"A STUDY OF EXPORT OF CHILLIES FROM GUNTUR (ANDHRA PRADESH)"

PROJECT REPORT

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BY

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DECLARATION

The project work titled **"A STUDY OF EXPORT OF CHILLIES FROM GUNTUR(ANDHRA PRADESH)"** has been carried out under the direction of **Dr Lekha Ravi** in partial Fulfillment of the requirements for the award of the degree of Master of Business Administration in Port and Shipping Management to be submitted to the School of Maritime Management, Indian Maritime University, Chennai Campus.

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DANNARAPU SRINIVASA RAO

Certificate

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This is to certify that the project report entitled "**A STUDY OF EXPORT OF CHILLIES FROM GUNTUR(ANDHRA PRADESH)**", submitted to the School of Maritime Management, Indian Maritime University, Chennai Campus., in partial fulfillment for the award of the degree of Master of Business Administration in International Transportation and Logistics Management, is a record of work carried out entirely by **Dannarapu Srinivasa Rao**, Reg. No. **2003305012.**

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EXECUTIVE SUMMARY

The current research investigates the economics of chilli production in Andhra Pradesh. Chillies are among the most valuable crops farmed in India. It is sometimes referred to as 'hot pepper. ‘It can be eaten as a vegetable, spice, condiment, sauce, or pickle.

India is well-known for its spices, which are frequently employed in sectors such as pharmaceuticals. Cosmetics, toiletries, and more.. Guntur is an important district in Andhra Pradesh because to its agricultural vibrancy. The overall population is 48.88 lakh, divided into 57 Mandals and 729 villages. There are 3.90 lakh farmers in total, with 3.20 lakh being small and marginal. The total number of agricultural labourers is 10.73 lakh. Mineral resources in the district include limestone, Napa slabs, copper and lead, lime kankar, and so on. The Guntur district has an excellent road and communication network. The area has also served as a State educational hub.

Guntur chillies have good demand in international markets like China ,Bangladesh, Thailand, Singapore. Guntur mirchi yard is biggest yard in Asia .

The findings of the study The Indian spice market has performed admirably. Exports of spices and culinary herbs are increasing. Indian spice makers are reaping significant profits. Initiatives to increase spice quality supported by technical advances in order to tap the global marketplace

CHAPTER 1

INTRODUCTION

1.1 TOP 10 AGRICULTURE STATES IN INDIA – LARGEST CROP PRODUCING STATES:

India is the world's second largest agricultural producer. India ranks eighth in the world in terms of exports. and the world's largest milk producer, as well as the second largest fruit producer. Agriculture employs roughly 60% of the Indian population. Small and marginal farmers in India engaged in horticulture and livestock are included in this agriculture sector. Agriculture states in India are producing high-quality food grains and other food products. The Indian agriculture industry is expanding rapidly and continues to contribute significantly to global trade India's grocery and food market is the sixth largest in the world, accounting for 70% of total sales. Agriculture is evolving at the same rate as India is developing. Food production and consumption patterns are changing. For several years, India has seen an increase in population, income, rural/urban migration, and an expansion in rural per capita productivity. With the improvement of all of these factors, the demand for food increased as well. In the next 20 years, India's per capita GDP is expected to rise by 320 percent. The trend is changing with the passage of time. Indians are increasingly consuming high-quality foods, with the emphasis shifting from plant-based protein to animal-based protein. All because of rising disposable incomes and rapidly rising consumer demands.

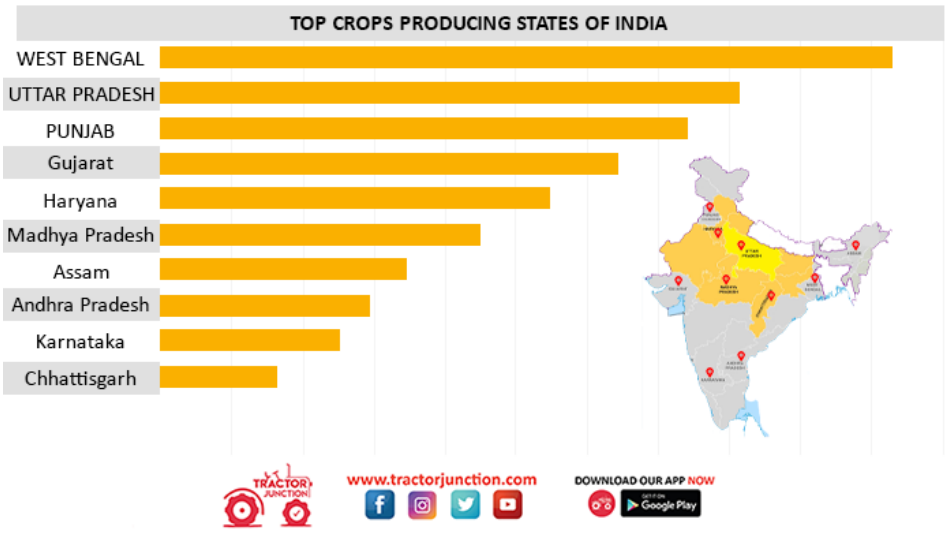

Figure 1: Top Crops Producing States Of India.

1.1.2 Top 10 Crops Producing States of India :

Here we are going to show agricultural production in India state wise. From that you get proper information regarding major crops of India. Let's have a look on the top 10 agriculture states in India.

1 WEST BENGAL:

West Bengal is India's major producer of food grains. Andhra Pradesh, Punjab, and Uttar Pradesh are noted for their rice output. It is also known for producing jute, sesamum, tobacco, and tea, in addition to rice. Rice output in West Bengal totals 146.05 lakh tonnes, with a yield of 2600 kilos per hectare. It is one among India's rice-producing states. Mango, Litchi, Pineapple, Guava, and Orange are among the fruits grown in West Bengal.

West Bengal is rich in food products, producing nearly all of them, including cauliflower, tomato, cucumber, cabbage, okra, and brinja. The main crops farmed in West Bengal are rice, jute, and wheat. Chilli, Ginger, Garlic, Coriander, and Turmeric are all spices grown in West Bengal. West Bengal is one of India's most agriculturally productive states.

2. UTTAR PRADESH :

Uttar Pradesh is India's top farming state, with considerable state-level crop production including bajra, rice, sugarcane, food grains, and many others. It ranks first among India's wheat-producing states, ahead of Haryana, Punjab, and Madhya Pradesh. Uttar Pradesh contains 22.5 million tonnes of wheat, and the weather is ideal for wheat production. Wheat was grown over 96 lakh hectares in Uttar Pradesh.

