supply in Market. This happens in 2017, where prices of Onion, Pulses went down due to good production after two years of below normal Monsoon. So, whether rains or not rains. Farmers suffer.

Victim of its past success - Past success of Green revolution has put Agriculture sector into ‘chakrayug' of Hybrid seeds - Urea dumping farming. Farmers and Research institutions are still struggling to get out of that unsustainable - high input cost farming. What are the biggest problems facing humanity in the 21st century?

Ignoring Women farmers - No policy measures have been evolved to protect or help women farmers who predominantly suffer in Agriculture. Agriculture will not develop if the schemes, policies, inventions and benefits don’t reach the other half of agrarians who happens to be women farmer. Read: Women Farmers - The Hidden face of Agriculture - IMoT Forum

Cycle of Indebtedness - Economists make hue and cry when farmers demand Farm loan waiver. But they need to think about farm credit and credit accessibility to farmers. Nearly 40 % of farmers are getting their farm loans through formal sources. Rest all dependent on Moneylenders and land owners. The crop insurance policy has long been less favorable to

farmers. We have to wait to see the result of "Pradhana Mantri fasal bhima yojna". The huge risk and uncertainty involved in agriculture make it hard farmers to get out of poverty.

New threats of Global are warming - Climate change may have led to over 59,000 farmer's suicide over the last 30 years in India as per reports from University of California, Berkeley, US. Here is the article Climate change and Agrarian distress in India that goes in length and breadth about the issue.

Government policies - Government policies like MSP favoring certain crops, Poor allocation for Agricultural R & D - less than 1% of GDP very low compared to other emerging economies. Weak dissemination of knowledge and implementation of modern techniques.

Lack of awareness about international standards: Most of the farmers are not aware about the international standards for chilli and turmeric. They need to provide information about quality aspects, hygienic practices, levels of aflatoxin, sudan and pesticide residues.

Lack of awareness about demand and supply: Spices growers are not aware about the current crop year demand and supply of chilli and turmeric. If the farmers are aware there will not be any marketing problems, prices and storage problems. The Government need to be educated the farmers about the supply and demand of crops.

Rural Entrepreneurship: Today technology has been accessible to everyone. We can do the business by sitting anywhere in the world, whether it is rural or urban. There is lot of importance to develop the rural entrepreneurship. Because of these practices farmers will do the value addition to the product and they will get the more price, bargaining power and marketability to their spices.

Lack of Research and Development: Today not much concentration on Research and Development part. This is very much essential for creation of awareness about the new product creation, marketing, trading and better and remunerative prices to the spices. Continuous efforts need to be put on Research and Development.

Lack of special economic zones: Today India needs specialized economic zones for spices. So that surrounding farmers will get to market their product, fetch better prices, quality development, employment generation, infrastructure development, institutional development and so many incentives will provide to the special economic zones.

Lack of awareness about e-NAM: Most of the growers are not willing to sell their produce through the e-Nam system. Because of their misconception about the system. Actually, this is the good system and farmers will get the amount immediately after sale.

3.8.2 PROBLEMS OF TRADERS IN TRADING[140]

Distance: Due to long distance between different countries, it is difficult to establish quick and close trade contacts between traders. Buyers and sellers rarely meet one another and personal contact is rarely possible. There is a great time lag between placement of order and receipt of goods from foreign countries. Distance creates higher costs of transportation and greater risks.

Different languages: Different languages are spoken and written in different countries. Price lists and catalogues are prepared in foreign languages. Advertisements and correspondence also are to be done in foreign languages. A trader wishing to buy or sell goods abroad must know the foreign language or employ somebody who knows that language.

Difficulty in transportation and communication: Dispatch and receipt of goods takes a longer time and involves considerable expenses. During the war and natural calamities, transpor-tation of goods becomes even more difficult. Similarly, the costs of sending or receiving informa-tion are very high.

Risk in transit: Foreign trade involves much greater risk than home trade. Goods have to be transported over long distances and they are exposed to perils of the sea. Many of these risks can be covered through marine insurance but increases the cost of goods.

Lack of information about foreign businessmen: In the absence of direct and close relationship between buyers and sellers, special steps are necessary to verify the creditworthiness of foreign buyers. It is difficult to obtain reliable information concerning the financial position and business standing of the foreign traders. Therefore, credit risk is high.

Import and export restrictions: Every country charges customs duties on imports to protect its home industries. Similarly, tariff rates are put on exports of raw materials. Importers and exporters have to face tariff restrictions. They are required to fulfill several customs formalities

[140] https://www.researchgate.net/Kalsariya B N Junagadh Agricultural University | JAU · Department of Agricultural Extension.

and rules. Foreign trade policy, procedures, rules and regulations differ from country to country and keep on changing from time to time.

Documentation: Both exporters and importers have to prepare several documents which involve expenditure of time and money.

Study of foreign markets: Every foreign market has its own characteristics. It has require-ments, customs, weights and measures, marketing methods, etc., of its own. An extensive study of foreign markets is essential for success in foreign trade. It is very difficult to collect accurate and up to date information about foreign markets

.

Problems in payments: Every country has its own currency and the rate at which one currency can be exchanged for another (called exchange rate) keeps on fluctuating change in exchange rate create additional risk. Remittance of money for payments in foreign trade involves much time and expense. Due to wide time gap between dispatch of goods and receipt of payment, there is greater risk of bad debts.

Frequent market changes: It is difficult to anticipate changes in demand and supply conditions abroad. Prices in international markets may change frequently. Such changes are due to entry of new competitors, changes in buyers' preferences, changes in import duties and freight rates, fluctuations in exchange rates, etc.

Investment for longer period: There is longer time gap between supply of goods and receipt of payment. Therefore, the exporter's capital remains locked up over a longer period.

Intense competition: Traders who want to sell goods abroad have to face severe competition from different countries. Considerable market research is necessary to ensure suitability of product in foreign markets. Heavy expenditure on advertising and sales promotion may be necessary.

Different Trade Patterns: International business has to deal with the business patterns among the various countries of the world. It has to take into account these business policies of various countries which govern their imports and exports. These policies and practices impose certain constraints and restrictions on international business.

Regulatory Measures: Every country wants to export its surplus natural resources, agricultural produce and manufactured goods to the extent, it can and import only these goods and products which are not produced or manufactured within the country. For this purpose regulatory measures like tariff barriers (custom duties) non-tariff barriers, quota restrictions, foreign exchange restrictions, technological and administrative regulations, consulter formalities, state trading and preferential arrangements, trade agreements and joint commissions etc. Come in the way of free trade and unfettered flow of foreign business.

Lopsided Development of Developing Countries: Developed counters are equipped with sophisticated, technologies capable of transforming raw materials into finished goods on a large scale. While developing countries on the other-hand lack technological knowledge and latest equipment. It leads to the lop sided development in the international business.

Economic Unions: There is an increasing tendency among nations to form small groups of Economic Unions which help them to negotiate terms for the business with other countries.

National Policy of Development: sophisticated technology and restricting imports of less important consumer goods with a view to lowering down its import bill.

Procedural Difficulties: Different countries have evolved different procedures, practices and documents in order to regulate the export trade. Some of these such as foreign exchange control regulations and others have been formulated after keeping in view the national objectives and have posed certain procedural problems to exporters and importers.

3.8.3 MAJOR PROBLEMS FACED BY INTERNATIONAL TRADE[141]

International marketing is not as easy as domestic marketing. International marketing environment poses a number of uncertainties and problems. As against, national markets, international markets are more dynamics, uncertain, and challenging. Especially, cultural diversities and political realities in several nations create a plenty of barriers that need special attention. In the same way, geographical constraints cannot be totally undermined. Widespread terrorism has created a new threat to international trade. Though the world is advancing in

[141] http://www.preservearticles.com/education/what-are-the-problems-or-difficulties-in-international-trade/21485

terms of information technology, innovative and superior methods of organizing marketing efforts (like horizontal organization, network organization, virtual organization), global efforts for smooth international trades, and so forth, yet international marketing is not that much easy to pursue, it has become a challenge to accept.

Tariff Barriers: Tariff barriers indicate taxes and duties imposed on imports. Marketers of guest countries find it difficult to earn adequate profits while selling products in the host countries. Sometimes, to prevent foreign products and/or promote domestic products, strategically tariff policies are formulated that restricts international marketing activities. Frequent change in tariff rates and variable tariff rates for various categories of products create uncertainty for traders to trade internationally. Antidumping duties levied on imports and defensive strategies create difficulty for exporters.

Administrative Policies: Bureaucratic rules or administrative procedures – both in guest countries and host countries – make international (export and/or import) marketing harder. Some countries have too lengthy formalities that exporters and importers have to clear. Unjust dealings to get the formalities/ matters cleared create many problems to some international players. International marketers have to accustom with legal formalities of several courtiers where they wants to operate.

Considerable Diversities: Different countries have their own unique civilization and culture. They pose special problems for international marketers. Global customers exhibit considerable cultural and social diversities in term of needs, preferences, habits, languages, expectations, buying capacities, buying and consumption patterns, and so forth. Social and personal characteristics of customers of different nationalities are real challenges to understand and incorporate. Compared to local and domestic markets, it is more difficult to understand behaviors of customers of other countries. In the same way, as against domestic markets, to design and modify marketing mix over time for international markets seem more difficult. Market segmentation, product design, pricing, and distribution need more information and efforts. Promoting products in international markets is a formidable task. Message preparation and execution in suitable media in international markets is not easy game to play. Language and religious diversities are the real challenge for international business players. There are 6000 languages in the world. China (20%) is the largest in term of native speakers, followed by English (6%), and followed by Hindi (5%). Yet English is recognized as global business

language. English speaking countries can contribute the largest share (40%) in global business. Religious diversities seem difficult to cope with as they determine needs and wants of people. At present Christianity is the largest in the world (1.7 billion), followed by Islam (1.0 billion), followed by Hinduism (750 million), and followed by Buddhism (350millions)

Political Instability or Environment: Different political systems (democracy or dictatorship), different economics systems (market economy, command economy, and mixed economy), and political instability are some of real challenges that international markers have to face. Political atmosphere in different courtiers offer opportunities or pose challenges to international marketers. Governments in different nations have their priorities, philosophies, and approaches to the international trades. They may adopt restrictive (protectionist) or liberal approach to international business operations. Especially, political approaches of dominant nations have more influence in international marketing activities. Long-term trend of global political environment is unpredictable and uncertain. Economic policies of different nations (industrial policies, fiscal policies, agricultural policies, export-import policies, etc.,) do have direct impact on international trade. Drastic change in these policies creates endless difficulties to international traders. While dealing with international markets, international political and legal environment needs a special attention.

Place Constraints (Diverse Geography): Trade in foreign countries of far distance itself practically difficult. In case of perishable products, it is a real challenge. Exporting and importing products via sea route and making arrangements for effective selling involves more time as well risks. Segmenting and selecting international markets require the marketers to be more careful.

Variations in Exchange Rates: Every nation has its currency that is to be exchanged with currencies of other nations. Currencies are traded every day and rates are subject to change. Indian Rupee, European Dollar, US Dollar, Japanese Yen, etc., are appreciated or discounted at national and international markets against other currencies. In case of extraordinary and unexpected moves (ups and downs) in currency/exchange rates between two courtiers create serious settlement problems.

Norms and Ethics Challenges: Ethics refers to moral principles, standards, and norms of conduct governing individual and firm's behavior. They are deeply reflected in formal laws

and regulations. Indifferent parts of the world, different codes of conduct are specified that every international business player has to observe. However, globalization process has emphasized some common ethics worldwide. Corruption is another issue relating to business ethics.

Terrorism and Racism: Terrorism is a global issue, a worldwide problem. People of the world are living under constant fear of terrorists attracts anywhere in the world. To trade internationally is not economically risky, but there is the threat to life. Racism also restricts international trade activities.

3.9 Perceptions of farmers, traders, exporters, commission agents and cold storage on problems of spices trade in andhra pradesh.

India is the leading producer, consumer and exporter of different spices. Out of all spices Andhra Pradesh plays a significant role in production, consumption and export of major spices like chilli and turmeric. A study has been taken to know and understand the problems and to offer better solution to problems of spices farmers, traders, exporters, commission agents and cold storage owner in Andhra Pradesh.

3.9.1 Agreement with different arguments between Chilly farmers.

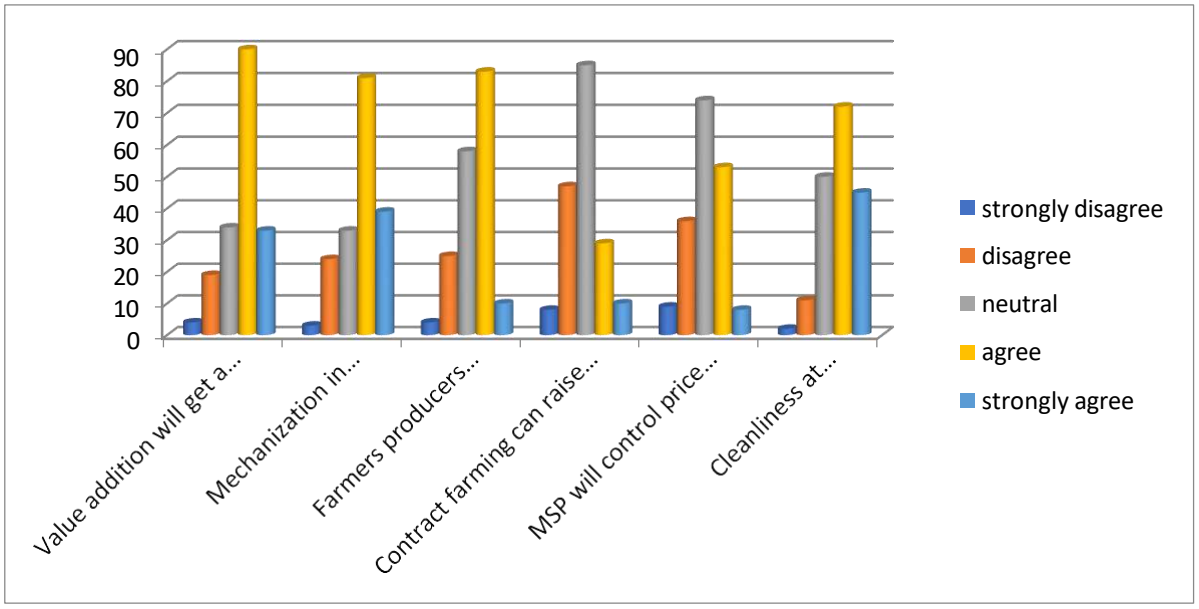
Table 3.4 Level of agreement with different arguments between Chilly farmers

	strongly disagree	disagree	neutral	agree	strongly agree	total
Value addition will get a better price and shelf life	4 2.22%	19 10.56%	34 18.89%	90 50%	33 18.33%	180 100%
weighted total	4	38	102	360	165	669
Mechanization in harvesting/boiling/cooking/drying and packaging will fletch better price	3 1.67%	24 13.33%	33 18.33%	81 45%	39 21.67%	180 100%
weighted total	3	48	99	324	195	669
Farmers producers organizations (FPO's) can enhance competitiveness and increase advantage in emerging market opportunities	4 2.22%	25 13.89%	58 32.22%	83 46.11%	10 5.56%	180 100%
weighted total	4	50	174	332	50	610

Contract farming can raise assured market and profitability	8 4.44%	47 26.11%	85 47.22%	29 16.11%	10 5.56%	180 100%
weighted total	8	94	255	116	50	523
MSP will control price instability and surety of minimum prices	9 5%	36 20%	74 41.11%	53 29.44%	8 4.44%	180 100%
weighted total	9	72	222	212	40	555
Cleanliness at harvesting/drying/grading/packaging is more important for better market	2 1.11%	11 6.11%	50 27.78%	72 40%	45 25%	180 100%
weighted total	2	22	150	288	225	687

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Graph No.3.1 Level of agreement with different arguments between Chilly farmers



Source: The Research Reporter extracted and designed from Table No.3.4.

From the table it can be observed that among chilli farmers the level of agreement with different statements are tabulated

For 'value addition will get a better price and shelf life' 2.22% strongly disagree, 10.56% disagree, 18.89% are neutral, 50% agree and 18.33% strongly agree.

For 'mechanization in harvesting/boiling/cooking/drying and packaging will fletch better price' 1.67% strongly disagree, 13.33% disagree, 18.33% are neutral, 45% agree and 21.67% strongly agree.

For 'Farmers producers' organizations (FPO's) can enhance competitiveness and increase advantage in emerging market opportunities' 2.22% strongly disagree, 13.89% disagree, 32.22% are neutral, 46.11% agree and 5.56% strongly agree.

For ‘Contract farming can raise assured market and profitability’ 4.44% strongly disagree, 26.11% disagree, 47.22% are neutral, 16.11% agree and 5.56% strongly agree.

For ‘MSP will control price instability and surety of minimum prices’ 5% strongly disagree, 20% disagree, 41.11% are neutral, 29.44% agree and 4.44% strongly agree.

For ‘Cleanliness at harvesting/drying/grading/packaging is more important for better market’ 1.11% strongly disagree, 6.11% disagree, 27.78% are neutral, 40% agree and 25% strongly agree.

Weighted total indicates the level of agreement with the given statements. From the table it is evident that the weighted total for all the observations lie in moderate to high region.

For the statements mentioned below the level of agreement among farmers is high

- Value addition will get a better price and shelf life
- Mechanization in harvesting/boiling/cooking/drying and packaging will fletch better price
- Farmers producers’ organizations (FPO's) can enhance competitiveness and increase advantage in emerging market opportunities
- Cleanliness at harvesting/drying/grading/packaging is more important for better market

For the statements mentioned below the level of agreement among farmers is moderate

- Contract farming can raise assured market and profitability
- MSP will control price instability and surety of minimum prices

3.9.2 Level of agreement with different arguments between turmeric farmers

Table 3.5 Level of agreement with different arguments between turmeric farmers

	strongly disagree	disagree	neutral	agree	strongly agree	total
Value addition will get a better price and shelf life	3 1.67%	5 2.78%	10 5.56%	136 75.56%	26 14.44%	180 100%
weighted total	3	10	30	544	130	717
Mechanization in harvesting/boiling/cooking/drying and packaging will fletch better price	9 5%	24 13.33%	15 8.33%	122 67.78%	10 5.56%	180 100%
weighted total	9	48	45	488	50	640
Farmers producers’ organizations (FPO's) can enhance competitiveness and increase advantage in emerging market opportunities	3 1.67%	40 22.22%	22 12.22%	84 46.67%	31 17.22%	180 100%
weighted total	3	80	66	336	155	640

Contract farming can raise assured market and profitability	8 4.44%	58 32.22%	29 16.11%	77 42.78%	8 4.44%	180 100%
weighted total	8	116	87	308	40	559
MSP will control price instability and surety of minimum prices	26 14.44%	27 15%	8 4.44%	114 63.33%	5 2.78%	180 100%
weighted total	26	54	24	456	25	585
Cleanliness at harvesting/drying/grading/packaging is more important for better market	4 2.22%	55 30.56%	27 15%	87 48.33%	7 3.89%	180 100%
weighted total	4	110	81	348	35	578

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that among turmeric farmers the level of agreement with different statements are tabulated

For 'value addition will get a better price and shelf life' 1.67% strongly disagree, 2.78% disagree, 5.56% are neutral, 75.56% agree and 14.44% strongly agree.

For 'mechanization in harvesting/boiling/cooking/drying and packaging will fletch better price' 5% strongly disagree, 13.33% disagree, 8.33% are neutral, 67.78% agree and 5.56% strongly agree.

For 'Farmers producers' organizations (FPO's) can enhance competitiveness and increase advantage in emerging market opportunities' 1.67% strongly disagree, 22.22% disagree, 12.22% are neutral, 46.67% agree and 17.22% strongly agree.

For 'Contract farming can raise assured market and profitability' 4.44% strongly disagree, 32.22% disagree, 16.11% are neutral, 42.78% agree and 4.44% strongly agree.

For 'MSP will control price instability and surety of minimum prices' 14.44% strongly disagree, 15% disagree, 4.44% are neutral, 63.33% agree and 2.78% strongly agree.

For 'Cleanliness at harvesting/drying/grading/packaging is more important for better market' 2.22% strongly disagree, 30.56% disagree, 15% are neutral, 48.33% agree and 3.89% strongly agree.

Weighted total indicates the level of agreement with the given statements. From the table it is evident that the weighted total for all the observations lie in moderate to high region.

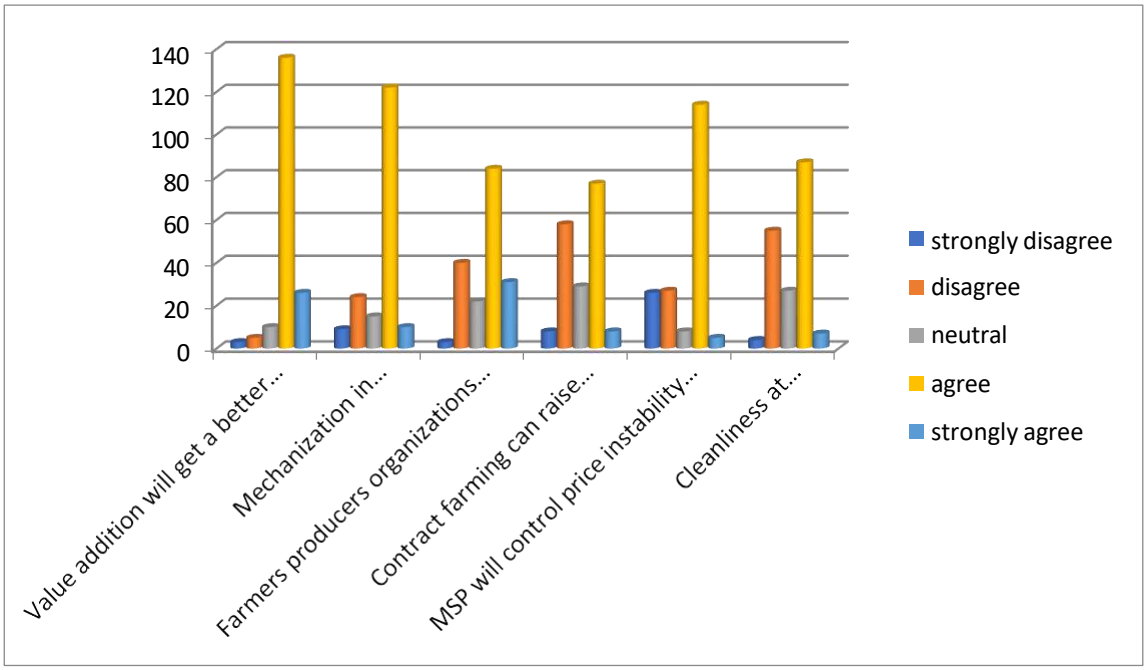
The statements mentioned below the level of agreement among farmers is high

- Value addition will get a better price and shelf life
- Mechanization in harvesting/boiling/cooking/drying and packaging will fletch better price

- Farmers producers' organizations (FPO's) can enhance competitiveness and increase advantage in emerging market opportunities

The statements mentioned below the level of agreement among farmers is high

- Contract farming can raise assured market and profitability
- MSP will control price instability and surety of minimum prices
- Cleanliness at harvesting/drying/grading/packaging is more important for better market



GraphNo.3.2 Level of agreement with different arguments between turmeric farmers

Source: The Research Reporter extracted and designed from Table No.3.5.

3.9.3 Perceptions chilli farmer's reasons for not going for organic cultivation

Table 3.6 Reasons for not going for organic cultivation

	Guntur	Kurnool	**T**
No better price	0 0.00%	9 10.00%	9 5.00%
Less productivity	27 30.00%	27 30.00%	54 30.00%
More disease effect	5 5.60%	17 18.90%	22 12.20%
No market	7 7.80%	3 3.30%	10 5.60%
Lack of knowledge	51	34	85

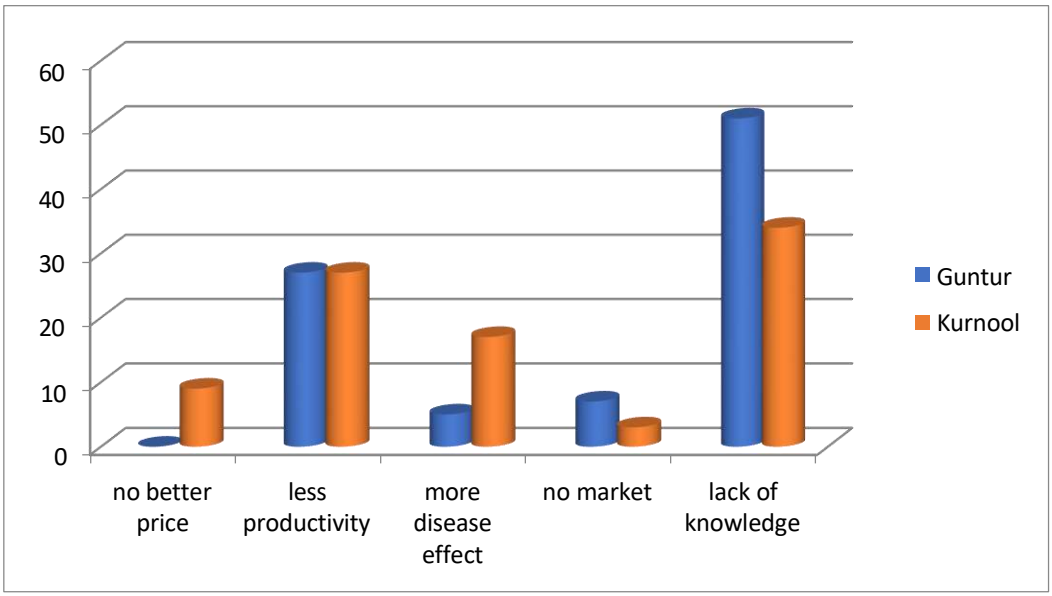
	56.70%	37.80%	47.20%
	90 100.00%	90 100.00%	180 100.00%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 20.54 at 4 degrees of freedom.

From the table it can be observed that among farmers from Guntur district majority of farmers are not going for organic farming because of lack of knowledge which constitute 56.7%, followed by less productivity 30%, no market 7.8% and more disease effect 5.6%. From Kurnool district majority of farmers are not going for organic farming because of lack of knowledge which constitute 37.8%, followed by less productivity 30%, more disease effect 18.9%, no better price 10% and no market 3.3%. The chi square value reveals that there is a significant variation among the opinions of respondents from the two regions.

Graph No.3.3 Reasons for not going for organic cultivation



Source: The Research Reporter extracted and designed from Table No.3.6.

3.9.4 Perceptions turmeric farmer's reasons for not going for organic cultivation

Table 3.7 Reasons for not going for organic cultivation

	Guntur	Kadapa	
No better price	3 3.3%	1 1.1%	4 2.2%
Less productivity	43	16	59

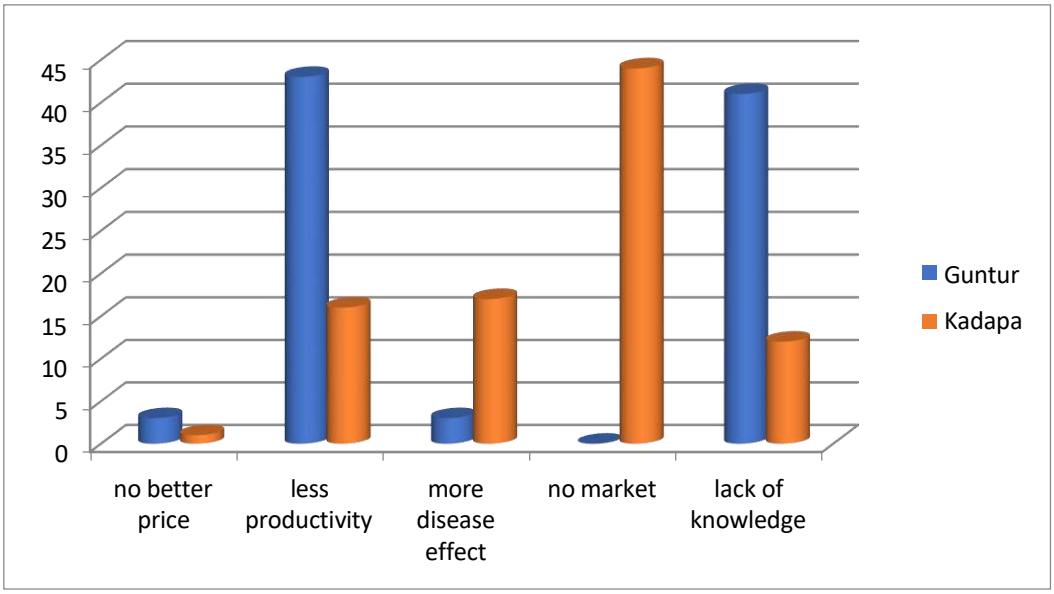
	47.8%	17.8%	32.8%
More disease effect	3 3.3%	17 18.9%	20 11.1%
No market	0 .0%	44 48.9%	44 24.4%
Lack of knowledge	41 45.6%	12 13.3%	53 29.4%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 83.024 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 3.3% no better price, 47.8% less productivity, 3.3% more disease effect and 45.6% lack of knowledge on organic cultivation. Among the farmers from Kadapa 1.1% no better price, 17.8% less productivity, 18.9% more disease effect, 48.9% no market and 13.3% lack of knowledge on organic cultivation.

'Less productivity', 'no market' and 'lack of knowledge' are the major cause and concerns for the farmers for not going for organic farming. Also, chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions



Graph No.3.4 Reasons for not going for organic cultivation

Source: The Research Reporter extracted and designed from Table No.3.7.

3.9.5 Chilli grower's knowledge about insurance coverage at warehouse/cold storage

Table 3.8 Knowledge about insurance coverage at warehouse/cold storage

	Guntur	Kurnool	
Fully don't know	4 4.5%	3 3.3%	7 3.9%
Don't know	8 9.0%	50 55.6%	58 32.4%
Neutral	32 35.6%	24 26.7%	56 31.1%
Know	44 49.4%	13 14.4%	57 31.8%
Fully know	2 2.2%	0 .0%	2 1.1%
	90 100.0%	90 100.0%	180 100.0%

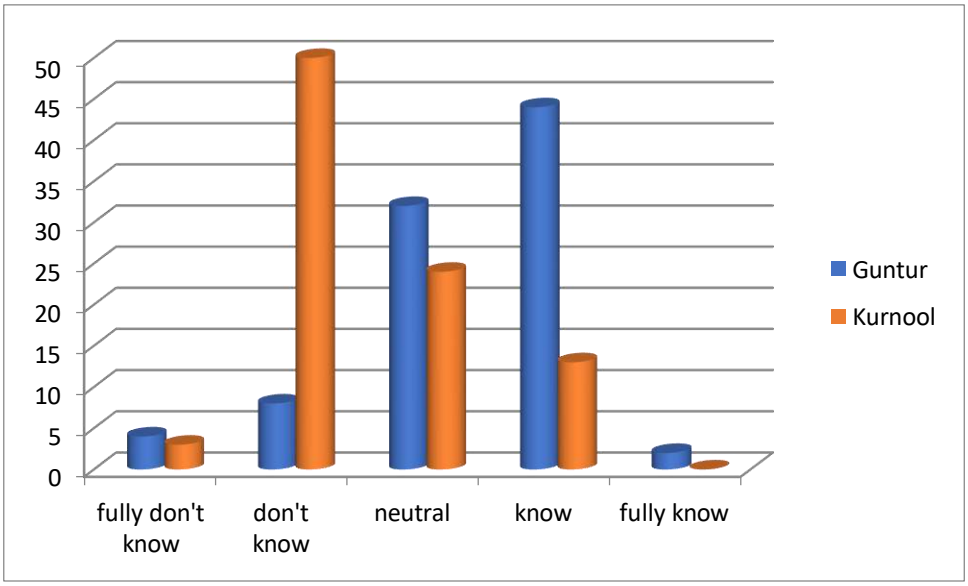
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 50.59 at 4 degrees of freedom

From the table it can be observed that among farmers from Guntur 4.5% fully don't know, 9% don't know, 35.6% are neutral, 49.4% know and 2.2% fully know about the insurance coverage at ware house/cold storages. From Kurnool district 3.3% fully don't know, 55.6% don't know, 26.7% are neutral, 14.4% know about the insurance coverage at ware house/cold storages.

When it comes to knowledge of the insurance coverage it is evident that most of the Kurnool district farmers don't know about it when compared with Guntur district farmers. Also, chi square test also reveals the same i.e. there is a significant variation in the opinion of respondents from two regions.

Graph No.3.5 Knowledge about insurance coverage at warehouse/cold storage



Source: The Research Reporter extracted and designed from Table No.3.8.

3.9.6 Turmeric grower's knowledge about insurance coverage at warehouse/cold storage

Table 3.9 Knowledge about insurance coverage at warehouse/cold storage

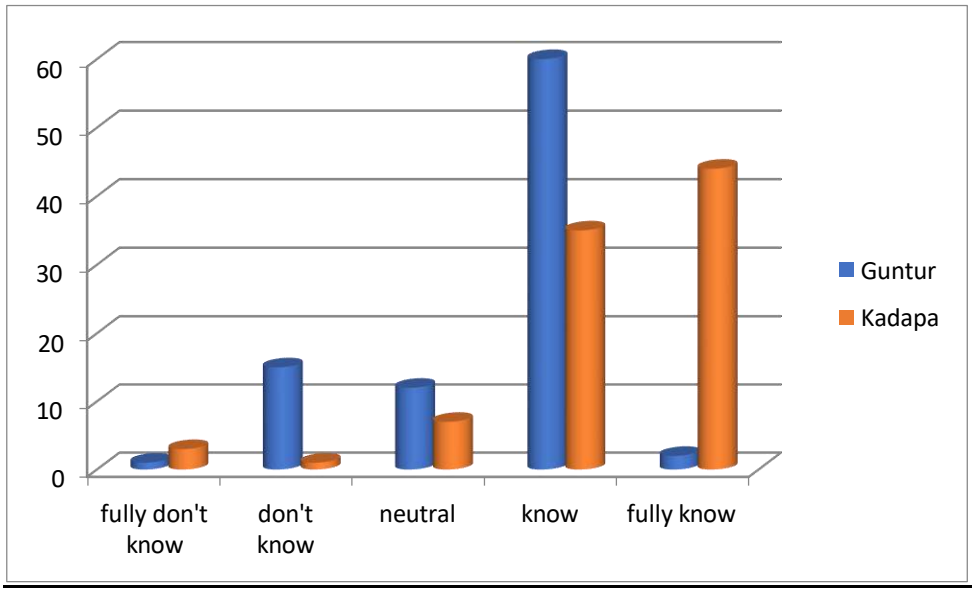
	Guntur	Kadapa	
fully don't know	1 1.1%	3 3.3%	4 2.2%
don't know	15 16.7%	1 1.1%	16 8.9%
neutral	12 13.3%	7 7.8%	19 10.6%
know	60 66.7%	35 38.9%	95 52.8%
fully know	2 2.2%	44 48.9%	46 25.6%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 59.493 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 1.1% fully don't know, 16.7% don't know, 13.3% are neutral, 66.7% know and 2.2% fully know about the insurance coverage at ware house/cold storages. Among the farmers from Kadapa 3.3% fully don't know, 1.1% don't know, 7.8% are neutral, 38.9% know and 48.9% fully know about the insurance coverage at ware house/cold storages.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.



Graph No.3.6 Knowledge about insurance coverage at warehouse/cold storage

Source: The Research Reporter extracted and designed from Table No.3.9.

3.9.7 Major problems faced by chilli farmers while cultivation

Table No.3.10 Major Problems faced while cultivation

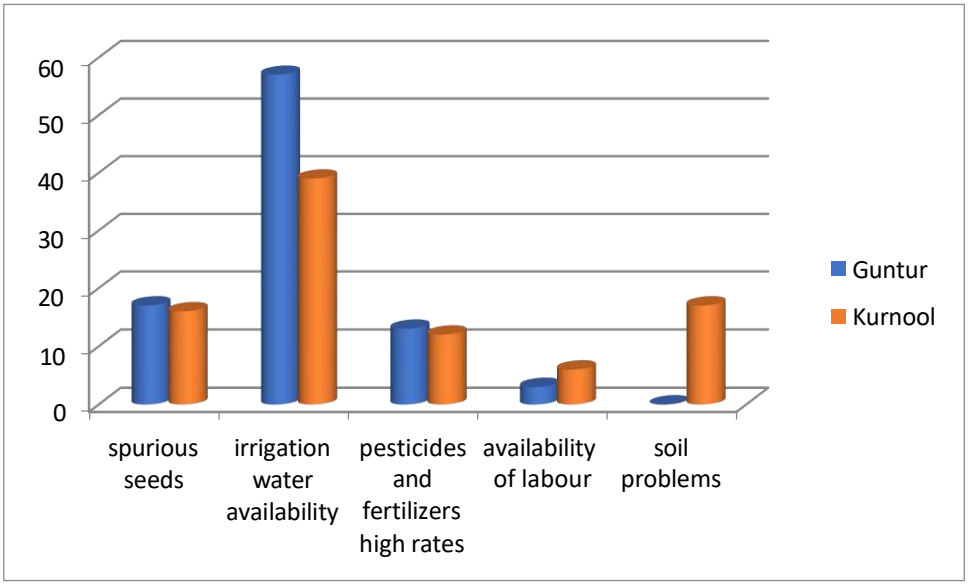
	Guntur	Kurnool	
Spurious seeds	17 18.9%	16 17.8%	33 18.3%
Irrigation water availability	57 63.3%	39 43.3%	96 53.3%
Pesticides and fertilizers high rates	13 14.4%	12 13.3%	25 13.9%
Availability of labour	3 3.3%	6 6.7%	9 5.0%
Soil problems	0 .0%	17 18.9%	17 9.4%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 21.445 at 4 degrees of freedom

From the table it is evident that most of the farmers from both the regions are facing problems because of irrigation water availability. Along with those farmers from Guntur district face problems because of spurious seeds 18.9% and 14.4% from pesticides and fertilizers high rates. The farmers from Kurnool district face problems with spurious seeds 17.8%, pesticides and fertilizers high rates 13.3% and soil problems 18.9% while cultivation.

Most of the farmers from both regions have common problems like irrigation water, spurious seeds and pesticides and fertilizers high rates. But farmers from Kurnool faces soil problems too. The chi square test indicates a variation in the opinion of respondents from both districts



Graph No.3.7 Major Problems faced while cultivation

Source: The Research Reporter extracted and designed from Table No.3.10.

3.9.8 Major problems faced by turmeric farmers while cultivation

Table 3.11 Major problems faced while cultivation

	Guntur	Kadapa	
Spurious seeds	4 4.4%	8 8.9%	12 6.7%
Irrigation water availability	0 .0%	29 32.2%	29 16.1%

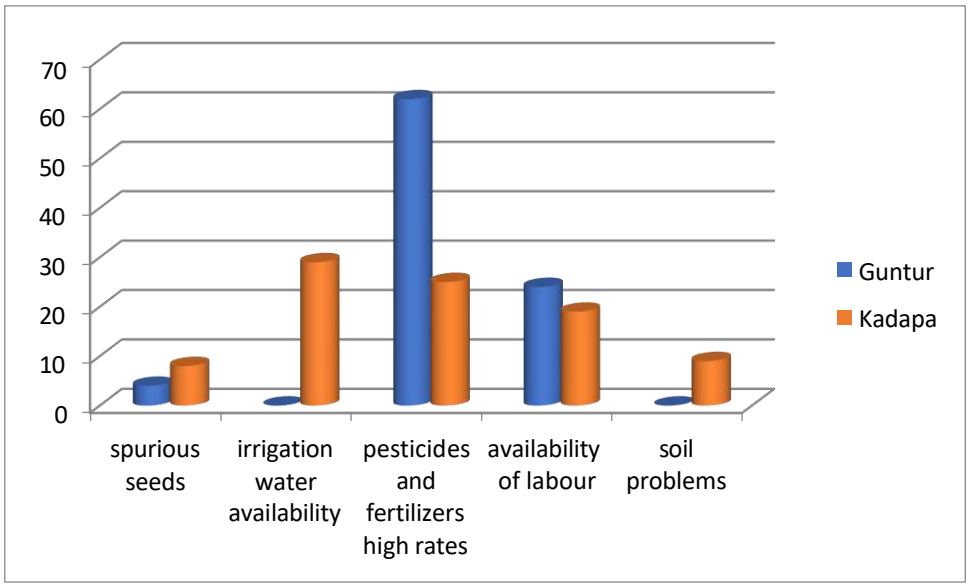
Pesticides and fertilizers high rates	62 68.9%	25 27.8%	87 48.3%
Availability of labour	24 26.7%	19 21.1%	43 23.9%
Soil problems	0 .0%	9 10.0%	9 5.0%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 55.65 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 4.4% are suffering from spurious seeds, 68.9% from pesticides and fertilizers high rates and 26.7% from availability of labour. Among the farmers from Kadapa 8.9% are suffering from spurious seeds, 32.2% from irrigation water availability, 27.8% from pesticides and fertilizers high rates, 21.1% from availability of labour and 10% from soil problems. Most of the farmers are affected by pesticides and fertilizers high rates and availability of labour.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.



Graph No.3.8 Major Problems faced while cultivation

Source: The Research Reporter extracted and designed from Table No.3.11.

3.9.9 Minor constraints faced by chilli growers

Table 3.12 Minor constraints chilly growers

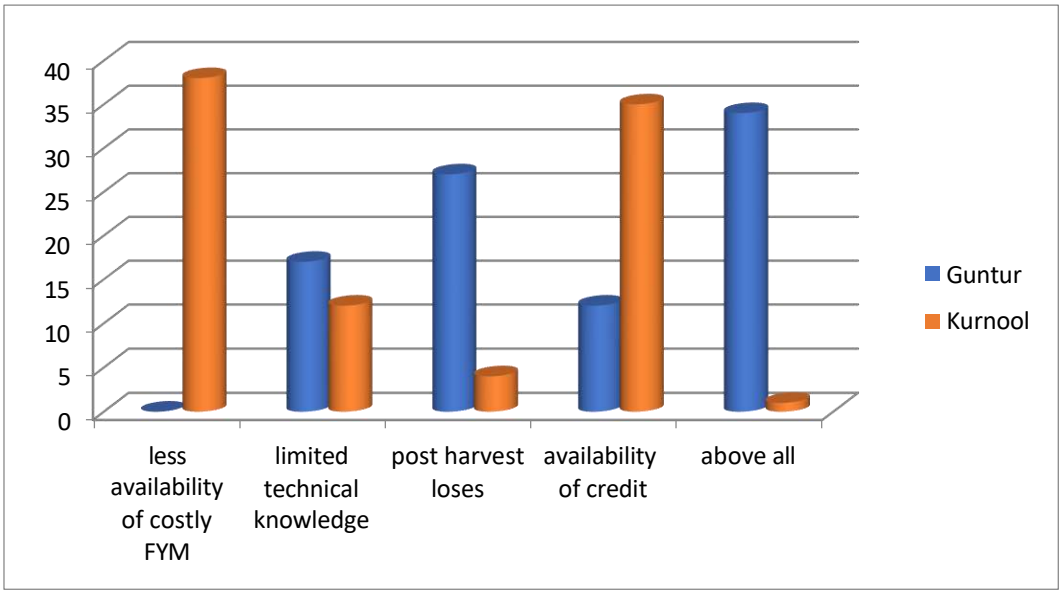
	Guntur	Kurnool	
Less availability of costly FYM	0 .0%	38 42.2%	38 21.1%
Limited technical knowledge	17 18.9%	12 13.3%	29 16.1%
Post harvest loses	27 30.0%	4 4.4%	31 17.2%
Non availability of credit	12 13.3%	35 38.9%	47 26.1%
Above all	34 37.8%	1 1.1%	35 19.4%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 98.296 at 4 degrees of freedom

From the table it can be observed that among Guntur farmers 18.9% have limited technical knowledge, 30% have post harvest loses, 13.3% have non availability of credit and 37.8% have above all problems while cultivation. While Kurnool district farmers have less availability of costly FYM 42.2, limited technical knowledge 13.3%, post-harvest loses 4.4%, non-availability of credit 38.9% and above all 1.1%.

Minor constraints in cultivation differ very much among both the regions. Each region has a different set of problems they are facing. Also, the chi square test reveals that there is a lot of variation in the opinion of the respondents.



Graph No.3.9 Minor constraints chilly growers

Source: The Research Reporter extracted and designed from Table No.3.12.

3.9.10 Minor constraints faced by turmeric growers

Table 3.13 Minor constraints faced by turmeric growers

	Guntur	Kadapa	
Less availability of costly FYM	2 2.2%	5 5.6%	7 3.9%
Limited technical knowledge	33 36.7%	80 88.9%	113 62.8%
Post-harvest loses	3 3.3%	0 .0%	3 1.7%
Availability of credit	39 43.3%	1 1.1%	40 22.2%
Above all	13 14.4%	4 4.4%	17 9.4%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

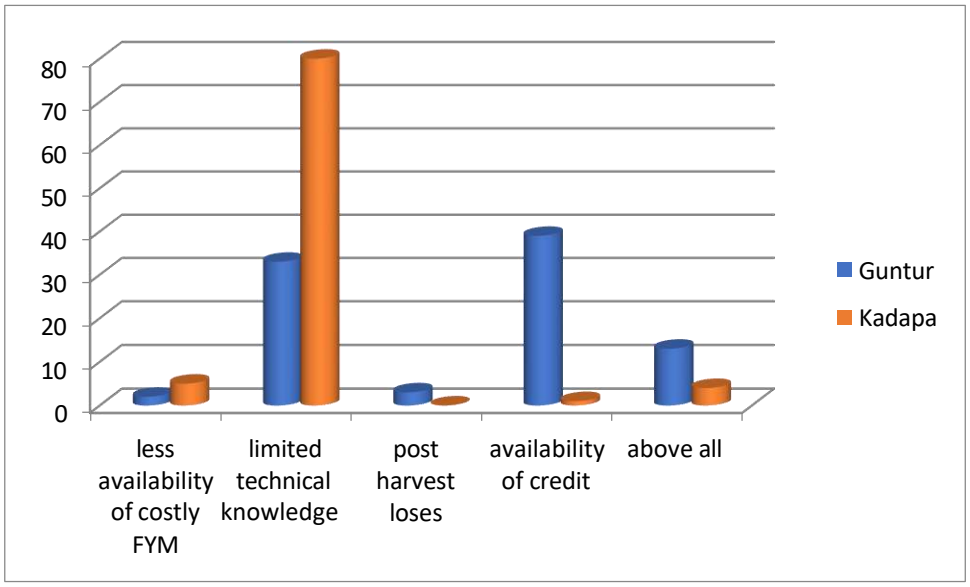
Chi square value = 64.699 at 4 degrees of freedom

From the table it can be observed that among farmers from Guntur 2.2% faced problems with less availability of costly FYM, 36.7% with limited technical knowledge, 3.3% with post harvest loses, 43.3% with availability of credit and 14.4% with above all. among farmers from Kadapa 5.6% faced problems with less availability of costly FYM, 88.9% with limited

technical knowledge, 1.1% with availability of credit and 4.4% with above all. Most of the farmers are facing problems with lack of technical knowledge.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

GraphNo.3.46



GraphNo.3.10 Minor constraints faced by turmeric growers

Source: The Research Reporter extracted and designed from Table No.3.13.