Sugarcane is the most widely grown crop in the world, and Uttar Pradesh is its largest hub. Sugarcane thrives in hot, humid climates, and Uttar Pradesh is the greatest place to grow it. Sugarcane is grown on 2.17 million hectares and produces 145.39 million tonnes of sugar.

3. PUNJAB:

Punjab is the world's most fertile state. Wheat, sugarcane, rice, vegetables, and fruits are best grown in Punjab. Punjab is also known as the granary of India and the breadbasket of India. Food grain production accounts for over 93 percent of all productive land. Wheat and paddy agriculture cover the majority of Punjab's land. This area expands year after year.

Punjab is India's third-largest agricultural crop producer. It is well-known for its irrigation system, which is suitable for farming. Punjab is also the world's 3rd largest producer of food grains.

4 GUJARAT:

Gujarat is India's fastest-growing state. This state followed a prudent development strategy. They made investments in agriculture, energy, and manufacturing, and saw double-digit growth as a result. Gujarat's weather is unpredictable, making crop production difficult. One approach farmers might use is enhanced crop management to modify crop surroundings for high output.
Gujarat was the leading producer of cotton, followed by Karnataka, Maharashtra, and Telangana. Groundnut was also grown here. Cotton, groundnut, castor, bajra, tur, green gramme, sesamum, paddy, maize, and sugarcane were all grown in Gujarat.

5 HARYANA:

Haryana is one of the most important agricultural contributors. Agriculture employs over 70% of the population. Haryana is a significant part of India's Green Revolution. Haryana has a vast irrigation system as a result of all of this.

Sugarcane, paddy, wheat, and sunflower are some of Haryana's most important crops. It is also the second largest sunflower producer in India. Haryana is also engaged in cattle farming. In India, there are 99.97 lakh livestock populations. Milk products are consumed on a regular basis in India. It is an essential diet. This is one of India's most important agricultural states.

6. MADHYA PRADESH:

Pulses are produced in Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh, in that order. It's also well-known for growing soybeans and garlic. Madhya Pradesh is well-known for its pulse growing. In Madhya Pradesh, farmers' main sources of income are wheat and maize. Uradhi, soybean, and tur are examples of other pulses.

Because Madhya Pradesh has the most land area, it has a variety of climate and soil conditions that are ideal for a wide range of agricultural products. Madhya Pradesh agriculture sector is the backbone of the Indian economy. The agriculture sector in Madhya Pradesh employs 65 % of the workforce and accounts for ¼ % of the state's GDP (Gross State Domestic Product).

7 ASSAM:

The state of Assam is known for its tea cultivation. It is India's leading tea producer, with Himachal Pradesh, West Bengal, and other North Indian states following closely behind. Nigeria tea, Darjeeling tea, Assam tea, and Kangra tea are the most well-known forms of tea in India. Assam produced 52 percent of India's total tea production. In India, Assam is heavily reliant on agriculture. Assam is one of the least developed states in contrast to other states. Assam's economy is nearly entirely focused on agricultural, and agriculture provides a living for 70% of the population. Tea is the second most often drank beverage in the world after water.

8 ANDHRA PRADESH :

In Andhra Pradesh, agriculture employs 62 %. Rice production is becoming more popular. Andhra Pradesh is responsible for 77 percent of India's agricultural output. Other crops planted include chilies, jowar, bajra, maize, ragi, tobacco, legumes, sugarcane, and others. Andhra Pradesh has 1.5 million hectares of horticulture land. Fruit cultivation covers almost 720 thousand hectares in this allocated area

9 KARNATAKA:

Karnataka is known for its coffee output, contributing for 70% of all production in India. The state of Karnataka produced 222300 metric tonnes of coffee. Agriculture is the most important sector of the entire economy in Karnataka. Agriculture employs the majority of the state's inhabitants. Karnataka's weather climate is ideal for agriculture. Rice, maize, moong dal, red chili, sugarcane, peanuts, soybean, turmeric, and cotton are the Kharif crops of Karnataka. Mustard, sesames, barley, wheat, and peas are the Rabi crops of Karnataka. Karnataka is one of India's top agricultural states.

10 CHHATTISGARH:

The Rice Bowl of Central India is known as Chhattisgarh. Rice, millets, and maize are some of the crops grown in Chhattisgarh. Rice farming takes up 77 percent of the land in Chhattisgarh. Chhattisgarh is completely reliant on rainfall. Only 20% of the region's total area is irrigated.

1.2 INTRODUCTION to CHILLIES :

In India, chilies are a major cash crop. It can be found practically everywhere in the United States. Chilies come in more than 400 different types from all over the world. It's called cayenne pepper, sweet pepper, bell pepper, and a variety of other names. Capsicum annuum is its botanical name. The world's hottest chili, Naga Jolokia, is grown in Assam's harsh terrain, in the little town of Tezpur. Vegetables, spices, condiments, sauces, and pickles are all grown on the farm. In Indian cuisine, chili is a key component. Because it's regularly used as a condiment in some form or another, it's a must-have in the kitchen. The majority of spices ingested per person are dried chili fruits.

Chilies are presently used all over the world as a spice, as well as in the creation of beverages and medications. The pigment 'capsanthin' is responsible for some chilies' red colour, whereas the pigment 'capsaicin' is responsible for their piercing pungency. India is the only country with such a vast assortment of high-quality items. Vitamins A and C, in particular, are abundant in chilies. Also prevalent are potassium, magnesium, and iron. Because of their propensity to inhibit pain messages, chilies have long been utilized for pain treatment.. Arthritis, headaches, burns, and neuralgia are all treated using chili pepper extracts. They're also thought to boost your immune system and lower your cholesterol levels. They can also aid in the elimination of intestinal parasites.

Depending on the area and type, the chili or Capsicum plant fruit is known by a variety of names. It's known as chili pepper, red or green pepper, or sweet pepper in Britain, and capsicum in Australian and Indian English. The large mild type is known as bell pepper in the United States and Canada. It is known as paprika in some countries (although paprika can also refer to the powdered spice made from various capsicum fruit). Chilli (now Chile in Mexico) comes from the Nahuatl word xilli, which refers to a larger Capsicum variety that has been cultivated since 3000 BC, as evidenced by ceramics from Puebla and Oaxaca. Other names for it include Pimenton, Puvre de Guinee, Filfil Ahmar, Paprika, Spans Pepper, Pepperoni, Pimento, Struchkovy pyeret, Togarashi, Hesiung Yali chiao, Lal-mirch,etc. others.

On the Indian subcontinent, chilies are grown all year. The country produces two crops throughout the Kharif and Rabi seasons. Chilli thrives at temperatures between 20 and 30 degrees Celsius. Growth and yields are reduced when temperatures hit 30°C or dip below 15°C for extended periods of time. The crop can be grown anywhere between sea level and 2100 meters above sea level.

1.2.1 Origins:

Capsicum plants are said to have originated in modern-day Bolivia and have been consumed by humans since around 7,500 BC. They are one of the Americas' oldest cultivated crops. Chili peppers were first cultivated independently across different locations in the Americas, including highland Bolivia, central Mexico, and parts of South America, according to research published in 2014 by the New York Botanical Garden press. They were one of the first self-pollinating crops cultivated in Mexico, Central America, and parts of South America.

Peru is a centre of diversification where varieties of all five domesticates were introduced, produced, and consumed in pre-Columbian times, it possesses the most cultivated Capsicum diversity. Bolivia consumes the widest variety of wild Capsicum peppers. Ulupicas, which include C. eximium, C. cardenasii, C. eshbaughii, and C. caballero landraces, and arivivis, which include C. baccatum var. baccatum and C. chaconne variations, have little round fruits; and arivivis, which have small elongated fruits.

1.3 ANDHRA PRADESH :

Chillies' are produced, consumed, and exported in huge quantities in India. Chilli production in India is the highest in the world, followed by China, Thailand, Ethiopia, and Indonesia. The colour and pungency levels of Indian chili are considered to be world famous commercial features. Andhra Pradesh is the leading producer of chilies in India, accounting for around 26% of the total area under chilies, followed by Maharashtra (15%), Karnataka (11%), Orissa (11%), Madhya Pradesh (7%), and other states accounting for nearly 22% of the total area under chilies.

13.1 Guntur Sannam Chilli :

The major chili varieties exported from India include Sannam, teja, byadagi, mundu, Kashmiri chili, and others. Andhra Pradesh produces the most chilies in India, accounting for around 26% of the total area under cultivation. Guntur Sannam is a chili pepper cultivar that thrives in the Indian districts of Guntur, Prakasam (Andhra Pradesh), Warangal (Telangana), and Khammam. It is recognized as one of Andhra Pradesh geographical indicators (under the Geographical Indications of Goods (Registration and Protection) Act, 1999). Guntur chilies are commonly used in curries and other popular dishes in the Indian state of Andhra Pradesh. Guntur Mirchi Yard, Asia's largest dried red chili market, is the largest trade place for the Guntur chili.

1.3.2 Proof of Origin :

Sannam chillies are Capsicum annum varieties. It's a common commercial crop used as a condiment, culinary ingredient, or vegetable. Dried chilies make up a significant share of India's spice consumption per capita. The Indians were the first to discover chilli 400 years ago. India produces the most chilli in the world, with Andhra Pradesh topping the way. Andhra Pradesh produces 46% of India's total chilli production. The fact that the name Guntur Sannam chilli in Telugu confirms its Andhra Pradesh origins. Sannam is a Telugu word that implies thin or long.

1.3.3 Description of Goods :

Sannam is a Telugu word that means thin or lengthy. The chilli's name implies two things: a description of the fruit and, more crucially, strong antecedents from Andhra Pradesh. Sannam Chillies' are classified into at least four grades. They are,

Sannam Special (S.S.) **–** which is light red in colour, glossy, and has a length of at least 5cm.

Sannam General (S.G.) **–** Light crimson in hue, with lustrous skin and a length of 3 to 5 cm.

Sannam Fair (S.F.) – It has a length of 3 to 5 cm and is blackish a dull crimson in hue.

N.S. means "not specified." – This is not a standard grade; it is designed to suit special buyer criteria that are not addressed by standard grades.

1.3.4Geographical Area of Production and Requirements :

Guntur Sannam Chilli is mostly grown, processed, and sold in the Guntur district of Andhra Pradesh. For growth, the Guntur Sannam chili requires a warm, humid climate, with dry weather during maturation.

1.3.5 Cultivation:

Guntur Sannam harvesting season runs from December to March. Each year, roughly 280,000 tonnes are produced using this method. The Guntur Sannam chili has certain criteria in terms of production procedures for optimal results. Because Guntur Sannam crops are disease-prone, more care and attention is required to ensure a healthy, pest-free yield.

Guntur Sannam Factsheet

Producing Centers	Andhra Pradesh, Tamil Nadu, Maharashtra, Karnataka, Rajasthan, Assam
Harvesting seasons	January to March or December to March
ASTA Colour Value	32.11
Capsaicin content	0.226%
Annual Production	280,000 Tonnes

1.3.6 Characteristics:

The Guntur Sannam chili has received a lot of appreciation for its distinctive features. Sannam chilies are S4 type chilies that are utilized for pungency as well as the extraction and extraction of capsaicin, the chemical that gives chilies their heat.

T**he Guntur Sannam chili has the following characteristics:**

• With a length of 5 to 15 cm and a diameter of 0.5 to 1.5 cm, the Guntur Sannam chili is a Capsicum Annuum var. longum variation.

- The skin of the chili is extremely thick.
- When crushed, the Chile's skin is thick, red, and hot.
- On average, the chili has a SHU rating of 35,000 to 40,000.
- The chili has a strong red colour with an ASTA colour grade of 32.11.
- Capsaicin has a concentration of 0.226 %.

Vitamin C (185 mg/100 g) and protein (11.98 g/100 g) are both abundant in this chili.

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1.3.7 Interesting Facts of Guntur Sannam Chilli :

- Chillies are fruits of the Capsicum genus..
- Chillies have been consumed by humans since 7500 BC.
- There are over 400 different types of chilies in the world.

The first European to encounter Chilli was Christopher Columbus, who dubbed it Peppers.

1.3.8 Utility Value :

Chilli is a must-have condiment in every home. Apart from adding pungency and colour to dishes, it is also a good source of vitamins and has medicinal properties.

The pungency of chilli is caused by capsaicin, and the red colour is caused by carotenoid pigments such as capsanthin and capsorubin. As the demand for natural pigments rises, so will the demand for chili on the global market.