3.9.11 Major problems faced by chilli growers while marketing

Table No.3.14 Major Problems faced chilly growers while marketing

	Guntur	Kurnool	
Lack of awareness of the market	12 13.3%	52 57.8%	64 35.6%
Lack of adequate storage facilities	6 6.7%	5 5.6%	11 6.1%
Defective weights and scales	18 20.0%	7 7.8%	25 13.9%
Too many intermediates	50 55.6%	22 24.4%	72 40.0%
Above all	4 4.4%	4 4.4%	8 4.4%

	90 100.0%	90 100.0%	180 100.0%

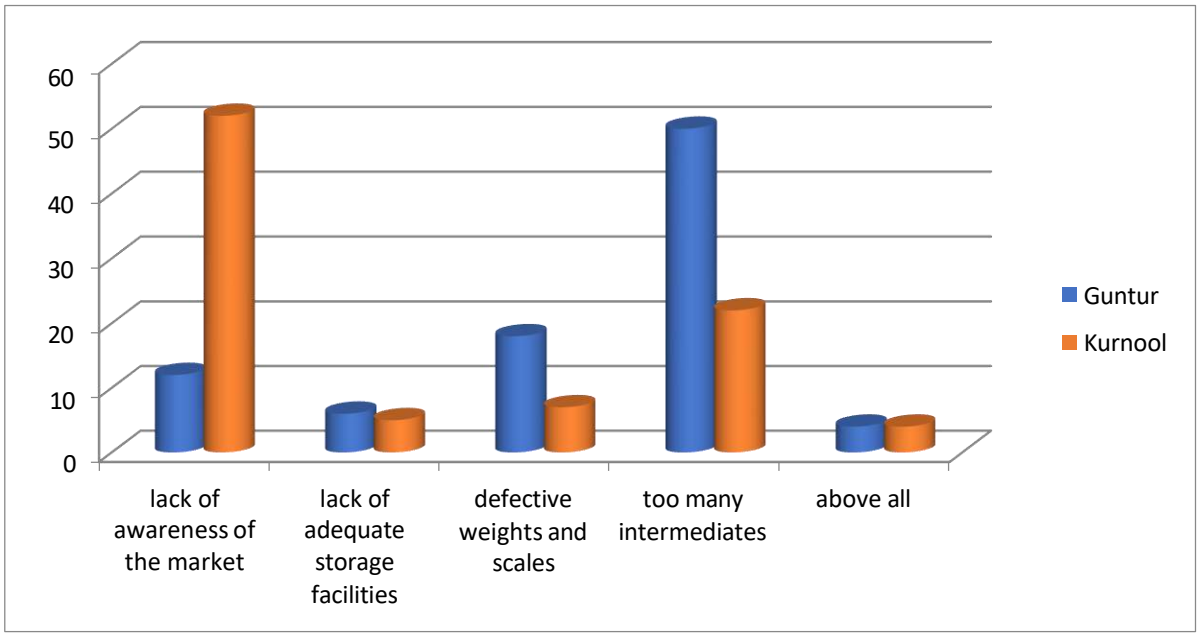
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 40.82 at 4 degrees of freedom

From the table it can be observed that among Guntur district farmers 13.3% have lack of awareness of the market, 6.7% have lack of adequate storage facilities, 20% have defective weights and scales, 55.6% have too many intermediates and 4.4% have above all problems. Among Kurnool district farmers 57.8% have lack of awareness of the market, 5.6% are having lack of adequate storage facilities, 7.8% have defective weights and scales, 24.4% have too many intermediates and 4.4% have above all problems.

Major problems faced in both regions are lack of market knowledge and too many intermediates. Whereas the Guntur district farmers are affected by too many intermediates and Kurnool district farmers are having problems with lack of market knowledge. The chi square test also reveals that there is a significant variation in the opinion of respondents from both the regions.

GraphNo.3.11 Major Problems faced chilly growers while marketing



Source: The Research Reporter extracted and designed from Table No.3.14.

3.9.12 Major problems faced by turmeric growers while marketing

Table 3.15 Major problems faced while marketing

	Guntur	Kadapa	
Lack of awareness of the market	4 4.4%	11 12.2%	15 8.3%
Lack of adequate storage facilities	77 85.6%	63 70.0%	140 77.8%
Defective weights and scales	0 .0%	2 2.2%	2 1.1%
Too many intermediates	4 4.4%	5 5.6%	9 5.0%
Above all	5 5.6%	9 10.0%	14 7.8%
	90 100.0%	90 100.0%	180 100.0%

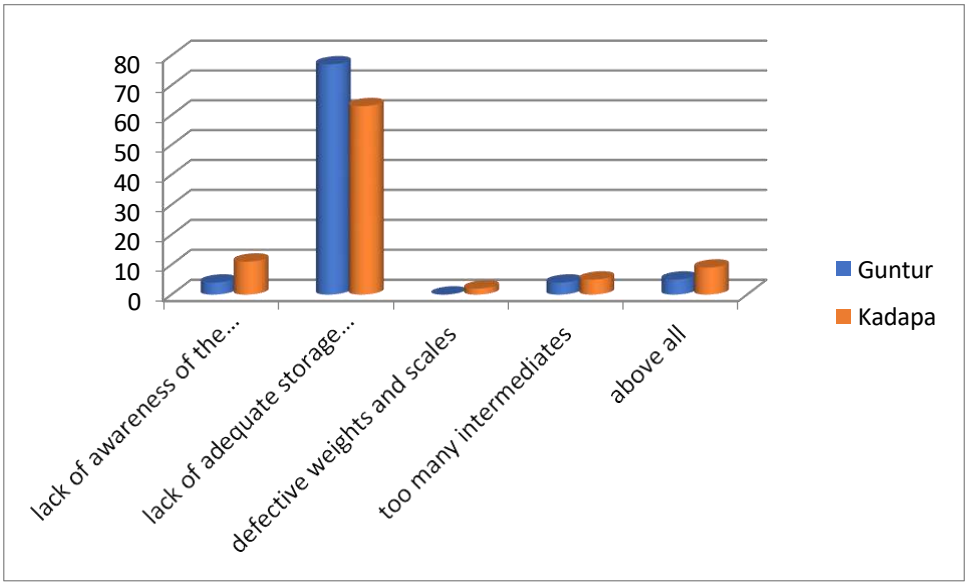
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 16.537 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 4.4% faced problems with lack of awareness of the market, 85.6% with lack of adequate storage facilities, 4.4% with too many intermediates and 5.6% with above all problems. among the farmers from Kadapa 12.2% faced problems with lack of awareness of the market, 70% with lack of adequate storage facilities, 2.2% with defective weights and scales, 5.6% with too many intermediates and 10% with above all problems. Most of the farmers are facing problems with lack of storage facilities.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

GraphNo.3.12 Major problems faced while marketing



Source: The Research Reporter extracted and designed from Table No.3.15.

3.9.13 Minor constraints faced by chilli growers while marketing

Table No3.16 Minor constraints faced chilly growers while marketing

	Guntur	Kurnool	
Price negotiation	3 3.3%	13 14.4%	16 8.9%
Fluctuation in market prices	31 34.4%	62 68.9%	93 51.7%
Corrupt of policies of AMC's	8 8.9%	3 3.3%	11 6.1%
Unwanted sample collection	44 48.9%	6 6.7%	50 27.8%
Above all	4 4.4%	6 6.7%	10 5.6%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

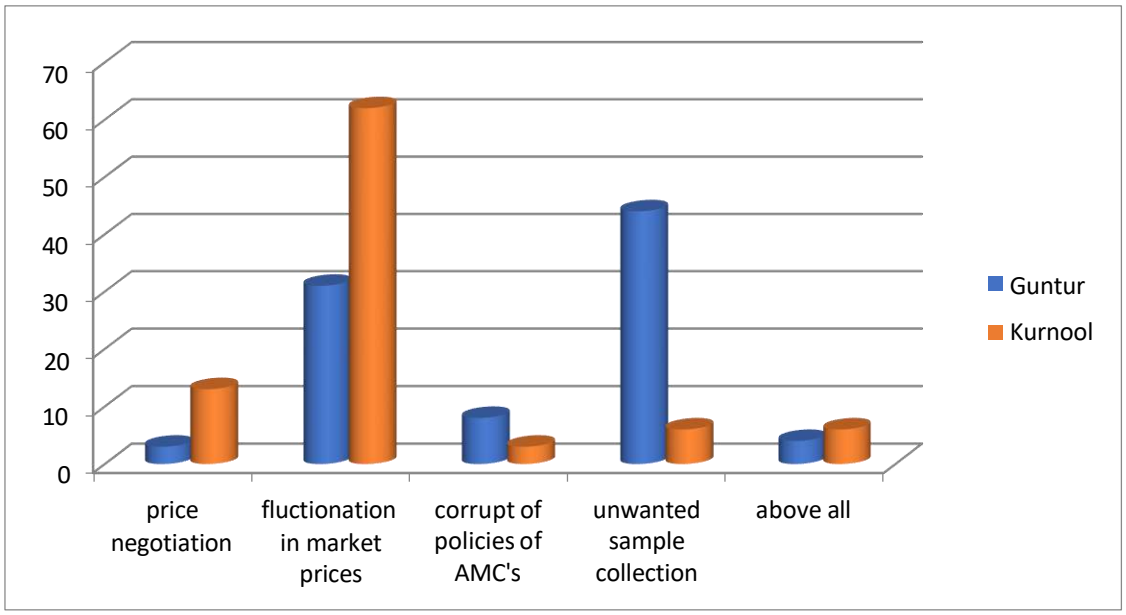
Chi square value = 48.136 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 3.3% are facing problems with price negotiation, 34.4% with fluctuation in market prices, 8.9% with corrupt of policies of AMC's, 48.9% with unwanted sample collection and 4.4% with above all. Among the farmers from Kurnool 14.4% are facing problems with price negotiation, 68.9% with

fluctuation in market prices, 3.3% with corrupt of policies of AMC's, 6.7% with unwanted sample collection and 6.7% with above all.

It is evident that the farmers are facing problems with fluctuations in market prices and unwanted sample collection both of them constitute 79% of the sample which is majority. Also the chi square test predicts that there is a significant variation in the opinions of the farmers from both the districts

GraphNo.3.13 Minor constraints faced chilly growers while marketing



Source: The Research Reporter extracted and designed from Table No.3.16.

3.9.14 Minor constraints faced by turmeric growers while marketing

Table No. 3.17 Minor constraints faced by turmeric growers while marketing

	Guntur	Kadapa	
Price negotiation	9 10.0%	10 11.1%	19 10.6%
Fluctuation in market prices	71 78.9%	34 37.8%	105 58.3%
Corrupt of policies of AMC's	5 5.6%	7 7.8%	12 6.7%
Unwanted sample collection	1 1.1%	19 21.1%	20 11.1%
Above all	4 4.4%	20 22.2%	24 13.3%

	90 100.0%	90 100.0%	180 100.0%

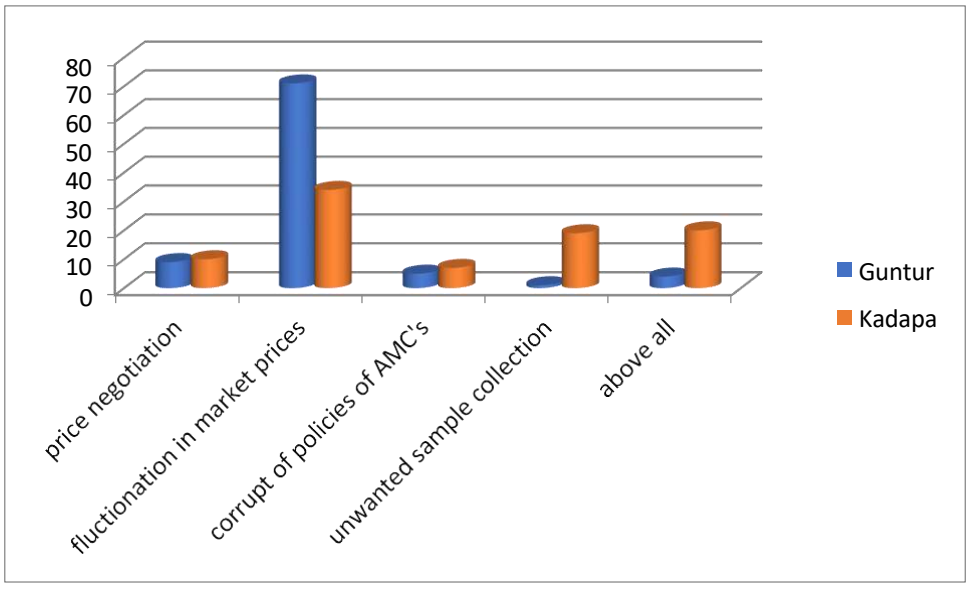
Source: Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 40.291 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 10% faced problems with price negotiation, 78.9% with fluctuation in market prices, 5.6% with corrupt policies of AMC's, 1.1% with unwanted sample collection and 4.4% with above all. among the farmers from Kadapa 11.1% faced problems with price negotiation, 37.8% with fluctuation in market prices, 7.8% with corrupt policies of AMC's, 21.1% with unwanted sample collection and 22.2% with above all. The major problem seems to be the fluctuation in market prices and it is more in Guntur district when compared with Kadapa.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

GraphNo.3.14 Minor constraints faced by turmeric growers while marketing



Source: The Research Reporter extracted and designed from Table No.3.17.

3.9.15 Problems faced chilly growers while getting loans

Table 3.18 Problems faced chilly growers while getting loans

	Guntur	Kurnool	
High rate of interest	3	15	18
	3.3%	16.7%	10.0%
Inadequate amount	35	52	87
	38.9%	57.8%	48.3%
Collateral security	8	6	14
	8.9%	6.7%	7.8%
Corrupt practices	28	4	32
	31.1%	4.4%	17.8%
Above all	16	13	29
	17.8%	14.4%	16.1%
	90	90	180
	100.0%	100.0%	100.0%

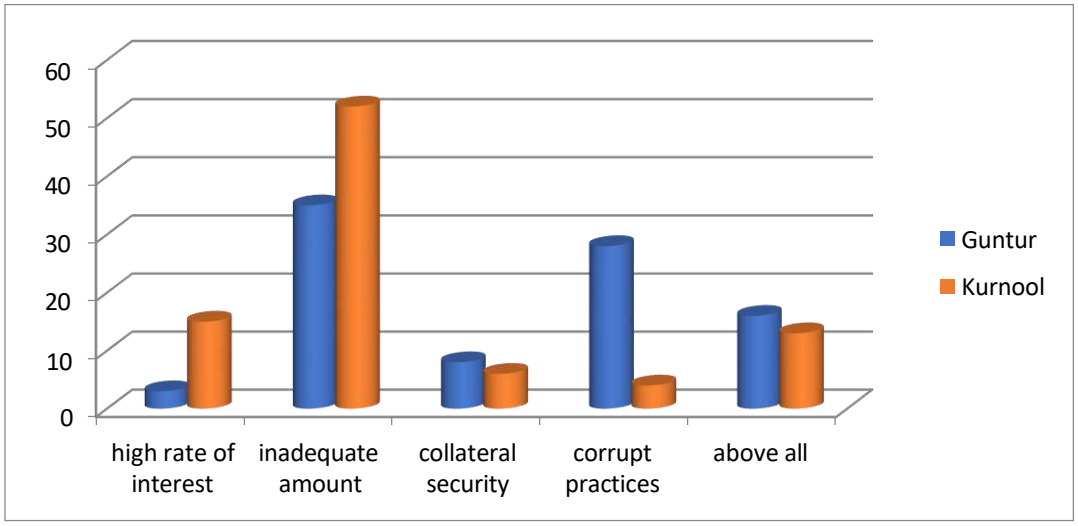
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 29.918 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 3.3% are having problems with high rate of interest, 38.9% with inadequate amount, 8.9% with collateral security, 31.1% with corrupt practices and 17.8% with above all in getting loans. Among the farmers from Kurnool 16.7% are facing problems with high rate of interest, 57.8% with inadequate amount, 6.7% with collateral security, 4.4% with corrupt practices and 14.4% with above all in getting loans.

Not getting the required amount of loan is the major problem faced by the farmers from both the regions. But there is a huge difference in opinions can be observed from the table. Also, the chi square test also predicts that there is a significant variation of opinions among the farmers from both the regions.

GraphNo.3.15 Problems faced chilly growers while getting loans



Source: The Research Reporter extracted and designed from Table No.3.18.

3.9.16 Problems faced by turmeric growers while getting loans

Table No. 3.19 Problems faced by turmeric growers while getting loans

	Guntur	Kadapa	
High rate of interest	11 12.2%	7 7.8%	18 10.0%
Inadequate amount	6 6.7%	7 7.8%	13 7.2%
Collateral security	4 4.4%	9 10.0%	13 7.2%
Corrupt practices	38 42.2%	51 56.7%	89 49.4%
Above all	31 34.4%	16 17.8%	47 26.1%
	90 100.0%	90 100.0%	180 100.0%

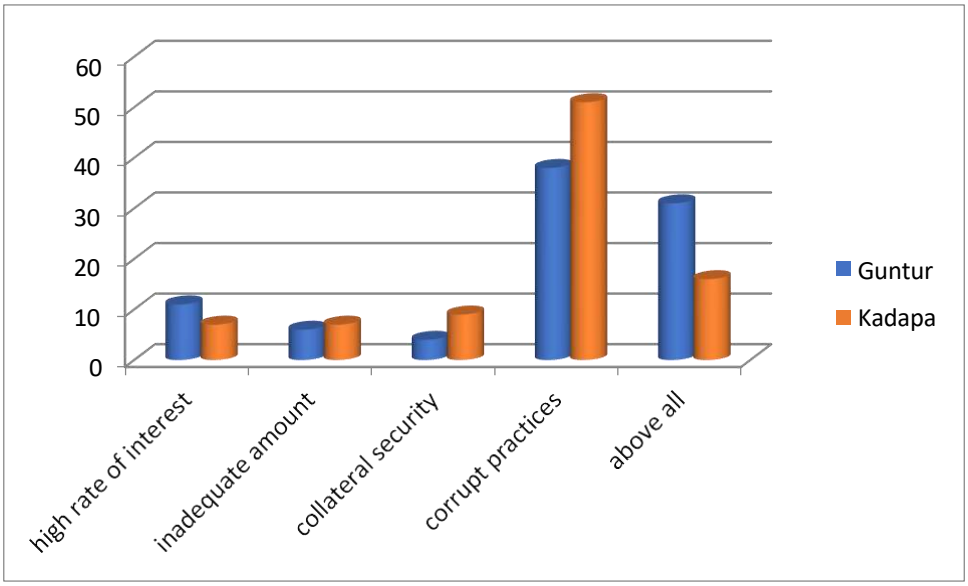
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 9.575 at 4 degrees of freedom

From the table it can be observed that among the farmers from the Guntur 12.2% are facing problems with high rate of interest, 6.7% with inadequate amount, 4.4% with collateral security, 42.2% with corrupt practices and 34.4% with above all problems. among the farmers from the Kadapa 7.8% are facing problems with high rate of interest, 7.8% with inadequate

amount, 10% with collateral security, 56.7% with corrupt practices and 17.8% with above all problems. Corrupt practices are the major problem faced by the farmers from both the districts. The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

GraphNo.3.16 Problems faced by turmeric growers while getting loans



Source: The Research Reporter extracted and designed from Table No.3.19.

3.9.17 Reasons for selling chilli immediately after harvesting

Table 3.20 Reasons for selling chilli immediately after harvesting

	Guntur	Kurnool	
Better price	9 10.0%	6 6.9%	15 8.5%
To pay debts	71 78.9%	25 27.8%	96 53.3%
Lack of storage	7 7.8%	24 27.6%	31 17.5%
Force by commission agent	3 3.3%	16 18.4%	19 10.7%
Above all	0 .0%	19 21.8%	19 10.7%
	90 100.0%	90 100.0%	180 100.0%

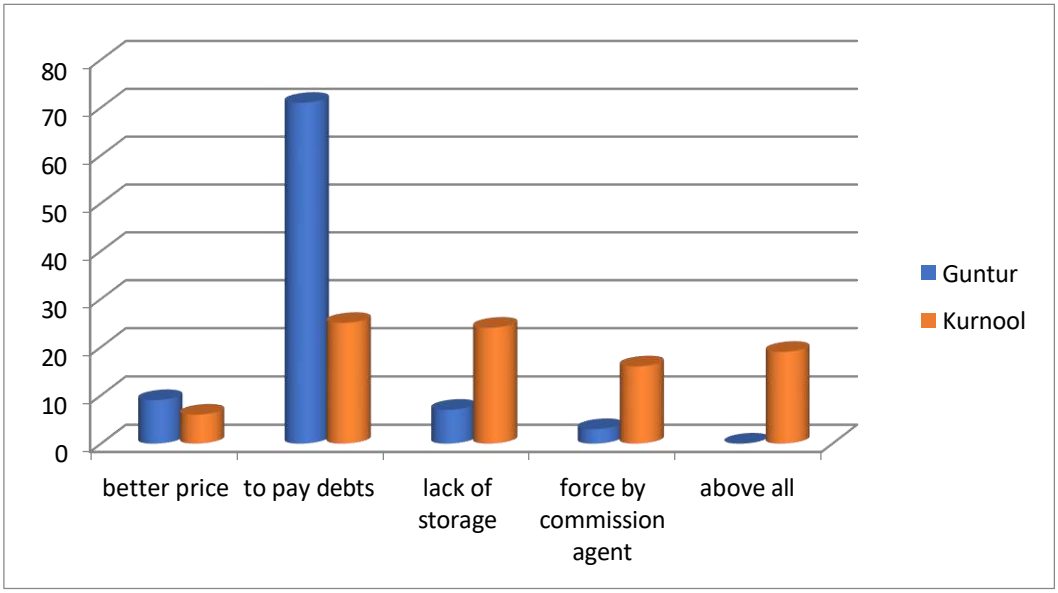
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 59.859 at 4 degrees of freedom

From the table it can be observed that among farmers from Guntur 10% are selling because of better price, 78.9% to pay debts, 7.8% for lack of storage facilities and 3.3% by the force of commission agent. Among farmers from Kurnool 6.9% are selling because of better price, 27.8% to pay debts, 27.6% for lack of storage facilities, 18.4% by the force of commission agent and 21.8% above all.

Paying debts is the major factor influencing the farmers to sell the crop immediately. This influence is predominant in Guntur district. Also, the chi square test confirms that there is a significant variation in the opinions of the farmers in two districts.

GraphNo.3.17 Reasons for selling chilli immediately after harvesting



Source: The Research Reporter extracted and designed from Table No.3.20.

3.9.18 Reasons for selling Turmeric immediately after harvesting

Table No.3.21 Reasons for selling Turmeric immediately after harvesting

	Guntur	Kadapa	
Better price	36 40.0%	26 28.9%	62 34.4%
To pay debts	22 24.4%	42 46.7%	64 35.5%
Lack of storage	21 23.3%	10 11.1%	31 17.2%
Force by commission agent	7 7.8%	6 6.7%	13 7.2%
Above all	4	6	10

	4.4%	6.7%	5.6%
	90 100.0%	90 100.0%	180 100.0%

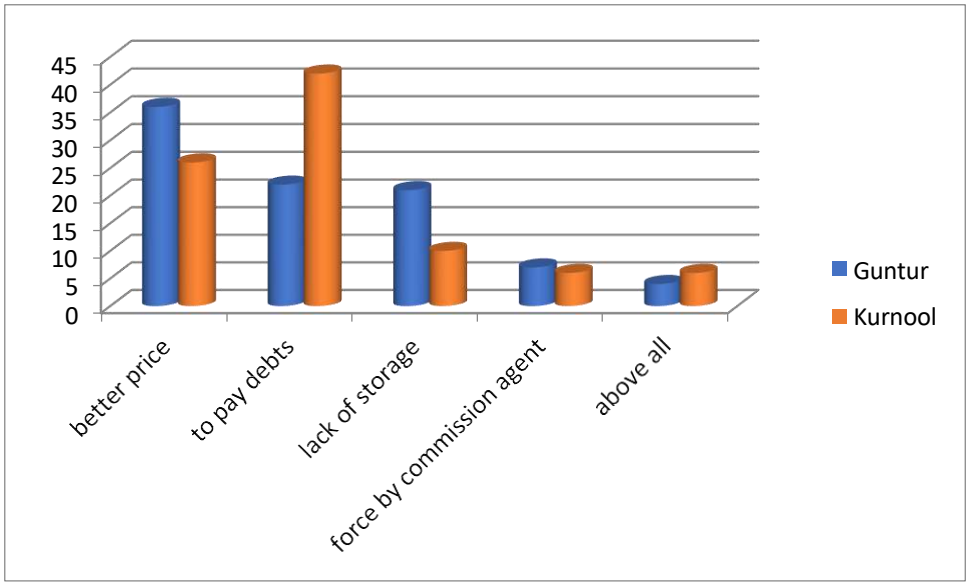
Source: The Research Reporter extracted the data from primary sources of Questionnaire**.**

Chi square value = 12.243 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 40% are selling crop immediately after harvesting for better price, 24.4% to pay debts, 23.3% for lack of storage, 7.8% because of force from commission agent and 4.4% for above all. among the farmers from Kadapa 28.9% are selling crop immediately after harvesting for better price, 46.7% to pay debts, 11.1% for lack of storage, 6.7% because of force from commission agent and 6.7% for above all. Better price and to pay debts are the major reasons for selling the crop immediately after harvesting.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

GraphNo.3.18 Reasons for selling Turmeric immediately after harvesting



Source: The Research Reporter extracted and designed from Table No.3.21.

3.9.19 Agreement with e-NAM system by chilly growers

Table No. 3.22 Level of agreement with e-NAM system will get a better price, more market linkage, direct payment, better returns and reduction of intermediation costs

	Guntur	Kurnool	
Strongly disagree	3 3.3%	2 2.2%	5 2.8%
Disagree	13 14.4%	22 24.4%	35 19.4%
Neutral	32 35.6%	50 55.6%	82 45.6%
Agree	40 44.4%	15 16.7%	55 30.6%
Strongly agree	2 2.2%	1 1.1%	3 1.7%
	90 100.0%	90 100.0%	180 100.0%

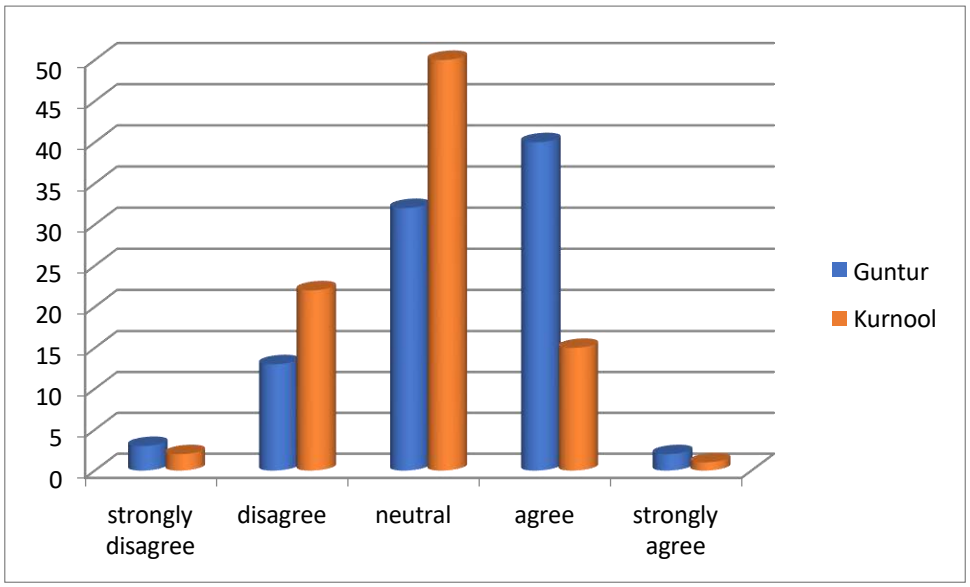
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 18.162 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 3.3% strongly disagree, 14.4% disagree, 35.6% are neutral, 44.4% agree and 2.2% strongly agree with the given argument. Among the farmers from Guntur 2.2% strongly disagree, 24.4% disagree, 55.6% are neutral, 16.7% agree and 1.1% strongly agrees with the given argument.

Most of the farmers are moderately agree with the e-NAM system. A significant variation can be observed between farmers of two districts. Majority of the farmers are either neutral or agrees with e-NAM system in Guntur district, but majority are neutral in Kurnool district. Also, the chi square test reveals that there is a significant variation in the opinions of the farmers from both the districts.

GraphNo.3.19 Level of agreement with e-NAM system will get a better price, more market linkage, direct payment, better returns and reduction of intermediation costs



Source: The Research Reporter extracted and designed from Table No.3.22.

3.9.20 Agreement with e-NAM system by turmeric farmers

Table No.3.23 Level of agreement with e-NAM system will get a better price, more market linkage, direct payment, better returns and reduction of intermediate costs

	Guntur	Kadapa	
Strongly disagree	5 5.6%	3 3.3%	8 4.4%
Disagree	39 43.3%	34 37.8%	73 40.6%
Neutral	7 7.8%	41 45.6%	48 26.7%
Agree	39 43.3%	11 12.2%	50 27.8%
Strongly agree	0 .0%	1 1.1%	1 .6%
	90 100.0%	90 100.0%	180 100.0%

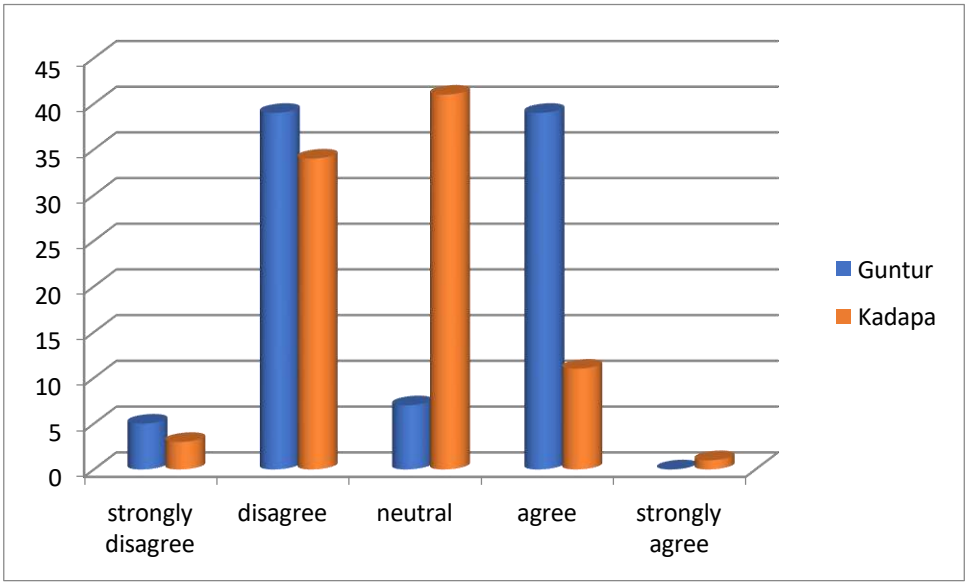
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 41.606 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 5.6% strongly disagree, 43.3% disagree, 7.8% are neutral, 43.3% agree with the argument e-NAM system will get a better price, more market linkage, direct payment, better returns and reduction of intermediation costs. among the farmers from Kadapa 3.3% strongly disagree, 37.8% disagree, 45.6% are neutral, 12.2% agree and 1.1% strongly agree with the argument e-NAM system will get a better price, more market linkage, direct payment, better returns and reduction of intermediation costs.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

GraphNo.3.20- Level of agreement with e-NAM system will get a better price, more market linkage, direct payment, better returns and reduction of intermediation costs



Source: The Research Reporter extracted and designed from Table No.3.23.

3.9.21 Problems faced at AMC while selling

Table No. 3.24 Problems faced at AMC while selling

	Guntur	Kadapa	
No transparency in prices	11 12.2%	2 2.2%	13 7.2%
Middleman involvement	0 .0%	7 7.8%	7 3.9%
Defective weights and scales	0 .0%	18 20.0%	18 10%
Unfair collection of charges	72	41	113

	80.0%	45.6%	62.8%
Above all	7 7.8%	22 24.4%	29 16.1%
	90 100.0%	90 100.0%	180 100.0%

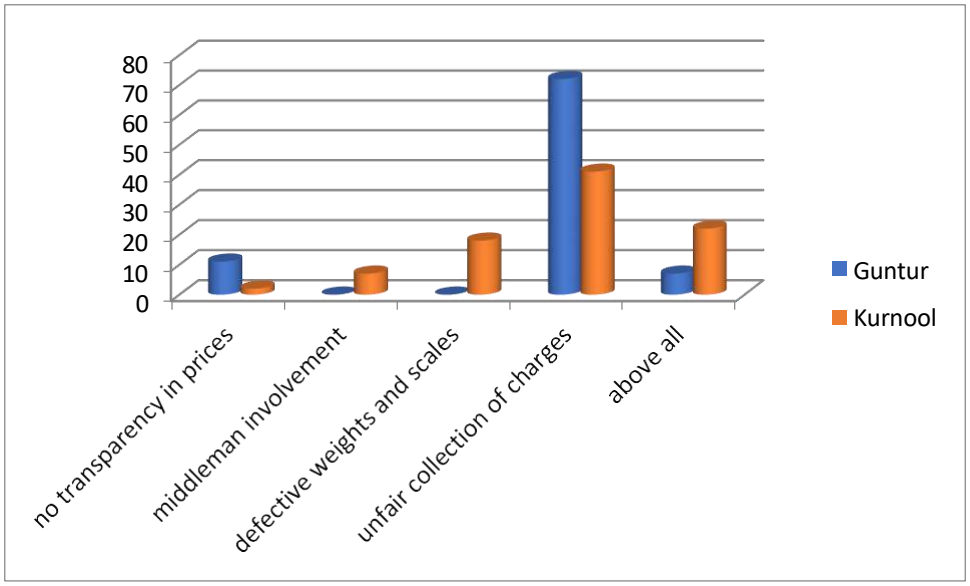
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 47.494 at 4 degrees of freedom

From the table it can be observed that among the farmers form Guntur 12.2% are facing problems with no transparency in prices, 80% with unfair collection of charges and 7.8% with above all. Among the farmers from Kadapa 2.2% are facing problems with no transparency in prices, 7.8% with middleman involvement, 20% with defective weights and scales, 45.6% with unfair collection of charges and 24.4% with above all. Unfair collection of charges is the major cause of concern for the farmers from both the regions; it is more severe in Guntur district.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

GraphNo.3.21 Problems faced at AMC while selling



Source: The Research Reporter extracted and designed from Table No.3.24.

3.9.22 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers

Table No.3.25 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers

	Guntur	Kurnool	
Strongly disagree	1 1.1%	5 5.6%	6 3.3%
Disagree	4 4.4%	6 6.7%	10 5.6%
Neutral	20 22.2%	16 17.8%	36 20.0%
Agree	47 52.2%	23 25.6%	70 38.9%
Strongly agree	18 20.0%	40 44.4%	58 32.2%
	90 100.0%	90 100.0%	180 100.0%

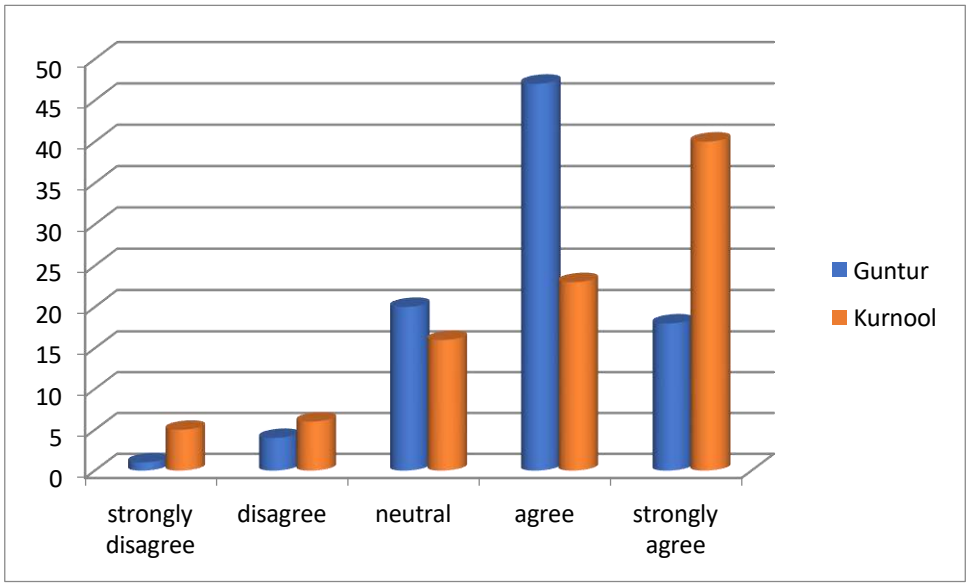
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 20.085 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 1.1% strongly disagree, 4.4% disagree, 22.2% are neutral, 52.2% agree and 20% strongly agree with the argument cold storages established by government is more beneficial. among the farmers from Kurnool 5.6% strongly disagree, 6.7% disagree, 17.8% are neutral, 25.6% agree and 44.4% strongly agree with the argument cold storages established by government is more beneficial.

From the data it can be observed that most of the farmers from both the regions agree with the argument. But the chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

GraphNo.3.22 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers



Source: The Research Reporter extracted and designed from Table No.3.25.

3.9.23 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers

Table No.3.26 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers

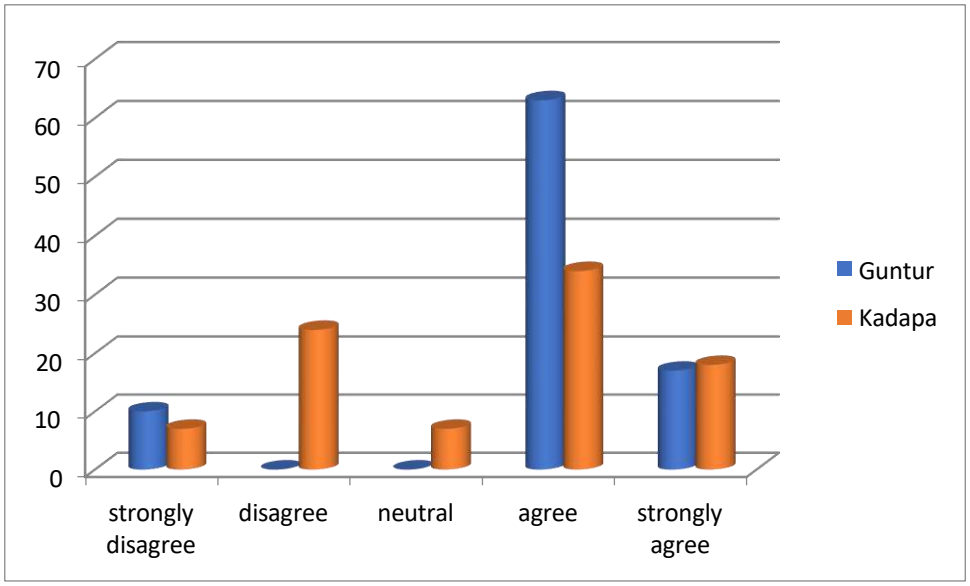
	Guntur	Kadapa	
Strongly disagree	10 11.1%	7 7.8%	17 9.4%
Disagree	0 .0%	24 26.7%	24 13.3%
Neutral	0 .0%	7 7.8%	7 3.9%
Agree	63 70.0%	34 37.8%	97 53.9%
Strongly agree	17 18.9%	18 20.0%	35 19.4%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

Chi square value = 40.228 at 4 degrees of freedom

From the table it can be observed that among the farmers from Guntur 11.1% strongly disagree, 70% agree and 18.9% strongly agree with the argument establishment of cold storages by the government is more beneficial to the farmers. Among the farmers from Guntur 7.8% strongly disagree, 26.7% agree, 7.8% are neutral, 37.8% agree and 20% strongly agree with the argument establishment of cold storages by the government is more beneficial to the farmers. The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

Graph No.23 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers



Source: The Research Reporter extracted and designed from Table No.3.26.

3.10 PERCEPTIONS OF TRADERS ON ISSUES AND PROBLEMS IN SPICES TRADE

3.10.1 ANOVA between age and degree of speculation in chilly/turmeric

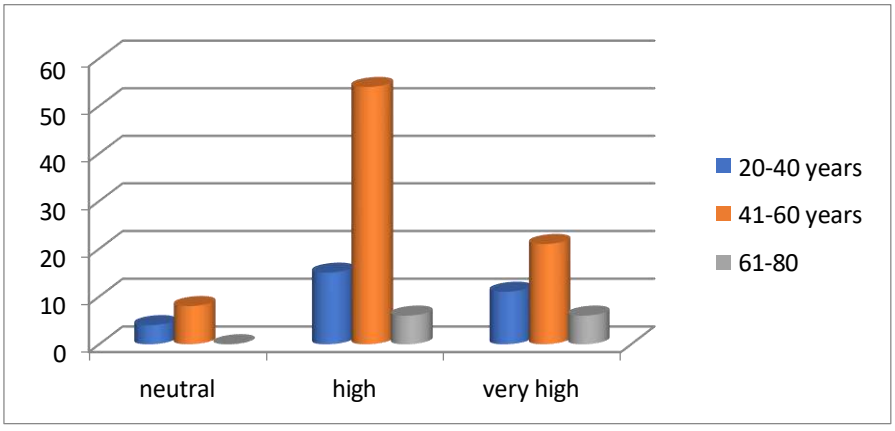
Table No. 3.27 ANOVA between age and degree of speculation in chilly/turmeric traders

	neutral	high	very high	
20-40 years	4 13.3%	15 50.0%	11 36.7%	30 100.0%
41-60 years	8 9.6%	54 65.1%	21 25.3%	83 100.0%
61-80	0 .0%	6 50.0%	6 50.0%	12 100.0%
	12 9.6%	75 60.0%	38 30.4%	125 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that among domestic traders with age between 20-40 years 13.3% are neutral, 50% are high and 36.7% are very high with respect to degree of speculation in chilly/turmeric. Among domestic traders with age between 41-60 years 9.6% are neutral, 65.1% are high, and 25.3% are very high with respect to the degree of speculation in chilly /turmeric. Among domestic traders with age between 61-80 years 50% are high and 50% are very high with respect to degree of speculation in chilly/turmeric.

Graphno.3.24 ANOVA between age and degree of speculation in chilly/turmeric traders



Source: The Research Reporter extracted and designed from Table No.3.27.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.261	2	.631	1.776	.174
Within Groups	43.331	122	.355		
Total	44.592	124			

An ANOVA test is conducted between the variables "Age" and "Speculation in chilly/turmeric" and the results are tabulated in the above table. From the table it can be observed that the calculated p value is 0.174 which is greater than 0.05, which is in the acceptance region hence null hypothesis is accepted. Hence it can be concluded that there is no significant difference between the age and speculation in chilly/turmeric.

3.10.2 ANOVA between Education and identification of buyers by traders

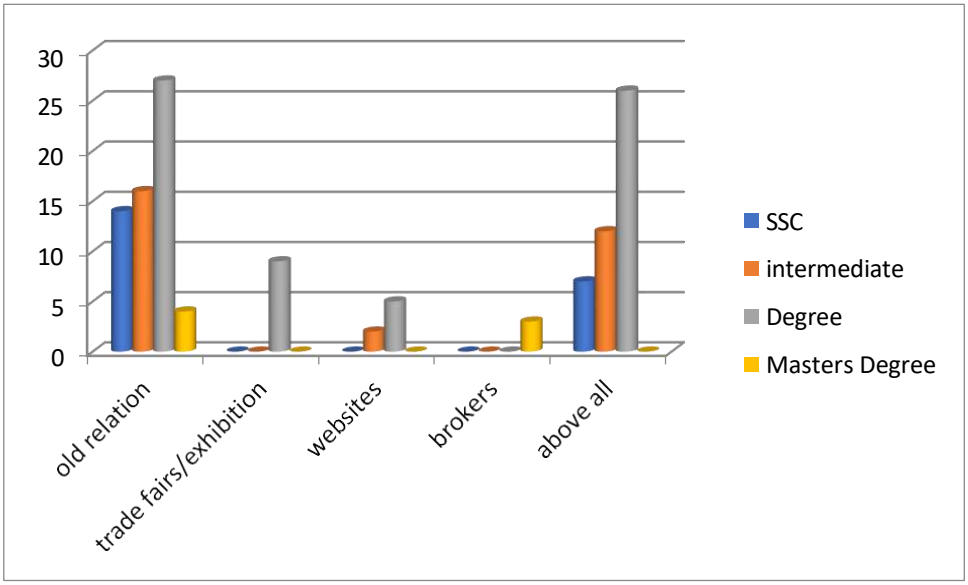
Table No.3.28 ANOVA between Education and identification of buyers

	old relation	trade fairs/exhibition	websites	brokers	above all	
SSC	14	0	0	0	7	21
	66.7%	.0%	.0%	.0%	33.3%	100.0%
intermediate	16	0	2	0	12	30
	53.3%	.0%	6.7%	.0%	40.0%	100.0%
Degree	27	9	5	0	26	67
	40.3%	13.4%	7.5%	.0%	38.8%	100.0%
Master's Degree	4	0	0	3	0	7
	57.1%	.0%	.0%	42.9%	.0%	100.0%
	61	9	7	3	45	125
	48.8%	7.2%	5.6%	2.4%	36.0%	100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that among domestic traders with educational qualification SSC 66.7% identify buyers by old relation, 33.3% by all the above. Among domestic traders with educational qualification intermediate 53.3% identify buyers by old relation, 6.7% by websites, 40% by above all. Among domestic traders with degree qualification 40.3% identify buyers by old relation, 13.4% by trade fairs/exhibitions, 7.5% by websites, 40% by above all. Among domestic traders with master degree 57.1% identify buyers by old relation, 42.9% by brokers.

GraphNo.3.25 ANOVA between Education and identification of buyers



Source: The Research Reporter extracted and designed from Table No.3.28.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.292	3	1.764	.509	.677
Within Groups	419.156	121	3.464		
Total	424.448	124			

An ANOVA test is conducted between the variables "Age" and "Target buyers" and the results are tabulated in the above table. From the table it can be observed that the calculated p value is 0.236 which is greater than 0.05, which is in the acceptance region hence null hypothesis is

accepted. Hence it can be concluded that there is no significant difference between the age and target buyers.

3.10.3 ANOVA between Education and method of purchase of chilly/turmeric

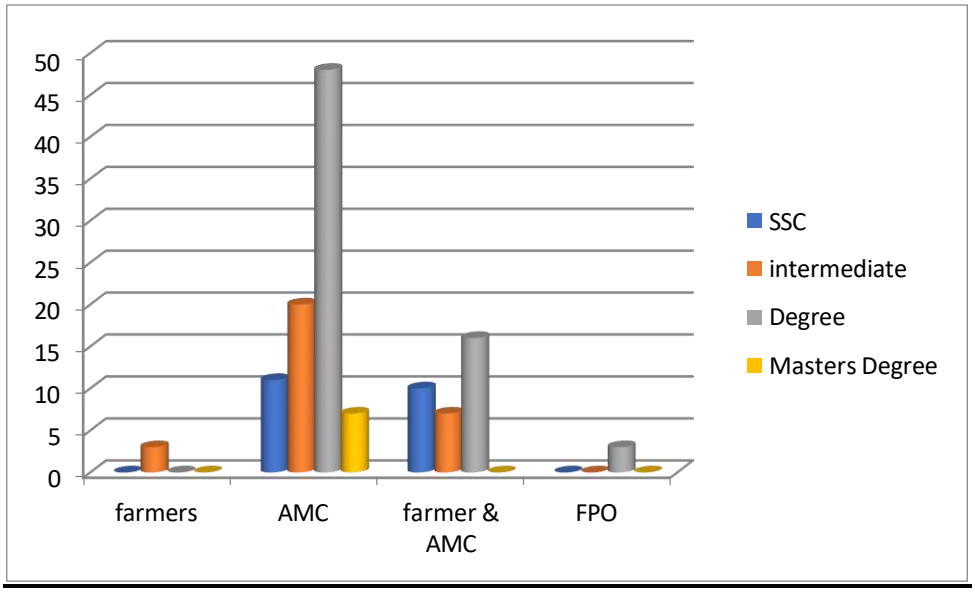
Table No.3.29 ANOVA between Education and method of purchase of chilly/turmeric

	farmers	AMC	farmer & AMC	FPO	
SSC	0 .0%	11 52.4%	10 47.6%	0 .0%	21 100.0%
intermediate	3 10.0%	20 66.7%	7 23.3%	0 .0%	30 100.0%
Degree	0 .0%	48 71.6%	16 23.9%	3 4.5%	67 100.0%
Master's Degree	0 .0%	7 100.0%	0 .0%	0 .0%	7 100.0%
	3 2.4%	86 68.8%	33 26.4%	3 2.4%	125 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that among domestic traders with SSC qualification 52.4% purchase at AMC, 47.6% at farmers & AMC. Among domestic traders with Intermediate qualifications 10% buy from farmers, 66.7% from AMC and 23.3% from both farmers and AMC. Among domestic traders with degree qualifications 71.6% buy from AMC, 23.9% from farmer & AMC, 4.5% from FPO. Among domestic traders with master degree 100% buys from AMC.

GraphNo.3.26 ANOVA between Education and method of purchase of chilly/turmeric



Source: The Research Reporter extracted and designed from Table No.3.29.

An ANOVA test is conducted between the variables "Age" and "Target buyers" and the results are tabulated in the above table. From the table it can be observed that the calculated p value is 0.236 which is greater than 0.05, which is in the acceptance region hence null hypothesis is accepted. Hence it can be concluded that there is no significant difference between the age and target buyers.

3.10.4 ANOVA between Education and Target buyers of chilly/turmeric

Table No.3.30 ANOVA between Education and Target buyers of chilly/turmeric

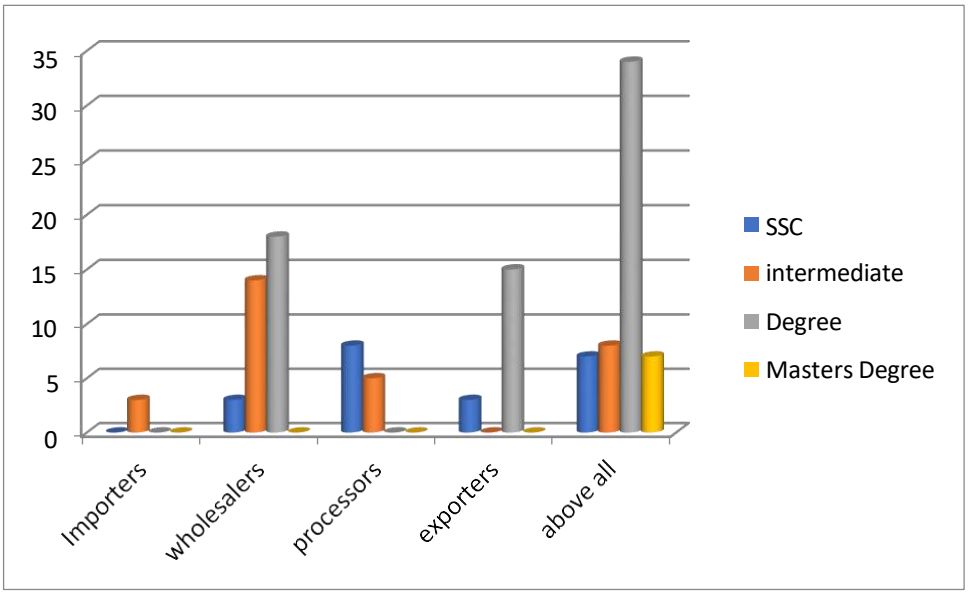
	Importers	wholesalers	processors	exporters	above all	
SSC	0	3	8	3	7	21
	.0%	14.3%	38.1%	14.3%	33.3%	100.0%
intermediate	3	14	5	0	8	30
	10.0%	46.7%	16.7%	.0%	26.7%	100.0%
Degree	0	18	0	15	34	67
	.0%	26.9%	.0%	22.4%	50.7%	100.0%

Master's Degree	0 .0%	0 .0%	0 .0%	0 .0%	7 100.0%	7 100.0%
	3 2.4%	35 28.0%	13 10.4%	18 14.4%	56 44.8%	125 100.0%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that among domestic traders with ssc qualification for 14.3% target buyers are wholesalers, 38.1% processors, 14.3% exporters and 33.3% above all. Among domestic traders with intermediate qualification for 10% target buyers are importers, 46.7% wholesalers, 16.7% processors and 26.7% above all. Among domestic traders with degree qualification 26.9% target buyers are wholesalers, 22.4% exporters and 50.7% above all. Among domestic traders with master's degree qualification 100% the target buyers are above all mentioned.

GraphNo.3.27 ANOVA between Education and Target buyers of chilly/turmeric



Source: The Research Reporter extracted and designed from Table No.3.30.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	37.558	3	12.519	8.055	.000
Within Groups	188.074	121	1.554		

Total	225.632	124			

An ANOVA test is conducted between the variables “Educational qualification” and “Target buyers” and the results are tabulated in the above table. From the table it can be observed that the calculated p value is 0.000 which is greater than 0.05, which is in the rejection region hence null hypothesis is rejected. Hence it can be concluded that there is a significant difference between the educational qualification and target buyers.

3.11 PERCEPTIONS OF EXPORTERS ON PROBLEMS OF SPICES TRADE IN ANDHRA PRADESH

3.11.1 Problems and constraints in spice trading faced by exporters

Table No.3.31 Problems and constraints in spice trading faced by exporters

Statements	Strongly never	never	sometimes	more times	always	total
Obtaining importer exporter code	12 48%	13 52%	0 0%	0 0%	0 0%	25 100%
weighted score	12	26	0	0	0	38
Getting registration cum membership certificate	9 36%	16 64%	0 0%	0 0%	0 0%	25 100%
weighted score	9	32	0	0	0	41
Finding potential buyers for international trade	2 8%	1 4%	16 64%	5 20%	1 4%	25 100%
weighted score	2	2	48	20	5	77
Getting container service	3 12%	14 56%	4 16%	4 16%	0 0%	25 100%
weighted score	3	28	12	16	0	59
while drawing pre-shipment samples	11 44%	8 32%	5 20%	0 0%	1 4%	25 100%
weighted score	11	16	15	0	5	47

meeting port formalities and custom clearance	6 24%	14 56%	5 20%	0 0%	0 0%	25 100%
weighted score	6	28	15	0	0	49
meeting govt rules, norms and acts	5 20%	14 56%	1 4%	4 16%	1 4%	25 100%
weighted score	5	28	3	16	5	57

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that most of the exporters are not facing major problems mostly minor problems regarding the statements. The weighted score describes the severity of the problems faced by the exporters.

The problems listed below are on the moderate side

Finding potential buyers for international trade - 77

Getting container service – 59

Meeting government rules, norms and acts – 57

The problems listed below are on the lower side

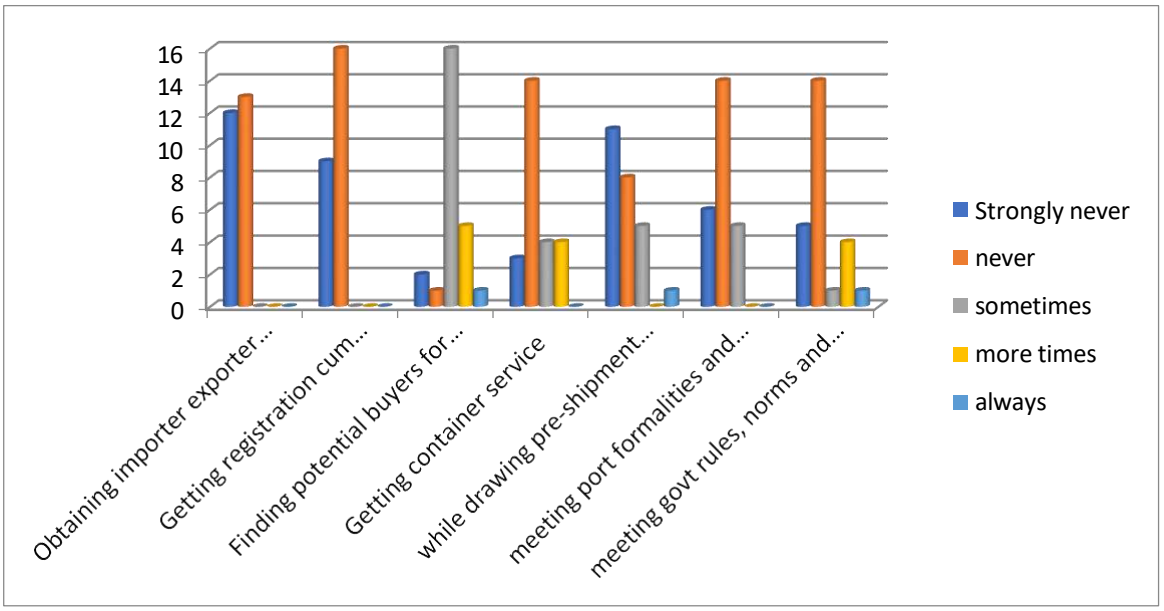
Meeting port formalities and custom clearance – 49

While drawing pre-shipment samples – 47

Getting registration cum membership certificate – 41

Obtaining importer exporter code – 38

Graphno.3.28 Problems and constraints in spice trading faced by exporters



Source: The Research Reporter extracted and designed from Table No.3.31.

3.11.2 Degree of competition among exporters

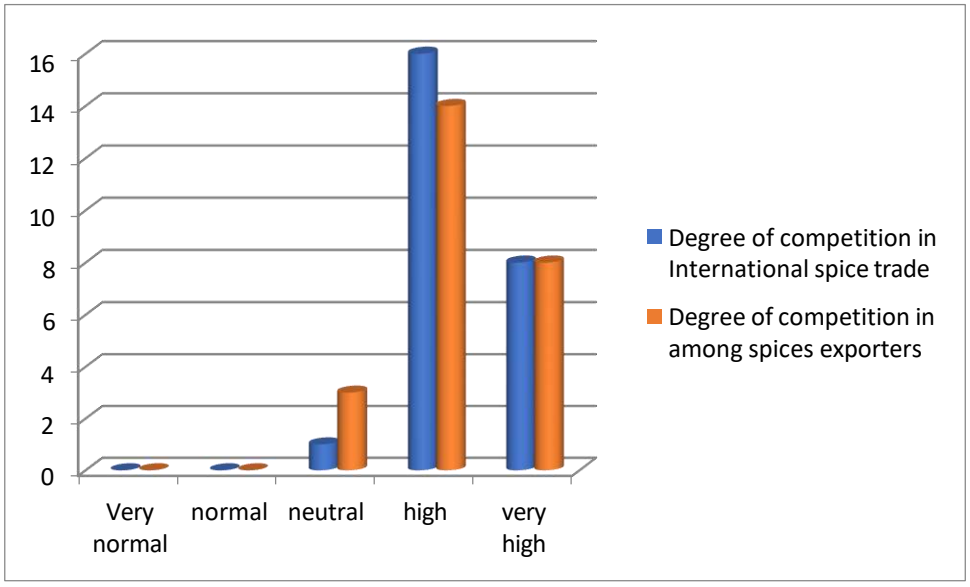
Table No.3.32 Degree of competition among exporters

Statements	Very normal	normal	neutral	high	very high	
Degree of competition in International spice trade	0 0%	0 0%	1 4%	16 64%	8 32%	25 100%
Degree of competition in among spices exporters	0 0%	0 0%	3 12%	14 56%	8 32%	25 100%

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that among exporters the degree of competition in international spice trade is neutral for 4%, high for 64% and very high for 32% of the exporters. The degree of competition among spices exporters is neutral for 12%, high for 56% and very high for 32% of the exporters.

GraphNo.3.29 Degree of competition among exporters



Source: The Research Reporter extracted and designed from Table No.3.32.

3.11.3 Level of agreement with different aspects among exporters

Table No.3.33 Level of agreement with different aspects among exporters

	strongly disagree	disagree	neutral	agree	strongly agree	total
ECGC Scheme is essential to mitigate the risks in international trade	0 0%	3 12%	1 4%	12 48%	9 36%	25 100%
Maintaining high quality is necessary to sustain in international business	0 0%	0 0%	2 8%	14 56%	9 36%	25 100%
Good labelling and attractive packaging as per the buyer's specification is needed	0 0%	1 4%	7 28%	6 24%	11 44%	25 100%

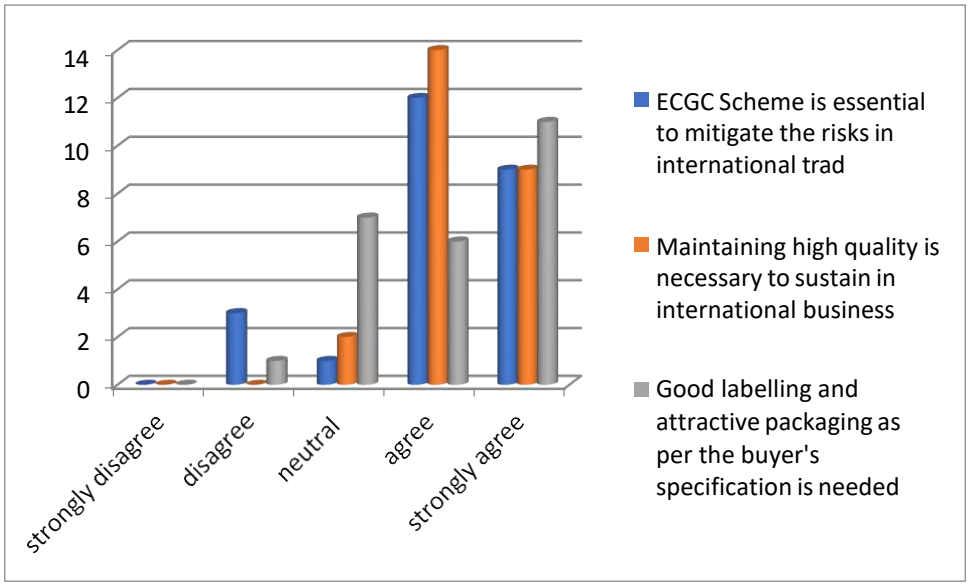
Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that among exporters 12% disagree, 4% are neutral, 48% agree and 36% strongly agree with ECGC scheme is essential to mitigate the risks in international trade.

Among exporters 8% are neutral, 56% agree and 36% strongly agree with maintaining high quality is necessary to sustain in international business. Among exporters 4% disagree,

28% are neutral, 24% agree and 44% strongly agree with good labeling and attractive packaging as per the buyers' specifications is needed.

GraphNo.3.30 Level of agreement with different aspects among exporters



Source: The Research Reporter extracted and designed from Table No.3.33.

3.11.4 Reasons for selection of spices products for international trade

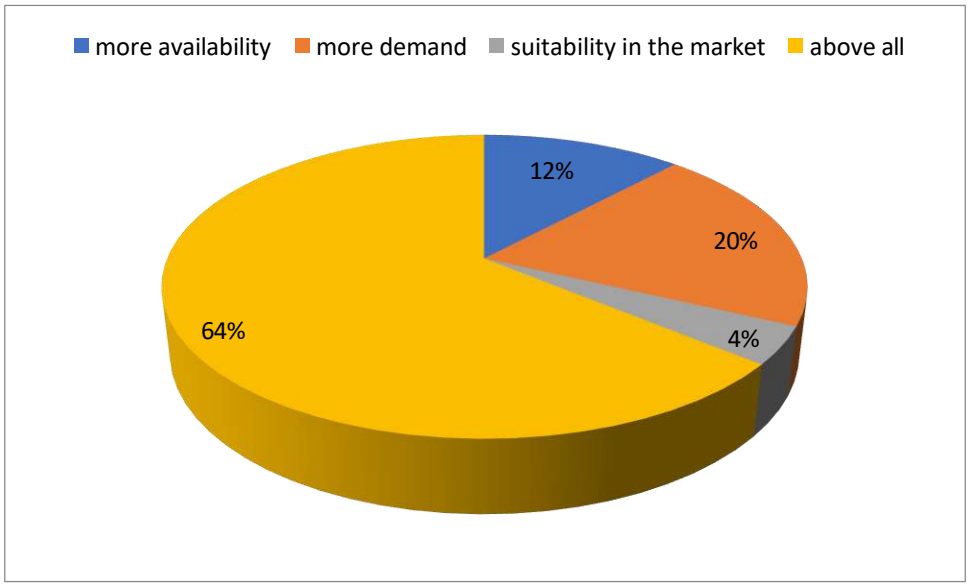
Table No.3.34 Reasons for selection of spices products for international trade

	Frequency	Percent
more availability	3	12.0
more demand	5	20.0
suitability in the market	1	4.0
above all	16	64.0
Total	25	100.0

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that the reasons for selection of spices products for international trade is 12% for more availability, 20% for more demand, 4% for suitability in the market and 64% for all above.

GraphNo.3.31 Reasons for selection of spices products for international trade



Source: The Research Reporter extracted and designed from Table No.3.34.

3.11.5 Major difficulties faced while selection of the country for international trade

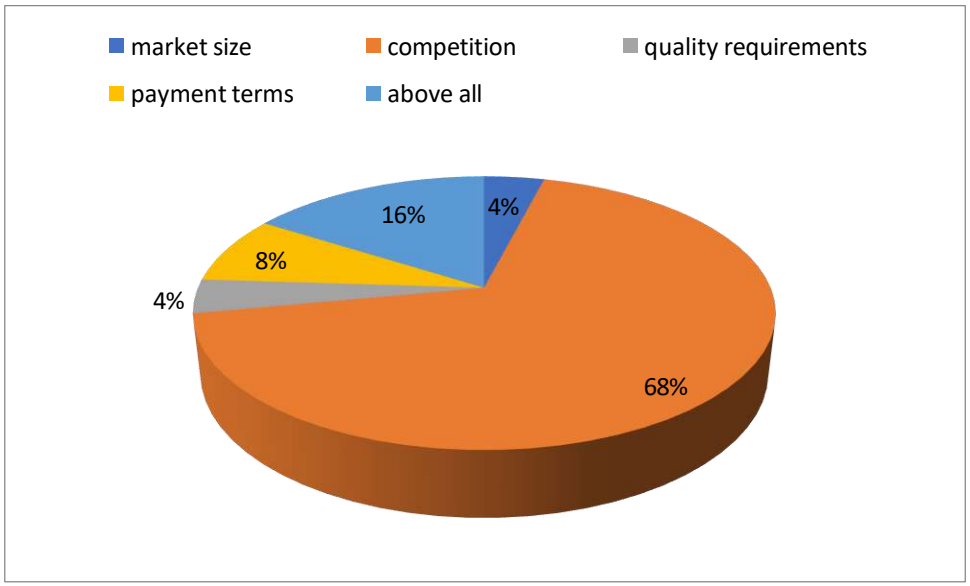
Table No.3.35 Major Difficulties faced while selection of the country for international trade

	Frequency	Percent
market size	1	4.0
competition	17	68.0
quality requirements	1	4.0
payment terms	2	8.0
above all	4	16.0
Total	25	100.0

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table it can be observed that among exporters 4% faced problems with market size, 68% with competition, 4% with quality requirements, 8% with payment terms and 16% with above all problem,

Graph No.3.32 Major Difficulties faced while selection of the country for international trade



Source: The Research Reporter extracted and designed from Table No.3.35.

CHAPTER 4
GLOBAL NORMS ON EXPORTING OF CHILLI AND TURMERIC

4.1 INTRODUCTION

Exports are the most important source of foreign exchange for developing countries. All developing countries, including, of course, India endeavor to enlarge their exports as a means for organize resources for their development plans. Indian economy is fundamentally agrarian and hence exports of food and agricultural products assume essential significance in our export efforts. During 2023-24 India has exported 443900 MTs in quantity and 4256.33 crores in value of Chilli and 107300 MTs in quantity and 1035.67 Crores in Value of Turmeric. Growth in Agro-exports not only brings in extra foreign exchange for the country. But benefits a great number of people involved in the production, processing and exports of such products.

4.1.1 Export of spices from India

From time immemorial India has been known as the territory of Spices. The Chinese, Arabs and The Europeans came to the Indian shores lured by the spices grown here. Pepper, ginger, turmeric and cardamom are the mainly renowned of Indian spices. During 2023-24 India has exported 16840 MTs with value of 82078.00 lakhs pepper, 5860MTs value with 60908.50 Lakhs of Small Cardamom, 22605 MTs with value 21606.55 lakhs of Ginger, 143670 MTs value with 241799.50 of Cumin 34550 MTs value with 25906.50 Fennel, 21500 Mts value with 322835.50 of Mint Products other than chilli and Turmeric. The world utilization of spices is growing steadily year by year. Expansion of our export of spices to enlarge or even to retain our share of world market is very important. This can be accomplished only through increased productivity and improved quality.[142]

4.1.2 Export and economy of farmers

India is primarily an agrarian country and the richness of our farmers brings prosperity to the nation. During 2023-24 India's chilli area under cultivation is 814790 ha and production is 2302670 MTs and Turmeric area under cultivation is 224260 ha and production is 1107920 MTs. While no efforts should be spared to enhance productivity from each hectare of land under cultivation, the marketability of the produce is critically important. If there is a fall in demand it leads to a surplus in the market and accordingly prices become uneconomic. All

[142] Spices Exports Review published by Spices Board..

agricultural commodities have this intrinsic problem. When a product depends upon an export market also, the circumstances become more complex. A setback in the markets in New York or London affects the farmers in the remote villages in Andhra Pradesh or Karnataka and upsets our economy. It is, therefore, a theme of survival for us to increase productivity and also preserve the marketability of the produce through improved quality and hygiene.[143]

4.1.3 Quality Requirements for spices Export

Developed countries are the major markets for our food exports. USA, Japan, Canada, Australia and the European countries have their own rigorous food laws and regulations. During 2023-24 India exported 79882 MTs and 3024.22 crores in value of spices to USA, 206879 MT's and 2267.43 crores in value to Vietnam, 28981 MT's in quantity and 1934.22 crores in value to China, 30659 MT's in quantity and 681.38 crores in value to U.K, 62545 MTs' in quantity and 600.45 crores in value to Malaysia. The main purpose of the laws is to protect the health and safety of their citizens. They allow import of food materials only when they conform to the provisions of their food laws and regulations.[144]

4.1.4 Why food quality?

The developed countries give top importance to the health of their citizens. The laws with respect to items of food are meant to guard the consumers from food of substandard quality, or those which are likely to be infected by impurities or poisonous materials. They should be free from the Aflatoxin, Sudan, and salmonella, free from pesticide residues. Therefore, any food item that we export, be it marine products, cashews, pepper, cardamom or ginger, it is significant that the product conforms to the quality standards required by the importing country. In the context of thousands of people getting tainted with food borne diseases or even dying of food poisoning, it is only just and sensible that countries which depend on imported food stuffs should take such tremendous precautions. Food materials that have become rotten, spoiled, infected with micro-organisms or contaminated by other impurities are either damaged by the import inspection authorities or sent back to the exporting country. This not only results in loss of market but also damages the exporting country's reputation.[145]

[143] Horticulture Statistics of Ministry of Agriculture, Govt. of India.
[144] Quality regulation procedures manual published by Spices Board.
[145] Hand book on Food safety and supply chain management of spices and botanicals ingredients by MIDH.

4.2 GLOBAL QUALITY NORMS FOR EXPORTING OF CHILIES AND TURMERIC FROM INDIA.

There are mainly four global quality standards that are followed for Chilli and Turmeric products. They are (1) FSSAI standards (2) Agmark standards, (3) ASTA standards and (4) European Union standards.

4.2.1 Food Safety Standards Authority of India (FSSAI)

4.2.1.1 What is FSSAI: -

Definition: Food Safety and Standards Authority of India (FSSAI) is an autonomous body established under the Ministry of Health & Family Welfare, Government of India. The FSSAI has been established under the Food Safety and Standards Act, 2006 which is a consolidating statute related to food safety and regulation in India. FSSAI is responsible for protecting and promoting public health through the regulation and supervision of food safety.[146]

4.2.1.2 FSSAI quality specifications for chilli whole and powder

Table No.4.1 FSSAI quality specifications for chilli whole and powder[147]

Standards	Whole chillies	Powder chillies
Extraneous matter	NMT 1.0% by weight	-
Unripe and marked fruits	NMT 2.0% by weight	-
Broken fruits, seeds & fragments.	NMT 5.0% by weight	-
Moisture content	NMT 11.0% by weight	NMT 11% by weight
Total ash on a dry basis	NMT 8.0% by weight	NMT 8% by weight
Hydrochloric acid insoluble ash on dry basis	NMT 1.3 % by weight	NMT 1.3 % by weight
Insect damage-matter	NMT 1.0% by weight	-

[146]Hand book of FSSAI regulations and guidelines, 2018.
[147] Hand book of FSSAI regulations and guidelines, 2018

Crude fibre	-	NMT 30% by weight
Non-volatile ether extract on a dry basis	-	NLT 12% by weight

NLT: Not less than NMT: Not more than

The above table no.4.1 is explaining FSSAI standards for chilli whole and powder. India also very stringent in quality and safety of spices which are using even domestic market also after the implementation FSSAI act in India. Each and every trader, processor, dealer and whole seller has to follow the act. The act has mentioned strictly about limitations of extraneous matter should be not more than 1.0 per cent by weight, unripe and marked fruits should be not more than 2 per cent by weight. broken fruits and seeds should be not more than 5 per cent, moisture content should be not more than 11 per cent in both whole and powder, total ash on a dry basis not more than 8 per cent both whole and powder.

4.2.1.3 FSSAI quality specifications for Turmeric whole and powder

Table No.4.2 FSSAI quality specifications for Turmeric whole and powder[148]

Standards	**Whole Turmeric**	**Powder Turmeric**
Extraneous matter	NMT 1.0 % by weight	-
Defective rhizomes	NMT 5.0 % by weight	-
Moisture	NMT 12.0 % by weight	NMT 10.0% by weight
Insect damaged matter	NMT 1.0% by weight	-
Test for lead chromate	Negative	Negative
Total ash on dry basis	-	NMT 9.0% by weight
Ash insoluble in dilute HCL on a dry basis	-	NMT1.5% by weight
Coloring powder expressed as curcuminoid content on a dry basis	-	NLT 2.0% by weight

[148] Hand book of FSSAI regulations and guidelines, 2018

Total starch	-	NMT 60.0% by weight

NLT: Not less than NMT: Not more than

The above table no.4.2 is explaining about the FSSAI quality standards for turmeric whole and powder. India is the largest exporter, producer and consumer of turmeric. Quality and safety is very important for spices exports. Within India each processor, traders and exporters has to follow the quality standards prescribed by the FSSAI. Extraneous matter should be not more than 1 per cent by weight, defective rhizomes not more than 5 per cent by weight, moisture not more than 12 per cent by weight to whole and 10 per cent for powder, insect damaged matter not more than 1 per cent by weight and total starch not more than 60 per cent by weight.

4.2.2 Agmark grade specifications chilli and turmeric.

4.2.2.1 What is Agmark: -

Definition: "AGMARK is a certification mark in use on farming products in India, assuring that they be conventional to a set of standards permitted by the Directorate of Marketing and Inspection an attached Office of the Department of Agriculture, Cooperation and Farmers Welfare under Ministry of Agricultural & Farmers Welfare an agency of the Government of India."[149]

"The term agmark was created by combination the words 'Ag' to mean agriculture and 'mark' for a certification mark. This expression was introduced originally in the bill obtainable in the parliament of India for the Agricultural Produce (Grading and Marking) Act".

Compulsory pre-shipment inspection and quality control for chillies under Agmark standards have been in place since 1962, till the relaxation in 1991. Even after such relaxation, considerable quantities of chillies are continued to be graded under Agmark prior to export. The quality factors considered under these specifications are colour, length of the pods, broken, damaged and discolored pods, loose seeds, foreign matter, moisture content, pods with or without stalks etc. Presence of mould, insect infestation, extraneous coloring matter, and other harmful substances are evaluated while examining the quality characteristics of the lot.

[149] Reports and publications of Directorate marketing and Inspection, Govt. of India.

4.2.2.2 Agmark grade specifications for Chilli (whole)

Table 4.3 Agmark grade specifications for Chilli (whole)[150]

Grade designation	Organic extraneous matter	In organic extraneous matter	Unripe and marked fruits	Broken fruits and garments	Moisture	Total ash	Acid insoluble ash	Capsaicinoid content
	% (m/m) max	% (m/m) max	% (m/m) max	% (m/m) max	% (m/m) Max	% (m/m) max	% (m/m) Max	% (m/m) min
Special	0.8	0.2	2.0	5.0	10.0	7.0	1.3	0.3
standard	4.0	1.0	5.0	15.0	12.0	8.0	1.3	Not specified

Source: Directorate of Marketing and Inspection.

Table No.4.3 is explaining about the agmark grade specification for special and standard grade chilli whole variety. In special grade chilly the organic extraneous matter should be 0.8 per cent of m/m, in organic extraneous matter 0.2 per cent of m/m, broken fruit and garments s 5.0 per cent of m/s, moisture should be max 10.0 of m/m, total ash max 7.0 per cent of m/m, Acid insoluble max 1.3 per cent of m/m, capsaicinoids content min of 0.3 per cent of m/m. In standard grade chilly the organic extraneous matter should be 4.0 per cent of m/m, in organic extraneous matter 1.0 per cent of m/m, broken fruit and garments s 15.0 per cent of m/s, moisture should be max 12.0 of m/m, total ash max 8.0 per cent of m/m, Acid insoluble max 1.3 per cent of m/m, capsaicinoids content not specified.

4.2.2.3 Agmark Grade specifications for chilli (Powder)

Table No.4.4 Agmark Grade specifications for chilli (Powder)[151]

	Moisture,	Total ash,	Acid	Crude	Nonvolatile	Capsaicinoid

[150] "Agmark grade specification for spices " published by Spices Board, page no. 8,9
[151] Agmark grade specification for spices "published by Spices Board, page no. 8,9

Grade Designation			insoluble ash	fiber	Ether extract	content
	% (m/m) (Max.)	% (m/m) (Max.)	% (m/m) (Max.)	% (m/m) (Max.)	% (m/m) (Min.)	% (m/m) (Min.)
Special	10.0	7.0	1.25	30.0	12.0	0.3
standard	12.0	8.0	1.30	30.0	12.0	Not specified

Source: Directorate of Marketing and Inspection.

Table 4.4 is explaining about the agmark specification for standard and special chilli powder. In special chilli standard moisture max 10.0 per cent of m/m, total ash max 7.0 per cent of m/m, acid insoluble ash max 1.25 per cent of m/m, crude fiber max 30.0 per cent 0f m/m, nonvolatile ether extract min 12.0 per cent of m/m and capsaicinoid content should be 0.3 per cent of m/m. In standard chilli standard moisture max 12.0 per cent of m/m, total ash max 8.0 per cent of m/m, acid insoluble ash max 1.30 per cent of m/m, crude fiber max 30.0 per cent of m/m, nonvolatile ether extract min 12.0 per cent of m/m and capsaicinoid content should be specified.

4.2.2.4 Agmark Grade designations and quality of Turmeric (whole)

Table No.4.5 Agmark Grade designations and quality of Turmeric (whole)

Grade designations	Organic extraneous matter	Inorganic extraneous matter	Defective rhizomes,	Moisture,	Curuminoid content
	(m/m) (Max.)	%(m/m) (Max.)	% (m/m) (Max.)	% (m/m) (Max.)	% (m/m) (Min.)

Special	0.8	0.2	3.0	12.0	2.0
Standard	1.5	0.5	5.0	12.0	Not specified

Source: Directorate of Marketing and Inspection.

Table no.4.5 is explaining about the agmark grade specification for special and standard grade turmeric whole. Special turmeric should have the organic extraneous matter max 0.8 % of m/m, inorganic extraneous matter max 0.2 % of m/s, defective rhizomes max 3.0 % of m/m, moisture max 12.0 % of m/m and curcuminoids content min 2.0 % of m/m. standard turmeric should have the organic extraneous matter max 1.5 % of m/m, inorganic extraneous matter max 0.5 % of m/s, defective rhizomes max 5.0 % of m/m, moisture max 12.0 % of m/m and curcuminoids content min not specified.

4.2.2.5 Agmark grade standards for turmeric (powder)

Table No. 4.6 Agmark grade standards for turmeric (powder)

Grade designation	Moisture (%w/w) max	Total ash (%w/w) max	Acid insoluble ash (% w/w) max	Lead Max (ppm)	Starch (% w/w) max	Chromate test
Special	10	7	1.5	2.5	60	Negative
Standard	12	9	1.5	2.5	60	Negative

Agmark grade standards for turmeric (powder)

Table no.4.6 is explaining about the agmark grade standards for special and standrard grade turmeric powder. Special turmeric powder should have the moisture content max 10.0 % of w/w, total ash max 7.0 % of w/w, acid insoluble ash max 1.5 % of w/w, lead max 2.5 ppm, starch max 60 % of w/w and chromate test should be negative. Standard turmeric powder should have the moisture content max 12.0 % of w/w, total ash max 9.0 % of w/w, acid insoluble ash max 1.5 % of w/w, lead max 2.5 ppm, starch max 60 % of w/w and chromate test should be negative.

4.2.3 ASTA standards for Chillii and Turmeric.

4.2.3.1 What is ASTA?

Definition: The American Spice Trade Association (ASTA) was established in New York City in 1907 to present demonstration for the American spice trade. Today, ASTA is based in Washington, D.C. and its members comprise companies involved in all aspects of the spice trade — importing, growing, processing, and marketing at the wholesale and retail levels. On behalf of its members, ASTA works with federal and state regulators and legislators, and help out its members in speak to a variety of issues to help its members provide a sufficient bring of secure and healthy spices for their industrial, food service, and consumer customers[152]

4.2.3.2 ASTA Cleanliness Specifications for chilli and Turmeric[153]

Table 4.7 ASTA Cleanliness Specifications for chilli and Turmeric

Name of the spice	Whole insect dead	Excreta Mammalian	Excreta, others	Mold	Insect defiled/ infested	Extraneous/ foreign matter
	By count	By mg/lb	By mg/lb	% By weight	% By weight	% By weight
Chilli	4	1	8	3	2.5	0.5
Turmeric	3	5	5	3	2.5	0.5

Source: USFDA source documents

Table No. 4.7 is the ASTA (American Spice Trade Association) cleanliness specifications were evolved for compliance by the spice importers of USA at the initiative of the US Food and Drug Administration (FDA). The objective of the policy of the FDA was to reach self-regulation understanding with spice importers so as to shift most of the work of sampling and analysis of spice imports from the FDA to the industry. It gave the industry the privilege of importing spices, under conditional release without formal FDA inspection. In exchange, the importers would guarantee that all spice shipments found to be adulterated would be properly cleaned/reconditioned and brought into compliance before giving entry/ into

[152] Hand book of American Standard Trade Association cleanliness specifications.
[153] ATSA cleanliness specifications for spices manual page no.12.

distribution channels or the shipment re-exported/destroyed if the defect is beyond reconditioning. The ASTA cleanliness specifications for unprocessed spices are supplementary to ASTA's import contract.

4.2.3.3 ASTA specifications for Ground Processed Spice

Table 4.8 ASTA specifications for Ground Processed Spice[154] (Cannot exceed limit shown)

Spices	Whole Equivalent Insects	Insect Fragments	Mites	Other Insects	Rats/Mouse Hairs	Animal Hairs
Ground Paprika	-	Avg. of more than 75 fragments/ 25g	-	-	Avg. of more than 75 fragments/ 25g	-

Source: Spices Board India

Table 4.8 is explaining about the ASTA specifications for ground spices and insect fragments should be average of more than 75 fragments/25g and Rats/muse hairs should be average of more than 75 fragments/25 grams.

4.2.4 European Spice Association standards for chilli and Turmeric

The European Spice Association, ESA, is the umbrella organisation of the European spice industry. Members of ESA are the national federations of the spice industry in the member countries of the European Union, Switzerland and Turkey. Associated membership of ESA is also available to national or international associations or organizations representing exporters/traders at origin and processors, packers/traders or associations from European countries (other than the European Union) that are able to satisfy the membership requirement.[155]

Definition: European Spice Association **is** a non-profit association representing the interests of its members in all matters pertaining to the processing, packing, quality assurance and food safety and/or marketing of herbs, spices and spice products (e.g. seasonings).

4.2.4.1 Europium Spices Association (ESA) quality and sanitation specification

[154] ATSA cleanliness specifications for spices manual page no.12.

[155] European Spice Association quality Standards documents page no.12

Table 4.9 Europium Spices Association (ESA) quality and sanitation specification[156]

Name of the spice	Extraneous Matter	Foreign Matter	Ash	Acid insoluble ash	Maximum water	Volatile oil
	%	%	%w/w max (ISO)	%w/w max	%w/w max	%w/w max
Turmeric whole	1	2	8(BSI)	2(BSI)	12(BSI)	2.5
Turmeric ground	1	2	9(ISO)	2.5(ISO)	10(ISO)	1.5(ESA)
Chilli	0.5	0.5	10	1.6	11	

Source: Quality policy stands of Spices Board India.

Table No.4.9 is explaining about the European spices' association quality and sanitation specifications for chilli, turmeric whole and powder. For turmeric whole extraneous matter 1%, foreign matter should be 2% ash max 8 % of w/w, Acid insoluble ash max 2% of w/w, maxim water 12% of w/w and volatile oil max 2.5 % of w/w. turmeric whole and powder. For turmeric ground extraneous matter 1%, foreign matter should be 2% ash max 9 % of w/w, Acid insoluble ash max 2.5% od w/w, maxim water 10% of w/w and volatile oil max 1.5 % of w/w. Chilly whole and powder. For turmeric whole extraneous matter 0.5%, foreign matter should be 0.5% ash max 10% of w/w, Acid insoluble ash max 1.6% of w/w, and maxim water 11% of w/w.

4.3. Quality standards of different countries for export of chilli, turmeric and chilli & turmeric containing products from India

Table 4.10 Quality standards of different countries for export of chilli, turmeric and chilli & turmeric containing products from India

Country/Region	Spices & Spice Products	Parameter	Maximum Limit
	Chilli Whole	Aflatoxin	Aflatoxin B1-5ppb

[156] European Spice Association quality Standards documents. page no.13-14

European Union	Turmeric whole		Aflotoxin total-10ppb
	Chilli powder & products Turmeric powder & products	Aflatoxin	Aflatoxin B1-5ppb Aflatoxin total-10ppb
		Sudan	Not Detected
USA	Chilli Whole	Aflatoxin Salmonella	Aflatoxin B1-5ppb Aflatoxin total-20ppb Absent in 25g
	Turmeric Whole		Aflatoxin B1-5ppb Aflatoxin total-20ppb
	Chilli powder & products Turmeric powder & products	Aflatoxin	Aflatoxin B1-5ppb Aflatoxin total-20ppb
		Sudan	Not Detected
Canada	Chilli Whole	Aflatoxin	Aflatoxin Total – 15 ppb
	Chilli Powder & Chilli Products	Aflatoxin Sudan I –IV	Aflatoxin Total – 15 ppb Not Detected
	Turmeric Powder	Sudan I-IV	Not Detected
South Africa	Chilli Whole	Aflatoxin	Aflatoxin B1 – 5 ppb Aflatoxin Total-10 ppb
	Chilli Powder & Chilli Products	Aflatoxin Sudan I-IV	Aflatoxin B1 – 5 ppb Aflatoxin Total-10 ppb Not Detected
North American Countries other than USA and Canada	Chilli Whole	Aflatoxin	Aflatoxin Total - 30 ppb
	Chilli Powder & Chilli Products	Aflatoxin Sudan I –IV	Aflatoxin Total – 30 ppb Not Detected
	Turmeric Powder	Sudan I-IV	Not detected

Japan	Chilli Whole	Aflatoxin Iprobenfos Profenofos Triazophos Ethion phorate Parathion Chlorpyrifos Methyl Parathion	Aflatoxin Total – 10 ppb <0.01 ppm <0.05 ppm <0.01 ppm <5.00 ppm <0.10 ppm <0.60 ppm <1.00 ppm <5.00 ppm
	Chilli Powder Curry Powder (containing chillies)	Aflatoxin Sudan I-IV Iprobenfos Profenofos Triazophos Ethion phorate Parathion Chlorpyrifos Methyl Parathion	Aflatoxin Total – 10 ppb Not Detected <0.01 ppm <0.05 ppm <0.01 ppm <5.00 ppm <0.10 ppm <0.60 ppm <1.00 ppm <5.00 ppm
	Turmeric whole	Iprobenfos Profenofos Triazophos Ethion Phorate Parathion Chlorpyrifos Methyl Parathion	<0.01 ppm <0.05 ppm <0.01 ppm <0.30 ppm <0.10 ppm <0.60 ppm <1.00 ppm <3.00 ppm
	Turmeric Powder	Sudan I-IV	Not Detected
		Iprobenfos Profenofos	<0.01 ppm <0.05 ppm

		Triazophos Ethion Phorate Parathion Chlorpyrifos Methyl Parathion	<0.01 ppm <0.30 ppm <0.10 ppm <0.60 ppm <1.00 ppm <3.00 ppm
Australia & New Zealand	Chilli Whole	Aflatoxin	Aflatoxin Total – 15 ppb
	Chilli Powder & Chilli Products	Aflatoxin Sudan I-IV	Aflatoxin Total- 15 ppb Not Detected
	Turmeric Powder	Sudan I-IV	Not Detected
Malaysia	Chilli Whole	Aflatoxin	Aflatoxin B1- 5 ppb Aflatoxin Total-10 ppb
	Chilli Powder & Chilli Products	Aflatoxin Sudan I-IV	Aflatoxin B1- 5ppb Aflatoxin Total –10 ppb Not Detected
Other countries	Chilli Whole	Aflatoxin	Aflatoxin Total – 30 ppb
	Chilli Powder & Chilli Products	Aflatoxin Sudan I-IV	Aflatoxin Total – 30 ppb Not Detected

Source: The Research Reporter compiled from Spices Board quality documents

Table No.4.10 is explaining about the global standards for export of Chlli and Turmeric and containing spices products from India. Each country/region like European Union, USA, North American countries other than USA and Canada, Japan and other countries have certain maximum limits for different parameters for different products. These products may be chilli whole, crushed and ground, Turmeric whole and ground and chilli and turmeric containing products. Each country has fixed the aflatoxin, Sudan I-IV, pesticide residues level based on the country standards.EU fixed the Aflatoxin B1 level should be 5 ppb and total aflatoxin level is 10ppb and Sudan should not be detected. USA fixed the aflatoxin levels for chilli whole is

total aflatoxin is 20ppb and salmonella should be absent and Sudan in Turmeric powder should be absent. Canada fixed the total aflatoxin 15ppb and Sudan should not be detected. South Africa and Japan fixed the total aflatoxin is 10ppb and Sudan should not be detected. North American countries other than USA, Canada and other countries has fixed the total Aflatoxin is 30ppb and Sudan I-IV should not be detected.

4.3.1 What is Aflatoxin?

Aflatoxin is a family of toxins produced by certain fungi that are found on agricultural crops such as Chilli, maize (corn), peanuts, cottonseed, and tree nuts. The main fungi that produce aflatoxin are Aspergillus flavus and Aspergillus parasiticus, which are abundant in warm and humid regions of the world. Aflatoxin-producing fungi can contaminate crops in the field, at harvest, and during storage.[157]

4.3.2 What are Sudan dyes?

Sudan dyes are synthetic chemical dyes of similar chemical structure. They are aromatic compounds containing azo group (- N=N -). Sudan I, II, III and IV are kinds of the Sudan red dyes. They can be generally applied for colouring substances such as hydrocarbon solvents, oils, fats, waxes and plastics. Sudan II and III can also be used in cosmetics and drugs applied externally whereas Sudan IV (also known as scarlet red) can be used in veterinary and human medicine as an ointment or dressings for stimulating wound healing.

Sudan I was considered by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) in 1973 to be unsafe for use in food, on the basis of toxicological evidence. Although Sudan dyes have been reported as contact allergens and sensitizers, the greatest concern has been on their possible carcinogenicity.[158]

4.3.3 What is Salmonella?

Salmonella is one of the most common causes of food poisoning in the United States. Each year, salmonella infections, called salmonellosis, sicken more than 1 million people. Up to 450 die from salmonella poisoning annually. The common bacteria “can live in many

[157] Food safety training manual published by USFDA, Spices Board and CII.
[158] Food safety training manual published by USFDA, Spices Board and CII.

animals, such as livestock, pets, reptiles, and sometimes humans," says Alan Taege, MD, an infectious diseases specialist at the Cleveland Clinic.[159]

4.3.4 What is a Pesticide Residue?

Pesticides are used to protect crops against insects, weeds, fungi and other pests. Pesticides are potentially toxic to humans and can have both acute and chronic health effects, depending on the quantity and ways in which a person is exposed. Some of the older, cheaper pesticides can remain for years in soil and water. These chemicals have been banned from agricultural use in developed countries, but they are still used in many developing countries.