- Chillies have powerful and effective medicinal properties.
- Chillies are antioxidants that fight cholesterol, diabetes, cataracts, osteoporosis, and rheumatoid arthritis, as well as burn calories.
- A chilli poultice could really heal ulcerated stomach sores.
- The right amount of chilies is beneficial to the kidneys, spleen, and pancreas, and is excellent for Lock-jaw.
- Chillies are a wonderful source of vitamins and minerals. Fresh chili fruits contain vitamins B and C, as well as provitamin A (carotene). They have seven times the Vitamin C content of an orange.
- Chillies with food stimulate taste buds, increasing the flow of saliva containing 'amylase,' which aids digestion.
- Chillies can help with sore throats, congestion, sluggish digestion, varicose veins, ulcers, laryngitis, blood pressure, insomnia, flu, and other infections.

Chilli colour is being used in food as a natural colorant rather than harmful synthetic dyes. It's also used to flavor eggs, fish and meat dishes, sauces, chutney, pickles, sausages, and other dishes. Chilli is mostly used in cooking as a ground spice powder. Oleoresin, a chili oil extract, is used in food industries, confectioneries, cosmetic industries, beverage industries for toning fresh wine, meat industries, pharmaceutical industries, poultry and cattle feed industries, and as a dye in textile industries.

1.3.9 WORLD'S MAJOR CHILLI PRODUCING COUNTRIES:

Chillies are farmed on 1832 thousand hectares around the world, yielding 2959 thousand tonnes in total. India, China, Indonesia, Korea, Pakistan, Turkey, and Sri Lanka are major chilli-growing countries in Asia; Nigeria, Ghana, Tunisia, and Egypt are major chili-growing countries in Africa; Mexico and the United States of America are major chilli-growing countries in North and Central America; Yugoslavia, Spain, Romania, Bulgaria, Italy, and Hungary are major chilli-growing countries in Europe; and Aruba is a major chili-growing country in South America. China and Pakistan produce the most chilies in the world, followed by India. Despite the fact that chili is grown all over the world, Asian countries produce the majority of it.

- The 10 leading countries that produce chillies.

- India, China, Ethiopia, Myanmar, Mexico, Vietnam, Peru, Pakistan, Ghana, and Bangladesh are among the countries represented.

In 2009, India accounted for more than 85 percent of global chili production, with 36 percent, followed by China (11 percent), Bangladesh (8%), Peru (8%), and Pakistan (8%). (6 percent).

India is the greatest producer of chillies, with an annual production of over 14 lakh tonnes. China, with a production of around 4.5 lakh tonnes, Mexico, with a production of around 4 lakh tonnes, and Pakistan, with a production of around 3.5 lakh tonnes, are the other main chili producers.

1.3.10 INDIA'S MAJOR CHILLI PRODUCING STATES:

- India is not just the world's largest producer of chili, but also its largest consumer. Chillies are the most widely grown spice in India.
- Chilli is an all-purpose Indian spice. It is grown in all of the country's states and union territories.
- India produces roughly 36% of entire global production. Chillies are grown in practically every state across India.
- Andhra Pradesh is India's greatest producer of chilli, accounting for around 26% of the total area under cultivation, followed by Maharashtra (15%), Karnataka (11%), Orissa (11%), Madhya Pradesh (7%), and other states accounting for nearly 22% of the total area under cultivation..

- Andhra Pradesh is the largest producer of chilli in India, accounting for almost 57% of total production..
- In 2006-07, Karnataka was the second largest producer, accounting for 12% of total production, followed by Orissa (5%), West Bengal (5%), Maharashtra (4%), Madhya Pradesh (3%), and others accounting for the remaining 14%.
- Guntur, Warangal, Khammam, Krishna, and Prakasam are the major chilli-growing districts in Andhra Pradesh..
- With an annual turnover of over Rs.600 crore, Guntur is the largest chilli producing region in AP, accounting for 30% of the state's total production.
- The prices at the national level are determined by the area and production of chilli in this area.
- Growing demand from a variety of sectors and shifting consumption patterns are driving India's chili output northward.

CHAPTER -2

REVIEW OF LITERATURE

Spices from India are commonly utilized in the pharmaceutical, neuraceutical, fragrance, toiletry, and cosmetics sectors. Exports of spices and culinary herbs from India have increased dramatically. In order to enter the international market, Indian spice makers are putting in significant effort to increase the quality of their products through technical advancement. India is also a market leader in spice derivatives, meeting about 70% of global demand for spice oils and oleoresins. As a result of its value-added products, the country has gained international recognition. Indian manufacturers are inventing new goods and using organic methods of production in order to provide organic spices and herbs, which attract a 10-30% premium.

Chillies are grown in practically all of Andhra Pradesh districts. Chilli, more than any other spice crop planted in the state, takes up a disproportionately large amount of land. Chilies occupied roughly 30.87 percent of the land under spice cultivation on average. Chilli is mostly grown in irrigated settings in Andhra Pradesh. Andhra Pradesh key chili-producing districts include Guntur, Khammam, and Prakasam.

Andhra Pradesh produces about 40% of India's chilli, and the Guntur Mirchi Yard, Asia's largest chilli trading market, is located there. A group of academics conducted studies on chili production, storage, and marketing, as well as analyses for the chili market and the Indian spice market, which also contributes to the global economy because it is involved in worldwide trade. This project will benefit from these publications as an analyzing tool.

2.1 B. Sowjanya, D. V. Subba Rao and R. Vijaya Kumari (2020) :

The research was carried out in the Andhra Pradesh district of Guntur to determine the prices and profitability of chili marketing. The study collected both primary and secondary data. In the Cobb Douglas production function, the elasticity coefficients for area (1.177) and material costs (3.699) were both positively significant. Expenses on production material and marketing services were found to have a substantial impact on farmers' income in multiple regression analysis. The ARDL model for factors influencing market arrivals of commodities analysis R2 revealed that current pricing and variance were found to have a substantial impact on farmer arrivals. In the ARDL model, factors influencing current commodity prices analysis R2 revealed that 84 percent of variance and lagged

prices (Pt-1 and Pt-2) were shown to have a substantial impact on farmers' current prices. The majority of farm produce was channeled through two marketing channels, Channel-I (producer-trader-whole saler retailer-consumer) and Channel-II (producer-trader-whole saler retailer-consumer) (producer-processor-retailer-consumer). For Channel-I and Channel-II, the producer's share in the consumer's rupee was found to be 80.51 percent, 76.72 percent, and the price spread was '1500.67,'1971.92 correspondingly. In Archery's and Shepherd's techniques, marketing efficiency in channel I and channel II was 3.53, 14.11, and 2.93, 16.87respectively. The farmers' most significant constraints were a low price for their produce at harvest and a shortage of transportation, which scored 78.26 and 63.13 respectively.