People who face the greatest health risks from exposure to pesticides are those who come into contact with them at work, in their home or garden. Pesticides play a significant role in food production. They protect or increase yields and the number of times per year a crop can be grown on the same land. This is particularly important in countries that face food shortages.[160]

4.3.5 What is Mould?

Mould is a type of fungi that are naturally occurring organisms playing a major role in the earth's ecosystem. Mould grows best in damp and poorly ventilated areas, and reproduces by making spores. Moulds are present virtually everywhere, indoors and outdoors and can grow in and on materials such as food and food products. Mould growth occurs when there is a water source (food source) or moisture present in an environment with limited or no sunlight.[161]

4.3.6 What are Mycotoxins?

Mycotoxins are naturally occurring toxins produced by certain moulds (fungi) and can be found in food. The moulds grow on a variety of different crops and foodstuffs including cereals, nuts, spices, dried fruits, apples and coffee beans, often under warm and humid conditions. Mycotoxins can cause a variety of adverse health effects and pose a serious health threat to both humans and livestock. The adverse health effects of mycotoxins range from acute poisoning to long-term effects such as immune deficiency and cancer.

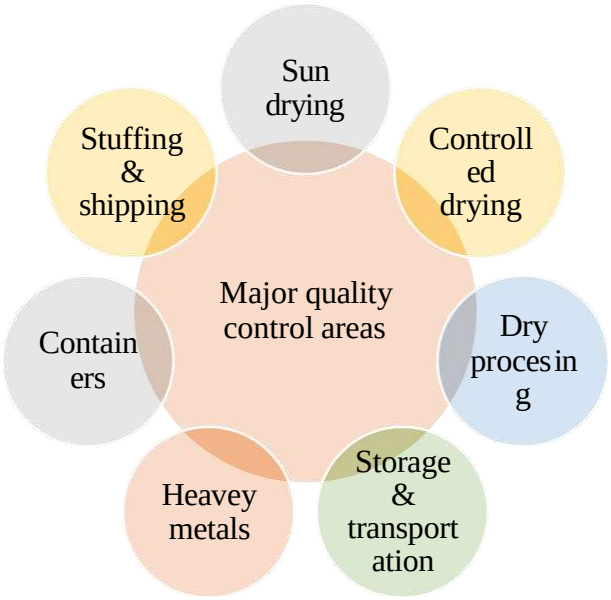
[159] Food safety training manual published by USFDA, Spices Board and CII.
[160] WHO FOSCOLLAB quality control database reports.
[161] WHO FOSCOLLAB quality control database reports.

A scientific expert committee jointly convened by WHO and the Food and Agriculture Organization of the United Nations (FAO) – called JECFA – is the international body responsible for evaluating the health risk from natural toxins including mycotoxins. International standards and codes of practice to limit exposure to mycotoxins from certain foods are established by the Codex Alimentarius Commission based on JECFA assessments.[162]

4.4 MAJOR QUALITY CONTROL AREAS [163]

Even though India has been in the largest producer, consumer and exporters of no. of spices and exporting to many nations. All the nations are demanding the quality and safety food from India. The imposition of quality standards by importing countries resulted in efforts for quality assurance. India needs to take the necessary steps to develop and inculcate good post-harvest management right from the stage of harvesting particularly in chilli and Turmeric.

Figure No.4.1 Major Quality Control Areas



4.4.1 Harvesting

The soil under the plant should be covered with a clean sheet of plastic during picking to avoid fruits getting contaminated by dirt or mixed up with mould fruits that have fallen prior to harvesting. Fallen fruit and leaves should be removed from the area as they provide the correct rising conditions for moulds.

[162] World Health Organization pesticide residue series manual 5.
[163] Post-harvest profile of Chilli and Turmeric document by Directorate of Marketing and Inspection, 2009.

Fruits that have fallen to the ground are recognized to be vulnerable to mould growth. Fruits that are precious by mould or infected should be removed. instead, the raw spice fallen to the ground should be collected separately, washed, cleaned, dried and evaluated prior to any addition within the main lot.

Process fresh spices as quickly as possible. Avoid storage of fruits, especially ripe and over-ripe ones, as any period of storage (in a bag or in a pile) increases the likelihood of mould growth. Anywhere possible starts drying on the day of harvesting.

4.4.2 Sun Drying

Do not dry on naked soil. Use trays, tarpaulins, bamboo mats or drying yards and make sure that these are clean as it is known that mould spores from earlier use could re-contaminate product during drying. Techniques for cleaning all of the above should be taught to the farmers. The layer of drying fruits or leaves should not be more than 4 cm thick. Drying fruits or leaves must be regularly raked (5-10 times per day).

Protect fruits during drying from rain and night dew and make sure that any fruit does not get any re-wetting during storage or any other time. Drying areas should be raised from the ground to prevent pest ingress and the potential effect this could have on mycotoxins generation, amongst other issues. Pathways should be made in the drying area to prevent anyone walking on the crop, as this can damage the pods and allows mould growth to occur.

4.4.3 Controlled Drying

To give better quality, reduced bacterial loads and ensure less risk of mycotoxin growth a system of controlled drying can be employed. Solar drying is one method, wherever crops are protected in polythene tunnels and the temperature is controlled through the use of air movement. Such tunnels should be designed so that the risk of condensation falling onto the drying crop is eliminated.

Hot air drying can also be employed and be concerned should be taken to ensure that there is no risk of fumes from the fuel coming into contact with the product. This can be best accomplished through the use of a heat exchanger so that only clean air comes into contact with the product. A solar heat exchanger can also be used where hot air produced from the sun’s rays on a heat exchanger are feed into a unit which contains the spice spread on a fine wire mesh.

4.4.4 Dry Processing

The site processing plant should be in a dry area, as moist, humid conditions such as those found on swampy land, encourage the growth of mould. There should be separation between raw material receipt, cleaning, washing, processing and storage, to prevent any cross contamination. Arrange of waste from wet processing, such as the washing and peeling of ginger, away from clean dry spices. Keep equipment and facilities clean, make sure they have any debris removed prior to using and make sure the equipment is dry before use. Use clean dry bags for storing and transporting dry, cleaned spices and keep dried spices away from any damp material or areas.

4.4.5 Heavy Metals

Heavy metals are chemicals that are known to be toxic to humans and are often not possible for the human body to metabolize. Therefore, their occurrence needs to be controlled, and should not exceed the Codex maximum residue limits, to stop a buildup in the body over a period of time.

Within the spice industry a number of possible heavy metal problems exist, and, whilst their occurrence is not currently considered to be a major problem, this guide offers advice to ensure that their presence in spices is prevented. Typical heavy metals found in spices are lead, cadmium, zinc, tin, arsenic and copper.

4.4.6 Potential Sources

It is important that in spice growing and processing areas the disposal of batteries, whether car or portable device batteries, should be disposed of correctly to ensure that they do not decay and contaminate growing areas.

A monitoring programme should be recognized to ensure that any naturally occurring heavy metals, for example from natural ores present in the soil, do not become a potential problem for the spices. This is particularly important for spices where ore is processed locally having the potential to contaminate the local water supply.

4.4.7 Storage and Transportation

It is also important to ensure that product is stored off the floor and away from the walls so that any potential condensation does not rewet the product. In addition, there should be good

air movement through the warehouse to prevent sweating and mould formation. Temperatures within large warehouses can achieve levels ideal for mould growth, particularly towards the roof, thus suitable ventilation should be provided to ensure that both temperature and humidity are correctly managed. When product is moved into or out off the warehouse ensure it is protected from the rain during transportation.

Make regular checks to ensure that the truck is covered and that there are no rips in the covers and no leaks on the undersides of trucks which would allow water from the road to get into the truck. Check from the inside by closing all doors and looking for holes where daylight is visible. Trucks must be clean, dry and odour-free. This also prevents cross contamination from previously transported products (see allergens). Do not load and unload trucks if the product is exposed to rain. Provide shelter so that the spice does not get wet during this operation.

4.4.8 Containers

Do not use spoiled containers. Ensure there are no water leaks. Rust spots on the roof and sides of containers can be a sign of leakage. Check from the surrounded by during daylight hours by closing all doors and looking for holes and unwanted smells. Ensure that the containers have not been previously used for dangerous and hazardous cargoes according to the criteria set by IMCO (International Maritime Organization). These are cargos such as solid or liquid chemicals and other materials, gases and products for and of the oil refinery industry, and waste chemicals and other cargos which have a damaging effect on foodstuffs.

4.4.9 Stuffing and Shipping

Make sure that pallets or wooden floors of containers are dry. Spices absorb moisture quickly if the bags get wet and as a result the moisture content increases considerably. Lining a container using cardboard, (single-side corrugated and waxed on the inside) has proven to be the best protection against condensation for bags in containers. Kraft paper has also been used successfully. Control that the lining is properly fastened, particularly in the ceiling so that the lining will not fall down and settle on the top bags When stuffing the container, bags or bulk, keep spices away from the roof. Bags should preferably be placed on a layer of pallets to avoid contact with the floor where condensation from the ceiling and walls may gather

Enough top space between bags and the roof is important. Use the saddle stow method, which minimizes side contact and maximizes airflow between the bags. The storage,

transportation and shipping advice in this section is also applicable to all other sections of this document.

4.4.10 Factors affecting the quality of food products

Right from the initial stages of production to the time until the turn out reaches the patron, the farmer must combat several unfavorable circumstances. Among these are pests, micro-organisms that infest the farmland, foreign matter which can be dangerous or otherwise, toxic substances or impurities that get into product from materials employed in process, micro-organisms and dirt introduced into the merchandise through unhealthful practices of the people that handle the turn out, in addition as loss of quality that results from short-comings in storage practices.

4.4.11 what is adulterated food?

The word 'adulterated' includes a completely different connotation within the developed countries. Things of food littered with pests, microbes or fungi become impure and unfit for human consumption. The presence of foreign matter, wet content on top of permissible levels, residues of pesticides, presence of alternative chemicals etc., additionally build food unfit for human consumption. Importing countries like USA and Japan detain foreign foods once they have proof that these were made and processed below insanitary conditions, and subject to additional action reckoning on the degree of contamination.[164]

4.4.12 the consumer and the contaminants in food stuffs

Pathogenic organisms which get into food stuffs cause diseases to the consumer. Toxins produced by the microbes cause food poisoning. Toxins secreted by certain fungi also have been proved to cause cancer. The excreta of rodents and birds contain millions of microbes. These can cause deadly diseases as well as poisoning due to toxin. Rodent excreta contain chemicals which may cause cancer. Food stuffs processed in dirty and unhygienic conditions are rejected by the consumers. They also begin to suspect any product originating from countries which have been guilty of exporting such contaminated products. Moreover, the consumers organize themselves and apply pressure on the government for stringent measures. Such a situation seriously affects the export trade of the producing countries.

[164] Food safety and supply chain management training manual published by UMFDA, Spices Board and CII.

4.4.13 New trends in the international market

Stringent health and food law exists altogether developed countries. These countries usually revise such laws within the light-weight of recent scientific findings. For instance, it'd therefore happen that watching to seek out the presence of bound sickness inflicting organisms in food stuffs is formed obligatory all on a explosive. Similarly, changes are usually created within the tolerance levels of chemical residues. These countries also are steady delivery down the permissible levels of different impurities. So scientific and technological advancement brings forth new challenges within the export trade. The health and food laws that are progressively changing into demanding replicate the grave concern of the various governments for the protection and welfare of their individuals.

A new consciousness is growing everywhere the planet concerning disease-causing organisms, toxic substances and impurities. Parallel to the present, the degree of excellence that shoppers expect from foods is additionally growing. Exportation countries are so forced to keep up quality standards set by the commercialism countries. In step with projections created by the Food and Agriculture Organization, food exports can register vital growth within the next decade. Increasing our share during this increasing market offers chance similarly as a challenge.

We export spices principally to developed countries like USA, UK, Germany, different European Countries, Japan, Canada etc. These countries have horribly demanding food laws and laws to confirm that foods that embody spices, are safe, whole - some and created below hygienically and hygienic conditions. Thence spices exported into these countries ought to be free from microorganism contamination, mold, mycotoxins, harmful chemicals together with chemical residues and different pollutants, insect infestation and filth contributed by animals, insects or unsanitary conditions within the farm, warehouse, package or carrier. The priority of the commercialism countries concerning food safety and quality is comprehensible as many cases of food borne diseases and sickness occur in these countries as a result of overwhelming contaminated food.

FDA conjointly administers police work programmes to watch for chemical residues in spices, The United States of America Environmental Protection Agency (EPA) enforces them through compliance programmes. Common Market Countries represent a serious marketplace for Indian Spices. Most Common Market Countries import spices in accordance with prevailing food laws. European country has specifications for varied quality parameters of spices. Federal Republic of Germany has prescribed tolerance levels for chemical residues. The German

specifications are imagined to be the foremost demanding. The Dutch law conjointly prescribes most residues for pesticides in spices. The food business and spice processers in U.K. follow the limit for pesticides prescribed within the German specifications in the absence of U.K. Specifications.

4.4.14 Spice-wise exports in 2015-16, 2022-23 and 2017-18

Table No. 4.11 Spice-wise exports in 2015-16,2022-23 and 2017-18

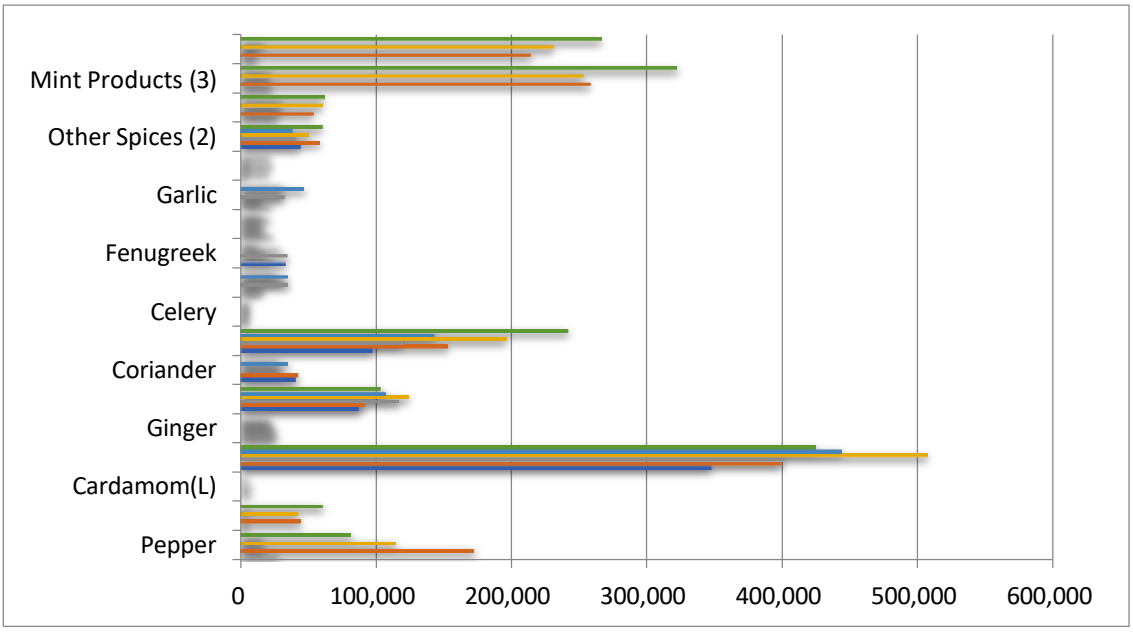
Item	2015-16		2022-23		2023-24	
	Quantity (MT)	**Value (lakhs)**	**Quantity (MT)**	**Value (lakhs)**	**Quantity (MT)**	**Value (lakhs)**
Pepper	28,100	173042	17,600	114313	16,840	82078
Cardamom(S)	5,500	44983	3,850	42150	5,680	60908
Cardamom(L)	600	7551	780	8266	760	5654
Chilli	3,47,500	399744	4,00,250	507075	4,43,900	425633
Ginger	24,800	27596	24,950	25705	22,605	21606
Turmeric	88,500	92165	1,16,500	124189	1,07,300	103567
Coriander	40,100	42681	30,300	29208	35,185	27274
Cumin	97,790	153113	1,19,000	196320	1,43,670	241799
Celery	5,310	5328	6,250	6246	6,480	5950
Fennel	15,320	17240	35,150	30876	34,550	25906
Fenugreek	33,330	23381	34,680	18277	29,280	12689
Other Seeds (1)	23,880	16206	18,100	15455	22,175	16045
Garlic	23,085	15959	32,200	30712	46,980	30936
Nutmeg & Mace	4,050	20928	5,070	23642	5,500	22094
Other Spices (2)	43,955	58349	40,210	50595	38,305	60192
Curry Powder/Paste	26,550	53175	28,500	59910	30,150	61619
Mint Products (3)	23,250	258130	22,300	252750	21,500	322835
Spice Oils & Oleoresins	11,635	214255	12,100	230775	17,200	266172
TOTAL	8,43,255	1623823	9,47,790	1766461	10,28,060	1792955

Source: The Research Reporter collected the data from Spices Board statistics

Table No.4.11 During 2023-24, the export of Indian spices continued its increasing trend and achieved an all time record in both volume and value. A total of 10,28,060 tonnes of spices and spice products valued at `17929.55 crores (US$ 2781.46 Million) has been exported from the country as against 9,47,790 tonnes valued at ` 17664.61 crores (US$ 2633.29 Million) in 2022-23, registering an boost of 6588% in volume, 1% in rupee terms and 6% in dollar terms of value. With regard to the spices export target of 10,23,000 tons valued at 17665.10 crore

(US$2636.58million) for 2023-24, the achievement was 100% in terms of volume,101% in rupee and 105% in dollar terms of value. During 2023-24, the export of cardamom (small), cumin, garlic etc recorded an increase both in volume and value as compared to 2022-23. The export of value-added products such as curry powder/paste, spice oils & oleoresins etc. showed an increase both in volume and value when compared to 2022-23.

Graph No.4.1 Spice-wise exports in 2015-16, 2022-23 and 2023-24

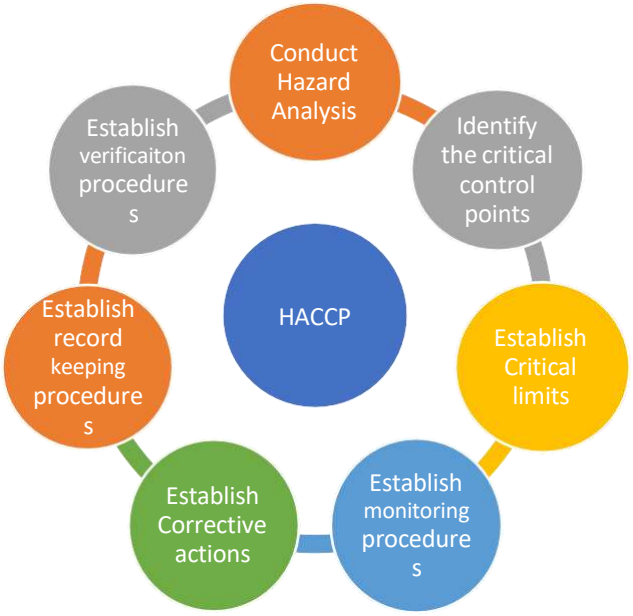


Source: The Research Reported compiled data from Spics Board statistics.

4.5 HAZARD ANALYSIS CRITICAL CONTROL POINT (HACCP)

A HACCP System requires that potential hazards are recognized and prohibited at specific points in the process. This includes biological, chemical or physical hazards. Any company involved in the manufacturing, processing or handling of food products can use HACCP to reduce or abolish food safety hazards in their product.

Figure No.4.2 HACCP process



4.5.1 What is Hazard?

Definition: -A hazard is an agent which has the potential to cause harm to a vulnerable target. The terms "hazard" and "risk" are often used interchangeably. However, in terms of risk assessment, they are two very distinct terms. A hazard is any agent that can cause harm or damage to humans, property, or the environment. Risk is defined as the probability that exposure to a hazard will lead to a negative consequence, or more simply, a hazard poses no risk if there is no exposure to that hazard.

4.5.2 What is Critical Control Point (CCP):

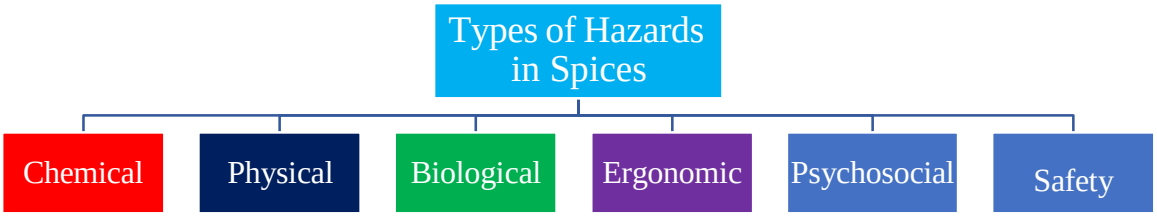
Definition: Critical Control Point is a step at which control can be functional and is crucial to avoid or eradicate a food safety hazard or decrease it to a satisfactory level.

4.6 Types of Hazards

There are six primary types of hazards to consider when conducting a hazard analysis. They include the following:

- Chemical Hazards
- Physical Hazards
- Biological Hazards
- Ergonomic Hazards
- Psychosocial Hazards
- Safety Hazards

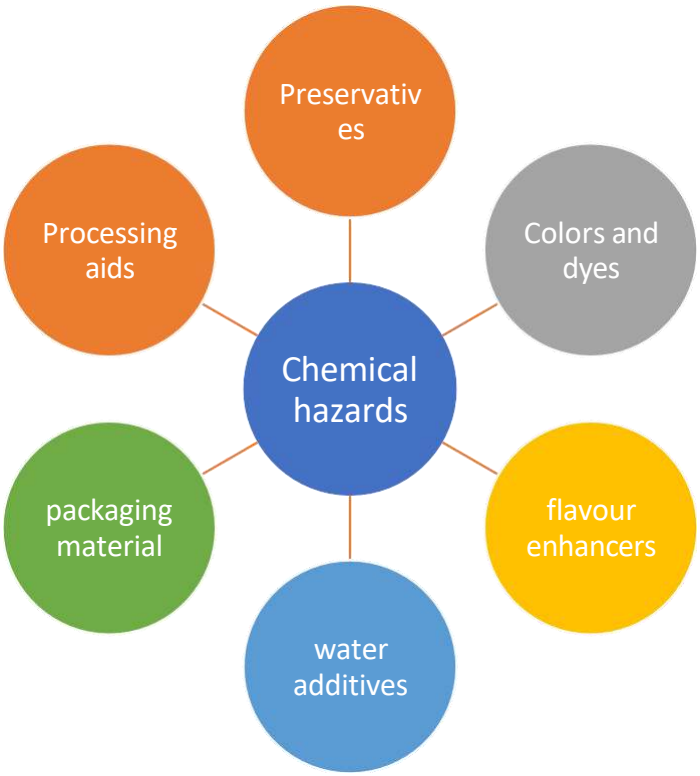
Figure 4.3 Types of Hazards



4.6.1 CHEMICAL HAZARDS

A wide variety of chemicals are used in food production and processing. Some chemicals, such as pesticides used in growing spices, cannot be removed by a subsequent process thus their control needs to be prior to the intake of the facility. This would normally be through controls in GAP or through product testing / rejection upon arrival. However, there are chemicals in processing facilities and manufacturing plants that should be rigorously controlled. These include such items as sanitizers, lubricants, pest control chemicals used within a processing facility and water treatment additives, plus chemicals added to the manufacturing process for a specific process. While most of these chemicals do not pose a health hazard when used properly, some are capable of causing serious health problems if used incorrectly.

Figure 4.4 Chemical hazards

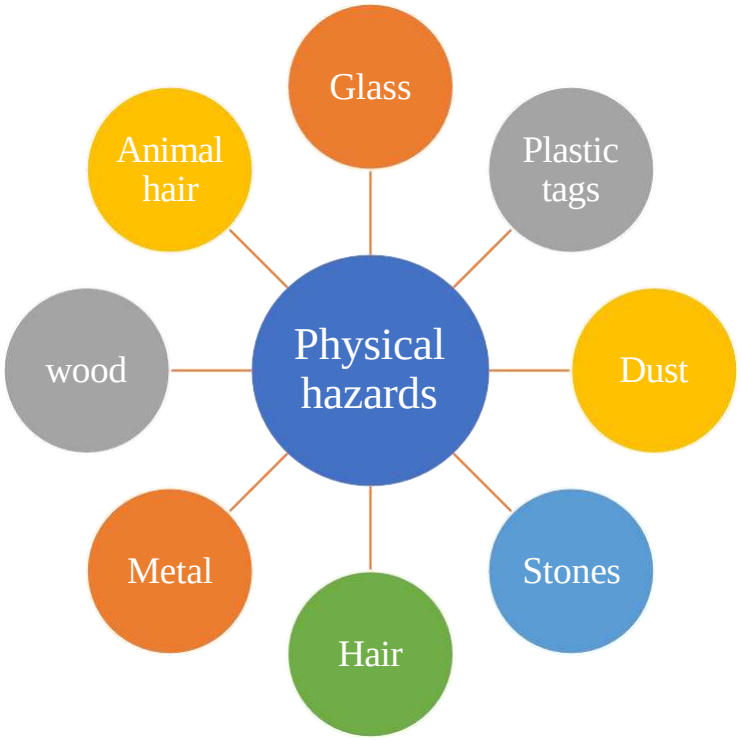


Some chemical hazards occur in foods due to poor growing or handling conditions or natural conditions that cannot be controlled. Some toxins originating from microorganisms, molds or bacteria are often considered ‘naturally occurring’.

4.6.2 PHYSICAL HAZARDS

For the spice and seasoning industries, a major objective is to remove physical hazards. This is true for any industry that deals with field or comparable materials. Physical hazards usually result in personal injuries, such as a cut from glass or a case of choking from foreign materials. The ASTA Cleanliness Specifications list extraneous/foreign matter that is considered to be a physical hazard. The list includes, but is not limited to; stones, dirt, wire, string, stems, sticks, nontoxic foreign seeds, excreta, manure and other animal contamination. For HACCP plans, the hazards should be classified as a health risk, legal requirement, aesthetic or ethical problem.

Figure 4.5 Physical hazards



Physical hazard points of entry into the products are in the field, in-transit, deliberate by employees or others, equipment failure, and poorly maintained facilities and equipment. Controlling foreign objects in raw materials can be started by specifications, letters of guarantee and vendor inspection and certifications.

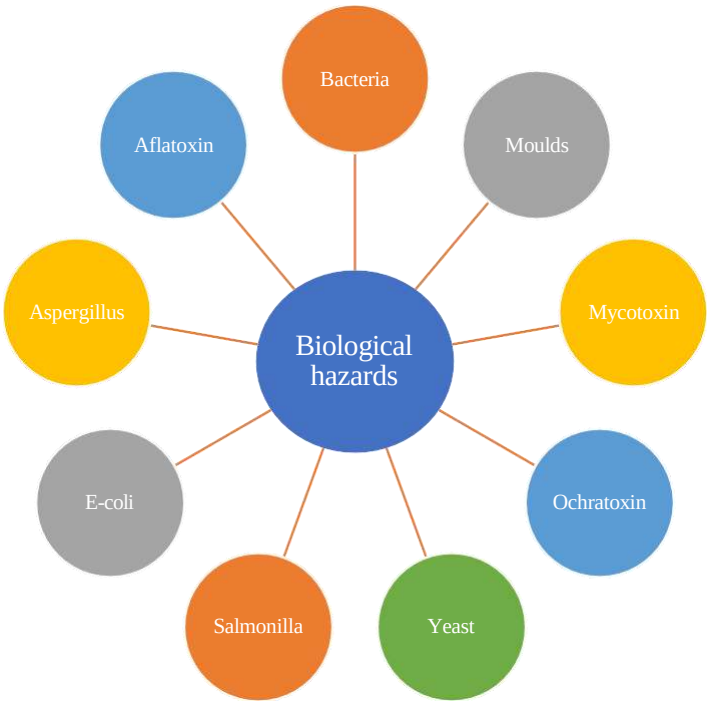
Contaminants in facilities can be controlled with strict compliance to GMPs and having prerequisite programs that include insect and pest control, properly protected light fixtures, sanitation, etc. Adherence to regulatory guidelines regarding proper clothing for employees and the absence of jewelry will prevent many problems. Employee education is necessary to help control these foreign materials.

4.6.3 BIOLOGICAL HAZARDS

Due to the environment in which they are grown, spices and herbs often harbor large numbers of bacteria and fungi, including potential spoilage organisms and occasionally organisms of public health significance. In general, roots, berries, and herbs carry a greater microbial load than bark and seed products. Although a number of microorganisms are killed during the drying of spices and herbs, many bacteria and molds survive. If the products are not stored and shipped properly, problems may occur. In addition, when spices are incorporated into various food

products, such as processed meats or dairy ingredients, the foods are capable of supporting growth of the microorganisms.

Figure 4.6 Biological Hazards

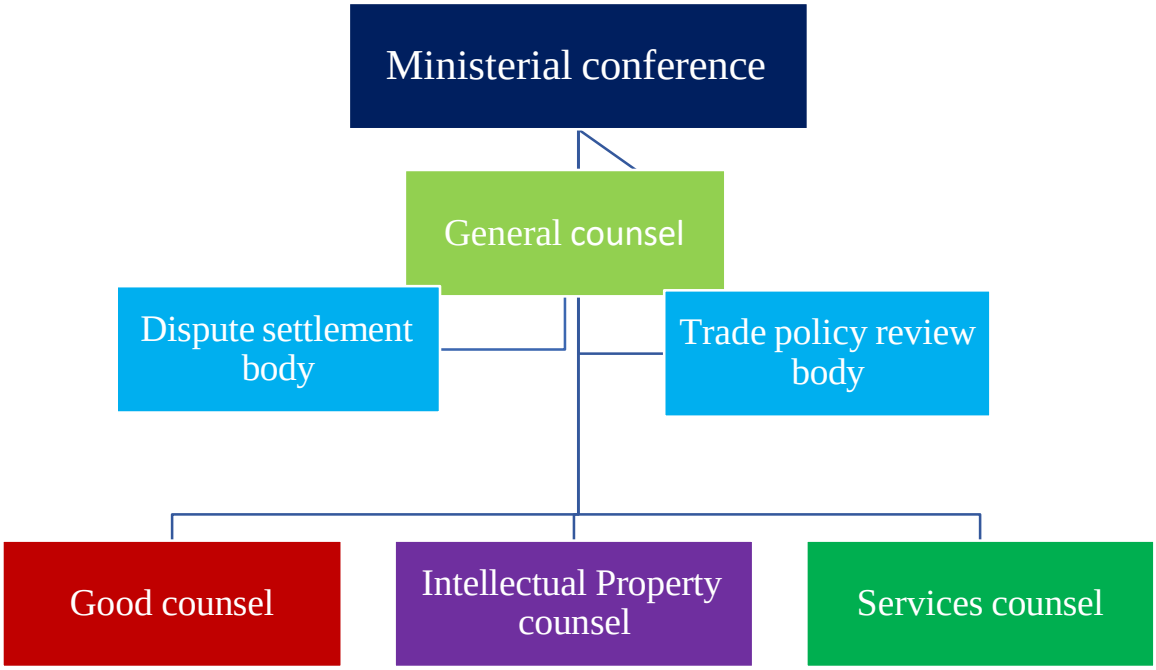


The bacterial and fungal species in spices include aerobic spoilage organisms, spore forming bacteria, high heat stable toxin producing bacteria, proteolytic and gas-producing bacteria, and mycotoxin-producing microorganisms. Of all the spices, black pepper typically has the highest aerobic plate counts, usually in excess of 106 cfu/ g. Paprika, celery seed, coriander, turmeric, thyme, basil and other spices can also have plate counts in the millions per gram.

4.7 ORIGIN OF WORLD TRADE ORGANIZATION-AGREEMENTS

The long-drawn-out recession before the World War II in the West was accredited to the excessive protectionism followed by the industrialized countries. This led to a variety of negotiations to

Figure 4.7. Structure of World Trade Organization



Source: WTO website

avoid protectionism policies and to rejuvenate the economies from the slump. The Bretten woods Conference 1944, be presented by 44 non-communist nations at Bretton woods, New Hampshire, USA was a important step. The conference was sponsored by the United States, United Kingdom, France, erstwhile USSR and China. At the symposium the British economist J.M. Keynes and the Advisor to the American secretary of treasury H.D. White extended several proposals for creating a global economic order. All the participants discussed the possibility of the proposals. The conference recommended the organization of International Monetary Fund (IMF), International Bank for Reconstruction and Development (IBRD) and International Trade Organization (ITO). Although the IMF and the World Bank (i.e IBRD) were established in 1946, the suggestion for the ITO did not materialize; instead the GATT, a less determined organization (or better say, a package of multi lateral trade agreements) was formed in 1948.

The GATT, which had been drawn up only as an temporary accord to fill the gap until the ITO charter was satisfied, became the structure for international trading system since 1948. Initially there were only 23 founding countries that became the GATT members (officially "the contracting parties"). For approximately half a century the GATT's basic legal text stay behind as it was in1948. There were accompaniments in the form of "plurilateral" agreements (i.e with voluntary membership) and effort to decrease tariffs further continued. Much of this was achieved through a series of multilateral negotiations known as "Trade Rounds" which were held under the GATT's auspices. There were eight such Trade Rounds known by unusual names.

The eighth round of trade cooperation usually known as the Uruguay Round was the latest and the most widespread of all and which spread over between 1986 and 1994. It took seven years for its conclusion on 15th December 1993, and there upon the Final Act was signed on 15th April 1994 at Marrakesh Morocco, (and therefore the Final Act is also recognized as the Marrakech Declaration.) As a result, replacing GATT, the World Trade Organization (WTO) was established on 1st January 1995.

The WTO, a global organization of 149 countries, is now a forum for negotiating international trade agreements and the monitoring and regulating body for implementing the agreements. It is viewed as the third pillar of international business, the first and the second being the IMF and IBRD; while the IMF mostly provides short term intercontinental finance and the IBRD provides long term international finance, the WTO enlarges the worldwide business. According to the Marrakesh Declaration, the results of the Uruguay round would make stronger the world economy and lead to more trade, venture, service and income growth all through the world.

India is one of the originator members of the IMF, IBRD and WTO. India signed the Marrakech Declaration at Morocco on 15th April 1994 along with other 164 countries. WTO is the only international body dealing with the rules of trade between nations. The trading system activated by the WTO is known as the bilateral trading system.

4.7.1 WTO Agreements and Spices Trade:

Spices are the tropical products produced and exported mainly by developing countries. Keeping in mind the special troubles of tropical products to their economies, developed countries had agreed long before the conclusion of the Uruguay Round to reduce tariffs on them a most-favored nation (MFN) basis and to eradicate non-tariff measures. However, the Final Act will without doubt have an impact on the spices trade in India.

4.7.2 Agreement on Agriculture (AOA)

During the Uruguay Round of trade negotiations, it was felt that the immense subsidies given by developed countries to their agricultural sectors over decades had distorted the intercontinental trade in agricultural products. Subsidization and concurred agricultural policies had led to over-production of assured items, import limitations, and dumping on global markets. In its prelude, the Agreement on Agriculture states its aim as follows: "to establish a fair and market-oriented agricultural trading system" by providing for substantial progressive reductions in agricultural sustain and protection. Over an agreed period of time, resulting in correcting and preventing limitations and distortions in world agricultural markets". The preamble also specifies the Agreement's areas of coverage as follows: "Market access; Domestic support; Export competition; and Sanitary and Phytosanitary issues".

The Agreement acknowledges that developing country members have particular needs and that therefore differential and more favorable actions should be accorded to them. Particular mention is made of less developed countries (LDCs) and net food-importing on the rise countries, for which special provisions are made in the Decision on Measures Concerning the Possible Negative Effects of the Reform Program on Least-Developed and Net Food-Importing Developing Countries.

The important provisions of AOA affecting spices trade are contained in its clauses relating to market access, domestic support and export competition. Under the marketplace access provision, the Agreement imposes new rules in regard to the use, for import-control purposes, of non-tariff border measures such as quantitative import restrictions, variable import levies, minimum import prices, discretionary import licensing, non-tariff measures maintained through State trading enterprises, and voluntary export restraints. First, members agreed to change all their accessible non-tariff measures into tariff equivalents (the tariffication process)

and to restore them by tariffs. Second, members agreed not to "maintain, resort to, or revert to any measures of the kind which have been required to be converted into ordinary customs duties". As a result, market access for agricultural foodstuffs is now governed completely by tariffs. Third, members agreed to bind against additional increases in the tariffs consequential from tariffication and other tariffs on agricultural products.

Under the domestic support provision, the Agreement establishes a ceiling on the total domestic support that governments may provide to agricultural producers. Expressed in financial terms, this support is referred to as the Total combined Measurement of Support or Total AMS. It covers all maintain provided on either a product-specific or non-product-specific basis that does not qualify for exemption. The Total AMS is calculated as the sum of all AMS for basic farming products, all non-product-specific AMS, and all corresponding measurements of maintain for agricultural products.

Under the Export opposition clause, the Agreement has placed certain export subsidies under discipline. The export subsidies subject to decrease commitments under the conformity on Agriculture are;

A Direct subsidies by governments or their agencies to exports by governments or their agencies of non-commercial stocks at prices lower than the comparable price for the like product in the buyer's domestic market;

B Payments on the export of agricultural produce that are financed by virtue of governmental action;

C Subsidies to reduce the costs of marketing agricultural exports including handling, upgrading and other processing costs and the costs of international transport and freight;

D Subsidies on internal transport and freight charges for export shipments; and

E Subsidies on agricultural products contingent on their incorporation in exported products.

4.7.3 Impact of the Agreement on Spices Trade

It has been estimated that tariffs on spices would come down by 52 per cent in developed countries. However, except for consumer packs and ground spices in a few countries, most spices were imported at zero rates of duty under GSP and other preferential trade arrangements. A reduction in MFN tariffs therefore may not significantly improve market access. By contrast, the removal of quantitative restrictions and other non-tariff measures can be expected to have a beneficial effect on market access.

The MFN and GSP tariff schedules of developed country markets show higher tariffs for ground and processed spices, and spices put up in containers for retail sale. Progressive reduction could bring competitive advantages for spice-producing countries. However, the erosion of preference margins for developing countries will remain a major concern.

As spice cultivation is highly labour intensive, developing countries may be able to obtain a higher share of the market by taking advantage of their low labour costs. Developing countries will also be able to continue their support programmes for reducing freight and transportation disadvantages. This will give their products a competitive edge. In many developing countries, direct input subsidies and investment subsidies are targeted to low-income and resource-poor farmers. As most farmers in the spice sector are low-income and resource-poor, most subsidy programmes can be continued in this sector without violating the provisions of the WTO Agreement.

As the tariffs on spices and spice products in the pre-Uruguay Round period have been low, and most spice-producing countries have been exporting spices under special preferential arrangements (such as the Generalized System of Preferences (GSP), the impact of the Agreement on market access for spices may not be significant. Also, most spice producing nations should be able to maintain some subsidies under the de minimize rule.

The value of direct export subsidies is to be reduced by certain percentages below a specified base level over the implementation period. The quality of subsidized export is also to be reduced by varying percentages (lower for developing countries). LDCs are exempt from this obligation. While the use of export subsidies for products not subject to reduction commitments is prohibited, developing countries may have recourse to subsidies to reduce the cost of marketing exports of agricultural products and the cost of internal transport and freight charges on export shipments.

The effect of the AOA on the spices trade in Kerala will be to enlarge market access, create new opportunities for growth (in processing) and raise prices. Increased prices will mean higher incomes for the spices growers (mostly small farmers), more employment in the rural areas (with or without increased wage levels) and better incomes for agricultural labour, particularly women. In general, therefore higher prices should reduce poverty in spice growing areas in Kerala.

Thus, as per the AOA, if the existing subsidies for spices cultivation are also stopped, it will lead to an increase in the cost of production of spices and spices from Kerala may not be able to compete in the global spices market.

4.7.4 Agreement on the Application of Sanitary and Phytosanitary Measures (SPS)

The Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) deals with the application of food safety and animal and plant health regulations. While it recognizes the rights of governments to take SPS measures, it obliges governments to ensure that such measures are based on science, are applied only to the extent necessary to protect human, animal or plant life or health, and do not unjustifiably discriminate among foreign sources of supply.

4.7.4.1 A sanitary or phytosanitary measure is any measure applied.

1 To protect animal or plant life or health from risks missing from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms

2 To protect human or animal life or health from risks arising from additives contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs

3 To protect human life or health from risks arising from diseases carried by animals, plants or products thereof or from the entry, establishment or spread of pests

4 The term animal includes fish and wild fauna; plant includes forests and wild fauna; pests include weeds; and contaminants include pesticide and veterinary drug residues and extraneous matter.

Sanitary and Photo-Sanitary measures include all relevant laws, decrees, regulations, requirements, and procedures including, inter alia, end product criteria; processes and production methods; testing, inspection, certification and approval procedures; quarantine treatments including relevant necessities associated with the transport of animals or plants, or

with the materials necessary for their survival during transport; provisions on relevant statistical methods, sampling procedures and methods of risk appraisal, and packaging and labeling requirements straight related to food safety.

4.7.4.2 SPS Measures Affecting Spices in Major Markets

Almost all importing countries have stringent food safety standards, which are compulsory, either at the port of entry or at the point of sale. More and more rules are being imposed, largely because of pressures from consumer groups and ecological activists. In the recent past, for example, the Delaney Clause (repealed and replaced in August 1996) of the US Food. Drugs and Cosmetics Act outlawed any pesticide that reasoned or was known to have caused cancer in laboratory animals. There is also growing concern in many of these markets for the protection of infants and children. Many countries have previously laid down special regulations for the safety of children and are in the process of escalation their application to baby food. The food safety standards enforced by the major importing countries mainly cover up the following areas: macro-cleanliness; microbial loads; mycotoxins and aflatoxin in particular; trace metals; and pesticide residues.

4.7.4.3 Impact of SPS Agreement for Spices Trade Developing Countries

Spice-producing rising countries have limited or no access to boundary technologies. With the intensification of the patent laws in many countries, access to new products (particularly agro-chemicals) that are environmentally friendly and adequate in developed country markets will become costly. The whole area of pest control, for example, will tend to add to the cost of invention. The advantages of cheap labor that spice producing developing countries enjoy today may be somewhat offset by this.

Emergent countries have been used to a certain type and rank of usage of pesticides (mostly obtained from developed countries). Some of these pesticides like DDT and BHC have fallen out of favor. However, DDT and BHC have long half-lives, which indicate that residues that are already in the soil will take a long time to decay. Until they do, strict limits on pesticide residues could adversely affect the export trade of these countries. R&D in the cultivation of spices will be an area of prime significance for export growth. As spices are largely tropical products, most of the research expertise in spice cultivation and post-harvest handling is in developing countries.

Industrialized countries have higher research findings on many major crops, which are also applicable to spices. Research should necessarily focus on productivity, control of pests and diseases, the evolution of varieties, which are more pests and disease-resistant and amenable to integrated pest management practices. In tune with the SPS regulations, spices trade in Andhra Pradesh has to address the following issues.

- The use of pesticides least toxic to natural predators, minimum use of Pesticides and application only when the pest has reached a critical damage level (i.e., the evasion of random appliance);
- Phasing and timing of the use of pesticides to make sure that the product has the least pesticide residue;
- Use of discriminatory rather than broad-spectrum pesticides; and
- Prevention of highly toxic chemicals such as BHC, DDT, aldrin and chlordane.

4.7.5 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)

The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) embodies the results of the first attempt under the GATT rounds of negotiations to address the problems brought about by widely varying standards in the protection and enforcement of Intellectual Property Rights (IPRs) and the lack of a multiparty framework for dealing with intercontinental trade in fake goods. The Agreement takes up the applicability of the basic GATT philosophy and those of pertinent international intellectual property agreements; the stipulation of adequate values and principles concerning the availability, scope and use of IPRs; the effective enforcement of those rights; multilateral dispute settlement, and transitional arrangements.

The Agreement integrate by reference most of the substantive provisions of the Paris Convention for the Protection of Industrial Property (1967), the Berne Convention for the Protection of Literary Works (1971) and the Washington Treaty on Intellectual Property in reverence of Integrated Circuits. Some provisions of the Rome Convention for the Protection of Performers, Producers of phonograms and Broadcasting Organizations are also included in the Agreement. The applicability of the Parts Convention is specific in regard to Parts 11, 111 and IV of the Agreement.

4.7.5.2 Geographical indications: Article 22

Article 22 enables geographical indications to be registered and protected. These are "indications which classify a good as originating in the territory of a member, or a region or area in that territory, where a given quality, status or other characteristic of the good fundamentally attributable to its environmental origin". In general, the Agreement asks members to check the use of indications that mislead consumers about the geographical origin of the goods, and any use constituting unfair competition.

The spice-producing developing countries need to generate the legal framework to obtain the shield provided for in Article 22. This is particularly critical for countries with established reputations for their spices in the international market. With the right legislation, they can convert these designations of origin into brand names for higher price realization.

Protection should cover designations of origin and geographical indications. Protection can also be offered by means of a 'certificate of specific characteristics" for a spice or spice product possessing specific individuality because of its ingredients or methods of production.

Many spices are currently sold under trade names giving geographical indications. Chinese cassia; Guntur Sannam chilli, Alleppey turmeric; Brazil, Lampong, Malabar and Sarawak pepper, Cochin and Jamaican ginger; Jamaican pimento; Madagascar cloves and Muntok white pepper are examples. The safety of such names, now possible under the Agreement, will guarantee an identity for the product and give it a brand appeal. However, legislation must ensure that the right to use these names is restricted to traders and processors who are able to maintain both the inherent and the extrinsic qualities of the spice. Administrative preparations will have to be made to confine the sourcing of raw materials to the geographical regions identified.

4.7.5.3 Patents and Sui Generis Systems

The Agreement provides that plant varieties must be protected "either by patents or by an effective sui generis system or by any grouping thereof." A sui generis system grants developers of new variety of plants fortification from piracy in the form of plant breeder's rights or comparable rights. Such a system is accessible under the international Convention for the Protection of New Varieties of Plants. The States parties to the meeting form - the Union

International pour la protection des objections vegetables, known in English as the International Union for the Protection of New Varieties of Plants or UPOV for short.

4.7.5.4 Other Agreements

Three other Agreements in the Final Act that are likely to have an impact on the spice trades are:

- Agreement on Safeguards;
- Agreement on Technical Barriers to Trade (TBT) ; and
- Agreement on Subsidies and Countervailing Measures (SCM).

4.7.5.4.1 Agreement on Safeguards

Referring to Article XIX of GATT 1994, the Agreement on Safeguards accepts that, when imports are causing or threatening to cause serious injury to domestic producers of like or directly competitive products, governments may come to the rescue of these domestic producers by applying safeguard measures. The Agreement provides for taking action for a temporary period (Article 7) on the basis of an assessment (Articles 3 and 4) that somber injury has indeed been caused to domestic industry. Such an assessment has to be made on the basis of "investigations carried out by competent authorities".

Foreign suppliers and governments whose welfare may be harmfully affected by the projected safeguard actions are given sufficient opportunity to defend their interests. In the agricultural sector, despite the staging of reduction in tariffs and in export and domestic subsidies, agricultural makers may find it difficult to adjust to the increased import competition resulting from the reductions. To provide such producers breathing space to adjust to competition, safeguard measures can be applied to restrict imports for a temporary period.

4.7.5.4.2 Impact of Agreement on Safeguards on Spices Trade

The Agreement on Safeguards permits members to initiate tariff-based measures and quantitative import limitations in cases where serious injury has been caused or is imminent. Though these measures are temporary in nature, they could cause havoc on export plans, mostly in regard to seasonal and perishable agricultural products. An importing country may not apply safeguard measures on an export product from a rising country whose share in imports does

not exceed 3%, provided that developing countries with individual shares of less than 3% have a collective share of not more than 9% of total imports of that product. Measures like deliberate export restraints, orderly marketing arrangements, selective exports through state monopoly undertakings, etc., had to be phased out. Many producing countries that have entered into such plural side arrangements will have to redefine their strategies for the future.

4.7.5.4.3 Agreement on Technical Barriers to Trade (TBT)

Most countries have rules specifying mandatory standards for imported products. These standards are adopted largely to guard the health and safety of their populations and their environments. The Agreement provides that such mandatory standards should not be applied in a manner as to cause "unnecessary barriers to trade". The standards should, as far as possible, be based on "worldwide agreed standards" and scientific information and proof. Countries are free to evolve and adopt national standards unusual from international standards for geographical, climatic and other reasons.

However, they are under compulsion to publish the draft standards with a view to facilitate producers in other countries to comment on them. In addition, industry groups often introduce voluntary standards.

Differing voluntary standards could pose serious problems to producers and could become more difficult to apply than mandatory standards. The Code of Good performs for the Preparation. acceptance and Application of Standards (Annex 3 to the Agreement) is an primary part of the Agreement and urges member countries to ensure "that standards are not equipped, adopted or applied with a view to, or with the effect of, creating unnecessary obstacles to international trade"

Mandatory standards enforced by governments normally address wellbeing, protection and environmental issues. By contrast, product standards adopted by industry may be based on professed quality and price deliberations and could be prejudiced by consumer behaviour. These voluntary standards could have the result of mandatory standards when large user industries or user industry connection decide, for commercial or other considerations, not to buy products or raw materials not conforming to such standards.

4.7.5.4.4 Impact of TBT on Spices Trade

The TBT agreement, which has now been signed by all the WTO members, is applicable to all products including agricultural goods, spices and food. Besides labelling and packaging, the TBT agreement covers quality necessities for fresh food products such as spices and labelling of textiles in the agro-processing sector. The TBT agreement enjoins in the lead the countries to set up inquiry points; in India the Bureau of Indian standards is to serve as an inquiry point. The TBT Agreement is to be read along with the Agreement on SPS to understand the issues related to agriculture.

Most of the mandatory standards mentioned in the TBT Agreement fall in the category of sanitary and phytosanitary measures (for agricultural products) since most of them speak about to issues of food safety. However, labeling standards (including nutrition labeling standards), packaging standards (the use of biodegradable packaging material etc.) fall under the purview of the TBT Agreement. These standards are becoming more and more important to success in the export trade. Ecological considerations have radically altered packaging regulations in many countries. These generate new problems for exporting countries at a low level of technology, as they may have to import most of their packaging materials. With the introduction of labelling necessities like bar codes, the problems of some LDCs are likely to increase. The other area of concern to exporting developing countries is voluntary standards. As has been explained earlier, voluntary standards are often set by industries in developed country markets for reasons of their own. In a market segment where giant multinational companies dominate the scene, voluntary principles could have a heavier impact than mandatory standards.

4.7.5.5 Importance of Good Agricultural Practices (GAP's)

Good Agricultural Practices or GAP are "practices that need to be applied on farms to make sure food safety during pre-production, production, harvest and post-harvest. In several cases such practices also help care for the surroundings and safety of workers". They are a collection of principles to apply for farm production and post-production processes resulting in safe and strong food and non-agricultural products while taking into account economic, social and ecological sustainability. Their purpose varies from fulfillment of trade and government authoritarian requirements, in particular with regard to food safety and quality, to more specific necessities of specialty or niche markets. In addition to facilitation of

marketplace access, reduction in non-compliance risks concerning pesticide residues and microbial and other impurity hazards may be achieved. GAP schemes are primarily consumer driven and include traceability requirements as an important part of their food safety measures.

4.8 Role of spices Board in quality control and testing in India.

Spices Board is the flagship institute for the expansion and international promotion of Indian spices. The Board has been organizing activities for brilliance of Indian spices, so as to help the Indian Spices Industry to achieve the dream of becoming the international processing hub and head of state supplier of clean and value-added spices and herbs to the industrial, retail and food service division of the global spices market. The Board has made quality and hygiene as the keystone for its development and promotional strategies.

4.8.1 Quality Evaluation Laboratory

The Quality Evaluation Laboratory of Spices Board was established in 1989. It provides analytical services to the Indian spice industry, monitors the quality of spices produced and processed in the country and analyze all the samples collected by the Board under the Compulsory inspection on Chillies, Chillies products and Turmeric powder exported from India. The Regional Quality Evaluation Laboratory is established at Guntur, Andhra Pradesh during 2010.

The Laboratory at Guntur is certified by British Standards Institution, U.K. for the ISO 9001:2008 Quality Management System since 1997, ISO 14001:2004 Environmental Management System since 1999 and Accredited under the National Accreditation Board for Testing & Calibration Laboratories (NABL) (under the ISO/IEC: 17025:2005) in 2004. The Laboratory activities are fully computerized and linked with network. The Laboratory is also in the process of providing the web enabled result delivery in the immediate future. The Laboratory is divided into three divisions Viz. Chemistry Lab, Residue Lab and Microbiology Lab for the speedy and efficient handling of the analysis done on various parameters.

4.8.2 Year -wise samples analyzed for different parameters in Spices Board, Quality Lab, Guntur

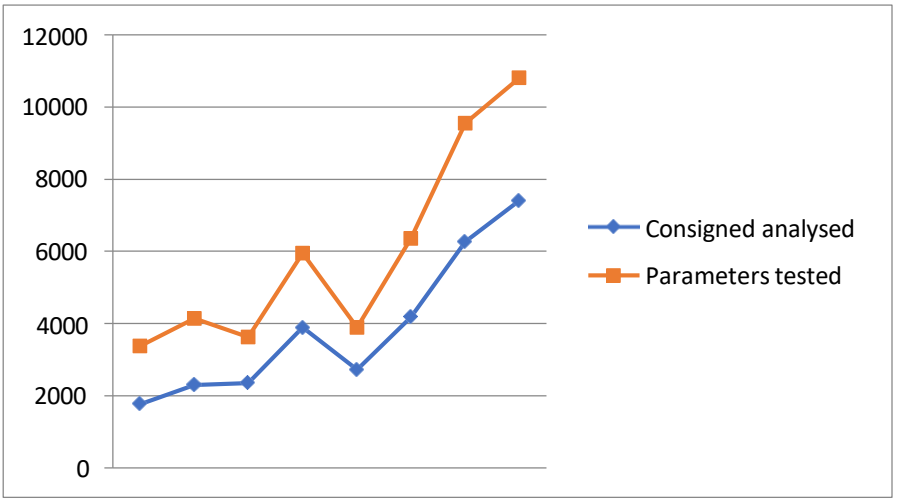
Table No.4.12 Year -wise samples analyzed for different parameters in Spices Board, Quality Lab, Guntur

Year	Consignments analyzed(samples)	Parameters tested
2016-17	1766	3379
2017-18	2296	4141
2018-19	2356	3634
2019-20	3902	5951
2020-21	2725	3900
2021-22	4183	6355
2022-23	6274	9561
2023-24	7414	10808
Average	**3865**	**5966**
CAGR	**22.75%**	**18.07%**

Source: Spices Board Quality lab, Guntur.

Table No.4.12 is explaining about the year-wise consignments analyzed for different parameters in Spices Board, Quality Lab at Guntur from 2016 to 2023. In 2016-17 lab received the 1766 export samples and analyzed for 3379 parameters. In 2017-18 lab received 2296 export samples and analyzed 4141 parameters. In 2020-21 the lab received 2725 export samples and 3900 parameters. In 2022-23 the lab received 6274 samples and did the 9561 parameters and the maximum export consignment analyzed 7414 in 2023-24 and did the analysis for 10808 parameters.

Graph No.4.2 Year -wise samples analyzed for different parameters in Spices Board, Quality Lab, Guntur



Source: The Research Reporter compiled and designed from Table no.4.12

The above graph no.4.2 is publicizing about the samples analyzed and tested for various parameters. The trend in consignments analysis and parameters tested has been increased year after year. An average consignment analyzed was 3865 and parameters tested were 5966. The compound annual growth rate of analyzed 22.75 per cent and parameter tested is 18.07 per cent

4.8.3 Year -wise spices export consignments analyzed, rejections and % of rejections at Spices Board, Quality Lab Guntur.

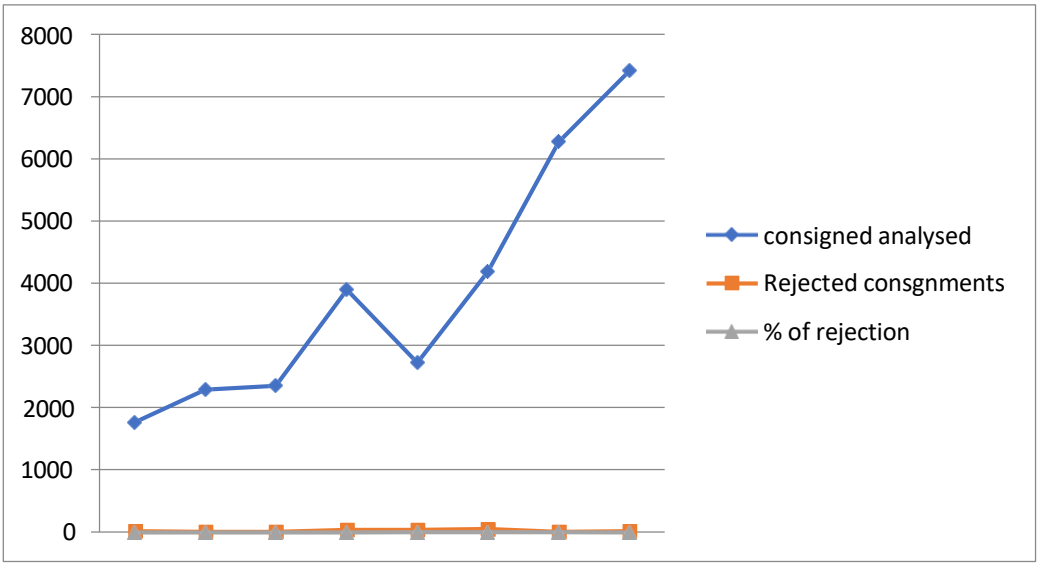
Table No.4.13 Year -wise spices export consignments analyzed, rejections and % of rejections at Spices Board, Quality Lab Guntur.

Year	Consigned analysed exports	Consignments Rejected for exports	% of rejection
2016-17	1766	17	0.96%
2017-18	2296	6	0.26%
2018-19	2356	5	0.21%
2019-20	3902	39	1.00%
2020-21	2725	36	1.32%
2021-22	4183	50	1.20%
2022-23	6274	7	0.11%
2023-24	7414	15	0.20%

Source: Spices Board Quality lab, Guntur data.

Table No.4.13 is explaining about the year –wise consignments analyzed for exports, no. of consignments rejected for exports and rejection % from 2016-17 to 2023-24. The rejections will happen through various reasons. One strong reason is high level of aflatoxin, adding of unwanted food colors, pesticide residues and salmonella. Generally, rejections were happened lack of care at the time of harvesting, drying, packing, transportation, storage and handling. During 2020-21 lot of rejection was happened 1.32 per cent, due to lack of care from the side of farmers, traders and exporters. Even in 2022-23 also we can observe the high level of export consignment rejections. In 2022-23 is lowest rate of export rejections 0.11 per cent can be observed? This indicates that high rejections of export consignments need to be taken care to reduce the percentage. The Government should bring the awareness among the farmers, traders and export community about the reasons for export rejection. If proper care is not taken it impact on our exports.

Graph No.4.3 Year -wise spices export consignments analyzed, rejections and % of rejections at Spices Board, Quality Lab Guntur.



Source: The Research Reporter compiled and designed from Table no.4.13.

The above graph no.4.3 is explaining about the raise of number of consignments subsequent years and also rising of rejection in export consignments. This trend is good system and it should be controlled at the field lever, market level, trader level and processor level.

4.9. Perceptions of exporters on spices EXPORTs.

4.6.1 Major export regions wise for export by exporters

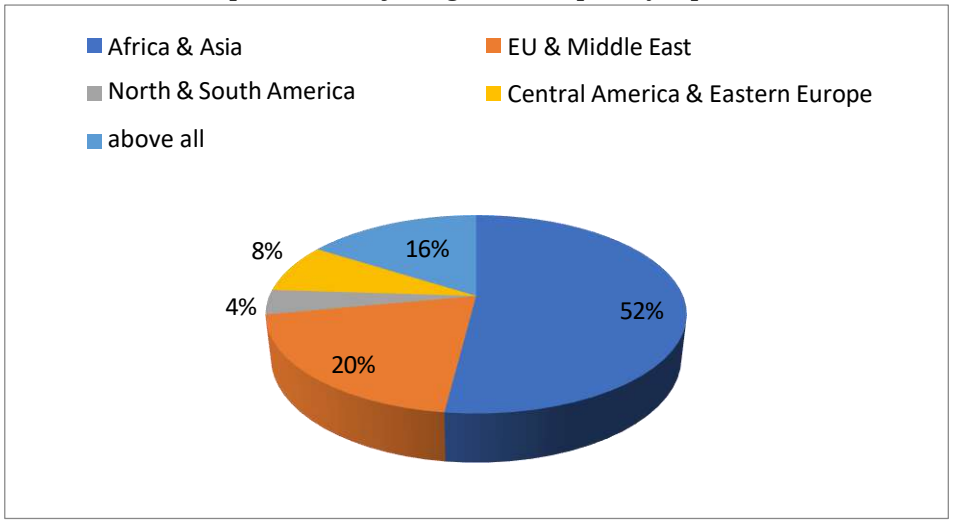
Table 4.14: Major regions for export by exporters

	Frequency	Percent
Africa & Asia	13	52.0
EU & Middle East	5	20.0
North & South America	1	4.0
Central America & Eastern Europe	2	8.0
above all	4	16.0
Total	25	100.0

Source: The Research Reporter extracted the data from primary sources of Questionnaire.

From the table no.4.14 it can be observed that among traders 52% export to Africa & Asia, 20% to EU & Middle East countries, 4% to North & South America, 8% to Central America & Eastern Europe and 16% to above all countries.

Graph No.4.4 Major regions for export by exporters



Source: The Research Reporter compiled and designed from Table no.4.14.

4.6.2 Demand for value added spices in the international market

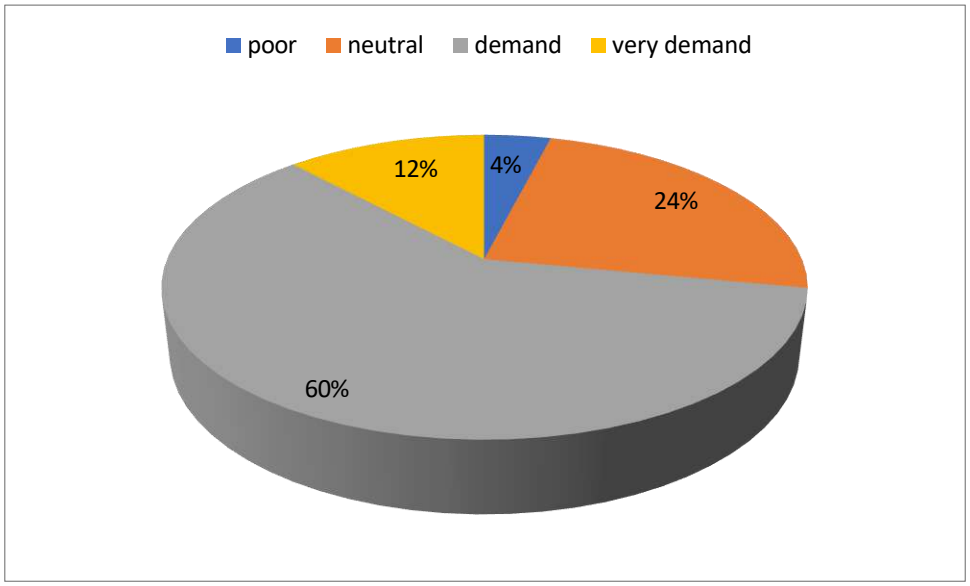
Table4.15: Demand for value added spices in the international market

	Frequency	Percent
Poor	1	4.0
Neutral	6	24.0
Demand	15	60.0
Very Demand	3	12.0
Total	25	100.0

Source: The Research Reporter extracted the data from primary sources of Questionnaire

From the table it can be observed that among traders 4% say it is poor, 24% are neutral, 60% said demand and 12% said very demand for the value-added spices in the international trade

Graph No.4.5 Demand for value added spices in the international market



Source: The Research Reporter compiled and designed from Table no.4.15.

4.6.3 Form of spices which have more demand in international market

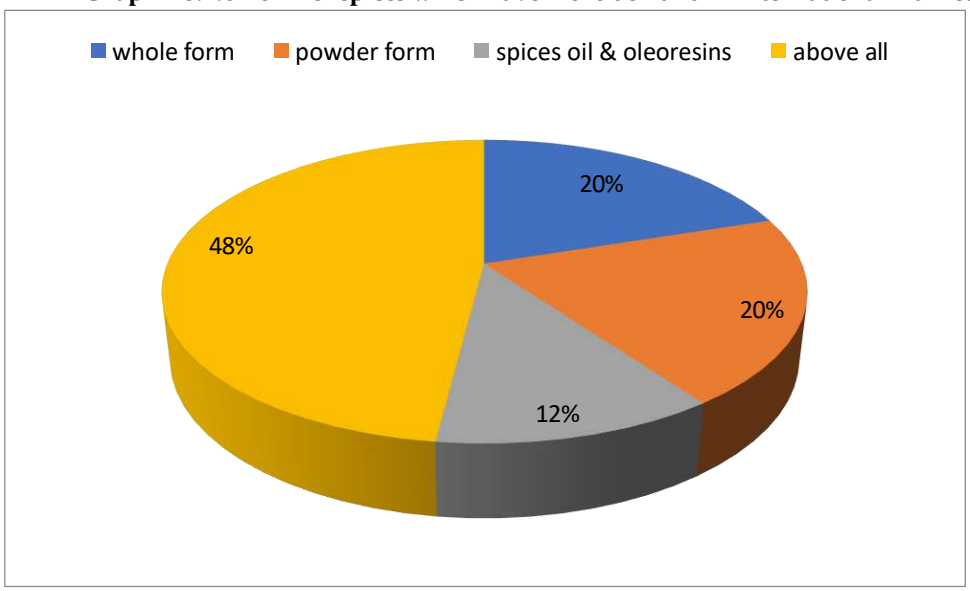
Table4.16: Form of spices which have more demand in international market

	Frequency	Percent
whole form	5	20.0
powder form	5	20.0
spices oil & oleoresins	3	12.0
above all	12	48.0
Total	25	100.0

Source: The Research Reporter extracted the data from primary sources of Questionnaire

From the table it can be observed that among exporters 20% said for whole form, 20% said powder form, 12% said spices oil & oleoresins and 48% said all the above.

Graph No.4.6 Form of spices which have more demand in international market



Source: The Research Reporter compiled and designed from Table no.4.16.

4.6.4 Major threats for Indian Chilly/Turmeric industry

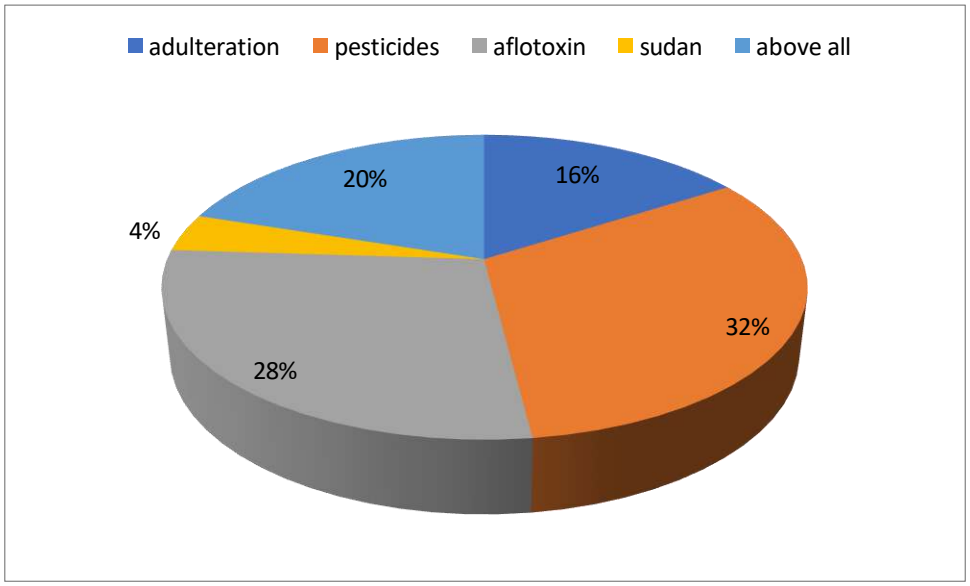
Table 4.17: Major threats for Indian Chilly/Turmeric industry

	Frequency	Percent
adulteration	4	16.0
pesticides	8	32.0
aflotoxin	7	28.0
Sudan	1	4.0
above all	5	20.0
Total	25	100.0

Source: The Research Reporter extracted the data from primary sources of Questionnaire

In response to the major threats for Indian chilly/turmeric industry exporters responded in the following way 16% said adulteration, 32% pesticides, 28% Aflatoxins, 4% Sudan and 20% above all.

Graph No.4.7 Major threats for Indian Chilly/Turmeric industry



Source: The Research Reporter compiled and designed from Table no.4.17.

4.6.5 Availability of chilly/turmeric as per global standards

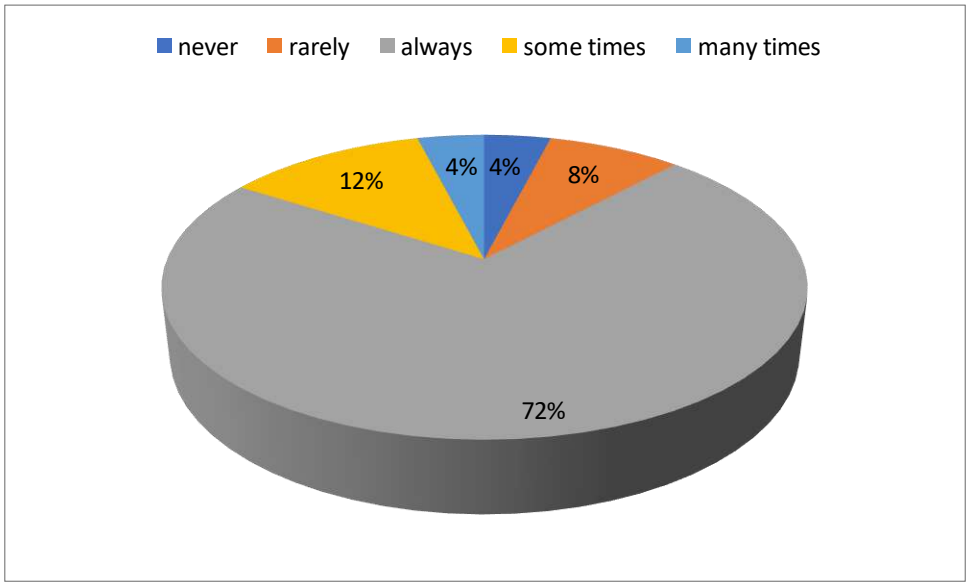
Table4.18: Availability of chilly/turmeric as per global standards

	Frequency	Percent
never	1	4.0
rarely	2	8.0
always	18	72.0
some times	3	12.0
many times,	1	4.0
Total	25	100.0

Source: The Research Reporter extracted the data from primary sources of Questionnaire

In response to the availability of chilly/turmeric as per global standards 4% responded never, 8% rarely, 72% always, 12% some times and 4% many times.

Graph No.4.8 Availability of chilly/turmeric as per global standards



Source: The Research Reporter compiled and designed from Table no.4.18.

4.6.6 Awareness of exporters with regard to global norms on spice trade

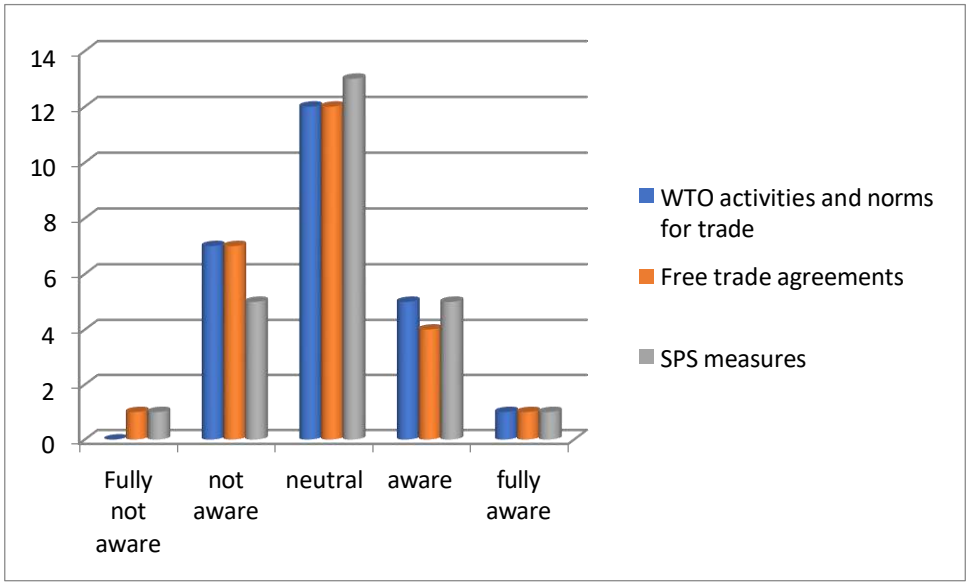
Table4.19: Awareness of exporters with regard to global norms on spice trade

	Fully not aware	not aware	neutral	aware	fully aware	total
WTO activities and norms for trade	0 0%	7 28%	12 48%	5 20%	1 4%	25 100%
Free trade agreements	1 4%	7 28%	12 48%	4 16%	1 4%	25 100%
SPS measures	1 4%	5 20%	13 52%	5 20%	1 4%	25 100%

Source: The Research Reporter extracted the data from primary sources of Questionnaire

From the table it can be observed that among exporters regarding the WTO activities and norms for trade 28% are not aware, 48% are neutral, 20% are aware and 4% are fully aware. About free trade agreements 4% are fully not aware, 28% are not aware, 48% are neutral, 16% are aware and 4% are fully aware. About SPS measures 4% are fully not aware, 20% are not aware, 52% are neutral, 20% are aware and 4% are fully aware.

Graph No.4.9 Awareness of exporters with regard to global norms on spice trade



Source: The Research Reporter compiled and designed from Table no.4.19.

CHAPTER 5

INSTITUTIONAL SUPPOT FOR EXPORT PROMOTION OF INDIAN SPICES

Agriculture is the principal source of employment for about 58 per cent of India's population. Gross Value Added by farming, forestry and fishing is estimated at Rs 18.53 trillion (US$ 271.00 billion) in FY18. The Indian food industry is poised for huge growth, growing its contribution to world food trade every year due to its enormous prospective for value addition, predominantly within the food processing industry. The Indian food and grocery market is the world's sixth largest, with retail contributing 70 per cent of the sales. The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the biggest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. It adds around 8.80 and 8.39 per cent of Gross Value Added (GVA) in Manufacturing and Agriculture respectively, 13 per cent of India's exports and six per cent of total industrial investment.[165]

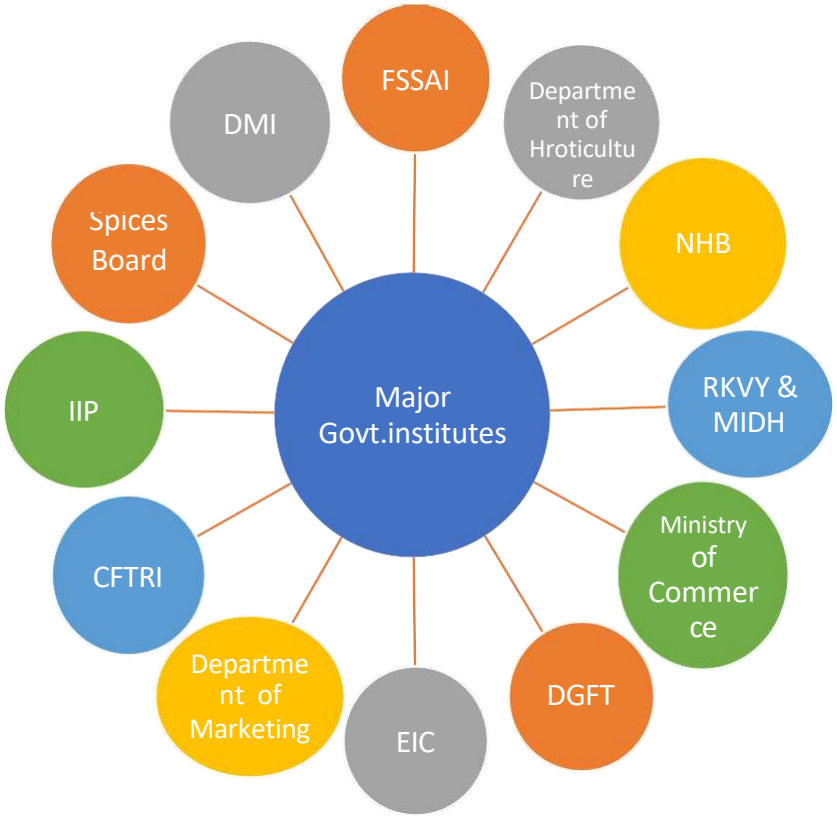
India is the largest producer, consumer and exporter of spices in the world. Production of horticulture crops is estimated at record 314.7 million tonnes (mt) in 2023-24. The horticulture sector of India is a newly evolve & develop sector for the rural people to get themselves employed for earning a decent livelihood. These sectors include a wide range of cultivation such as fruits, vegetables, plantation crops, medicinal plants and spices. Again, the horticulture sector can be classified as involvement of large, medium and small growers of products in term of area coverage and production.[166]

Looking into the growing numbers of rural poor people involved in this sector there is an urgent need that Government of India should provide and support the growers by implementing central, state and district schemes and programs. The Government supports will make aware the horticultural plans and programs, mission and objectives, target and strategies to provide brilliant opportunities in raising the income, employment and living standard of the farmers. The Government horticulture department in all parts of India has to implement and execute in making available the Govt. supports from time to time

[165] India Brand Equity foundation reports and publications.
[166] Annual reports of spices board India.

5.1 MAJOR GOVERNMENT INSTITUTIONS SUPPORTING FOR SPICES GROWERS, TRADERS AND EXPORTERS IN INDIA.

Figure No 5.1 Major Government Institutions Supporting for Spices Growers, Traders and Exporters in India



Source: The Research Reporter compiled the information from different departmental source documents.

5.1.1 Department of Horticulture:

Department of Horticulture, Government of Andhra Pradesh which promotes production, consumption, marketing and exporting of all horticulture crops grown in Andhra Pradesh by implementing their programs, activities and schemes. Andhra Pradesh has made significant contributions to India's traditional Horticulture crops cultivation. Increased area and production under Horticultural crops has put Andhra Pradesh in a stronger position in terms of attracting investments from private sector. In Andhra Pradesh area under Horticulture crops is 17.611 lakhs hectors with a production of 327.57 lakh MTs. Andhra Pradesh stands at 1st position in Chillies, Cocoa, Lime, Oil Palm, Papaya. The State has 17.611 Lakhs Ha. Under Horticulture crops with an annual production of 327.57 Lakhs metric tons. Horticulture sector

contributes approximately 16.07% to the state GVA.[167]

5.1.1.1 Programs and schemes of Department of Horticulture.[168]

5.1.1.1.1. Area expansion scheme: The main objective the scheme is to bring extra area under identified spice crops with enhanced varieties / Hybrids. The farmers who are having guaranteed source of irrigation and power supply are to be chosen & Micro irrigation should be incorporated for better endurance of plantations taken up under MIDH / State plan / RKVY through APMIP as per strategy.

5.1.1.1.2. Water resources scheme: Farm ponds are the man-made tanks created for storage of water in the farmers' field during rainy season from canals, bore wells, rainfall etc., and to provide life save irrigation to the crops or orchards during peak / critical stages of summer to save the plants from drying up.

5.1.1.1.3. Farm mechanization scheme: The identified farmers belong to above BPL should purchase by paying the total cost of the equipment to the concerned firm / authorized dealer empaneled through Agros and shall submit the Vouchers /Bills to the concerned ADH, together with the Account No, IFSC code, of the bank branch for release of subsidy directly.

5.1.1.1.4. Protected cultivation: Enhancing output per unit area. Promotion of high value Horticulture crops under Playhouses. Propagation of planting material to improve germination percentage and better consolidate. To promote high value vegetable cultivation under Shade net House. Year-round production of floricultural crops and off-season production of vegetables & fruit crops. Disease free and heritably superior transplants can be formed continuously.

5.1.1.1.5. Post-harvest management scheme: Specific programs which would be taken up under MIDH would contain enterprise of Pack houses, Integrated Pack houses, Pre-cooling units, Cold Rooms, Mobile Pre-cooling units, Cold Storage units, controlled (CA) Storage / Modified Atmosphere (MA) Storage / supply of refrigerated vans/containers, primary/mobile processing units, ripening chambers, evaporative/low energy cool chambers, preservation

[167] Department of Horticulture, Govt. of Andhra Pradesh.
[168] Department of Horticulture, Govt. of Andhra Pradesh.

units, and zero energy cool chambers. All these projects will be entrepreneur driven through commercial ventures for which Governmental assistance will be credit linked back-ended.

5.1.2 Department of Agriculture Marketing:

A separate division of Marketing was established on 01-02-1962 in Andhra Pradesh bifurcating from the Agriculture Department to implement the provisions of the Agricultural Produce Markets Act and other schemes of the Department. The Commissioner Director of Marketing is the Head of the Department. It is under the administrative control of the Agriculture and Cooperation Department. All the Agriculture marketing committees (APMC's) comes under the purview of Agriculture marketing. Department is working with farmers, commission agents and traders. e-NAM systems implemented by this department.[169]

5.1.2.1 Agricultural Marketing Committee spent under Rythu Bandhu Padhakam:

Table No.5.1 Agricultural Marketing Committee spent under Rythu Bandhu Padhakam from 2014-15 to 2017-18

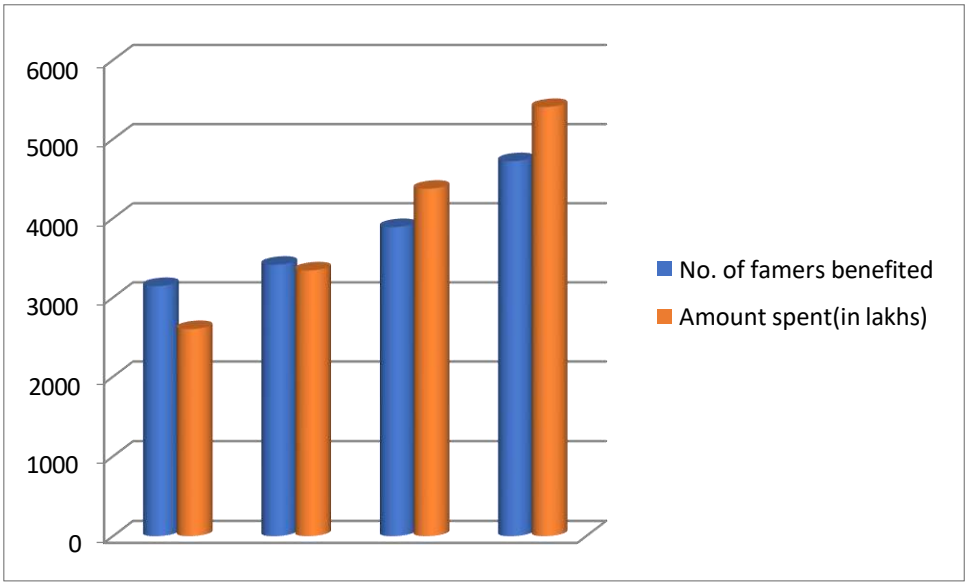
S.No.	Year	No. of famers benefited	Amount spent (in lakhs)
1	2020-21	3145	2601.60
2	2021-22	3414	3342.66
3	2022-23	3890	4374.35
4	2023-24	4723	5407.07

Source: market.ap.nic.in

The above table no.5.1 is explaining about the year wise amount spent under Rythu Bandu Pathakam, actually this program is introduced in 1982, as pledge finance scheme and renamed as Rythu Bandhu Pathakam in 1995. Financing against 75 per cent value of produce stored in go-downs (ceiling Rs. 2 Lakhs per farmer, no interest up to 180 days). During 2023-24, Rs. 54.08 Crores advanced to 4723 farmers. During 2021-22, Rs. 33.43 Crores financed to 3414 farmers. Following is the progress during last 4 years under the schemes.

[169] Department of Agriculture Marketing, Govt. of Andhra Pradesh reports.

Graph No.5.1 Agricultural Marketing Committee spent under Rythu Bandhu Padhkam from 20 to 2023-24



Source: The Research Reporter extracted and designed from Table No.5.1.

5.1.2.2 No. of Go-downs constructed under Go-down construction program

Table No.5.2 No. of Go-downs constructed under Go-down construction program

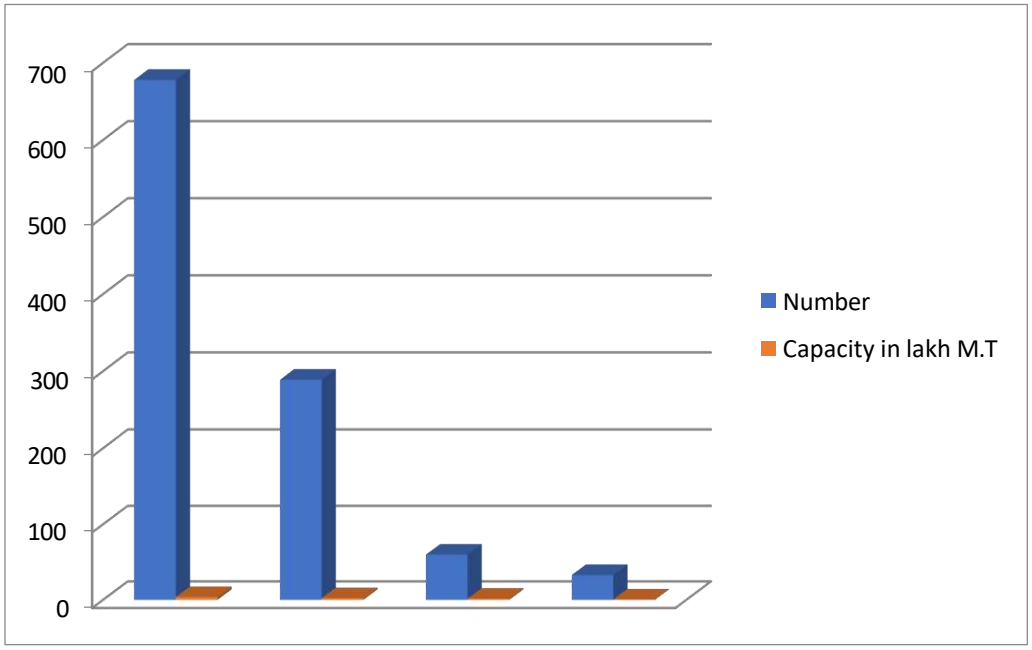
S.No	Ware house	Number	Capacity (in lakh M.T)
1	Go down existing up to 2010	678	3.78
2	Go down existing 2004-15	289	2.38
3	Go down existing 2015-20	60	1.69
4	Go down under progress till 2024	33	0.63
	Total	1063	8.48

Source: The Research Reporter extracted the data from market.ap.nic.in

The above table no.5.2 is explaining about the no. of go-downs constructed under this scheme. In total 1060 no's of Go downs with storage capacity of 8.48 Lakh MT is existing in Market yards of the Department. From 2015 onwards go downs are being constructed with upgraded technology of truss less roofing system with turbo ventilators. Due to this Roof panels of go

downs are mechanically seamed (Inter-locked) and they are free from holes, nuts, bolts, overlaps, ensures zero maintenance and also resistant to extreme weather conditions and 100% leak proof roofs. 33 No's of Go downs are sanctioned in 13 Districts of A.P., with 62500 MTs capacity, with an estimate cost of Rs. 3710.00 Lakhs

Graph No.5.2 No. of Go-downs constructed under Go-down construction program



Source: The Research Reporter compiled and designed from Table no.5.2

5.1.3 National Horticulture Board (NHB)

National Horticulture Board was set up by the Government of India in 1984 as an autonomous society under the society's registration Act 1860. Board has its Head Quarter in institutional area, sector 18, Gorgon (Haryana). The Managing Director is the principal Executive of NHB. It implements various schemes for growers with overall supervision and guidance of the Board of Directors of NHB as well as the department of agriculture & co-operation, ministry of agriculture, Government of India.[170]

[170] Department of agriculture & co-operation, Ministry of agriculture, Govt. of India reports.

5.1.3.1 Developmental schemes for spice producers by NHB4

Table No. 5.3 Developmental schemes for spice producers by NHB[171]

S.No.	Item	Cost norms	Pattern of assistance
1	Commercial Horticulture Development in open field conditions on project mode		
	Commercial Horticulture Development in open field conditions, including components viz planting material, plantation, irrigation, fertigation, precision farming, GAP etc.	Rs. 75.00 lakh /per project (Rs 125.00 lakh for date palm, olive and saffron) for projects covering area over 2 ha.	Credit linked back ended subsidy @ 40% of project cost limited to Rs.30.00lakh per project in general area and @ 50% of project cost limited to Rs. 37.50lakh for NE Region, Hilly States and Scheduled areas. Component-wise/crop-wise cost norms are given at table 1.1 (e). Add on component given in table 1.1(f) may be added in project mode within overall Cost ceiling.
2	Commercial Horticulture Development in protected cover on project mode		
	Commercial Horticulture Development in protected cover.	Rs 112.00 lakh per project covering area above 2500	Credit linked back ended subsidy @ 50% of cost limited to Rs.56.00 lakh per

[171] Department of agriculture & co-operation, Ministry of agriculture, Govt. of India.

		Sq.mt.	Project.
3	Integrated Post Harvest Management projects		
	Integrated Post Harvest Management Projects e.g. Pack House, Ripening Chamber, Refer Van, Retail Outlets, Pre-cooling units, Primary Processing etc.	Rs. 145.00 lakh per Project. The add-on Components of precooking, pack house, grading, packing, cold room can be taken up as individual components.	Credit linked back ended subsidy @35% of cost limited to Rs.50.75 lakh per project in general areas and @50% of project cost limited to Rs.72.50 lakh per project in NE Region, Hilly States and scheduled Areas, Ensuring backward and forward linkage.

Source: The Research Reporter compiled from Department of agriculture & co-operation, Ministry of agriculture, Govt. of India.

Table No.5.3 is explaining about the various developmental schemes available for the spices producers in India. These schemes are very useful and beneficial to the spices growers for the area expansion, product and production development, capital investments for construction, expansion, modernization of cold chain for horticulture produce. This is also helps for technology development, market research and development, to promote specialized studies and surveys shall be carried out.

5.1.3.2 State-wise support to spices farmers under National Horticulture Mission (in crores)

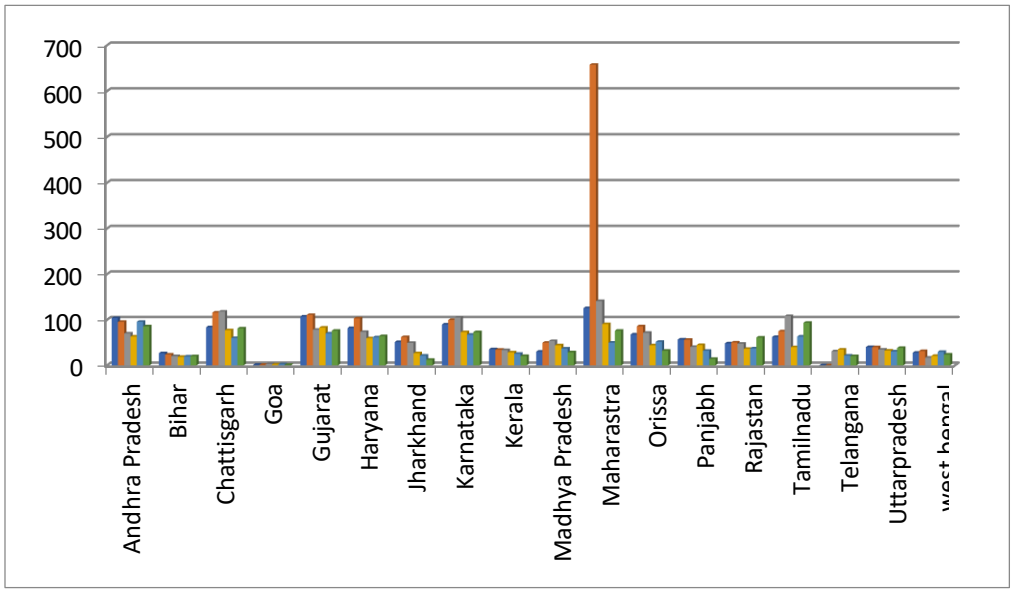
Table No. 5.4 State-wise support to spices farmers under National Horticulture Mission (in crores)

State	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Andhra Pradesh	103.7	95.4	70	63.2	95.6	85.61
Bihar	26.7	23.8	20.3	18.7	19.5	20.1
Chhattisgarh	83.6	115.8	118	77.1	60	81.08
Goa	1.3	1.3	2.8	2	2.3	1.13
Gujarat	107.2	110.6	78.1	82.8	70	76.01
Haryana	81.8	103.1	73.4	59.5	61.5	64.03

Jharkhand	51.2	62.1	49.3	26.7	21.4	12.27
Karnataka	89.7	99.7	104.8	72.9	67.2	72.78
Kerala	35.3	34.2	33.5	28.6	25.4	20.58
Madhya Pradesh	30.1	49.7	53.4	44	36.9	28.75
Maharashtra	125.6	657.5	141	90.6	49.8	76.05
Orissa	67.7	85.7	71.5	44	51.7	32.16
Punjab	56.7	56.1	40.4	44.6	32	14.22
Rajasthan	48.2	50.2	47.5	36.2	37.2	60.99
Tamilnadu	62.2	74.7	108.2	39.9	63.3	93.5
Telangana	0	0	30.9	34.7	21.5	20.39
Uttar Pradesh	40.1	39.9	34.6	32.4	30.6	38.33
west Bengal	27.8	31.3	16.9	20.8	29.7	23.66

Source: the Research Reporter compiled from Horticulture statistics 2018.