2 B.Aruna, D.Meghana, A.L.S.V.Maneesha and K .Leela vaishnavi (2021)[2] :

This study focused on "Impact assessment study –chilli farm value chain development through integrated agri extension platform in Andhra Pradesh," as stated by the authors. The project began with Acharya NG Ranga Agriculture University (ANGRAU) conducting a baseline study in May 2019 to describe the as- ls scenario of farmers in the project districts. Farmers and crop profiling, cost of cultivation, adoption level of Good Agriculture Practices, and market information were among the primary topics covered during the baseline survey in Guntur, Krishna, Kurnool and Prakasam districts.

Phase 2 of this study, "Chilli farm value chain development through integrated agri extension platform," was implemented during crop season 2019-20 (Year I), and covered 4,035 farmers and 12,250 acres. In 2020-21(Year II) the project was extended to 10,064 farmers covering 26,844acres. To further assess the impact of the Year II programmed, the College of Horticulture, VR gudem, Dr. Y. S. R. Horticulture University, has conducted a "Impact Assessment Study" in the project villages in Guntur, Krishna, Kurnool and Prakasam districts, under the direction of Dr. K . Umajyothi (Associate Dean College of Horticulture Dr. YSRHU).

2.3Dr. L. K . Velayutham, Dr. K. Damodaran (2015)[3] :

The economic study of chilli production in Andhra Pradesh is examined in this paper. Chillies' are a highly valuable crop farmed throughout India. It's also called "hot pepper," and it's used as a vegetable, spice, condiment, sauce, and pickle. It is clear from the analysis that using organic manure would boost agricultural productivity. As a result, it is important to emphasize that farmers should be encouraged to utilize organic manure. Organic farming is the only way to ensure a long-term production, and it must

not be delayed for any reason. As a result, the government must step forward to provide some price security for organic crops as well as loans to farmers in order to boost organic farming in the country. Controlling and managing production aspects with available resources may be more practicable for farmers in some cases than the next level. That is, marketing. Seasonal price fluctuations, overall production in the country, global demand, stocks in storage, and hedging among the various species of chilies all influence the market for chilies. Chilli production levels and variables influencing them, such as available resources, differ by state. The study's focus is on the production elements and accessible resources, with the following objectives.

Chilli is grown and supplied to the Guntur Mirchi Farm in Guntur district, from where it reaches the doorsteps of various countries. The great demand for organic chili production should be leveraged properly for higher returns on investments because the business is fully credit oriented and returns matter most to the farmer.

2.4 Bhavani Devi, M. Srikala, T. Ananda and V. Subramanyam (2016)[4]:

By using Markov chain analysis; this paper discovered that the United States is the most stable market for chilies, followed by the United Arab Emirates and Sri Lanka, while Malaysia, Bangladesh, and Pakistan are the most unstable importers. According to the study, Malaysia (24.83 percent) and Sri Lanka were the top markets for Indian chili in 2011-12. (14.70 percent). During the study period 2006-07 to 2010-11, the estimated NPCs suggested that the Indian chili was price competitive. In a five-year study period from 2006-07 to 2010-11, a comparison of the competitiveness of Indian chili against Chinese red chili indicated that Indian red chili is globally price competitive for three years.

According to Markov chain analysis, the most stable market for Indian chilies is the United States, followed by the UAE and Sri Lanka. Malaysia, Bangladesh, and Pakistan have all been identified as high-risk importers of Indian chili. Chilies with a higher demand in outside markets fetch a higher price, resulting in increased income for growers. Chilli is competitive for export to numerous nations, according to the computation of nominal protection coefficients, and India can capitalize on this competitive advantage by establishing modern infrastructure.

2.5 : Dr M. Thamaraikannan, Dr G. Palaniappan, C. Sengottuvel(2011)[5]:

Considering Guntur is Asia's largest market for chillies, this article emphasizes the need of cold storage. The marketing season kicks off in the first week of March, peaks in April, and ends in the middle of May. Around 35-40% of the crop is stored in the cold storage facilities in Guntur and the neighboring districts. During the season, around 8-10 million bags of chili (each bag containing 35 to

50 kilogram's) are exchanged in the Guntur market alone. During the season, market participants estimate that transaction worth around Rs 5000 million takes place in Guntur. There are well-established spot markets for this product. The largest spot markets at the production centre's are Guntur, Warangal, and Khammam in Andhra Pradesh, and Raichur and Bellary in Karnataka. A village-level dealer, commission agent, wholesaler, retailer, agents for exporters, and exporters are all part of the trade chain. The commodity changes hands multiple times, putting all of these participants at danger of losing money. Chilies are grown in India in various grades and types. However, SannamS4, which is largely grown in Andhra Pradesh, amounts for roughly 30-35 percent of overall production. This is also the most commonly exported cultivar. If this single variety is offered for futures trading, a rather uniform product can be offered for futures trading.

The two biggest roadblocks to increasing our exports are aflatoxins and pesticide residues. In the processing and preparation of chilies for export, buyers require a high level of hygiene and sanitation. If we meet the severe quality standards of importing countries, we have a lot of room to grow our exports of whole chilies, chili powder, and crushed chilies in consumer packs. Consumers in importing countries demand "clean spices," and we must make every effort to avoid contamination from external sources during harvesting, post-harvest handling, processing, and storage to fulfill this requirement. Only an integrated approach involving the efforts of farmers, processors, and dealers can achieve this.

2.6 Dr. CH. V. V. Satyanarayana Dr. C. R. Sukumaran (2002)[6] :

This article looks at the post-harvest features of chillies, as well as the technology that is needed and currently accessible for the country's greatest spice export. The following are the findings of the research.

Traditional processing methods are labor-intensive, unscientific, and unsanitary, resulting in low-quality products, especially for export markets. By implementing scientific processing and storage methods, quality can be improved. The majority of chili exports are dried whole chilies', stem less chilies', crushed chilies for oleoresin extraction, and some powder. Chilli oleoresin is the most essential type of value added product. Chilli drying and storage are critical processing procedures because they affect quality, particularly colour retention and aflatoxin levels. As a result, any technological advancement in these phases will result in improved chili quality. To fulfill the needs of importing countries, breeding of cultivars with more pungency, less pungency, and high colour should be conducted. It is necessary to develop varieties that are appropriate for processing, notably for the extraction of capsaicin and capsarithin. ii. To compete in the international market, scientific

investigations that lead to the manufacture of high-quality chilli products and a reduction in processing costs must be done.