Table No.5.4 is explaining about the state wise support to the spice growers under National Horticulture Mission from the financial year 2018-19 to 2023-24. In 2018-19 Maharashtra has given more funds 125.6 crores for the development of horticulture crops, next is the Gujarat 107.2 crores, Andhra Pradesh has given 103.7 crores. In 2019-20 again Maharashtra has spent 657.5 crores, 110.6 crores, Andhra Pradesh is 95.4 crores, Haryana also given 103.1 crores. In 2022-23 Andra Pradesh has given more funds and next is the Tamil Nādu, Orissa has spent51.7 crores, Karnataka also spent 67.2crores on horticulture crops. In 2023-24 Tamil Nādu has given more funds 93.05 crores, Karnataka 72.78 crores, Andhra Pradesh 85.61 crores, Rajasthan has spent 60.99 crores. Least is the Punjab with 14.22 crores.



Graph No.5.3 State-wise support to spices farmers under National Horticulture Mission (in crores)

5.1.3.3 State -wise assistance for marketing infrastructure projects under National Horticulture Mission.

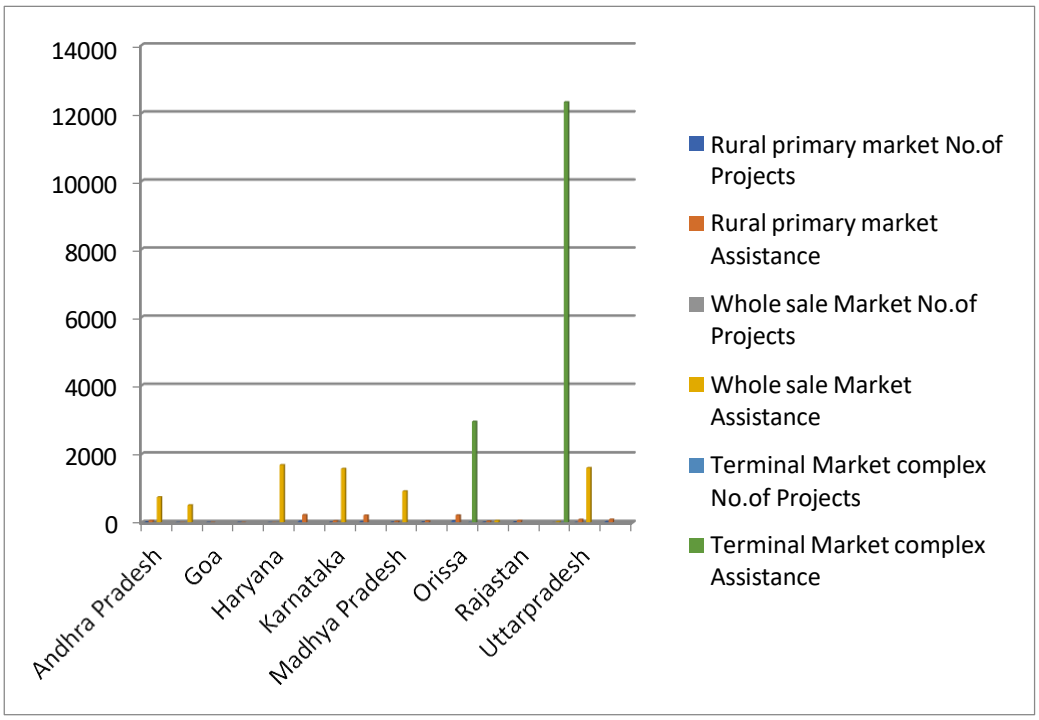
Table No.5.5 State -wise assistance for marketing infrastructure projects under National Horticulture Mission

State	Rural primary market		Whole sale Market		Terminal Market complex	
	No. of Projects	Assistance	No. of Projects	Assistance	No. of Projects	Assistance
Andhra Pradesh	16	60	17	744.96		
Chhattisgarh	0	0	1	510.83		
Goa	1	3.75				
Gujarat	1	3.75				
Haryana	0	0	11	1682.75		
Jharkhand	38	225.72				
Karnataka	9	52.7	19	1573.33		
Kerala	25	214.25				
Madhya Pradesh	8	33.25	1	918.62		
Maharashtra	12	46.7				
Orissa	48	216.89			1	2949
Punjab	11	41.25	7	58.46		
Rajasthan	16	59.97				
Tamilnadu			1	27.5	3	12324
Uttar Pradesh	4	90.84	11	1599.22		
west Bengal	26	92.68				

Source: The Research reporter extracted data from Horticulture statistics 2022-23

The above table no.5.5 is explaining about the state wise assistance given to marketing infrastructure projects under National Horticulture Mission. Assistance is very much important for establishment of Rural, whole sale and Terminal Markets. Most of the primary markets established in Orissa around 48, next is the Kerala 25 markets, west Bengal 26 markets, Rajasthan 16 markets, Andhra Pradesh 16 primary markets and Karnataka 9 primary markets. Another type of markets is whole sale markets where all the food commodities will be sold as whole sale. In Karnataka 19 markets, 17 Market in Andhra Pradesh, 11 markets at Haryana and 7 in Punjab.

Graph No.5.4 State -wise assistance for marketing infrastructure projects under National Horticulture Mission



Source: Complied data from Horticulture statistical book 2022

5.1.4 Directorate of Marketing and Inspection(DMI):

The Directorate of Marketing and Inspection (DMI), an attached Office of the Department of Agriculture, Cooperation and Farmers Welfare under Ministry of Agriculture & Farmers Welfare, was set up in the year 1935 to implement the agricultural marketing policies and programs for the integrated development of marketing of agricultural and other allied produce in the country with a view to safeguard the interests of farmers as well as the consumers. It maintains a close liaison between the Central and the State Governments.[172]

5.1.4.1 Objectives of Directorate of Marketing Inspection (DMI)[173]

1. To develop marketing infrastructure to effectively handle and manage marketable Surpluses of agricultural and allied produce including horticulture livestock, poultry, fishery, bamboo, minor forest produce and such like produce supportive to enhance farmers' income.

[172] Directorate Marketing and Inspection, Govt. Of India reports.
[173] The Research Reporter collected the information from http://dmi.gov.in/Documents/AMI_OG_Scheme.pdf

2. To promote innovative and latest technologies in post-harvest and agricultural Marketing infrastructure
3. To develop alternative & competitive marketing channels for agricultural and allied Produce through incentivizing private and cooperative sectors to make investments there for.
4. To benefit the farmers individually and collectively through FPOs from farm level Processing and marketing of processed produce along with promotion of small size Processing units.
5. To promote creation of scientific storage capacity for storing farm produce, processed Farm produce and agricultural inputs etc. to reduce post-harvest & handling losses, promote pledge financing and market access.
6. To incentivize developing and upgrading of Gramin Haats as GrAMs to make better Farmer-consumer market linkages and also to assist in integration GrAMs with e-NAM

   Portal so as to improve transparency in trading and better price discovery.
7. To provide infrastructure facilities for grading, standardization and quality certification

   of agricultural and allied produce with the objectives of (a) ensuring produce quality-based value realization to farmers; and (b) promoting pledge financing, e-NWRS and futures trading.
8. To promote Integrated Value Chains through minimal processing /value addition to make the produce more marketable, which includes washing, sorting, cleaning, grading,
9. To undertake publicity and awareness campaign among the stakeholders including Farmers, agri. pruners, market functionaries of sub-scheme and on other various aspects

   and functions of agricultural marketing including grading, standardization, quality
10. Certification, regulation, reforms, e-trading, promoting farmer's facilitation center for market information & intelligence by FPOs etc.

5.1.4.2 Scheme of Directorate of Marketing and Inspection

Table No. 5.6 Scheme of Directorate of Marketing and Inspection

Name of schemes	Category	Rate of subsidy On capital	Maximum ceiling
Storage Infrastructure Projects	For Registered FPOs, Panchayats, Women, Scheduled Caste (SC)/ Scheduled Tribe (ST) entrepreneurs or their cooperatives Self-help groups	33.33%	100 laths
	For all Other categories of beneficiaries	25%	75.00 laths
Farmer-consumers market And development and up gradation of rural Haats/rpms into GrAMs :	Registered FPOs, Panchayat Raj Institutions, Women farmers/ entrepreneurs, Scheduled Caste (SC)/ Scheduled Tribe (ST) entrepreneurs and their cooperatives.	33.33%	30.00 lakhs
	Other category of beneficiaries.	25%	25 lakhs

Source: The Research Reporter collected the information from DMI annual reports.

5.1.5 Ministry of Agriculture and Farmers Welfare:

The Ministry of Agriculture and Farmers' Welfare (formerly Ministry of Agriculture), a branch of the Government of India, is the apex body for formulation and administration of the rules and regulations and laws related to agriculture in India. This department will implement no. of schemes for development and expansion area under cultivation and production development.[174]

5.1.5.1 Schemes and programs Ministry of Agriculture[175]

1. Rain fed Area Development (RAD): RAD is being implemented by RFS Division.

[174] Ministry of Agriculture and Farmers Welfare, Govt. Of India annual reports.
[175] http://agricoop.gov.in/divisiontype/rainfed-farming-system/programmes-schemes-new-initiatives

2. Sub Mission on Agro Forestry (SMAF): SMAF is being implemented by NRM Division
3. Paramparagat Krishi Vikas Yojana (PKVY): PKVY is being implemented by INM Division
4. Soil and Land Use Survey of India (SLUSI): Being implemented by INM Division
5. National Rain fed Area Authority (NRAA): Being implemented by RFS Division
6. Mission Organic Value Chain Development in North Eastern Region (MOVCDNER): Being implemented by INM Division
7. National Centre of Organic Farming (NCOF): Being implemented by INM Division
8. Central Fertilizer Quality Control and Training Institute (CFQC&TI): Being implemented by INM Division

5.1.6 Ministry of Commerce & Industry:

The long-term vision of the Department is to make India a main player in the global trade by 2025 and presume a role of leadership in the global trade organizations proportionate with India's growing importance. The medium-term vision is to double India's exports of goods and services by 2023-24 over the level of 2014-15 with a long-term objective of doubling India's share in Global trade. This department is working with traders and exporters for promotion of Indian spices in the form of schemes, programs, activities, trade meetings and exhibitions.[176]

5.1.6.1 Export promotional schemes of Ministry of commerce & Industry.

Table No.5.7 Export promotional schemes of Ministry of commerce & Industry

S.No.	Name of the Scheme	Purpose
1	Merchandise Exports from India scheme	Under this scheme, exports of notified goods/products to notified markets as listed in Appendix 3B of Handbook of procedures are granted freely transferable duty credit scraps on realized FOB value of exports in the free foreign exchange at specified rate (2-3%)
2	Service export from India scheme	Service providers of notified services as Appendix 3E are eligible for freely transferable duty credit scrip @5% of net foreign exchange earned.

[176]Acts and Schemes, Ministry of Commerce & Industry, Govt. Of India.

3	Duty exemption & remission schemes	These schemes enable duty free import of inputs for export production with export obligation.
4	Duty free import Authorization scheme	DFIA is issued to allow duty free import of inputs, with a minimum value addition requirement of 20%.
5	Duty drawback of customs/Central Excise duties/Service tax	Under this scheme products made out of duty paid inputs are first exported and thereafter refund of duty is claimed.
6	Rebate of service tax through all industry rates	Refund of service tax paid on specified output services used for export of goods is available at specified all industry rates.
7	Zero duty EPCG scheme	Under this scheme import of capital gods at zero custom duty is allowed for producing quality goods and services to enhance India's export competitiveness.
8	EOU/EHTP/STP & BTP Schemes	Units undertaking to export their entire production of goods and services may be set up under this scheme for import/procurement domestically without payment of duties.

Source: The Research Reporter collected the information from Department Commerce & Industry.

Table No.5.7 is disseminating about the schemes, activities and programs available for export promotion of Indian Spices. When we export the spices from India we get lot of foreign currency, better prices and market. Under this scheme merchandise exports from India, services exports from India, duty exemption and remission, duty free import authorization, duty drawback of customs and central excise, zero duty EPCG. It will be very beneficial to the traders for getting financial incentives from Government by exporting the spices and spices products.

5.1.7 Food Safety standards Authority of India (FSSAI):

The Food Safety and Standards Act, 2006 (Act No. 34 of 2006) received the assent of the President of India on 23rd August 2006 and thereafter published in the Gazette of India (Extraordinary) Part I, Section 1 dated 24th August, 2006. Various provisions of the Act came with force on various dates through several notifications in this regard

viz. notifications dated 15.10.2007, 28.05.2008, 18.11.2008, 09.03.2009, 31.07.2009, 29.07.2010 and 18.08.2010.

The Act has been amended vide the Food Safety and Standards (Amendment) Ordinance, 2008 dated 7th Feb, 2008, which was replaced by the Food Safety and Standards (Amendment) Act, 2008 Pdf size:(0.03 MB) dated 28th March, 2008 amending Sections 3, 5 and 6. The Food Safety and Standards Rules, 2011 were notified vide Gazette Notifications Dated 5th May, 2011. Following principal regulations were notified and came into force on 01.08.2011.[177]

5.1.7.1 The important functions of FSSAI:[178]

- Framing of Regulations to lay down the Standards and guidelines in relative to articles of food and specifying suitable system of enforcing various principles thus notified.
- Laying down mechanisms and procedure for authorization of certification bodies engaged in certification of food protection management system for food businesses.
- Laying down method and guidelines for accreditation of laboratories and notification of the accredited laboratories.
- To present technical advice and scientific support to Central Government and State Governments in the matters of framing the policy and rules in areas which have a direct or indirect bearing of food safety and nutrition.
- Collect and collate data regarding food utilization, occurrence and frequency of biological risk, contaminants in food, residues of various, and contaminants in foods products, recognition of emerging risks and preface of rapid alert system.
- Creating an information network across the country so that the public, consumers, Panchayats etc receive rapid, reliable and purpose information about food safety and issues of concern.
- Present training programmes for persons who are concerned or propose to get involved in food businesses.
- Give to the development of worldwide technical values for food, sanitary and Phyto-sanitary standards.
- Encourage common awareness about food safety and food standards.

[177] https://www.fssai.gov.in
[178] https://www.fssai.gov.in

5.1.8 Directorate General of Foreign Trade (DGFT):

Directorate General of Foreign Trade is an emotionally involved office of the Ministry of Commerce and Industry and is headed by Director General of Foreign Trade. Right from its inception till 1991, when liberalization in the economic policies of the Government took place, this institute has been essentially involved in the directive and endorsement of foreign trade through regulation. Keeping in line with liberalization and globalization and the overall purpose of increasing of exports, DGFT has since been assigned the role of "facilitator". The shift was from prevention and control of imports/exports to promotion and facilitation of exports/imports, keeping in view the welfare of the country.[179]

5.1.8.1 Schemes and programs of DGFT

Table No. 5.8 Schemes and programs of DGFT

Name of the scheme	Scheme particulars
Importer-Exporter Code (IEC)	An IEC is a 10-digit number allotted to a person that is mandatory for responsibility any Export/import activities. Now the capability for IEC in electronic form or e-IEC has been operationalized.
Merchandise Exports from India Scheme (MEIS)	Merchandise Exports from India Scheme (MEIS) was established through the Foreign Trade Policy (FTP) 2015-20 on April 1, 2015. At the time of preamble, MEIS covered 4,914 tariff lines at 8 digits and presently it covers 8,056 lines. MEIS enticement is available at 2, 3, 5, 7, 10 and 20% of the FOB value of exports.
Services Exports from India Scheme (SEIS)	Services Exports from India Scheme (SEIS), introduced in the Foreign Trade Policy (2015-20) substitute the Served from India Scheme (SFIS), is an encouragement scheme for eligible Service exports.

[179] https://dgft.gov.in

	SEIS offers incentive at 3% or 5% of net foreign exchange earned. This proposal covers 'Service Providers located in India' instead of 'Indian Service Providers'. Under the new scheme, the incentive scrip's issued are manageable.
Export Authorization Scheme	Export of items categorized as 'Restricted' in Schedule 2 of ITC (HS) Classification for Export is subjected to license. The applications for issuance of export authorization for restricted items (other than SCOMET items) e.g., onion seeds, live animals, seaweeds, non-basmati rice paddy (husk) other than seed quality, fodder material, fertilizers (NPK, SSP, urea etc.), chemicals under Montreal Protocol etc., are processed and considered by an EXIM Facilitation Committee (EFC) consisting of representatives of various Ministries and Departments. "Special Chemicals, Organism, Materials, Equipment and Technologies (SCOMET)" items are dual-use items having potential for both civilian and Weapons of Mass Destruction (WMD) applications. Export of such items is either restricted, requiring an authorization for their export, or is prohibited. Total number of authorizations issued under Export License is 353 with FOB value of Rs. 1,831 crores during the month of April-October 2022.
Import Authorization Scheme	Import of items categorized as 'Restricted' in Schedule 1 of ITC (HS) arrangement for Import, is subjected to license. Total number of authorizations issued under Import License is 2,786 with CIF value of Rs. 66,578 crores during the month of April-Oct. 2022.

Advance Authorization Scheme	Advance Authorization is issued to allow duty free import of input, which is physically Incorporated in export product (making normal allowance for wastage). In addition, fuel, oil, Catalyst which is consumed/ utilized in the process of invention of export product, may also be allowed.
Export Promotion of Capital Goods (EPCG) Scheme	The purpose of the EPCG proposal is to facilitate import of capital goods for producing quality goods and services to enhance India's export competitiveness. Post Export EPCG duty credit scrip's are also available to exporters who intend to import capital goods on full compensation of applicable duties in cash and choose to opt for this scheme. Import under EPCG Scheme shall be subject to an export obligation equivalent to 6 times of duties, taxes and cess saved on capital goods, to be fulfilled in 6 years consider from date of issue of Authorization. Authorization shall be valid for import for 18 months from the date of issue of Authorization. EO shall be fulfilled by the authorization holder through export of goods which are manufactured by him or his supporting manufacturer / services rendered by him, for which the EPCG authorization has been granted. Revalidation of EPCG Authorization shall not be permitted.

Source: The Research Reporter collected the details from dgft.gov.in

5.19 The Export Inspection Council (EIC):

Export Inspection Agency was set up by the Government of India under Section 3 of the Export (Quality Control and Inspection) Act, 1963 (22 of 1963), in order to ensure sound development of export trade of India through Quality Control and Inspection and

for matters connected thereof. EIC will give the origin certificate to the products and fit for human consumption. EIC has NABL accredited labs in the county. [180]

5.1.9.1 Functions of Export Inspection Council[181]

1	Issue of certificate of Origin
2	Issue e-health certificate
3	Issue of authenticity certificate
4	Issue of phytosanitary certificate
5	Conducting pre-shipment inspection
6	Undertaking laboratory testing
7	Providing technical assistance
8	Recognition of laboratories
9	Residue monitoring plans
10	Appoint committee on quality complaints and trade disputes(CQCTD)

5.1.10 The Indian Institute of Packaging (IIP):

India Institute of Packaging is a national apex body which was set up in 1966 by the packaging and allied industries and the Ministry of Commerce, Government of India, with the specific objective of improving the packaging standards in the country. The Institute is an autonomous body working under the administrative control of the Ministry of Commerce. This institute will support the trading community by generating new packaging program [182]

5.1.10.1 Objectives of the Indian Institute of packaging:

1. To commence research on raw materials for the packaging industry.
2. To linger India in step with international develop in the field of packaging.
3. To organize training program on packaging technologies.

[180] https/eic.gov.in
[181] https/eic.gov.in
[182] https.//iip.gov.in

4. To intimate conscious of the need for food packaging
5. To organize consultancy services for the industry
6. To provide testing facilities for quality control in packaging
7. To organize seminars conferences workshops in respect of re development in the field.

5.1.12 Central Food Technological Research Institute (CFTRI):

CSIR−Central Food Technological Research Institute (CFTRI), Mysore (A constituent laboratory of Council of Scientific and Industrial Research, New Delhi) came into existence during 1950 with the great vision of its founders, and a network of inspirational as well as committed scientists who had a attraction to pursue in-depth research and progress in the areas of food science and technology. This institute helps to the industry by designing new products by promoting value added products for domestic and international consumption. [183]

5.1.12.1 Programs and activities of CFTRI[184]

- CSIR-CFTRI can assist industry by undertaking projects of shorter durations with one-time activity such as testing & analysis, scientific assistance of advisory nature etc. The mode will be extremely friendly to MSMEs.
- Industries can get assistance in the consultancy mode. This includes support for preparing the Detailed Project Report (DPR), turn-key solution, Advisory support etc.
- Off-the-shelf purchase of technologies industrial by CFTRI.
- Delivering detailed solution in terms of R&D, Product growth etc. Here also, the project will be for a short duration such as 9-12 month while meeting specific objectives as definite by the party

5.2 THE ROLE OF SPICES BOARD IN THE DEVELOPMENT OF SPICES TRADE[185]

Spices Board was constituted on 26th February 1987 under the Spices Board Act 1986 (No. 10 of 1986) with the merger of the erstwhile Cardamom Board (1968) and Spices Export Promotion Council (1960). Spices Board is one of the five Commodity Boards functioning under the Ministry of Commerce & Industry. It is an autonomous body responsible for the

[183] https://CFTRI.gov,in
[184] https://CFTRI.gov,in
[185] Manual of general procedures of Spices Board India.

export promotion of the 52 scheduled spices and development of Cardamom (Small & Large). Spices Board works with spices growers by implementing quality improvement training program, supply of post-harvest management schemes. Board works with exporters also by implementing export promotion schemes.

The Board is concerned with all spices of the spices industry-production, marketing and exports. It undertakes promotional campaigns such as advertisements, exhibition, fairs etc. The functions of the Board as enumerated in the Spices Board Act, 1986 are: -

5.2.1 The Board may,

I. increase, promote and control export of spices
ii. Grant certificates for export of spices and register brokers
iii. Commence programmes and projects for endorsement of export of spices
iv. Assist and encourage studies and research for improvement of processing, quality, Techniques of grading and packaging of spices
V. struggle towards stabilization of prices of spices for export
vi. Evolve suitable quality standards and introduce documentation of quality through ' Quality marketing' for spices for export
vii. Control quality of spices for export
viii. Give licenses, subject to such terms and conditions as may be prescribed, to manufactures of spices for export
ix. Market any spice, if it considers necessary in interest of promotion of export
x. Provide warehousing amenities abroad for spices
xi. Assemble statistics with regard to spices for anthology and publication.
xii. Import with previous approval of Central Government any spice for sale and
xiii. Advise Central Government on matters relating to import and export of spices.

5.2.2 The Board may also,

I. Promote co-operative efforts among growers of cardamom
ii. Ensure remunerative return to growers of cardamom
iii. Provide financial or other assistance for improved extension of cardamom growing areas

iv. Regulate sale of cardamom and stabilization of prices

v. Provide training in quality testing and fixing grade of standard of cardamom

vi. Increase cardamom consumption and carry-on propaganda for that purpose

vii. Register and license brokers (including auctioneers) of cardamom and persons engaged in business of cardamom

viii. Improve marketing of cardamom

ix. Collect statistics from growers, dealers and such other persons relating as may be Prescribed on any matter relating to cardamom industry, publish statistics so collected or Portions thereof or extracts there from

x. Secure better working conditions and provision and improvement of amenities and incentives for workers

xi. Undertake, assist or encourage scientific, technical and economic research.

52 spices in any form including curry powders, spice oils, oleoresin and other mixture Where spice content is predominant come under the purview of Spices (Annexure –VII)

5.2.3 Activities under support by Spices Board India (in Lakhs)

Table No.5.9 Activities under support by Spices Board India (in Lakhs)

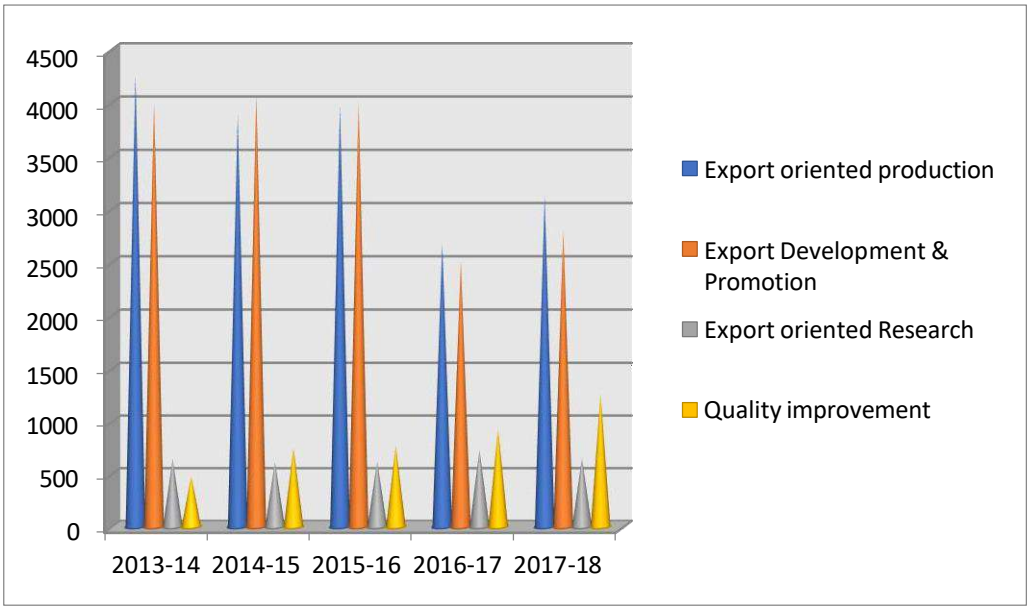
Purpose	2019-20	2020-21	2021-22	2022-23	2023-24
Export oriented production	4262.66	3885.91	3973.44	2676.43	3124.18
Export Development & Promotion	4001.6	4079.19	4003.16	2507.53	2791.07
Export oriented Research	644.99	616.03	621.44	734.65	651.93
Quality improvement	484.97	751.2	769.93	928.47	1261.97

Source: The Research Reporter compiled data from Spices Board annual reports

Table No.5.9 is explaining about the activities supported by the Spices Board India from 2019-20 to 2023-24. Board has supported for export-oriented production 4262.66 lakhs in 2019-20 and this is the highest amount spent for this purpose and other subsequent years amount is reduced based on the budget availability. For Export Development & Promotion in 2019-20 was 4001.6 lakhs, in 2020-21 as 4079.19 lakhs was used. For Export oriented research out of last five financial years 2022-23 was spent more amount, which is 734.65 lakhs, in 2023-24

was spent 651.93 lakhs. Board has given an important for improvement of quality and extends the budget also. For the last five consecutive years in 2023-24 was highest amount spent 1261.97 lakhs.

Graph No.5.5 Activities under support by Spices Board India (in Lakhs)



Source: The Research Reporter extracted and designed from spices Board annual reports.

5.2.4 Export promotional schemes for spices growers

Table No.5.10 Export promotional schemes for spices growers

S.No.	Name of the program	Purpose
1	Supply of silpaulin and tarpaulin sheets	Most of the importing countries have prescribed stringent quality standards for agro products including spices. These standards are becoming more and more stringent and are becoming effective trade barriers impacting spice exports.
2	Supply of IPM kits	Chilli is one of the major items in our export basket of spices. Indiscriminate use of pesticides has resulted in pesticide residues and detention of Indian chilli consignments in Australia, Spain and some other countries.

3	Quality improvement training programs	Post-harvest management practiced will be taught to meet the international quality requirements and standards.
4	Supply Turmeric boilers	Fresh turmeric is cured for obtaining dry turmeric. Curing involves boiling of fresh rhizomes in water and drying in the sun.
5	Supply of Turmeric polishers	Dried turmeric has a poor appearance and rough dull color outside the surface with scales and root bits.

Source: The Research Reporter complied form Spices Board annual reports.

Table No.5, 10 is explaining about the schemes available to spices growers for export promotion of India spices under Spices Board, which is the export promotion body under the Ministry of Commerce & Industry. To maintain the quality requirements and standards and meet the international market needs the growers need to be harvest the chilli and Turmeric and dry in good condition on silpaulin and tarpaulin sheets. Board is supporting the growers in the form of Integrated Pest Management (IPM) kits to reduce the indiscriminate use of the pesticides and chemicals. Board also educating the growers on market needs, exporter's requirements and conduction quality improvement training (QITP) programs continuously. Turmeric boilers and polishers help the farmers to value addition to their products and it improves marketability to the products

5.2.5 Spices Boards Schemes for export promotion

Table No. 5.11 Spices Boards Schemes for export promotion

S.No.	Name of the scheme	Eligibility
1	Adoption of hi-tech in spices processing/technology and process up gradation	All the registered exporters with the Board having a minimum investment of Rs. 50

2	Setting up/up-gradation of in-house quality control lab	Lakhs and who have Spice House Certificate are eligible for the assistance under IDS.
3	Sending business samples abroad	All registered exporters who are having Spice House Certificate/Brand Registration with the Board/Organic Certification are eligible for availing assistance under the scheme.
4	Printing promotional broachers	All registered exporters who are having Spice House / Logo, Brand Registration with the Board/Organic Certification are eligible for availing assistance under the scheme.
5	Promotion of Indian spices Brands abroad.	All registered exporters of spices who have registered their brands with the Board or holding Spice House Certificates (SHC) / Indian Spices Logo/ Organic Certification are eligible to avail the benefits
6	Product development and research	Under this programme, it is proposed to provide financial assistance to the Exporters/research institutions to undertake product research & development.
7	Market access initiative (MAI) scheme	Under this scheme financial assistance is provided for export promotion activities on focus country focus product basis to EPC's, industry & trade Associations.
8	Market Development Assistance (MDA)	Market Development Assistance is being implemented as per the guidelines issued by the Govt. of India from time to time. Assistance is available to all registered exporters for export promotion activities

		abroad such as participation in EPC lead trade Delegations, Buyer-Seller Meets, Trade Fairs, and Exhibitions.
9	Status Holder schemes	Upon achieving prescribed export performance, status recognitions one star Export House, Two Star Export House, three Star Export House, four- and five-star house is accorded to the eligible applicants as their export performance.

Source: The research Reporter compiled from Spices Board annual reports.

Table No.5.11 is explaining about the spices board's schemes for export promotion of Indian spices. All the registered exports will have the eligibility to avail the financial assistance under these schemes. These schemes will help the adoption of hi-tech in spices processing, technology and processing up-gradation, setting up or up-gradation of in-house quality control lab. Sometimes foreign buyers will ask product samples before giving orders to test the quality standards of the products and these cornier charges also be reimbursed. For printing promotional broachers, brand promotion, product development and research will be supported. Under the market development assistance individual exports will visit the foreign markets for promotion of their business.

5.3 OTHER PROGRAMS AND INITIATIVES FOR TRADE PROMOTION

5.3.1 CONTRACT FARMING[186]

Definition: Contract farming can be defined as agricultural production carried out according to an agreement between a buyer and farmers, which establishes conditions for the production and marketing of a farm product or products. Typically, the farmer agrees to provide agreed quantities of a specific agricultural product. These should meet the quality standards of the purchaser and be supplied at the time determined by the purchaser. In turn, the buyer commits to purchase the product and, in some cases, to support production through, for example, the supply of farm inputs, land preparation and the provision of technical advice.

[186] http://vikaspedia.in/agriculture/market-information/contract-farming-a-mechanism-of-alternative-marketing

5.3.2 Advantages of contract farming

1. Contract farming is looking towards the benefits both for the farm-producers as well as to the agro-processing firms. Producer/farmer
2. Makes small scale farming competitive - small farmers can access technology, credit, marketing channels and information while lowering transaction costs
3. Assured market for their produce at their doorsteps, reducing marketing and transaction costs
4. It reduces the risk of production, price and marketing costs.
5. Contract farming can open up new markets which would otherwise be unavailable to small farmers.
6. It also ensures higher production of better quality, financial support in cash and /or kind and technical guidance to the farmers.
7. In case of agri-processing level, it ensures consistent supply of agricultural produce with quality, at right time and lesser cost.

5.3.3 Challenges of contract farming

1. Contract farming arrangements are often criticized for being biased in favor of firms or large farmers, while exploiting the poor bargaining power of small farmers.
2. Problems faced by growers like undue quality cut on produce by firms, delayed deliveries at the factory, delayed payments, low price and pest attack on the contract crop which raised the cost of production.
3. Contracting agreements are often verbal or informal in nature, and even written contracts often do not provide the legal protection in India that may be observed in other countries. Lack of enforceability of contractual provisions can result in breach of contracts by either party.
4. Single Buyer – Multiple Sellers (Monophony).
5. Adverse gender effects - Women have less access to contract farming than men.

5.3.4 NATIONAL CROP INSURANCE PROGRAMME (NCIP)[187]

Keeping in view the risks involved in agriculture and to insure the farming community against various risks, Ministry of agriculture introduced a crop insurance scheme in 1985 and thereafter brought improvements in the erstwhile scheme(s) from time to time based on the

[187] http://vikaspedia.in/agriculture/agri-insurance/pradhan-mantri-fasal-bima-yojana

experience gained and views of the stakeholders, States, farming community etc. To enlarge the coverage in terms of farmers, crops and risks, National Agricultural Insurance Scheme (NAIS) was notified/ implemented with effect from 1999.

To make the crop insurance schemes more farmers' friendly, are-structured Central Sector crop insurance scheme namely, "National Crop Insurance Programme (NCIP)" was implemented by merging erstwhile Pilot schemes of Modified National Agricultural Insurance Scheme (MNAIS), Weather Based Crop Insurance Scheme (WBCIS) and Coconut Palm Insurance Scheme (CPIS) (as its components) with some improvements forts full-fledged implementation from Rabi 2013-14 season throughout the country. National Agricultural Insurance Scheme (NAIS) was to be discontinued after implementation of NCIP from Rabi 2013-14 season. However, on the representations and at the option of States, NAIS was also allowed for implementation up to 2022-23. The erstwhile crop insurance schemes have further been reviewed in consultation with various stakeholders including States/UTs. And new scheme namely, Prada Mantra Fatal Bema Yolanda (PMFBY) has been approved for implementation from Kharif 2016 along with pilot Unified Package Insurance Scheme (UPIS) and Restructured Weather Based Crop Insurance Scheme (RWBCIS).

5.3.5 The salient features of PMFBY are as under[188]

Table 5.12. Features of Pradhan Mantri Fasal Bhima Yojana

S.No.	Features of Pradhan Mantri Fasal Bhima Yojana
1	PMFBY provides a comprehensive insurance cover against failure of the crop thus helping in stabilizing the income of the farmers and encouraging them to adopt innovative practices.
2	The Scheme envisages coverage of all Food & Oilseeds crops and Annual Commercial/Horticultural Crops for Department of Agriculture, Cooperation & Farmers Welfare 101Annual Report 2022-23which past yield data is available and for which requisite number of Crop Cutting Experiments (CCEs) will be conducted being a part of the General Crop Estimation Survey (GCES).

[188] http://vikaspedia.in/agriculture/agri-insurance/pradhan-mantri-fasal-bima-yojana

3	The scheme is compulsory for loaned farmer obtaining Crop Loan /KCC account for notified crops. However, voluntary for other/non loaned farmers who have insurable interest in the insured crop(s)
4	The Maximum Premium payable by the farmers is 2% for all Sharif Food& Oilseeds crops, 1.5% for Rabi Food& Oilseeds crops and 5% for Annual Commercial/Horticultural Crops.
5	The difference between premium and the rate of Insurance charges payable by farmers is shared equally by the Centre and State. • The seasonality discipline is same for both loaned and non-loaned farmers
6	The scheme is implemented by AIC; all companies of General Insurers' (Public Sector) Association (GIPSA) and other empaneled private general insurance companies. Selection of Implementing Agency (IA) will be done by the concerned State Government through bidding.
7	The existing State Level Co-ordination Committee on Crop Insurance (SLCCCI), Sub-Committee to SLCCCI, District Level Monitoring Committee (DLMC) is responsible for proper management of the Scheme.
8	The Scheme is implemented on an 'Area Approach bases. The unit of insurance shall be Village/Village Panchayat level for major crops and for other crops it may be a unit of size above the level of Village/Village Panchayat
9	The Threshold Yield (TY) shall bathe benchmark yield level at which Insurance protection shall be given to all the insured farmers in an Insurance Unit Threshold of the notified crop will be moving average of yield of last seven years excluding yield up to two notified calamity years multiplied by Indemnity level.
10	The claim amount will be credited electronically to the individual Insured Bank Account.
11	Adequate publicity needs to be given in all the villages of the notified districts/areas

Source: The Research Reporter compiled from PMFBY reports.

5.3.6 ELECTRONIC NATIONAL AGRICULTURE MARKET (e-NAM)[189]

e-NAM is envisaged as a pan-India electronic trading portal which seeks to network the existing APMC and other market yards to create a unified national market for agricultural commodities. E-NAM is a "virtual" market but it has a physical market (mandi) at the back end.

e-NAM is not a parallel marketing structure but rather a device to create a national network of physical mandis which can be accessed online. It seeks to leverage the physical infrastructure of the mandis through an online trading portal, enabling buyers situated even outside the State to participate in trading at the local level.

It is necessary to create e-NAM to facilitate the emergence of a common national market for agricultural commodities. Current APMC regulated market yards limit the scope of trading in agricultural commodities at the first point of sale (i.e., when farmers offer produce after the harvest) in the local mandi, typically at the level of Taluka / Tahsil or at best the district. Even one State is not a unified agricultural market and there are transaction costs on moving produce from one market area to another within the same State. Multiple licenses are necessary to trade in different market areas in the same State. All this has led to a highly fragmented and high-cost agricultural economy, which prevents economies of scale and seamless movement of agri goods across district and State borders. e-NAM seeks to address and reverse this process of fragmentation of markets, ultimately lowering intermediation costs, wastage and prices for the final consumer. It builds on the strength of the local mandi and allows it to offer its produce at the national level.

The e-NAM electronic trading platform will be created with an investment by the Government of India (through the Ministry of Agriculture). It will offer a "plug-in" to any market yard existing in a State (whether regulated or private). The special software to be developed for e-NAM will be offered to each mandi which agrees to join the national network free of cost and necessary customization will be undertaken to conform to the regulations of each State Mandi Act.

[189] https://sfac.gov.in

5.3.7 The main features of e-NAM are as follows:[190]

1. No need for being physically present in different markets
2. Easy issuance of license to traders, buyers and commission agents and one license valid across any market in a state.
3. Quality testing to be done for agricultural produce and buyers to make informed bidding
4. Market fee to be levied on first wholesale purchase from the farmer
5. Soil Testing Laboratories near the mandis to help farmers get suitable information.

5.4 PERCEPTIONS OF THE STAKE HOLDERS ABOUT GOVERNMENT SCHEMES AND PROGRAMS.

5.4.1 Schemes availed by the farmers

Table 5.13: Schemes availed by the farmers

	Guntur	Kurnool	
IPM inputs	2 2.2%	9 10.0%	11 6.1%
Tarpaulin sheets	27 30.3%	31 34.4%	58 32.4%
Thivan sprayers	2 2.2%	4 4.4%	6 3.4%
Drip irrigation	21 23.6%	36 40.0%	57 31.8%
None of these	38 42.2%	10 11.1%	48 26.6%
	90 100.0%	90 100.0%	180 100.0%

Source: The Research Reporter extracted data from primary sources of Questionnaire.

Chi square value = 25.678 at 4 degrees of freedom

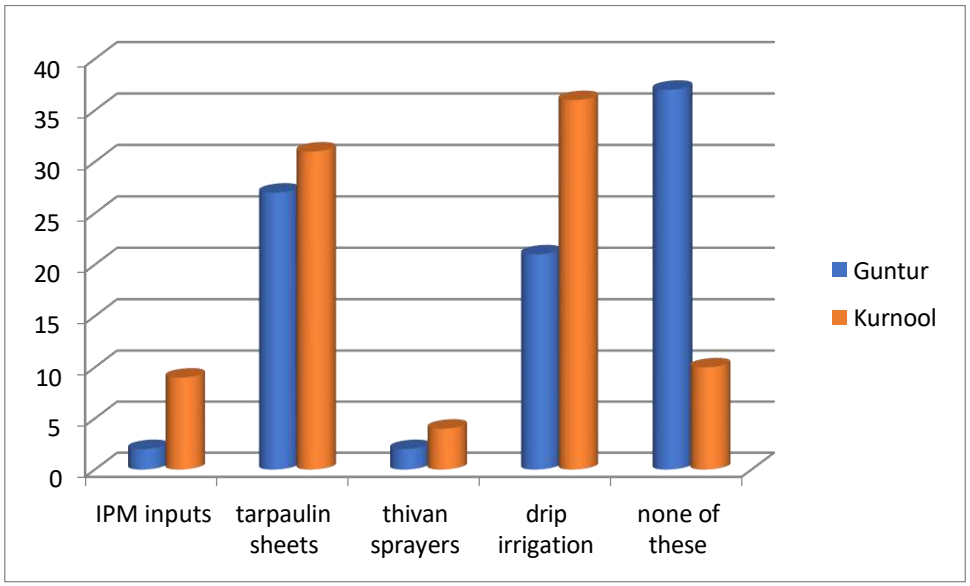
From the table no.5.13 it can be observed that most of the farmers from both the regions are interested in availing the schemes tarpaulin sheets and drip irrigation schemes. Also 26.6% are

[190] https://sfac.gov.in

not interested in any of these schemes and only a few are interested in IPM inputs and thivan sprayer's schemes.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

Graph 5.6 Schemes availed by the farmers



Source: The Research Reporter compiled and designed from Table No.5.13.

5.4.2 Reasons for not availing Schemes

Table 5.14 Reasons for not availing Schemes

	Guntur	Kurnool	
Banks restrictions	2 2.2%	12 13.3%	14 7.8%
Local politics	11 12.2%	18 20.0%	29 16.1%
Lack of understanding	61 67.8%	28 31.1%	89 49.4%
Lack of information	13 14.4%	19 21.1%	32 17.8%
Lack of recommendations	3 3.3%	13 14.4%	16 8.9%

	90 100.0%	90 100.0%	180 100.0%

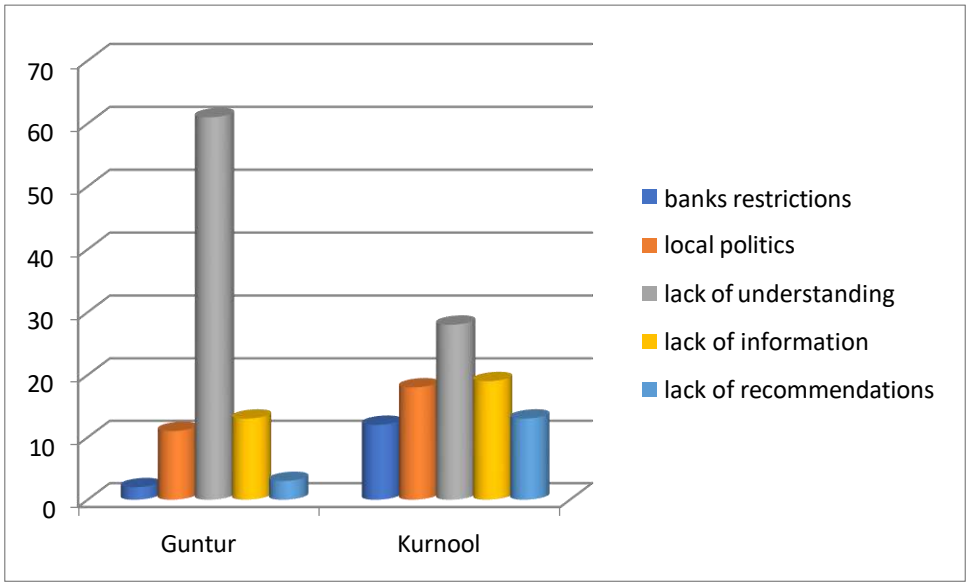
Source: The Research Reporter extracted data from primary sources of Questionnaire

Chi square value = 28.443 at 4 degrees of freedom

From the table no.5.14 it can be observed that among farmers from Guntur 2.2% are not availing schemes because of banks restrictions, 12.2% for local politics, 67.8% for lack of understanding, 14.4% for lack of information and 3.3% for lack of recommendations. among farmers from Kurnool 13.3% are not availing schemes because of banks restrictions, 20% for local politics, 31.1% for lack of understanding, 21.1% for lack of information and 14.4% for lack of recommendations.

It can be observed that most of farmers do not avail schemes because of lack of understanding it is more in Guntur district. So, a campaign about the schemes by the concern authority in these regions may change the situation. Also, the chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

Graph 5.7 Reasons for not availing Schemes



Source: The Research Reporter compiled and designed from Table No.5.14.

5.4.3 Awareness about spices board activities and schemes

Table 5.15 Awareness about spices board activities and schemes

	Guntur	Kurnool	
Fully not aware	4 4.4%	23 25.6%	27 15.0%
Not aware	27 30.0%	57 63.3%	84 46.7%
Neutral	30 33.3%	8 8.9%	38 21.1%
Aware	28 31.1%	0 .0%	28 15.6%
Fully aware	1 1.1%	2 2.2%	3 1.7%
	90 100.0%	90 100.0%	180 100.0%

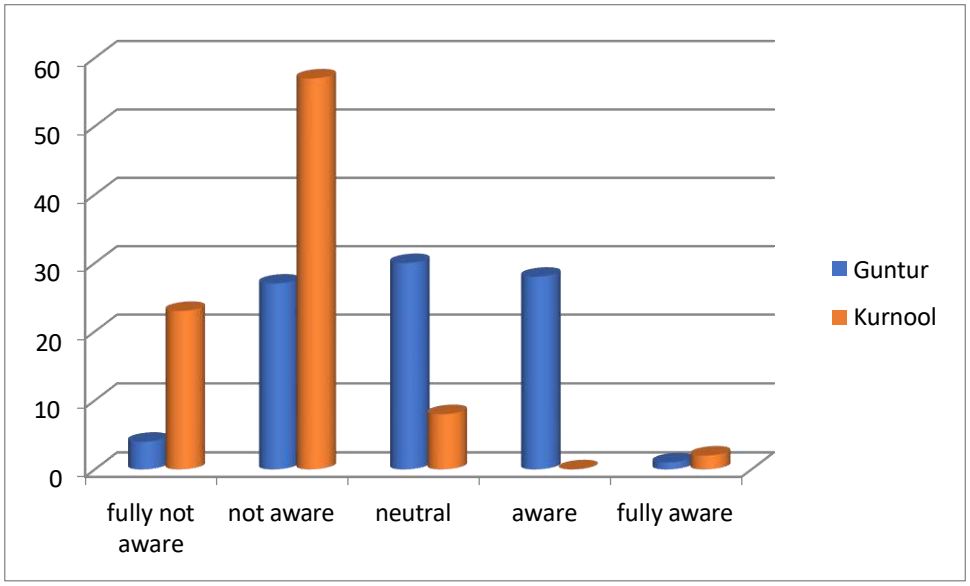
Source: The Research Reporter extracted data from primary sources of Questionnaire

Chi square value = 65.155 at 4 degrees of freedom

From the table no.15, it can be observed that among the farmers from Guntur district 4.4% are fully not aware, 30% are not aware, 33.3% are neutral, 31.1% are aware and 1.1% are fully aware with the spices board activities and schemes. Among the farmers from Kurnool district 25.6% are fully not aware, 63.3% are not aware, 8.9% are neutral and 2.2% are fully aware with the spices board activities and schemes.