2.7 Kirti Jalgaonkar and Manoj Kumar Mahawar (2017)[7] :

This in-depth examination of the qualities of chilli exposes everyone to the internal revolutionary assessment of chili agriculture for export quality.

The purpose of this study was to examine the physical and chemical parameters of three dried chilli cultivars: Guntur, Guntur Brown, and Byadgi. The axial dimensions, weight, seed, and stalk content of different varieties vary. The weight and length of a single Guntur, Guntur Brown, and Byadgi chili were 0.85 g, 1.37 g, and 1.35 g, respectively, and 95.90 mm, 113.05 mm, and 113.20 mm. Chilli cultivars' L/B ratios ranged from 6.71 to 8.58. Byadgi chili has the largest seed and stalks content (51.50 percent and 10.98 percent, respectively), followed by Guntur Brown (30.80 percent and 6.97 percent) and Guntur (13.95 percent and 7.07 percent). Guntur has the highest bulk density (0.130.78 g/cc), followed by Guntur brown (0.0892.21 g/cc) and Byadgi (0.0692.26 g/cc). Plywood had the highest coefficient of static friction compared to mild steel and galvanized iron. The quality parameters of whole chili powder, such as colour, total carotenoid content, ash content, total extractable colour, and total phenol content, were significantly different from destalked chili powder. Destalked Byadgi chili powder had a colour value of 32.31 (L*), 98.47 (a*), 36.12 (b*), which was significantly superior to whole Byadgi chili powder, which had a colour value of 32.28 (L*), 91.70 (a*), 38.65 (b*).Guntur Brown chilies followed a similar pattern. Guntur brown chili has the highest carotenoid concentration and total extractable colour, followed by Byadgi chili and Guntur chili. The presence of chili degraded the quality of the product, and its removal is suggested for future industrial usage..

2.8 Bojjagani Jhansi and Dr. Annapurna N Kalal (2021)[8] :

This significant study highlights the need for post-harvest chilli training for women. India is the world's most agriculturally dependent country, with a culturally diversified people that still relies on agriculture, which is not just a business to them, but the "True Culture of India." Women play a variety of tasks in Indian agriculture, from sowing to harvesting. She also contributes significantly to post-harvest operations. As a result, women play an important role in agricultural output. A comparative study in Karnataka and Andhra Pradesh identified training needs of APMC and field level women laborers' participating in post-harvest activities of dry chili. The study included a total of 120 participants (60 respondents from Karnataka and 60 respondents from Andhra Pradesh). The

information was gathered using a pre-structured interview schedule and personal interviews. The data was analyzed using statistical tools such as frequency and percentages. According to the findings of the survey, none of the respondents from both states attended training programmes. The vast majority of women laborers' from APMCs and the field have stated that they require training in order to boost their income. Field-level women laborers' stated that they require training to boost yields, whilst APMC women laborers' stated that they require training on value addition to dry chili in order to prepare chili products. Training progammes should be designed in such a that, everyone should feel comfortable to attend the programmers and it should be 2-3 days within village or nearby village. By planning appropriate training progammes to field level/APMC women laborers' will enhance better participation in post-harvest activities of dry chili.

2.9T. Prasad Rao, D.V.S. Rao and G. Raghunadha Reddy (2013)[9] :

The current research was conducted in Guntur, Andhra Pradesh, with the following specific goals: I to investigate the impact of corporate retail chains on unorganized traditional small retail enterprises, and (ii) to investigate the marketing efficiency of corporate retail chains in the vegetable trade compared to traditional channels. A random survey of 30 regular hawkers and petty vegetable enterprises in the vicinity of organized retail outlets operating within a 500-meter radius in five Guntur town localities, namely Koritepadu, Lakshmipuram, Arundalpet, Brodipet, and Kothapet, was conducted, and this treatment group was considered to be the most likely to be affected by corporate retail outlets.. The control group consisted of traditional retailers in Rythu bazaars and municipal markets operating at a distance of more than 500 meters from organized retail chains. A total of 90 retailers were chosen at random, with 30 in the treatment group and 60 in the control group. A random sample of 30 wholesalers from three wholesale markets was also chosen to investigate the impact of market intermediaries. The mean variations in profits, turnover, and number of customer visits as well as employment between two reference periods in Guntur, namely 2006 (before the establishment of corporate retail outlets) and 2009 (after the establishment of corporate retail outlets), were studied using the Z – test. The study found that between 2006 and 2009, there was a significant decrease in the number of customers visiting traditional vegetable enterprises, as well as a decrease in turnover and profits (mean percentage differences between treatment and control groups were -32.81 and -34.63 respectively), as well as a 5.56 percent increase in employment in the treatment group due to the establishment of organized retail chains, with no effect on the control group. The location of organized retail outlets has had a negative influence on hawkers and petty vegetable shop retailers who operate in

the vicinity or near these organized retail outlets compared to those who operate away from the retail chain shops. When compared to organized retail outlets, the producer's share of the consumer's rupee and marketing efficiency were higher in Rythu bazaars, and lowest in hawkers and petty vegetable companies. Price fluctuations, limited credit availability, high labour costs, and high transportation costs were the key challenges encountered by unorganized market retailers. It was suggested that more Rythu bazaars be established in all residential areas of Guntur and other towns in the state to benefit both farmers and customers, enhance marketing efficiency, and sell veggies to consumers at fair and lower costs than other supply chains. It was also suggested that better and more infrastructural facilities, a clean and hygienic environment, more shop space, insurance, and credit facilities for retailers in Rythu bazaars, as well as the organization of retail and farmers' co-operatives or SHGs for establishing linkages with institutional facilities in retailing, be provided, as the majority of hawkers and petty vegetable retailers and producer-cum-retailers come from poor socio-economic backgrounds and are illiterate It was also suggested that the creation of organized retail outlets in areas where traditional retailer outlets already operate be discouraged because they harm self-employed, independent, poor, and small retail businesses.