The data reveals that farmers are not aware of the spices board activities and schemes. It is clearly seen in the parts of Kurnool district. Also, the chi square test reveals that there is a significant variation in the opinions of the farmers from both the districts.

Graph 5.8 Awareness about spices board activities and schemes



Source: The Research Reporter compiled and designed from Table No.5.15.

5.4.4 Level of agreement with establishment of cold storages by the government beneficial to the farmers

Table 5.16 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers

	Guntur	Kurnool	
Strongly disagree	1 1.1%	5 5.6%	6 3.3%
Disagree	4 4.4%	6 6.7%	10 5.6%
Neutral	20 22.2%	16 17.8%	36 20.0%
Agree	47 52.2%	23 25.6%	70 38.9%
Strongly agree	18 20.0%	40 44.4%	58 32.2%
	90 100.0%	90 100.0%	180 100.0%

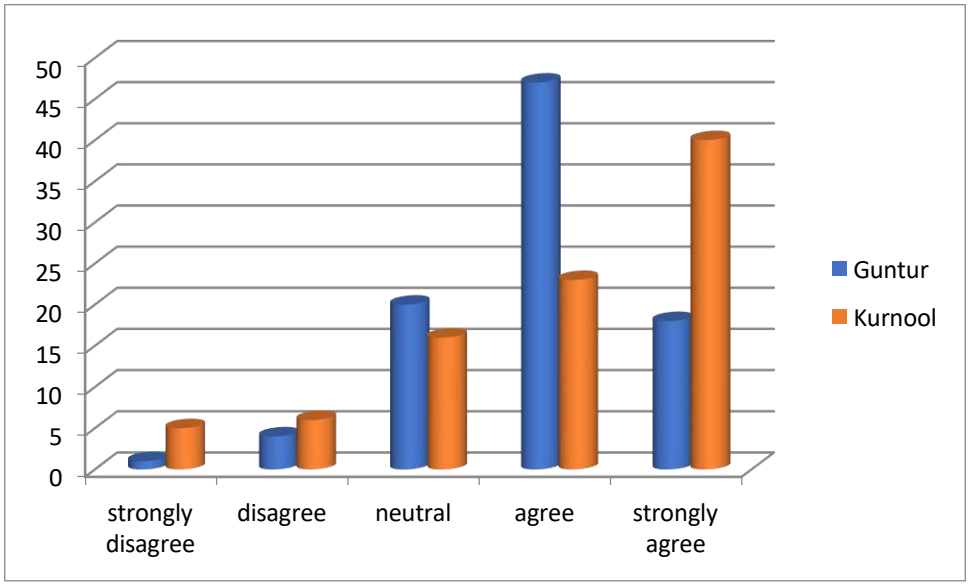
Source: The Research Reporter extracted data from primary sources of Questionnaire

Chi square value = 20.085 at 4 degrees of freedom

From the table no 5.16 it can be observed that among the farmers from Guntur 1.1% strongly disagree, 4.4% disagree, 22.2% are neutral, 52.2% agree and 20% strongly agree with the argument cold storages established by government is more beneficial. among the farmers from Kurnool 5.6% strongly disagree, 6.7% disagree, 17.8% are neutral, 25.6% agree and 44.4% strongly agree with the argument cold storages established by government is more beneficial.

From the data it can be observed that most of the farmers from both the regions agree with the argument. But the chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions

Graph 5.9 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers



Source: The Research Reporter compiled and designed from Table No.5.16.

5.4.5 Level of agreement with establishment of cold storages by the government is more Beneficial to the farmers

Table 5.17 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers

	Guntur	Kadapa	
Strongly disagree	10 11.1%	7 7.8%	17 9.4%
Disagree	0 .0%	24 26.7%	24 13.3%
Neutral	0 .0%	7 7.8%	7 3.9%
Agree	63 70.0%	34 37.8%	97 53.9%
Strongly agree	17 18.9%	18 20.0%	35 19.4%
	90 100.0%	90 100.0%	180 100.0%

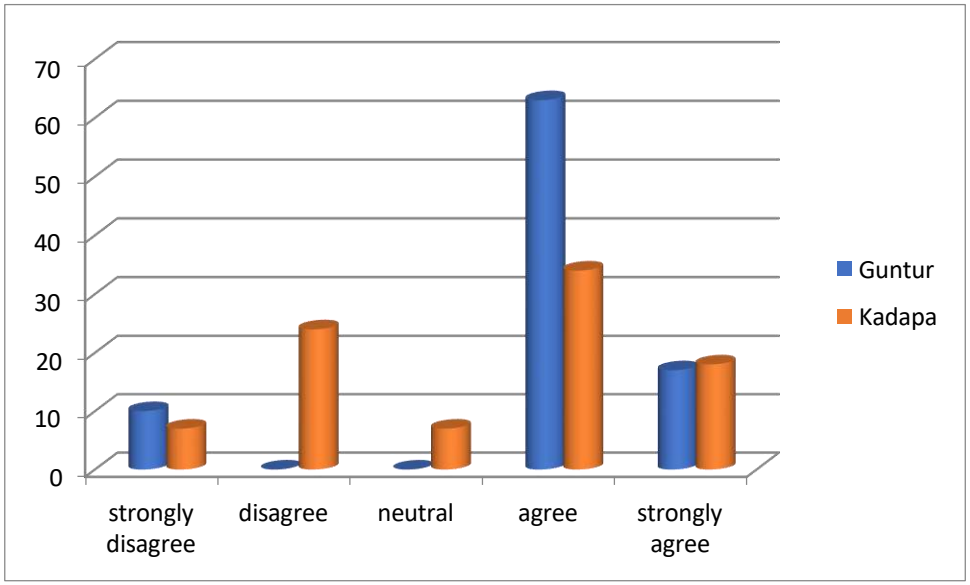
Source: The Research Reporter extracted data from primary sources of Questionnaire

Chi square value = 40.228 at 4 degrees of freedom

From the table no.5.17 it can be observed that among the farmers from Guntur 11.1% strongly disagree, 70% agree and 18.9% strongly agree with the argument establishment of cold storages by the government is more beneficial to the farmers. Among the farmers from Guntur 7.8% strongly disagree, 26.7% agree, 7.8% are neutral, 37.8% agree and 20% strongly agree with the argument establishment of cold storages by the government is more beneficial to the farmers.

The chi square test reveals that there is a significant variation in the opinions of the farmers from both the regions.

Graph 5.10 Level of agreement with establishment of cold storages by the government is more beneficial to the farmers



Source: The Research Reporter compiled and designed from Table No.5.17.

5.4.6 Awareness on export incentives

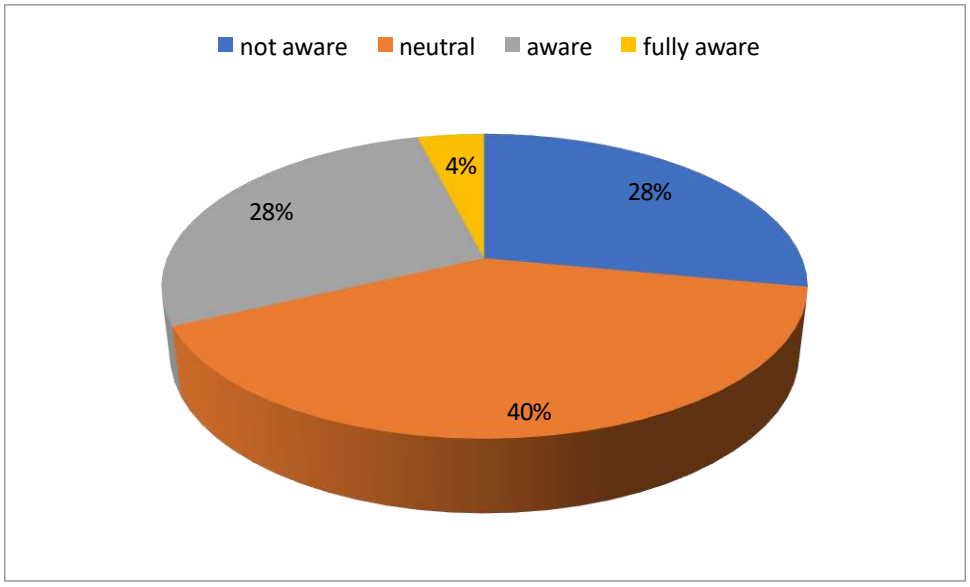
Table 5.18 Awareness on export incentives

	Frequency	Percent
not aware	7	28.0
neutral	10	40.0
aware	7	28.0
fully aware	1	4.0
Total	25	100.0

Source: The Research Reporter extracted data from primary sources of Questionnaire.

From the table no.5.18 it can be observed that among exporters 28% are not aware, 40% are neutral, 28% are aware and 4% are fully aware with the export incentives.

Graph 5.11 Awareness on export incentives



Source: The Research Reporter compiled and designed from Table No.5.18.

5.4.7 Availing government schemes for trade promotion

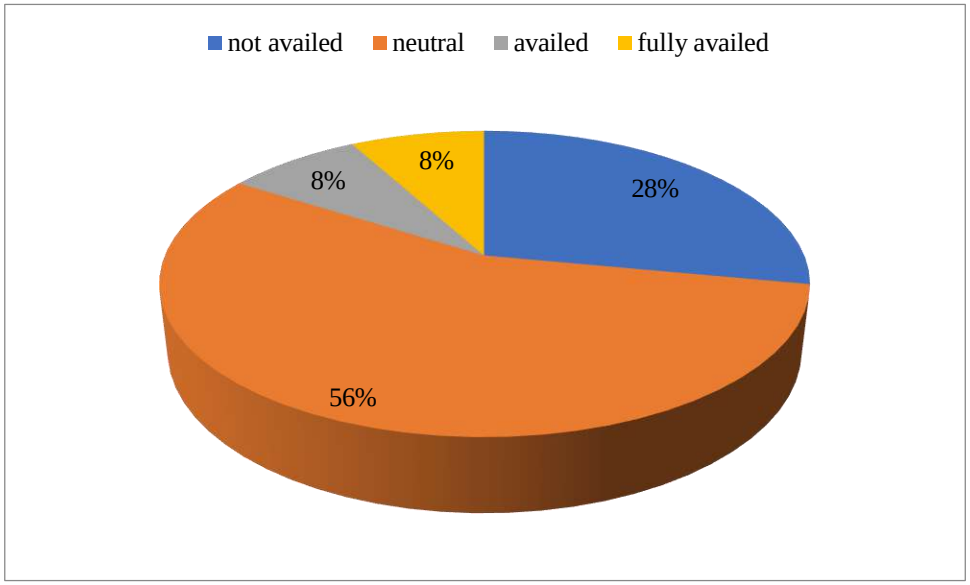
Table5.19 availing government schemes for trade promotion

	Frequency	Percent
Not availed	7	28.0
Neutral	14	56.0
Availed	2	8.0
Fully availed	2	8.0
Total	25	100.0

Source: The Research Reporter extracted data from primary sources of Questionnaire

From the table no.5.19 it can be observed that among exporters 28% not availed, 56% are neutral, 8% availed and 8% fully availed the government schemes for trade promotions.

Graph 5.12 Availing government schemes for trade promotion



Source: The Research Reporter compiled and designed from Table No.5.19.

CHAPTER- 6
RESEARCH FINDINGS, SUGGESSIONS AND CONCLUSION

Spices are one of the valuable gifts of life, to the people of India. From time immemorial India is considered as the renowned land of spices, producing nearly all the spices of the world. One or the other spices are grown in different parts of the country. So, spices play an important role in the economy of various regions of the country. Besides being a significant foreign exchange earner for the country, spices trade is revenue of living for a massive number of spices growers, commission agents, storage owners, spices traders, exporters and a source of employment for a large section of rural masses, especially rural women. In India, Andhra Pradesh is the most important producer, consumer and exporter of Chilli and Turmeric.

6.1 Statement of the problem

India, which is called the land of spices, once had almost exclusive monopoly in the global spices trade. But its leading position is falling by the entry of new spice producing and exporting countries. During 2023-24 chilly area under cultivation is 814790 Ha, production is 2302670 MT's, Domestic consumption is 1858770 MTs and exports are 443900 MT's and Turmeric area under cultivation is 224260 Ha, production is 1107920 MT's and domestic consumption is 1000620 Mt's and exports are 107300 Mt's.

India has lot of scope for expansion of area, production and exports, because of certain pre- and post-harvest challenges faced by the farmers, traders and exporters like lack irrigation facility, soil nutrition and fertility problem, lack of good seed and seed material, lack of sufficient credit facility, storage facility, entrepreneurship skills, infrastructure facilities. Other issues like Aflatoxin, Sudan, Salmonella, pesticide residue, Mould and Mycotoxins. There are other issues chemical, physical, biological, psychological ergonomic and safety hazards. There are other challenges like tariff barriers, political instability and environment, global norms and ethics.

This was the factor, which inspired the researcher to go deep into the prospects and problems spices trade in Andhra Pradesh with special emphasis on Chilli and Turmeric to offer policy decision to the Government.

The prospects and problems of the sector can be analyzed from the following

1. What is the chilly and Turmeric production and trading scenario in India?

2. What are all prospects of the spices sector in India?

3. What are the basic problems in spice cultivation and trading in India?

4. What are the existing supply chain and logistics management system?

5. What are the global norms on spices-on-spices sector?

6. What is the institutional support for the industry?

These questions need immediate attention and analyses in the absence of which our precious spices will disappear from the international trade and will receive an unnatural death in the fast-changing global economic scenario.

6.2 Objectives of the study

The major objective of the study is to evaluate the present production and trading system of spices and find out the critical issues hindering the growth and development of the spices sector. However, the following are the specific objectives of the study.

7. To know the Chilli and Turmeric total production and trading scenario of India and especially in Andhra Pradesh.
8. To study the various problems, constraints of the farmers and traders of Andhra Pradesh in Chilli and Turmeric.
9. To access or evaluate the existing supply chain and logistics management of the selected spices.
10. To identify the global norms on spices trading with related to Chilli and Turmeric, how for these selected spices meet the global norms and study the issues.
11. To analyze the trade performance of various Govt. schemes, programs and institutional support for spices trading.
12. To offer policy suggestions to the stake holders of the spices industry for developing policy document enlarge.

6.3 Verification of Hypothesis

Hypothesis 1: - There is no significant difference between the production problems faced by chilly farmers in different regions

The production problems faced by the farmers in both the districts are

1. Major Problems
2. Minor problems
3. Not going for organic cultivation

Chi-square test is conducted, and the results are tabulated as below

	Chi-square test	DF	Accept/reject
Major problems	21.445	4	Reject
Minor Problems	98.296	4	Reject
Organic cultivation	20.54	4	Reject

From the above table it can be understood that there is a significant variation in cultivation/production problems among both districts.

Hypothesis 2: - There is no significant difference between the production problems faced by Turmeric farmers in different regions

The production problems faced by the farmers in both the districts are

1. Major Problems
2. Minor problems
3. Not going for organic cultivation

Chi-square test is conducted, and the results are tabulated as below

	Chi-square test	DF	Accept/reject
Major problems	55.65	4	Reject
Minor Problems	64.699	4	Reject
Organic cultivation	83.024	4	Reject

From the above table it can be understood that there is a significant variation in cultivation/production problems among both districts.

Hypothesis 3: - There is no significant difference between the marketing problems faced by chilly farmers in different regions.

The Marketing problems faced by the farmers in both the districts are

1. Major Problems
2. Minor problems
3. Reasons for selling crop immediately after harvest

Chi-square test is conducted, and the results are tabulated as below

	Chi-square test	DF	Accept/reject
Major problems	40.82	4	Reject
Minor Problems	48.136	4	Reject
Reasons for selling crop immediately	59859	4	Reject

From the above table it can be understood that there is a significant variation in marketing problems among both districts.

Hypothesis 4: - There is no significant difference between the marketing problems faced by Turmeric farmers in different regions.

The production problems faced by the farmers in both the districts are

1. Major Problems
2. Minor problems
3. Not going for organic cultivation

Chi-square test is conducted, and the results are tabulated as below

	Chi-square test	DF	Accept/reject
Major problems	16.537	4	Reject
Minor Problems	40.291	4	Reject
Reasons for selling crop immediately	12.243	4	Reject

From the above table it can be understood that there is a significant variation in cultivation/production problems among both districts.

Hypothesis 5: - There is no significant difference between the procurement & trading strategies of the domestic traders with respect to age

The procurement & trading strategies of the domestic traders are

1. Identification of buyer
2. Method of purchase

3. target buyers

ANOVA test is conducted between the Age and above identified constraints and the results are tabulated below

	F value	Sig.	Accept/reject
Identification of Buyer	6.034	.003	Reject
Method of purchase	0.600	.550	Accept
Target buyers	1.460	.236	Accept

From the table it can be observed that there is a variation in identifying the buyer, but there is no variation in method of purchase and target buyers with respect to age

Hypothesis 6: - There is no significant difference between the procurement & trading strategies of the domestic traders with respect to Type of organization/firm

ANOVA test is conducted between the Age and above identified constraints and the results are tabulated below

	F value	Sig.	Accept/reject
Identification of Buyer	0.659	.519	Accept
Method of purchase	14.409	.000	Reject
Target buyers	5.224	.007	Reject

From the table it can be observed that there is a variation in method of purchase, target buyers, but there is no variation in identification of buyer with respect to type of organization.

6.4 Research Methodology

6.4.1 Sample Selection

The respondents of the study consist of spices cultivators, commission agents, cold storage owners, domestic traders and exporters. The details of spices cultivators, Commission Agents, Cold storages, domestic traders and exporter's details were collected form Department of Horticulture, Department of Marketing, Charmer of commerce, Market Yards and Spices Board of India. The sample respondents of the study selected from two leading chilly and Turmeric growing districts each in Andhra and Rayalaseema regions respectively. (Table 1.12)

Table 6.1 Sample selection design.

S.No	Region	Category	District	Mandal	Villages		respondents	Total
1	Andhra	Chilly Growers	Guntur	Bollapalli	Gummanampadu		15	90
					Vellaturu		15	
				Veldurthi	Veldurthy		15	
					Sirigiripadu		15	
				Amaravati	Dharanikota		15	
					Munugodu		15	
	Rayalaseema		Kurnool	Chippagiri	Chippagiri		15	90
					Yruru		15	
				Kowthalam	Bandinahal		15	
					Upparahal		15	
				Yemmiganuru	Kaluvatla		15	
					Kadimetla		15	
	Andhra	Turmeric growers	Guntur	Kolluru	Kiskindapalem		15	90
					Juwadapalem		15	
				Kollipara	Kollipara		15	

					Thummuluru		15	
				Duggirala	Pedakonduru		15	
					Veerlapalem		15	
	Rayalaseema		Kadapa	Mydukuru	Settivaripalli		15	90
					N.Mydukuru		15	
				Duvvuru	Bayanapalli		15	
					Kanagaduru		15	
				Kajipeta	Chemmullapalli		15	
					Sannupalli		15	
2	Andhra & Rayalayaseema	Domestic traders	Guntur Kurnool Guntur Kadapa				786	125
3		Exporters	Guntur Kurnool Kadapa				125	25
4		Commission agents	Guntur Kurnool Kadapa				760	110
5		Cold storage owners	Guntur Kurnool Kadapa				306	50
		Total						**670**

6.4.2 Questionnaire design

A structured interview schedules were prepared separately for chilly and turmeric producers, commission agents, cold storage owners, domestic traders and exporters and collected the relevant data on prospects and problems of spices trade in Andhra Pradesh with special emphasis on chilli and turmeric.

6.4.3 Scaling techniques

All the interview schedules were prepared multiple choices on 5-point scale. All the interview schedules prepared separately for chilly and turmeric producers, commission agents, cold storage owners, domestic traders and exporters.

6.4.4 Pilot study

In order to obtain an overall view of the practical problems of the above-mentioned groups and also to make the schedule of interview more accurate and relevant, a pilot study was conducted. Twenty spices producers, ten each from chilly and turmeric producers and ten spices traders, five each from chilly and turmeric traders and five exporters, ten commission agents, and 5 cold storage owners agencies were interviewed for the pilot study. The responses and opinions collected from them helped a lot to get an overview of the sector and also to locate the major defects of the draft schedule of interview. Based on the findings of the pilot study, the final schedule of interview was prepared.

6.4.5 Sampling techniques

A stratified random sampling was adopted for the collection of data from the sample respondents. Sample data were collected from spices producers, traders, spices exporters, commission agents and cold storage owners using the schedule of interview.

6.4.6 Data sources

The present study is analytical and descriptive in nature. Both primary and secondary data will be used for the study. The primary data has collected from the respondents based on structured interview schedule. Spices Board (Ministry of Commerce & Industry, Government of India), RBI Hand book on all India statistics, ITC statistics, FASTART, statistics of DGFT, Department of Horticulture (Government of Andhra Pradesh).

6.4.6.1 Primary data

Primary data were collected from Chilli and Turmeric growers, commission agents, cold storages, domestic traders and exporters directly using a structured interview schedule. (Annexure I-VI)

6.4.6.2 Secondary data

The secondary data has collected from spices statistics, Spices Board (Ministry of Commerce & Industry, Government of India), RBI Hand book on all India statistics, ITC statistics, FASTART, statistics of DGFT, Department of Horticulture(Government of AP), trade year book by the food and agricultural statistics, internal trade statistics year book by UNO, UNCTAD publications, other reports, books and periodicals.

6.4.7 Data analysis methods and statistical tools

After Data Collection, the following data analysis tools were used and analyzed by using of MATHSTAT- Analysis. The Various data analysis tools used in this Research work. Along with these, Line Graphs, Charts and Segmental representations have been used for analytical purposes.

These are:

8. Simple Percentage Analysis
9. Mean
10. Standard deviation
11. Anova
12. Chi-Square
13. CAGR

Ms-Excel, SPSS 17.0 and used for the analysis the data.

The Formulated hypotheses were examined at significant level of (0.05%)

Simple Percentage Analysis

The expression of data in terms of percentages is one of the simplest statistical devices used in the interpretation of business and economic statistics. Percentages are useful chiefly for the purpose of aiding comparison. A percent is the number of hundredth part one number. Using algebraic notation in which percentage (%) represents the number of parts of 100, i.e. the percent. b0 represents the base used for comparison, b1 represents the given data to be compared with the base and then the percentage of the given number in the base may be defined as:

$$p\% = \frac{b1}{b_o} \times 100$$

Generally percentages are recorded with one decimal place. Sometimes to grasp the relationships, whole percentages are shown. Percentages need not be calculated if the absolute numbers are micro, especially if the base is appreciably less than 100.

Mean

Mean is the average of the data, which is the sum of all the observations divided by the number of observations. Mean describes the sample with a single value that represents the center of the data. Many statistical analyses use the mean as a standard measure of the center of the distribution of the data. Mean can prove to be an effective tool when comparing different sets of data; however this measure can be influenced by the impact of extreme values.

The arithmetic mean (or simply mean) of a sample x1, x2,x3,.....,xn usually denoted by ¯x

, is the sum of the sampled values divided by the number of items

$$\boldsymbol{X} = \frac{\boldsymbol{x_1 + x_2 + x_3 + \cdots \ldots \ldots . + x_n}}{\boldsymbol{n}}$$

Standard deviation

In statistics, the standard deviation (SD, also represented by the lower case Greek letter sigma σ or the Latin letter s) is a measure that is used to quantify the amount of variation or dispersion of a set of data values.[1] A low standard deviation indicates that the data points tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values.

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{N}}$$

ANOVA

The analysis of variance frequently referred to by the contraction ANOVA is a statistical technique specially designed to test whether the means of more than two quantitative populations are equal. Basically, it consists of classifying and cross classifying statistical results and testing whether the means of a specified classification differ significantly. In this

study, ANOVA has been used to analyse the various kinds of problems faced by the respondents.

Assumptions

- The samples must be independent.
- The populations from which the samples were obtained must be normally or approximately normally distributed.
- The variances of the populations must be equal.

ANOVA: Analysis of Variance was used for testing the hypothesis formulated. For this test, the significance level of $p< 0.05$ was taken.

Sources Of Variation	Sum Of Squares	Degree Of Freedom	Mean Sum Of Squares	Ratio Of F
Between Groups	SS(B)	k-1	$\frac{SS(B)}{k-1}$	$\frac{MS(B)}{MS(W)}$
Within Groups	SS(W)	N-k	$\frac{SS(W)}{N-k}$	
Total	SS(W) + SS(B)	N-1		

SS(B) = Sum of squares between groups

SS(W) = Sum of squares within groups

k-1 =Degrees of freedom between groups

N-k= Degrees of freedom within groups

N-1= Total number of degrees of freedom

MS(B) = Mean square between groups

MS(W) = Mean square with in groups

Total Variation

The total variation (not variance) is comprised the $SS(T) = \sum(X - \overline{X_{GM}})^2$ the sum of the squares of the differences of each mean with the grand mean. There is the between group variation and the within group variation. The whole idea behind the analysis of variance is to compare the ratio of between group variance to within group variance. If the variance caused by the interaction between the samples is much larger when compared to the variance that appears within each group, then it is because the means aren't the same.

Between Group Variation

The variation due to the interaction between the $SS(B) = \sum n(X - \overline{X_{GM}})^2$ samples is denoted SS (B) for Sum of Squares Between groups. If the sample means are close to each other (and therefore the Grand Mean) this will be small. There are k samples involved with one data value for each sample (the sample mean), so there are k-1 degrees of freedom. The variance due to the interaction between the samples is denoted MS(B) for Mean Square Between groups. This is the between group variation divided by its degrees of freedom. It is also denoted by S_b^2.

Within Group Variation

The variation due to differences within individual $SS(W) = \sum df.s^2$ samples, denoted SS(W) for Sum of Squares Within groups. Each sample is considered independently, no interaction between samples is involved. The degree of freedom is equal to the sum of the individual degrees of freedom for each sample. Since each sample has degrees of freedom equal to one less than their sample sizes and there are k samples, the total degrees of freedom is k less than the total sample size: df = N - k. The variance due to the differences within individual samples is denoted MS(W) for Mean Square Within groups. This is the within group variation divided by its degrees of freedom. It is also denoted by $S_w^2$and it is the weighted average of the variances (weighted with the degrees of freedom).

The F values are calculated as follows:

$$F = \frac{\text{MS(B)}}{\text{MS(W)}}$$

The calculated values of F are compared with the table values. If calculated value of F is greater than the table value at pre-assigned level of significance, the null hypothesis is rejected, otherwise accepted.

Chi-square Test

The χ^2 test (pronounced as chi-square test) is one of the simplest and most widely used non-parametric tests in statistical work. The symbol χ^2 is the Greek letter Chi. The quantity χ^2 describes the magnitude of the discrepancy between theory and observation. It is employed in this study to evaluate the level of satisfaction of the respondents. It is defined as:

$$\chi^2 = \frac{\sum(O - E)^2}{E}$$

Were,

O refers to the observed frequencies and

E refers to the expected frequencies.

Steps to determine the value of χ^2 , the steps required are:

iv) Calculate the expected frequencies. In general, the expected frequency for any cell can be calculated from the following equation: $E = \frac{RT \times CT}{N}$
E = Expected frequency
RT = the row total for the row containing the cell
CT = the column total for the column containing the cell
N = the total number of observations.

v) Take the difference between observed and expected frequencies and obtain the squares of these differences, i.e., obtain the values of $(O-E)^2$

vi) Divide the values of $(O-E)^2$ obtained in step (ii) by the respective expected frequency and obtain the total $\sum ((O-E)^2/E)$. This gives the value of χ^2 which can range from zero to infinity. If χ^2 is zero it means that the observed and expect frequencies completely coincide. The greater the discrepancy between the observed and expected and frequencies, the greater shall be the value of χ^2

The Calculated value of χ^2 is compared with the table value of χ^2 for given degrees of freedom at a certain specified level of significance. If, at the stated level (generally 5% level is selected), the calculated value of χ^2 is more than the table value of χ^2, the difference between theory and observation is considered to be significant, i.e., it could not have arisen due to fluctuations of simple sampling. If, on the other hand, the calculated value of χ^2 is less than the table value, i.e., it is regarded as due to fluctuations of simple sampling and hence ignored.

6.5 OBJECTIVE WISE RESEARCH FINDINGS AND OBSERVATIONS

Objective: 1: -To know the chilli and turmeric total Production and trading scenario of India especially in Andhra Pradesh.

Finding 1: The Research Reporter observed that that 50.6% of chilly and 67.2% of Turmeric farmers are at the age group of 41-60 years and they are showing interest for cultivation of spices. It is observed that 34.4% of Chilli and 20% Turmeric farmers don't have formal education. It is also observed that 91.7% of Chilli and 93.9% Turmeric farmers are depending only on cultivation of spices. The family member's involvement (4-7 members) in chilly 67.2% and 77.2% in Turmeric cultivation.

Finding 2: The Research Reporter observed that 74.4% of chilly and 77.2% of Turmeric farmers are growing spices in their own land, 11.1% of chilly and 18.3% of Turmeric farmers are leasing land. It is also observed that 45% of chilly and 58.9% of Turmeric farmers have ½ to 2 acres of cultivated land. Further it is noticed that 20.6% of chilly and 13.9% of turmeric farmers are having 10-15 years of experience in spices cultivation which is very predominant.

Finding 3: The Research Reporter observed that 50% of Chilly and 75.56% of Turmeric farmers agree with the value addition of spices brings good profits. It is also observed that 45% of chilly and 67.78% of Turmeric farmers in both regions were agreed with mechanization in spices processing will fletch the farmers. Further 46.11 of Chilly and 46.67% of Turmeric farmers agreed with the forming Farmers Producers Organization (FPO). 29.44% of chilly and 63.33% of Turmeric farmers agreed Minimum Support Prices (MSP) to get the minimum price whenever prices are in downstream. 40% of chilly and 48.38% of Turmeric farmers agreed that Clean and hygienic spices will get a better price.

Finding 4: The Research Reporter observed the age group of the exporters involved in export business. It is found that 28% of exporters are in between 20-40 years age, 68% exporters are 41-60 years and 4% one 61-80 and it is noticed that middle age people are involving export business. It is also observed the level of education who involved in the spices trading. 76% of exporter studied graduation level and 24% traders are Master level. The Research Reporter also observed the type of exporter. It is found that 48% of exporters are sole proprietorship, 16 % partnership firm, 24% are private ltd. The Research Reporter also observed that among

exporters 4% are having 1-5 years' experience, 36% are having 6-10 years, 40% are having 11-15 years,12% are having 16-20 years and 8% are having above 20 years.

Objective 2. To study the various problems, constraints, of the farmers and traders of Andhra Pradesh in Chilli and Turmeric.

Finding 1: The Research Reporter observed the major problems experienced by the farmers of chilly and Turmeric in Andhra and Rayalaseema Region. 56.70% of Andhra and 37.80% of Rayalaseema chilly farmers and 45.6% of Andhra and 13.3% Rayalaseema Turmeric farmers are having lack knowledge about the organic farming. 30% of Andhra, 30% Rayalaseema Chilly farmers and 47.8% of Andhra, 17.8% Rayalaseema Turmeric farmers are opinion that organic cultivation will give a low productivity.

Finding 2: The Research Reporterer also observed that 16.7% of Chilly farmers in Andhra, 11.1% of farmers in Rayalaseema not aware of the insurance facilities available to them. 30.3% in Andhra, 37.8% in Rayalaseema Chilli farmers, and 31.1% in Andhra, 17.8% in Rayalaseema Turmeric farmers are investing 81 -100 thousands for spices cultivation. 63.3% in Andhra, 43.3% in Rayalaseema regions chilly farmers, 32.2% of Turmeric farmers in Rayalaseema regions expressed irrigation is the main problem. 18.9% in Andhra, 17.8% in Rayalaseema region chilly farmers and 4.4% in Andhra, 8.9 of Rayalaseema regiona Turmeric farmers expressed problem of spurious seeds.3.3% in Andhra, 6.7 in Rayalaseema region Chilli farmers and 26.7% in Andhra, 21.1% in Rayalaseema Turmeric farmers are facing sever labour problems in spices cultivation process.

Finding 3: The Research Reporter found that 18.9% in Andhra, 13.3% in Rayalaseema Chilly farmers and 36.7% in Andhra, 88.9% in Rayalaseema region Turmeric farmers are facing lack of technical knowledge. 30% in Andhra, 4.4% in Rayalaseema region Chilly farmers and 3.3% in Andhra Turmeric farmers are having the problem of post-harvest losses. It is also found that 13.3% in Andhra, 38.9% in Rayalaseema Chilly farmers and 43.3% in Andhra, 11.1% in Rayalaseema region Turmeric farmers are having the problems of inadequate credit availability at the time of cultivation.

Finding 4: The Research Reporter also observed that 50.6% in Andhra, 24.4% in Rayalaseema Chilli farmers and 4.4% in Andhra, 5.6 in Rayalaseema Region Turmeric farmers experience the problem of too many intermediates in APMC's. It is also observed that 13.3% in Andhra,

57.8% Rayalaseema Chilli farmers and 4.4% in Andhra, 12.2% of Rayalaseema region turmeric farmers have lack awareness about market information. 20.8% in Andhra, 7.8% in Rayalaseema chilli farmers and 2.2% in Rayalaseema regions turmeric farmers experience the problems of defective weights. 6.7% in Andhra, 5.6% Rayalasemma chilli farmers and 85.6% in Andhra, 70% in Rayalaseema Turmeric farmers have lack of adequate storage facilities. 48.9% in Andhra, 6.7% in Rayalaseema chilli farmers and 11.1% in Andhra, 21.1% in Rayalaseem Turmeric farmers faced with unwanted sample collection at market places. 34.4% in Andhra, 68.9& Rayalaseema chilli farmers and 78.9% in Andhra, 37.8% Rayalaseema region turmeric farmers experience the fluctuations in market prices. It is also observed that 83.9% in Andhra, 3.3% in Rayalaseema chilli farmers and 5.6% in Andhra, 7.8% Rayalaseema turmeric farmers felt the corrupt policies prevailed Market yards. Further 38.9% in Andhra, 57.8% in Rayalaseema chilli farmers and 6.7% in Andhra, 7.8% in Rayalaseema turmeric farmers felt that they don't have adequate credit facilities.31.1% in Andhra, 4.4% in Rayalaseema chilly farmers and 42.2% in Andhra, 56.7% in Rayalaseema Turmeric farmers opinioned that corrupt practices are prevailed in banks.

Finding 5: The Research Reporter found the major reasons for selling the chilly immediately after the harvest by the farmer is 8.5% for better price, 53.% to pay the debts, 17.5% lack of storage facilities,10.7% forced by the commission agents and turmeric farmers also 34.4% for better price, 35.5 for to pay the debts, 17.2% for lack of storage facility and 7.2% force by the commission agents.

Findings: 6: The Research Reporter found the problems faced by the commission agents that 17.3% felt that no commitment from farmers, 32.7% is no commitment from traders, 40% delay in payments by traders and 5.5% felt farmers are not giving money return. Further researcher also observed that 43.6% of commission agents felt that willful dragging in getting registration, 29.1% felt exorbitant fees, 22.7% opinioned unwanted delay.

Finding 7: The Research Reporter observed views of commission agents on e-NAM system. 45.5% of commission agents told they strongly support, 42.7% not support and 10% people felt strongly not support. The researcher also observed the reasons not to support e-NAM. 45.5% told that lack of AMC staff support, 26.4% felt that traders can't in a day, 14.5% daily business will reduce. The Research Reporter also observed the commission agents views on future trading and it is found that only 1.8% is always doing,20% sometimes, 73.6% never

doing. Researcher also found the view on AMC support to commission agents told that 48.2% neutral and 48.2% favorable.

Finding 8: The Research Reporter observed the problems of labor in chilli and Turmeric drying, grading, packing and stem removing. 47.9% chilly traders opinioned that they have labour problems in drying, grading, packing and stem removing. 74.5% of Turmeric traders also told that they have all problems in every stage of turmeric processing. The research reporter also observed the problems at storage of spices. 50.7%chilli traders opinioned that they experienced the high storage cost, 8.5% insufficient storage, 5.6% continuous power problems and also 74.5% Turmeric traders experience the same high storage cost.

Finding 9: The Research Reporter observed the whether any problems and constrains faced by the spices exporters. It is opinioned that 48% of exporters have no problem obtaining importer exporter code, 64% of exporters finding difficulty to get the potential buyers. 56% of exporters getting container service problems.

Objective 3: To access and evaluate the existing Supply Chain and Logistics Management of selected spices.

Finding 1: The Research Reporter found the major issues faced by Chilly farmers at cold chain system. 8.9% chilly farmers felt insufficient storage, 21.1% high storage cost, 26.7% unreachable to the production centre, 10% felt product damage. Turmeric farmers also 10.3% insufficient storage, 44.6% high storage cost, 37.7 unreachable to firm, 4.%product damage.

Finding 2: The Research Reporter also found the problems faced by the farmers while selling their materials at AMC's. There are chilly farmers 5.6% felt no transparency in prices, 31.7% middle man involvement, 28.9% defective weights and scales, 8.3% unfair collection of charges. Also turmeric farmers also felt 7.2% no transparency in prices, 3.9% middlemen involvement, 10% defective weights and scales and 62.8% unfair collection of charges.

Finding 3: The Research Reporter also found the views of the chilly farmers in Andhra Pradesh about the newly introduced systems of e-Nam in APMC's about better price, more market linkage, direct payment, better returns and reduction of intermediation cost etc. the 2.8% strongly disagreed, 19.4% disagreed, 45.6% are neutral, 30.6% agreed and 1.7% strongly agreed. Turmeric farmers also opinioned that 4.4% strongly disagree, 40.6% disagreed, 26.7%

are in neutral, 27.8% agreed and .6% strongly agreed the system. The Researcher found level of agreement with establishment of cold storage by the Government is more beneficial to the chilly farmers and 38.9% agreed and 32.2% strongly agreed. The turmeric farmers also felt 53.9% agreed and 19.4% are strongly agreed.

Finding 5: The Researcher found the information about the cold chain establishment, capacity, seasonal stocks, management and maintenance, storage charges, functionality, control, accessibility to the farmers. 68% cold storages were established in between the year 1996-2000 and 22% in 2001-2005 in Andhra Pradesh. Further Researcher found the capacity of cold storage and it 48% are 51-75 MT's, 30% are 25-50MT's and 22% are 76-100MT's. Another important thing the researcher found that storing material, it is 52% Chilli, 12% turmeric, 36% both the spices. The Researcher also found that the chilly and Turmeric farmers storing frequency of their material. It is found that 52% of farmers are keeping their materials 9-10months, 38% are 7-8% months, 4% 4-6 months and 6% are 11-12 months. Further, 56% of farmers paying Rs.175 per bag in a season. 44% are paying Rs.150 as storage charges. It is found that 96% stored chilly and Turmeric spices covered with insurance facility and only 4% not sure of coverage.

Finding 6: The Researcher also found the distance between the cold storage and the production centers. It is noticed that 38% of cold storages are 30-40 km away from the production centre, 16% are 40km and above, 8% are 5-10km and 26% are 20-30 km away. This is also found that 58% of and agreed, 32% owners strongly agreed to have the cold storage near to the production is more beneficial to the farmers. It is also found that 88% of cold storages are having fire protection, emergency exits and emergency alarm system. The researcher found the level of agreement with requirement of user-friendly low-cost loading and unloading facilities and found that 56% are agreed, 26& neutral and 18% are strongly agreed. The researcher also found that 54% agreement and 18% strongly agreement with online temperature system. It is also found that the how the cold storages are useful to the farmers. The owner opinioned that 12% better price, 16% quality retains,18% said more demand and 54% said better price, quality retain and more demand. The Researcher also found the level of agreement with bag identification taking in cold chain for traceability and it is found that 56% are agreed,4% neutral and 40% strongly agreed.

Finding 7: The Research Reporter observed the age distribution of domestic traders in spices trade. It is found that 66.4% is in between 41-60 years, 24% is between 20-40 years only 9.6%

are 61-80. The Researcher also observed the level of education of domestic traders. It is found that 53.6% are graduation level, 5.6% are post-graduation level, 24% inter level and 16.8% SSC level. It is also observed that 80% of traders 4-7 family member. It is also observed the types of form domestic traders are running. It is found that 76.8% are Proprietorship form, 16.8% Partnership form and only 6.4% are Private ltd. It is also observed that 56.8% traders dealing with chilly, 37.6% Turmeric and 1.6% Ginger. It is also observed that 48.8% traders finding the by old relation, 7.2% through trade fairs/exhibitions and 5.6% websites. It is also observed that 68.8% traders preferred to purchase chilli/turmeric form AMC only, 26.4% are from farmers & AMC and 2.4% from FPO.

Finding 8: The Research Reporter observed the reasons domestic traders choosing the AMC for procurement of their Chilli/Turmeric is that 32.8% for availability of more varieties, 8% more quantity, 4% more quality and 54.4% are all reasons. The researcher also observed the target buyers of the traders are 28% opinioned wholesalers, 10.4% processors, 14.4% exporters and 44.8% are importer, exporters and wholesalers. The Reporter also found the view of the traders about speculation in chilly /turmeric. It is observed that 60% of traders opinioned high speculation, 30.4% very high and 9.6% neutral.

Finding 9: The Research Reporter observed that 47.9% proprietors are identifying the buyer through old relation, 42.9% partnership firm through old relation and 75% private limited through old relation. It is also observed that 70.8% proprietors prefer to purchase at AMC, 71.4% partnership firm though AMC and 37.5% Pvt Ltd through t AMC. It is also observed that 64.6% proprietors felt high level speculation, 47.6% partnership firms felt high level speculation and 37.5% Pvt. Ltd felt high level of speculation. It is also observed that 26.8% domestic traders will prefer chilly at AMC because of availability of more varieties, 38.3% turmeric traders will prefer AMC for more varieties.

Finding 10: The Research Reporter also observed the method of procurement of chilly/Turmeric for exports. 8% informed from farmers, 52% from market yard, 12% traders, 12% from whole sellers and 16% from above all areas. Further the Research Reporter observed the export demand for value added spices in the international market. 60% said it has demand, 12% said very demand, 4% said poor demand and 24% said neutral. The Research Reporter also observed from exporters the form of spices which have more demand in international market. 20% whole form, 20% power form, 12% spices oil & oleoresins, 48% of above all.

Objective 4: To examine the global norms on spices trading with related to Chilli and Turmeric how for these selected spices meet the global norms and study the issues.

Finding 1: The Research Reporter observed the domestic trader's opinion about the availability of chilli and turmeric as per buyer's requirements/standards. It is found that 57.7% Chilli traders told that it is always available, 68.1% Turmeric traders told that always available.23.9% chiily traders expressed many times available and 14.9% turmeric traders expressed many times available as per buyers standards.

Finding 2: The Research Reporter observed the kind of spices traded and defects noticed. It is found that 21.1% chilly traded having moisture content, 52.1% extraneous matter, 9.9% pesticide residue,8.5% insects, mold and bacteria. 89.4% of turmeric trader's extraneous matter in their turmeric. Further, 54.9% of Chilli traders and 46.8% turmeric trader agreed that value addition will have more demand.

Finding 3: It is also observed that 56% of exporters are meeting the govt. rules, norms and acts. 56% exporters are meeting the port formalities and customs clearance. The Researcher also observed the degree of competition among the exporters and international spices trade. It is found that 56% exporters told high competition, 32% told very high competition in international trade.

Finding 4: The Research Reporter observed the agreement of exporters about the maintaining high quality is necessary to sustain in international business. 56% exporters agreed and 36% is strongly agreed. Further the researcher taken the opinion about the good labeling and attractive packaging as per the buyers specification is needed. 28% are neutral, 24% agreed and 44% strongly agreed.

Finding 5: The Research Reporter observed the reasons behind the exporters for selection chilli and Turmeric for exports. 64% said more availability, more demand, and suitability in the market. 20% more demand, 12% said more availability. The Research Reporter observed that 52% of exports are going to Africa & Asia, 20% EU & Middle east, 8% Central America & Eastern Europe and 4% North and south America.

Finding 6: The Research Reporter observed the difficulties faced by the exporters identifying the country in international trade. 4% informed market size, 68% said competition, 4% quality

and 8% said payment terms. The Research Reporter observed the major threats for Indian chilli/Turmeric. 16% said adulteration, 32% said pesticides, 28% Aflotoxin, 28% Sudan.

Finding 7: The Research Reporter observed the availability of chilli/Turmeric as per the Global standards. 4% said never available, 8% available, 72% always available, 12% some times and 4% many times available. The Research Reporter observed the awareness of exporters with regards the global norms on spices trade. Among exporters regarding the WTO activities and norms for trade 28% not aware, 48% are neutral, 20% are aware and 4% are fully aware. About free trade agreements 4% are fully not aware, 28% are not aware, 48 are neutral 16% are aware and 4% are fully aware. About SPS measures 4% are fully not aware, 20% are not aware, 52 % are neutral, 20% are aware and 4% are fully aware.

Objective 5: To analyze the trade performance of various Govt. schemes, programs and institutional support for spices trading.

Finding 1: The Research Reporter found the availing position of different Government schemes introduced for Chilly and Turmeric farmers for production and supply of quality and hygienic materials to the traders who sells at domestic and international market. Chilly farmers 6.1% IPM inputs, 32.4% Tarpaulin sheets, 3.4% Thivan sprays, 31.8% drip irrigation and also Turmeric farmers 14.4% IPM inputs, 22.8% Tarpaulin sheets, 17.2% Thivan sprayers, 20% drip irrigation system. Researcher also found the reasons some group of chilly and Turmeric farmers not availed. Chilly and Turmeric farmers felt that 7.8% & 23.9% banks restrictions, 16.1% & 38.9% local politics, 49.4% & 17.8% lack of understanding, 17.8% & 2.8% lack of information and 8.9% & 16.7% lack of recommendations respectively.