2.10 S.B. RAMYA LAKSHMI, I. BHAVANI DEVI AND G. MOHAN NAIDU(2016)[10] :

Chilli (dry) prices in the Guntur and Khammam markets of Andhra Pradesh and Telangana were investigated using ARIMA, trend analysis, decomposition fit, moving average, SES, DES, WMM, and ANN models, with 156 months of market data from April 2000-01 to 2012-13. ARIMA (1,0,0) was the best model for forecasting red chili prices in Guntur, while ARIMA (1,0,1) was the best model for Khammam markets. For the months of April to July 2013, the price of chili per quintal is expected to range from Rs. 6,818 to Rs. 6,647 in Guntur and Rs. 6,539 to Rs. 6,262 in Khammam markets, according to predictions. This forecast and strategy, which were used in the pre-covid era, allows us to compare and update market trends.

CHAPTER 3

SUPPLY CHAIN OF CHILLI PRODUCTION

3.1 Growth Of Chillies

Over the last five years, Indian dried chilli exports have exploded. Recent results show the positive impact of successful commercial activities. India's dried chilli pepper exports totaled 424,475 tonnes in 2020, up 68 % from 2016. Surge in export shipments is fueled by rising demand from China, where imports of the spice have increased by 118 times from 2016 to 2020, to 162,400 tonnes. This is due to the fact that domestic production is predominantly focused on low-heat chilli peppers, while deliveries from Central Asian countries are limited. The year 2021 is no exception, with Chinese dried chili pepper imports up 15% from the previous year's levels from January to September.

In 2021, India's whole dried chilli exports continued to rise. According to the latest trade statistics from India, the country exported over 338,500 tonnes of spice in the first nine months of 2021, an increase of 2.75 percent year over year. Exports increased by 8.6 percent in value compared to the same period previous year, totaling $737 million. Increased export revenue was achieved not only as a result of increased volumes, but also as a result of a higher average price, which was at $2,175 from January to September 2021, up 6% year on year.

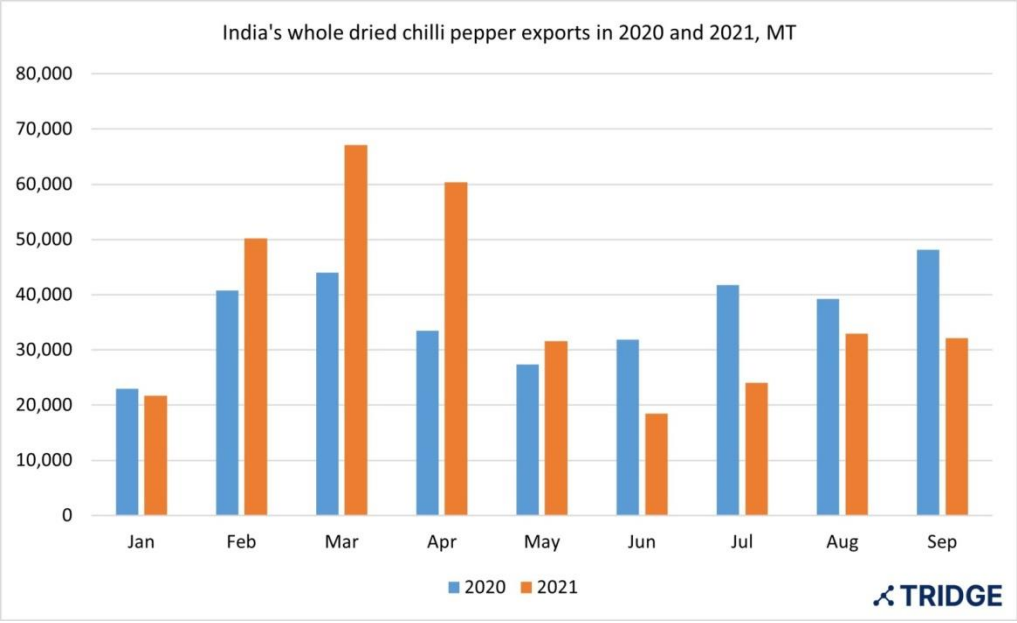

Figure 2: India Whole Dried Chilli Pepper Exports In 2020and 2021,MT

When the Indian chilli production season was at its peak in February-April 2021, importers rushed to buy the freshly dried spice from the new crop to refill their stocks, the physical volumes of exports increased the most. India's shipments of whole dried chilli paprika to international markets were 127,500 tonnes in March-April 2021, up 64 % last year. Exports decreased from June to September, signaling the end of the production season.

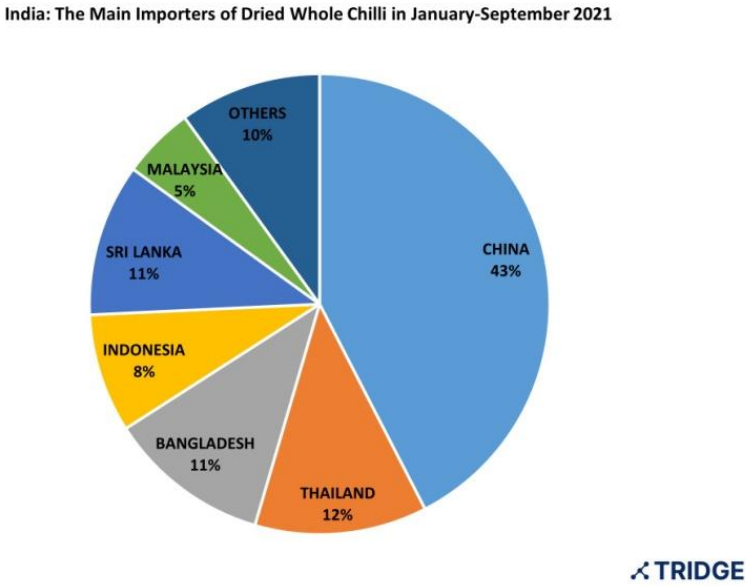

Figure 3 : India The Main Importers Of Dried Whole Chilli In January –September 2021

China imported the biggest volumes of whole dried chillies from India in March-April 2021 because of strongly depleted stocks after the holiday season. The risks associated with global logistics delays, as well as the longer cargo transportation times induced by COVID-19, prompted importers to order larger quantities in advance to ensure enough supplies in the home market.

The situation on India's export and domestic markets in November 2021

Due to poor output, whole dried chilli pepper exports from India frequently slow down around October-November.

The majority of the volumes sold for export are from the 2020/21 crop. Madhya Pradesh and Maharashtra harvest their crops in late November/early December. Due to the high moisture content of the chilies, the majority of the volumes collected in the aforementioned states are sold domestically.