Finding 2: The Researcher found the level of agreement from Chilli and Turmeric farmers about the usefulness of schemes/programs implemented by the Government agencies. Chilli and Turmeric farmers opinion that 1.1% & 16.7% strongly disagree, 6.7% & 35.6% disagree, 29.4% & .6% neutral, 41.7% & 45% are agreed and 21.1% & 2.2& strongly agreed the usefulness of the schemes.

Finding 3: The Researcher also found the information from Chilly and Turmeric farmers about the level of awareness about the Spices Board's activities and schemes in Andhra Pradesh. It is opinioned that 15% & 5% fully not aware, 46.7% 66.7% not aware, 21.1% & 10.6% neutral, 15.6% & 15% aware and 1.7% & 2.8% fully aware of the Board's schemes and activities chilly

and Turmeric farmers respectively. The Researcher found the Government support and service towards the cold storages in Andhra Pradesh. The researcher found mixed opinions that 32% owners are neutral, 64% said Well and 4% said very well.

Finding 4: The Research reporter also observed that 42.3% chilli traders opinioned that banker's service is favorable and 40.8% are felt neutral.53.2% of Turmeric traders felt that banker's service is favorable and 12.8% trader's opinion that service is unfavorable. Further 52.1 of Chilli trader's opinion that government participation is favorable and 12.7% felt unfavorable.59.6% Turmeric traders felt Government participation in spices trade is favorable and 6.4% expressed unfavorable.

Finding 5: The Research Reporter observed the agreement with essentiality of ECGC scheme to mitigate the risk in international trade. 48% exporters agreed and 36% strongly agreed it is very essential to mitigate the risks in international trade. Further the research reporter observed the opinion of the exporter about the banker's support for industry. 40 said neutral, 56% said favorable and 4% very favorable.

Finding 6: The Research Reporter observed the awareness on export incentives to the exporters. It is observed that among exporters 28% are not awareness, 40% are neutral, 28% are aware and 4% are fully aware with the export incentives. Further the Research Reporter observed the exporters availing position of Government schemes for trade promotion. It is observed that among exporters 28% not availed, 56% neutral, 8% are availed and 8% fully availed.

6.6 Major suggestions

6.6.1 Adult education programs.

Study revealed that more than 34% of farmers are uneducated. They are unable to read or write, it makes them handicap to know more about Good Agricultural practice, latest development on production process and to get market information about their spices.

6.6.2 Awareness programs about insurance (crop, personal, storage and Inputs)

The study revealed that most of the farmers are not aware of the insurance coverage to their products stored at cold storages. The concern departments need to make the aware of the farmers about the facilities available at cold storage.

6.6.3 Irrigation facility.

Study revealed that 57% of chilli and 17% turmeric farmers in Andhra region and 37% of chilli and 16% turmeric farmers of Rayalaseema region expressed that irrigation facility is the main problem.

6.6.4 Control of spurious seeds.

The study revealed that 17% from Andhra and 16% from Rayalasema Region farmers facing spurious seeds. The Government should take stringent action against the dealers, distributors and manufactures of spurious seed and supplying to the innocent farmers.

6.6.5 Sufficient credit facilities.

The study revealed that 39% from Andhra region and 58% Rayalaseema region farmers are not getting sufficient credit support in time. Because of these farmers are forced to sell their spices immediately after harvesting the product to pay the debt even through there is no better market prices to their products.

6.6.6 Control mediators.

The study revealed that 55% mediators are involving in the marketing system in Guntur region. Too many mediators and unwanted collection of samples will spoil the marketing system. The marketing department should take necessary steps to eliminate this system.

6.6.7 Adequate sample drawings:

The study revealed that more than 48% farmers in Guntur region felt that they were collected unwanted sample drawing at market place while selling their material.

6.6.8 Sufficient cold storage facility.

The study revealed that 28% farmers in Kurnool region selling their products immediately after harvest; this is lack of cold storage facility. 28% Guntur district and 39% farmers in Kurnool district facing limited storage and unreachable to the farmers. 52% and 44% farmers in Guntur and Kurnool region strongly agreed to establishment of cold storages by Government are very beneficial to the farmers to reduce the post harvest losses.

6.6.9 Attention of APMC

Study revealed that 29% and 34% of chilli and turmeric farmers in Andhra region and 32% and 26% chilli and turmeric in of farmers Rayalaseema region felt that problem of middlemen and defective weights causing more lass to their product. The department should have a very strong surveillance team to observe and control this kind of evil activities in the market yards. They also need to provide better facilities to the farmers at market yards like., roads, drains, electricity, warehousing facility, canteen, sufficient toilets with proper maintenance, market information display boards and good weighing machines.

6.6.10. Awareness on Government programs and activities.

Study revealed that 42% and 11% of farmers in Guntur and Kurnool region are not availed government schemes. 69% and 32%, 14% and 21% of farmers in Guntur and Kurnool region not availed schemes lack understanding and lack of information. Farmers need information about ongoing Good Agricultural Practices, schemes, trainings and market information to get better price.

6.6.11. Concentration on Rayalaseema region.

The study revealed that 3%, 30% and 3% of turmeric farmers availed IPM kits, Tarpaulin sheets and thivan sprayers in Rayalaseema region respectively. It shows that Rayalaseema area farmers are not given importance to implement the programs and schemes designated to them. There is a lot scope and potentiality to grow the best spices like chilli, turmeric and tamarind in this region.

6.6.12 More reach of Spices Board.

Study revealed that 30% of chilli and 51% turmeric farmers in Andhra and 63% of chilly 82% turmeric farmers in Rayalaseema opinion that they not aware of the Spices Board activities and schemes. Therefore, it is very necessary to the Board to spread their activities, programs, trainings and scheme in both the regions.

6.6.13 Enterpreneual and skill development programs.

The study revealed that only 28% of exporters under the age of 20-40 years. The Government department should take a initiatives to promote the EDP programs and skill

development programs more effective manner to address the unemployment problem and to provide the business opportunities to earn the foreign currency.

6.6.14 Organic cultivation.

It is observed that 56.7% of chilli and 45.6% turmeric farmers in Guntur district and 37.8% chilli farmers in Kurnool opinion that lack knowledge and awareness about the cultivation, 48.9% of farmers from Kadapa opinioned that there is not marketing. Therefore, it is very much necessary to motivate the farmers to grow organic spices and government needs to show the market facility also.

6.6.15 Farmer's producers' organization.

It is very much necessary to promote and train the farmers to form the Formers Producers Organization. This is very relevant to address the each and every problem of the farmers, which can enhance competitiveness and increase advantage in the emerging market opportunities.

6.6.16 Regulated Markets:

Regulated markets may be established with a view to eliminating un-healthy and unethical trade practices and reduc-ing various marketing charges with a view to benefitting the poor cultivator. Quite recently, nu-merous regulated markets have been set up in vari-ous States to safeguard the interest of the farmers.

6.6.17 Expansion of Market Yards:

This is a vital necessity. This must be supported by a corre-sponding expansion of ancillary facilities in the various existing markets and setting up new mar-kets and market yards for handling the pheno-menal increase in market arrivals, particularly in those areas where the Green Revolution has oc-curred (viz., Punjab, Haryana and western U.P.).

6.6.18 Transport Facilities:

Expansion of trans-port facilities between the villages and mandis seems to be the need of the hour. Rural transport has been given emphasis in the five year plans and quite some progress has been made in this direc-tion.

6.7 Major Policy suggestions

6.7.1 Awareness about insurance:

Farmers should be made aware of insurance facilities available to their personal life, crop and agricultural inputs through the social media like sms, whatsapp, Television, radio and telemarketing. Insurance Regulatory Authority of India (IRDA) should appoint an independent state agency to look after the farmers insurance sector.

6.7.2 Irrigation facilities:

In Andhra Pradesh some districts are experiencing the drought like situation every year and there is no sufficient rail fall in the state. Therefore, we need to save the water and control the water use in irrigation system. Most of the time our rivers, canals are flooding because of heavy rains in the states of Maharashtra, Karnataka, Goa and Telangana. We need to inter link the rivers, canals, tanks and ponds effective storage and utilization rain water, so that it does going sea Government should also promote and encourage the farmers to use of the mass micro-fertigation units to avoid the flooding systems of water use in irrigation.

6.7.3 Control of spurious seeds:

The Government should implement stringent rules to the manufactures, whole sale traders, distributors and retailers to provide quality seeds with strict condition on survivability of seeds germination.

6.7.4 Customized credit facilities:

Today the fact is that some farmers are not getting the loans from the local banks. Because every bank is experiencing the non-performing asset value. It means most of loans taken for agriculture are not paid and it becomes NPA. Banks have not trust on farmers and Government need to develop the trust and confidence in between the famers and bankers.

6.7.8 Sufficient cold storage facilities:

It is fact that cold storages are not available near to the production centre. Most of the farmers are wishing to have the cold storages near to the farm and it should be developed by the government. In this case, today establishing cold storage by Government and maintenance is very difficult. Chilly and turmeric growing areas have already no. of cold storages near to the market center. To encourage the farmers to keep their material till getting remunerative prices, the Government should provide the transportation charges to the nearest cold storage point from the farm to store their material.

6.7.9 Awareness about government schemes, trainings and programs:

It is fact that government programs, trainings and schemes are not reaching to some farmers and traders' group. Therefore, government should use the mass media and social media to propagate the activities, trainings and programs.

Fig 4.8 : Researcher providing training on Value addition, Exports & Schemes to Potential Farmers & Entrepreneurs

6.7.10 Organic cultivation:

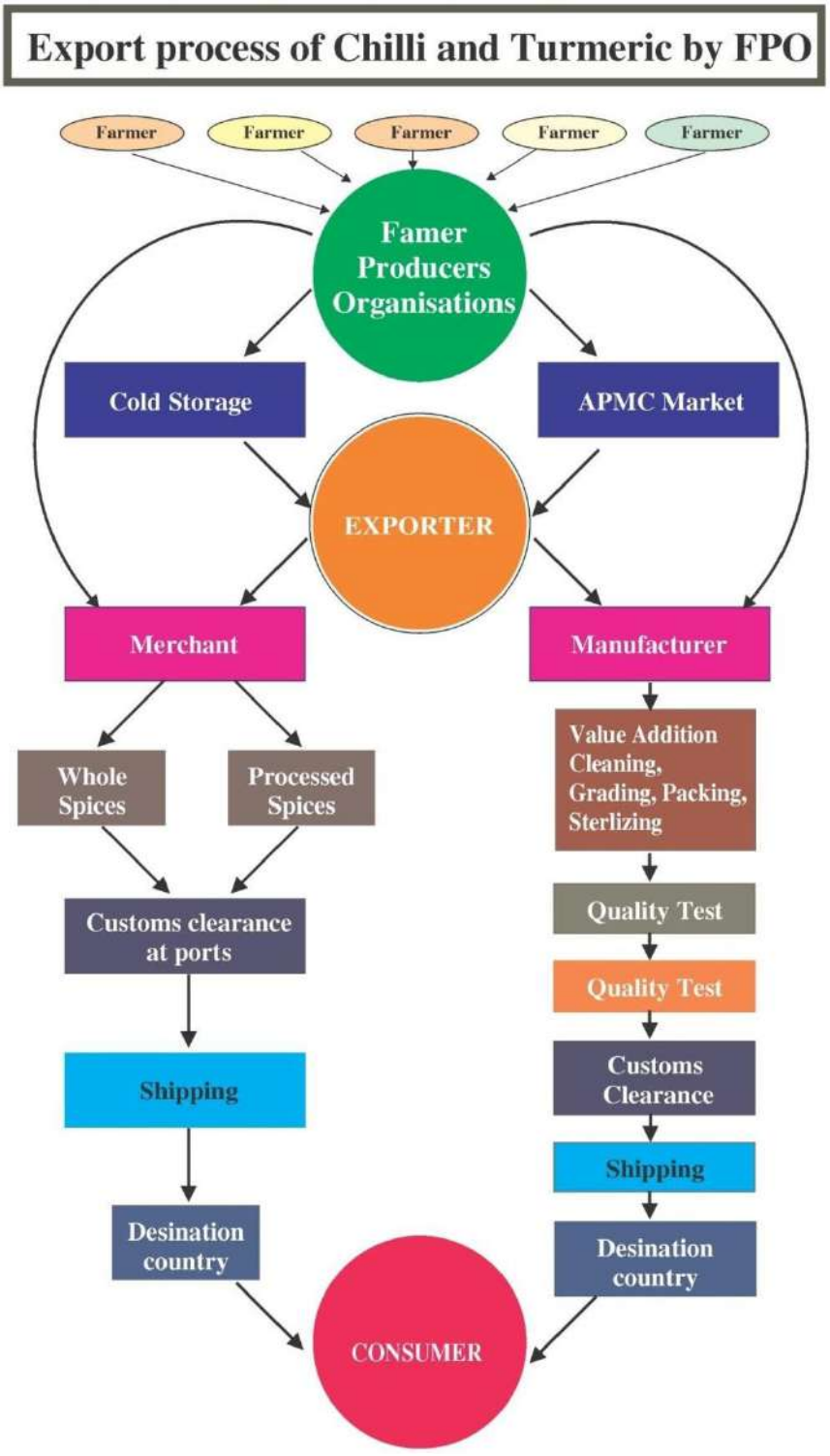
Today farmers are having different opinion, mindset about organic cultivation. Actually, it is traditional cultivation practices before 1970's our elders were doing. Farmers have

different opinion about organic cultivation like; no better price, less production, more disease effect, no market for the product. But actually though organic cultivation farmers protecting their soil and human health, environment, air and water protection. Therefore, the Government should support the farmers through the incentives or subsidies initially at least two to three years to mitigate their loses.

Fig 4.9: Organic Cultivation – Raising of seedlings under Controlled atmosphere

6.8 SUGGESTED MODEL MARKETING PROCESS OF CHILLI AND TURMERIC

Fig:4.10 Export process of chilli and turmeric by FPO



3.4.1 Farmers:

In this new system of supply chain farmers play vital role for production of chilli and turmeric with low-cost management, pest and disease management, cold storage management, primary processing, transport and marketing. Every activity will be taken by the group of farmers.

3.4.2 Farmers producer Organization/women SHG:

"An FPO, formed by a group of farm producers, is a registered body with producers as shareholders in the organization. It deals with business activities related to the farm produce and it works for the benefit of the member producers." Famers producer organization/Women self-help groups will play very important role in aggregation of material, pre-harvest and post-harvest management of chilli and Turmeric.

3.4.3 Value addition of chili and turmeric:

The require for value added chilli products like chilli powder, colour oleoresin and pungent oleoresin has been steadily increasing. In food beverage industries, chilli has acquired a great importance in the form of oleresin which permits better distribution of colour and flavour in food as compared to chilli powder.

3.4.3.1 Drying:

Drying is the most important step in the processing of chillies. This is because. If the chillies are not dried is could lead to the growth of mould, cause discoloration and lead to the entire process slowing down. Any produce with a slight amount of mould cannot be used for processing. The presence of mould on chillies will drop the market value of the chilli by at least 50%.

3.4.3.2 Cleaning:

Before processing, the chillies have to be cleaned. In the first stage of the cleaning process, dust and dirt should be removed using a winnowing basket or manual.

Grading:

3.4.3.3 **Crushing:**

This is another kind of value addition of chilli. It has more international market and demand. Mostly this product has demand in China, Thailand and Indonesia. They are produced by crushing small dry red chillies - only the flesh and the seeds are used. Chilli flakes can be sprinkled onto food as you would do with salt & pepper or they can be added to simmering dishes.

3.4.3.4 **Grinding:**

Grinding is the main important process of value addition of chilli and turmeric. In the form of powder lot of consignments are exporting and even domestic consumption also. Before exporting the product should be tested for Sudan test, which tests the availability/presence of unwanted food colours in the chilli or turmeric. The presence of Sudan color is very serious problems to the health.

3.4.3.5 **Oil extractions:**

This is another value addition process of chilli and Turmeric. Most of the companies are doing. But at FPO level no one is doing this process and it creates more demand for the products and will get the remunerative prices to their products.

3.4.3.6 **Curry powder making:**

chilli powder a additional pleasant taste and aroma by adding together dry ingredients like coriander (dania), garlic, ginger, small fish and salt before crushing in the mill. Across the world, chilli is used to flavor many dishes.

3.4.3.7 **Packaging**:

Any food items packaging plays a vital role for better marketing. The packaging should be more attractive and more informative also. It should have all necessary statutory information like allergens, ingredients used and nutrition value available in the material.

3.4.3.8 **Storage:**

Another important factor of in supply chain is storage. All finished goods should store in good climatic condition till the material going for sale.

3.4.3.9 **Quality testing**:

This is another important factor the material should be tested in authorized quality lab. It gives lot information about the material quality, purity and safety. More about any chemical, physical and biological hazards contain the product or not.

3.4.3.10 Domestic market:

If the material is qualify the lab , then the processor can shift the material form factory to domestic market, in case the processor intended to sell in domestic market.

3.4.3.11 **International market:**

This very important market for the product. The processor should take the very necessary precautions before crossing the factory premises. International market demand very quality, hygienic and pure material to meet their physical needs and at the same time it should not have physical, chemical and biological hazards, which damages the human health and creates food borne illness.

3.4.3.12 Transportation:

Transportation is very important factor in supply chain management. Why because material produced in one place and consumer in another place. Mean while the food material will move in different places. It may be from form to storage place, storage to market, market to godown, godown to processing center, processing centre to manufacturer place, processing unit to domestic market or customs point and customs point to the destination unit. In all places we use mode of transformation. Therefore, we should take utmost precautions to control the hazards.

3.4.3.13 **Customs clearance**:

One the food material is intended to export and it should be moved to the customs place for clearance of customs and shifted to foreign country.

Destination country: the food material will be shifted from India to foreign country by ship or road or sky based the material and urgency.

3.4.3.14 Consumer:

Finally material will supply or delivered to the consumer in foreign nation or domestic market. In everywhere supply chain management system should function well.

3.4.4 Benefits Farmers producers' groups (FPO):

3.4.4.1 Reduction in Cost of production: Today major problem of every farmer is cost of cultivation. It should be reduced by using the collective efforts in the form of purchasing the farm inputs like seeds, fertilizers, chemicals, farm machinery collectively. Instead of individual farmers.

3.4.4.2 Better negotiations and bargaining: This group concept helps the farmer and develops confidential levels and improves the power to bargain with the buyer. In no. of occasions individual farmers were cheated by the traders or middlemen or brokers.

3.4.4.3 Capacity building: The group system will helps the farmers to develop inter personnel skills and capacity building by interacting and involving in group activities.

Fig 4.11:Researcher doing Capacity building for potential farmers

3.4.4.4 Risk mitigation: In this group concept any risk will be shared by all group members instead of any individual farmers. It protects the farmers from huge loss or damage if anything happened in the course farming.

3.4.4.5 Economic and social empowerment: This group concept make the individual farmers become empowered economically and socially, financially, emotionally, psychologically and mentally.

Fig:4.12 Researcher Addressing large gathering of FPO's & Farmers regarding Economic & social empowerment

3.4.4.6 More market: Generally, the exporter will need the large quantity of food material to export to foreign nations. They can aggregate and collect the sufficient material from the group of farmers instead of individual farmers and it creates more marketability of their produce.

3.4.4.7 Remunerative prices: Each and every farmer has lot of opportunity to get the remunerative prices to their food products by way of reducing the cost of cultivation and by way of improving production in quality, safety and purity.

3.4.4.8 National and International relations: The group members will get the national and international exposure by way of group concept. They used to meet the national and international buyers, traders and exporters. Sometimes the group members can go to the international trade fare and exhibition to promote their business.

6.9 Further Research suggestions

There are many areas related to spices where further academic attention is urgently required. The following are the prominent among them.

1. Corporatization of spices production, processing and marketing.
2. Organic production of spices and its economic value implications.
3. Globalization and its impacts on spices processing and marketing.
4. Speculative trading impacts on the domestic and international prices formulation of spices.
5. Economic implication of value addition of spices.

6.10 Conclusion

India is the spices bowl of the world and the largest producer, consumer and exporter of different spices in the form of whole and value addition like, crushed, powdered, oils and oleoresin, soaps, chocolates and cosmetics. India is the biggest market for chilli and turmeric supply to the world. In India, Andhra Pradesh is the largest producer and exporters chilli and turmeric products.

Food safety is one of the major concerns of the developed and developing countries. In addition to the fundamental basis of foods to be natural, the modern concept of food safety embodies that the food be free or with minimum of contaminants like, heavy metals, pesticides/anti-biotic residues, mycotoxins, microbial and packaging material migrations. World wise food laws are changing. Huge amounts are spent for treatment of food borne diseases and its after effects, on many occasions it fails to yield substantial results. The only long-standing remedy is to produce safe food and safety to the consumers.

The State and Central Governments should immediately take necessary steps to address the issue and problems faced by the spices industry. Most of the farmers are uneducated and it is very difficult to understand the different chemicals they use in the cultivation. so, they need to be provided adult education programs. All the farmers should be made aware of crop, personal, storage and inputs insurance and it will help them in times of any trouble/damage of crop. It is also observed the most of the fields in both Andhra and Rayalaseema have the lack of irrigation facilities and it should be planned to provide sufficient water storage systems.

Farmers should be provided good and quality seeds for better germination, production and exports of quality and very quantity of spices. The government should take necessary action for control spurious seeds. Sufficient credit facility is another important factor in the chilli and Turmeric cultivation. When farmers have sufficient credit facility and flexibility of repayment, they don't go for selling of produce immediately after the harvest. So that they can store the produce and sell when the price is higher side. Sufficient cold and dry storage facility should be available to the spices growers.

Another important problems faced by the farmers is middlemen, defective weights, drawing unwanted samples. Govt. of India brought e-Nam system to address the middleman system in the market yards. All the farmers community made aware of the government programs and activities for the spices industry. So that farmers can be encouraged and motivated and produced quality and safe spices by using them. Farmers need to be encouraged to form of farmers producers' company (FPC) or Farmers producer organization (FPO) and it will reduce the cost of cultivation and improve the bargaining power while selling aggregated materials with exportable quality and quantity. Today world is in the need of chemical free, aflatoxin free, salmonella free materials and finally farmers need to be encouraged to grow organics spices which lot demand in international trade.

References

[1] V.A.Parthsarathy,M.S.Madan, “Spices Research and Development-an overview”Indian institute of spices research,Calicut. Page no.1

V.A.Parthsarathy,M.S.Madan, “Spices Research and Development-an overview” Indian institute of spices research,Calicut. Page no.269

[1] Dr.CH.V.V.Satyanarayana, “Post harvest profile of Chillies ”post harvest technology centre, ANGRAU, Bapatla page no.2

[1] Anne Plato, Post harvest management of Turmeric, FAOUNA page no.2

[1] J.S.Pruthi” Spices and Condiments” page no.244

[1] Karma L Bhutia, Nangsol D Bhutia and VK Khanna, Rich Genetic Diversity of Capsicum Species in Northeast India, as a Potential Source for Chilli Crop Improvement, Journal of Agriculture and Forest Meteorology Research JAFMR, 2(2): 77-83, Published March 26, 2019.

[1] M. Chinnadurai, V. Kavitha*, S. Angles and R. Sangeetha "Economics of turmeric cultivation in Erode district of Tamil Nadu Centre For Agriculture and Rural Development Studies,Tamil Nadu Agricultural University, Coimbatore-641 003, Tamil Nadu, India.Received: 03-08-2018 Accepted: 17-10-2018 Agric. Sci. Digest., 38(4) 2018: 293-296

[1] M Karthikeyan, Zhou Deyi and Meetha Ram "Analysis of trading opportunities and market trends of organic food products in southAsia to the world: A case study of India" International Journal of Multidisciplinary Research and DevelopmentOnline ISSN: 2349-4182, Print ISSN: 2349-5979; Impact Factor: RJIF 5.72 Received: 17-01-2019; Accepted: 19-02-2019Volume 6; Issue 3; March 2019; Page No. 153-158

[1] Pavithra and Mahantesh R. Nayak "Benefits and Perception of Dry Chilli Farmers in Online Marketing: Experiences from Karnataka State, India"Asian Journal of Agricultural Extension, Economics & Sociology28(4): 1-9, 2018; Article no.AJAEES.45760ISSN: 2320-7027

[1] Ajaikumar B. KunnumakkaraEmail author, Bethsebie L. Sailo, Kishore Banik, Choudhary Harsha, Sahdeo Prasad, Subash Chandra Gupta, Alok Chandra Bharti and Bharat B. Aggarwal "Chronic diseases, inflammation, and spices: how are they linked" Journal of Translational Medicine 201816:14,Published: 25 January 2018

[1] A. J. Kadte at all "Economics of Turmeric Production in Sangli District of Maharashtra, India"Int.J.Curr.Microbiol.App.Sci (2018) Special Issue-6: 2279-2284

[1] P. S. Kale1**, D. S. Perke and A. J. Kadte "Dynamics of Arrivals and Prices Behaviour of Turmeric in Sangli District of Maharashtra, India" Int.J.Curr .Microbiol.App.Sci (2018) Special Issue-6: 2275-2278

[1] Meena Narendra Kumar1, Gawade B.B,Dhage Anil Mohan, Shinde H.R,Kumar Rajesh And Gurjar G.N."A Study Of Marketing Of Green Chilli In Kolhapur District Of Maharashtra" Issn: 0975-3710&E-Issn: 0975-9107, Volume 9, Issue 9, 2017, Pp.-3958-3961

[1] Sourish Sen, Partha Sarathi Mohanty and Suneetha V,"Detection of Food Adulterants in Chilli, Turmeric and Coriander Powders by Physical and Chemical Methods" Research journal of Pharmacy and technology. 10(9):3057-3060 · September 2017

[1] Ann M.KempRPh, MDabMolly S.Clark PhD, ABPPcThomasDobbsMD, MPH" Top 10 Facts You Need to Know About Synthetic Cannabinoids: Not So Nice Spice"The American Journal of Medicine Volume 129, Issue 3, March 2016, Pages 240-244.e1

[1] Patricia Uberoi" Problems and Prospects of the BCIM Economic Corridor", Volume: 52 issue: 1, page(s): 19-44, January 21, 2016;

[1] Shree Kanungo"Influence of Market Arrival on Price Formation of Turmeric inKandhamal District of Odisha"IOSR Journal of Business and Management (IOSR-JBM) e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 17, Issue 1.Ver. I (Jan. 2015), PP 01-05

[1] MarijkeVander Veen Jacob Morales, "The Roman and Islamic spice trade: New archaeological evidence"Journal of Ethnopharmacology Volume 167, 5 June 2015, Pages 54-63 Marketing. 24(1): 26-37.

[1] Dr.A. Siva Sankar and Dr. K. Nirmal Ravi Kumar "Domestic And Export Competitiveness Of Major Agricultural Commodities In Andhra Pradesh– A Case Study, International Journal of Advanced Research (2014), Volume 2, Issue 2, 196-205

[1] K. Kalidas & K. Akila (2014), Micro level investigation of marketing and post harvest losses of tomato in Coimbatore District of Tamilnadu. Journal of Stored Products and Post harvest Research, 5(1), pp.1-7

[1] Yogesh, M. S & S. Mokshapathy"Growth Of Indian Export And Import Of Spices" International Journal of Humanities, Arts,Medicine and Sciences (BEST: IJHAMS), ISSN 2348-0521Vol. 2, Issue 9, Sep 2014, 41-46.

[1] G. Mohan Naidu*, V. Meena Kumari And V. Srikala1 "Behaviour Of Marketarrivals And Prices Of Red Chillies(Capsicum Annuum)" vol. 14 no. 1, 2014 pp. 511-519

[1] I Bhavani Devi, M. Srikala* and T. Ananda"Price behaviour of chillies in Guntur market of Andhra Pradesh, India"DOI: 10.18805/ijare.v50i5.3750 Page Range: 471-474

[1] V. Karthick, T. Alagumani and J.S. Amarnath" Resource–use Efficiency and Technical Efficiency of Turmeric Production in Tamil Nadu — A Stochastic Frontier Approach" Agricultural Economics Research Review Vol. 26(No.1) January-June 2013 pp 109-114

[1] Sajith Mohan, Sheena. S.Rajan, Unnikrishnan.G “Marketing of Indian Spices as achallenge in India” International Journal of Business and Management InventionVolume 2, Issue 2, February. 2013, pp.26-31.

[1] Kiruthika, N. “The economics of production of turmeric in India: A case study ofErode district of Tamilnadu”, Journal of Innovative Research and Solutions (JIRAS),Volume.1- Issue No.1- July –Dec 2013, pp.23-30.

[1] S.B. Goudappa, G.S. Biradarand Rajeev Bairathi"Technological Gap In Chilli Cultivation Perceivedby Farmers" Raj. J. Extn. Edu. 20 : 171-174, 2012

[1] Julia Meaton Biniyam Abebe Adrian P. Wood "Forest Spice Development: the Use of Value Chain Analysis to Identify Opportunities for the Sustainable Development of Ethiopian Cardamom (Korerima)"04 October 2013 https://doi.org/10.1002/sd.1563

[1] Aloysius Edward .J and Narasimha Rao T.V"Price Discovery Process and Volatility Spillover of Chilli spot and Futures PricesEvidence from National Commodity and Derivative Exchange Ltd (NCDEX)",IJEMR –December 2013-Vol 3 Issue 12 .and prices of green chillies in Punjab. Indian Journal of Agricultural

[1] Soumya Mukesh (2013) “The Role of Derivatives in the Commodity Market” ASM’s International E-Journal of Ongoing Research in Management and IT, e-ISSN: 2320-0065, INCON VIII- 2013, pp.1-8.

[1] Biradar, G. S.; Chandrgi, D. M.Socio Economic Profile of Chilli Farmers and their Constraints in Chilli Cultivation in North Eastern districts of Karnataka.Research Journal of Agricultural Science . Sep-Dec2013, Vol. 4, p661-666. 6p.

[1] Shivaraja (2012) "Production And Value Addition To Chilli In Northern Karnataka - An Economic Analysis"

[1] S.Mahendra Dev “Small Farmers in India: Challenges and Opportunities” WP-2012-014

[1] Falgun A and Kaneriya“Marketing of Spices”.2012.

[1]Mary P.U “ Role of Spices board in the cultivation and export of spices:A study with particular reference to Kerala” PhD thesis from The Cochin College, Kerala,2012.

[1]Singh Et Al “An Economic Analysis Of Turmeric Cultivation In Punjab”2012

[1] Nitin W. Jaswante **“**Trends in arrivals and prices of turmeric in major markets of marathwada region”2012

[1] Kanungo,Shree.. 2012. Marketing of turmeric and economic development at kandhamal. The International Research Journal of Economics and Business Studies. 1(6):37-40

[1] C.Tholkappian and PB. Rukmani devi “Economic Analysis of Organic andConvectional Turmeric Cultivation of Erode District in Tamilnadu” IBMRD’sJournal of Management & Research, June 2012, pp.28-34.

[1] Jijetiravi At All “A Study On Market Dynamics Of Byadgi Chilli In Karnataka” 2012

[1] S.Krishnan “ Impact of WTO on spices sector in India-an econometric analysis” PhD thesis from Manhatma Gandhi University, Kottam, Kerala,2012.

[1] Hoogar “Study On Market Dynamics Of Byadgi Chilli In Karnataka”2012

[1] Mane et al. (2011) Economics of Turmeric Production in Sangli District of Maharashtra, India ISSN: 2319-7692 Special Issue-6 pp. 2279-2284

Dr. Kedar nath Mukherjee"Impact of Futures Trading on Indian

[1] Angles et al(2011) Impact of Globalization on Production and Export of Turmeric in India â€“ An Economic Analysis” ISSN 0974-0279

[1] Bhardwaj et al (2011) "Challenges and Constraints of Marketing and Export of Indian Spices in India International Conference on Technology and Business Management March 28-30, 2011 739

[1] Dr. L. Manivannan, “An Analysis on Production and Marketing of Turmeric and Chilli in Erode District” International Journal of Research in Computer Application & Management, Volume No: 1, Issue No. 5,July, 2011, pp.88-90.36

[1] Mane et al "Economics of turmeric production in Sangli district of Maharashtra,Agriculture Update | Vol. 6 | Issue 2| May, 2011 | 34-37

[1] S. Angles, “Impact of Globalization on Productionand Export of Turmeric in India – An Economic Analysis” Agricultural EconomicsResearch Review, Vol. 24, July-December 2011, pp.301-308.

[1] C. Senthil Kumar “An Analysis on Production and Marketing of Turmeric and Chilli in Erode District” International Journal of Research in Computer Application & Management, Volume No: 1, Issue No. 5,July, 2011, pp.88-90.36

[1] Gyati Riku et al. (2011) estimated the growth rate in area, production and productivity of ginger in Meghalaya. Veeranagouda et al. (2011) studied the growth rate scenario of chilli in northern Karnataka.

[1] Mane U. S., R.B. Changule, P.L. Kolekar and S.H. Gharge (2011). An economic analysis of turmeric arrivals and price behaviour in Sangali district of Maharashtra. International Journal of Commerce and Business Management, 4 (2): 224-227.

[1] Bulla Tirumalesh “A study on the economic efficiency of chilly growing formers in Kurmool District” PhD thesis from Sri Krishna Devaraya University,Anantapur,2011.

[1] Ravichandran, S and Banumathy, V. (2011). A study on trend in area, production and price movement and marketing strategies of chilli in Guntur district, Andhra Pradesh. Indian Journal of Agricultural Marketing. 25: 64-71.

S.Suresh Dhas “Cost benefit analysis of chilly cultivation in Ramanathapuram, District” PhD thesis from Alagappa University, Karaikudi, Tamilnadu, 2011.

[1] Rohatash. K. Bhardwaj, B. K. Sikka, Ashutosh Singh, M. L. Sharma, N. K. Singh, Rahul Arya, “Challenges and Constraints of Marketing and Export of Indian Spices in India”, International Conference on Technology and Business Management, March, 2011, pp. 28-30.35

[1] Ramanathan. G. (2011) Has Made A Study Entitled “Performance And Prospects Of Turmeric Exports In India”.

[1] KRISHNADAS M."Production and Export Performance of Major Indian Spices – An Economic Analysis"See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/215461029

[1] ISHWARA P., (2010), Entrepreneurial opportunities in food processing units (with special references to Byadgi red chilli cold storage units in the Karnataka state), Annals of the University of Petrosani, Economics, 10(1), 2010, 119-128

[1] Singh, G., Chahal, S.S and Kataria, P. 2010. A study on behaviour of arrivals

[1] D.Srinivasa Rao “An Econometric analysis of spices exports from India” PhD thesis from Nagarjuna University, Guntur 2009.

[1] Muruganandhi D “A Study on the Direction of Trade in the Indian Turmeric Exports-Markov Chain

[1] VANDANA SHIVA, 2008, Seeds of Suicide, the Ecological and Human Costs of Globalisation of Agriculture, Research Foundation for Science, Technology and Ecology, 2008.

[1] Shivashankar K,' Marketing Of Dry Chillies in Karnataka-A Management Appraisal.' Ph.D.

[1] Nagesh Kumar 'Mapping of India's Export performance' RIS Discussion Paper, 37/2005, New Delhi. (2005)

[1] S. Angles and S. B. Hosamani, “Instability in area, production and productivity of turmeric in select South Indian states”, Madras Agriculture Journal. 92 (4-6)April-June 2005: pp. 271-278.

[1] B.R.Suryavanshi ““A study of Marketing of Turmeric in sangli District-problems and products” PhD thesis from Department of commerce & management, Shivaji Univerisity,2005.

[1] BHULLAR, A. S., 2005, Estimating, export competitiveness of chillies from Punjab state. Agricultural Marketing, April-June, 2005, 36:43.

[1] Lokesh G. B. and M. G. Chandrakant (2004) Economics of Production, Marketing of Turmeric in Karnataka. Indian Journal of Agricultural Marketing, 18 (2): 32-44

[1] Mehtha, Rajesh and Mathur, Parul 'India's Export by Countries and Commodities: On The Estimation of a Forecasting Model Using Panel Data', RIS Discussion Paper No.84/2004 38.

[1] Philip A.P “Marketing of spices –A study with special reference to pepper and Cardamom” PhD thesis from St.Domini’s college, Kanjirapally, Kerala, 2003.

[1] Kathirvel, “The general practice of conventional method of harvesting turmeric” Business line- Feb 25, 2003, p.3

[1] Angles A (2001) Production and export of turmeric in South India: An economic analysis. M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Dharwad.

[1] SEV Subramanyam “Marketing of chillies in Andhra Pradesh-A case stidy of Guntur Regulated market” PhD thesis from Sri Krishna Devaraya Univerisity, Anantapur,2001.

[1] Sudarsan, M.R., "White pepper a simple value addition to pepper", Spice India,Vol.V, June, 2000, pp.10-12.

[1] Jose, K.P and Roy, C.M., "Geographical differences in spice use", S~ice India,Vol. V111 .August 2000, pp. 16-1

[1] John, K.C., " A stu& of the export trnde of Keralaa, Unpublished PbD. Thesis, Thiruvananthapuram: University of Ke.rala,2000.

[1] Dr. I. Satya Sundaram, “Spices Striving Hard to lead globally”, Facts for you, February 2000, Vol.20., No:5, P.13

[1] M.G. Kerutagi, Y.K. Kotikal, N.C. Hulamani, G.K. Hiremath "Costs and Returns of Turmeric Production in Belgaum District of Karnataka" Journal of FARM SCIENCES, Vol 13, No 1 (2000)

[1] Patil, P. R.Economics Of Production And Marketing Of Turmeric In Sangli District [Maharashtra] 101pp,2000

[1] Patel, Anil (2000). Market integration and pattern of Market arrivals of rapeseed –

[1] Patil, 2000. Economics of production and marketing of turmeric in Sangli dist. unknown thesis submitted to M.P.K.V., Rahuri.

[1] Sreekumar, B., " World trade in spices- Import and Re- export of Pepper ", Suite India ,Val. Xl 1, 1999, pp.17-19.

[1] Peter, KV., "Makings of a global leader", The survey of Indian Agriculture, Chennai: Hindu1 999, pp. 81-83.

[1] Agarwal N L and Dhaka J M 1998, Relationship between arrivals and prices of spice crops in Rajasthan. Indian Journal of Agricultural Marketing, 12(3): 152-153.Agricultural Commodity Market"MPRA Paper No. 29290, posted 15. March 2011 10:13 UTC

[1] Mani and Chako jose “ Trends in the exports of cardamom problems and prospects” Agricultural Situation In India,1997 Vol 8 No 8 pp.106-111

[1] Nagaraja, H., “Export performance and prospects of selected fruits, vegetables and processed fruits in India : Aneconomic analysis”. Ph.D. Thesis, University of Agricultural Science, Bangalore, Karnataka, India 1997.

[1] D.C. Sangliene and H.K. Chamuah, "Problems and Prospects of Spices Production for Export in Meghalaya with Special Reference to Turmeric (Lankadong) and Ginger (Nadia)", Indian Spices, 1997, pp.51-53.

[1] Naidu, M.R. and anumanthaiah, C.V., “Price spread of turmeric and chilies regulated marketing inGuntur District, Andhara Pradesh – A comparative study”, Indian Journal of Agricultural Marketing, Vol. 52, NO.2, 1997, pp:95-68.

[1] Kasar, D. V., R. C. Raut and V. Rasane (1996). Behaviour ofprices and arrivals of red red chillieses – A case studyfrom Maharashtra. Indian.J.Agric.Marketing,10(3):78-81.

[1] Mamatha, B.G., “Techniques for measuring export competitiveness of agricultural Commodities”. SeminarReport, Department of Agricultural Economics, University of Agricultural Sciences, Bangalore 1996.

[1] O.T.S. Nambiar, “Export potential of spices and spices products of North East Region” A journal ofexport potential of spices and spices products of North East Region, Published by Spices Board,Gundahati, September 1994, pp.56-57.

[1] HIREMATH, A.P., 1994, Production and marketing of chillies in Karnataka – An economic analysis. M.Sc. (Agri) thesis (Unpub.), University of Agricultural Sciences, Dharwad.

[1] Lan Hambill, “The Australian market and opportunities for spices including turmeric from India”, Paper presented at World Spice congress, Goa November 1992.

[1] Lakshmanchar, M.S., “Marketing of Ginger and Turmeric in India”, paper presented at World spice congress, Goa, November 1992.

[1] Yugandhara Y. Bapat, “Nature of future trading in commodities”, Commerce, Vol.158, No.3, 1992, pp: 37-39.

[1] Senthilvasan K.G., "Marketing of Turmeric ar Erode – A Case study", Unpublished M.Phil dissertation, Bharathiar University, Coimbatore, 1991, p.83.

[1] Ramesh, B., "Volume of trade and its impacts on the economic development of Kerala", Unpublished Ph.D. Thesis, Calicut: Univenity of Calicut, 1990.

[1] Eswara Prasad, S., and Sreerama Murthy, T., "An analysis of arrivals and prices of turmeric in Guntur market, Andhra Pradesh", Vol. 53, No.3(1), January – June 1989, pp: 34-37.

[1] Eswara Prasad, Y., Sreeram Murthy, C. and Satyanarayana, G., (1989) "An analysis of arrivals and prices of Turmeric in Guntur market", Indian Journal of Agricultural Marketing, 3(1):34-37.

[1] Viji, I.C., "Export of Indian Spices: Performance and Prospects", India Journal of Agricultural Economics, Vol. 43, No.3, July-Sep, 1988, p.364.

[1] Jacob, Baby. Export development ofKerala, Ph.D. Thesis, Cochin: CUSAT. 1985.

[1] Periyasamy .V. "A study on performance of regulated market in Gobichettipalayam taluk., Erode District", Unpublished M.Phil Dissertation, Department of Economics, Gobi Arts College, 1985, pp: 76-77.

[1] Asthurkar, B.W., Ambegaonkar, L.V., and Deole, C.D., "Performance and Profitability of Turmeric in Maharashtra" Financing Agriculture, Vol. XII(4), October-December 1983, p.31.4.

[1]Venkatraman, S., "A study on the Marketing System exists for turmeric in Tamil Nadu", Paper presented at National Seminar on Ginger and Turmeric, Calicut, 1980.

[1] Sriraman K. and Balasubramaniam S. (1969) "Reports of the Production and Marketing of Spices (turmeric and chilly) in Madras state". Madras University

[1] Ibrahim YC, "production and export performance of Major Indian spices – an economic analysis" PhD theis 2015.
[1] D. Srinivasa rao "an econometric analysis of spices Exports from India" PhD thesis 2009.

[1] Spices Board annual reports 2018-19
[1] Thomas TP "problems and prospects of spices Trade in Kerala" PhD thesis,2009.
[1] Ibrahim YC" Export performance of Indian spices "PhD thesis 2015.
[1] www.indianspices.com
[1]Krishna Das .M" production and export performance of Major Indian spices – an economic analysis" PhD thesis 2010.
[1] J.S.Pruthi, Spices and condiments, page no.48.
[1] The above table composed from information of https://food.ndtv.com › food-drinks › health-benefits-of-38-important-spices.
[1] Composed from Indian brand equity foundation reports.
[1] Girish Kumar.KS and Y.S.Rao "Chilli- the crop with great export potential in India, Page no.1-2.
[1] V.A.Parthasarathy,"Major spices –production and processing,Indian institute of spices rerearch,Calicut page no.228.
[1] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post harvest technology,Indin counsel Agriculture Research page no.10
[1] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post-harvest technology, Indian counsel Agriculture Research page no.7
[1] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post-harvest technology, Indian counsel Agriculture Research page no.12.
[1] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post-harvest technology, Indian counsel Agriculture Research page no.9.

[1] Dr.Ch.V.V.Satyanaryana, "Post harvest profile of chillies" AICRP on post-harvest technology, Indian counsel Agriculture Research page no.10.
[1] https://www.ncbi.nlm.nih.gov/books/NBK92752

[1] Post-harvest management of Turmeric-FAO UNA page no.14

[1] Spices Exports Review published by Spices Board..
[1] Horticulture Statistics of Ministry of Agriculture, Govt. of India.
[1] Quality regulation procedures manual published by Spices Board.
[1] Hand book on Food safety and supply chain management of spices and botanicals ingredients by MIDH.
[1]Hand book of FSSAI regulations and guidelines, 2018.
[1] Hand book of FSSAI regulations and guidelines, 2018
[1] Hand book of FSSAI regulations and guidelines, 2018
[1] Reports and publications of Directorate marketing and Inspection, Govt. of India.
[1] "Agmark grade specification for spices " published by Spices Board, page no. 8,9
[1] Agmark grade specification for spices "published by Spices Board, page no. 8,9
[1] Hand book of American Standard Trade Association cleanliness specifications.
[1] ATSA cleanliness specifications for spices manual page no.12.
[1] ATSA cleanliness specifications for spices manual page no.12.

[1] European Spice Association quality Standards documents page no.12
[1] European Spice Association quality Standards documents. page no.13-14
[1] Food safety training manual published by USFDA, Spices Board and CII.
[1] Food safety training manual published by USFDA, Spices Board and CII.
[1] Food safety training manual published by USFDA, Spices Board and CII.
[1] WHO FOSCOLLAB quality control database reports.
[1] WHO FOSCOLLAB quality control database reports.
[1] World Health Organization pesticide residue series manual 5.
[1] Post-harvest profile of Chilli and Turmeric document by Directorate of Marketing and Inspection, 2009.
[1] Food safety and supply chain management training manual published by UMFDA, Spices Board and CII.
[1] India Brand Equity foundation reports and publications.
[1] Annual reports of spices board India.
[1] Department of Horticulture, Govt. of Andhra Pradesh.
[1] Department of Horticulture, Govt. of Andhra Pradesh.
[1] Department of Agriculture Marketing, Govt. of Andhra Pradesh reports.
[1] Department of agriculture & co-operation, Ministry of agriculture, Govt. of India reports.
[1] Department of agriculture & co-operation, Ministry of agriculture, Govt. of India.
[1] Directorate Marketing and Inspection, Govt. Of India reports.
[1] The Research Reporter collected the information from http://dmi.gov.in/Documents/AMI_OG_Scheme.pdf
[1] Ministry of Agriculture and Farmers Welfare, Govt. Of India annual reports.
[1] http://agricoop.gov.in/divisiontype/rainfed-farming-system/programmes-schemes-new-initiatives

[1]Acts and Schemes, Ministry of Commerce & Industry, Govt. Of India.
[1] https://www.fssai.gov.in
[1] https://www.fssai.gov.in
[1] https://dgft.gov.in
[1] https/eic.gov.in
[1] https/eic.gov.in
[1] https.//iip.gov.in
[1] https://CFTRI.gov,in
[1] https://CFTRI.gov,in
[1] Manual of general procedures of Spices Board India.
[1] http://vikaspedia.in/agriculture/market-information/contract-farming-a-mechanism-of-alternative-marketing
[1] http://vikaspedia.in/agriculture/agri-insurance/pradhan-mantri-fasal-bima-yojana
[1] http://vikaspedia.in/agriculture/agri-insurance/pradhan-mantri-fasal-bima-yojana
[1] https://sfac.gov.in

[1] https://sfac.gov.in