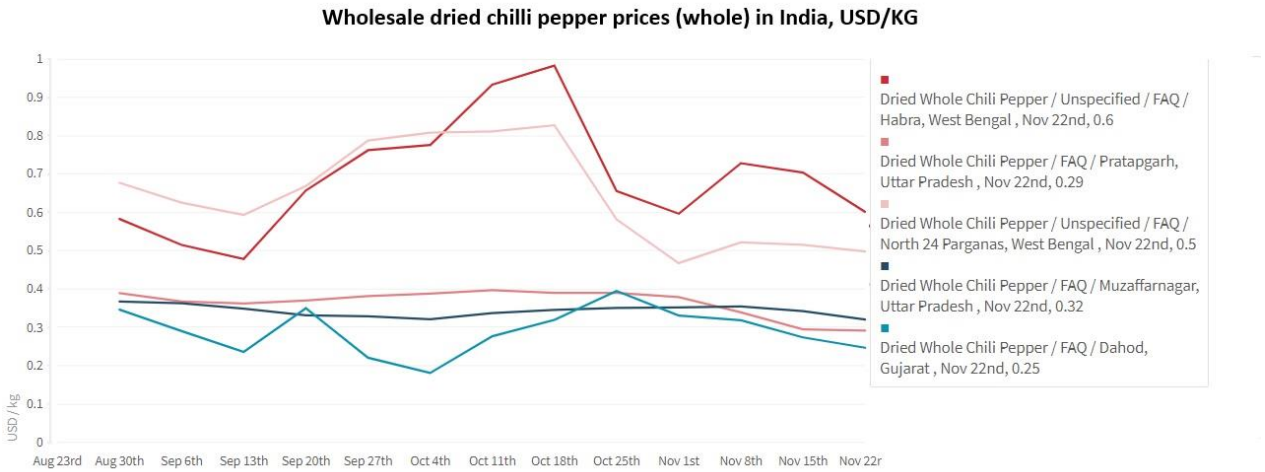

Figure 4: Wholesaler Dried Chilli Pepper Prices (whole) In India, USD /KG

Domestic and export prices for Indian whole dried chili peppers were under pressure in the first three weeks of November 2021, due to high stocks on the domestic market and expectations of a bumper crop in the 2021/22 season, which is expected to increase by 15-20 percent compared to 2020/21 due to the expansion of the crop's planted acreage. The chili harvest in India in 2021/22 is expected to be 1.98 million tonnes, according to the Spice Board of India. However, recent heavy rains in the key production areas, as well as rumors of a virus being detected on the crop, may prompt growers to reduce their early production forecasts.

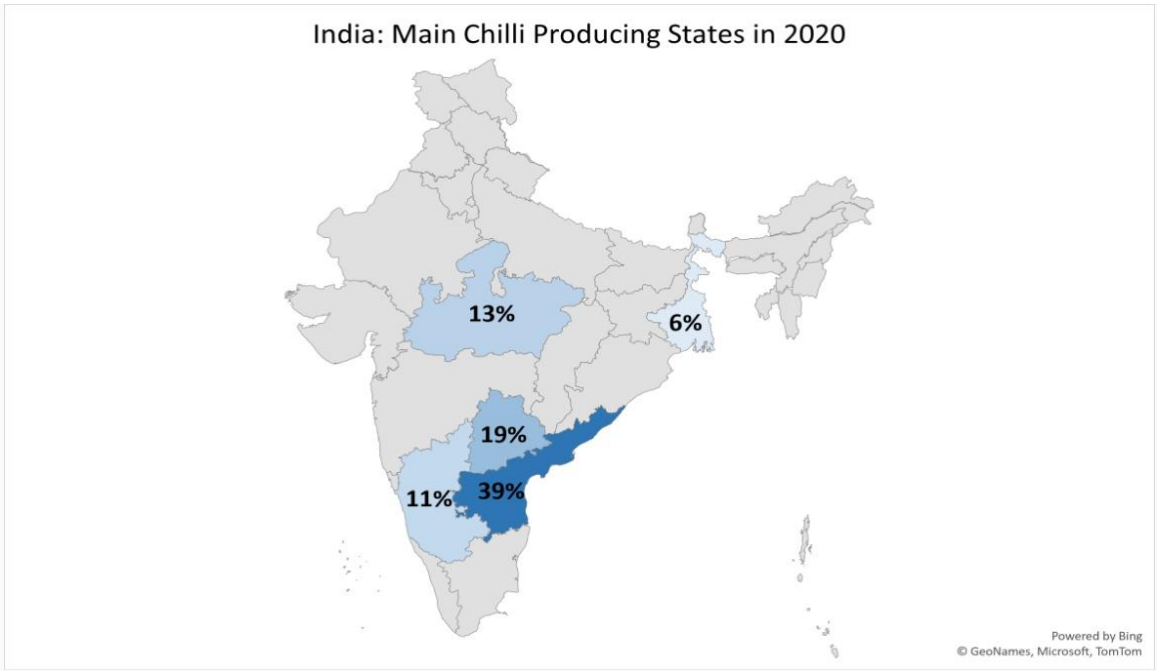

Figure 5: India Main Chilli Producing States in 2020

3.2 Aspects of Post Harvest Management :

When the pods are fully grown and half-wilted on the plant, they are collected. The pods are collected and stored in heaps for 2 or 3 days to create a consistent red colour, either indoors or in the shade away from direct sunlight, and then dried in the sun by spreading them on clean dry polythene sheets, cemented / concrete drying yards, and so on. The pods are spread out in thin layers and stirred frequently to prevent mould growth and discoloration. The dried pods are covered with clean gunny sacks or polythene sheets. The moisture content of dry pods is maintained between 8% and 10%. To ensure product cleanliness and colour consistency, a better drying method could be used.

Figure 6 : Harvesting Chillies.

Well-dried pods should be wrapped in clean, dry gunny bags and stored away from moisture after removing any superfluous items like as plant fragments. Dunage should be provided to stack the packed bags to prevent moisture infiltration from the floor. When stacking the bags, make sure they are 50–60 cm away from the wall. Chilies that have been stored for a long period may degrade. However, if cold storage facilities are used, the product can be stored for up to 8 months. The chili storage area should not be accessible to insects, rats, or other animals.

Figure 7 : **Grading Chillies.**

3.3 Traditional Methods Implementing for Sun Drying :

- Depending on whether they were partially dried on the plant or removed while still succulent, chilies have a moisture content of 65-80% when harvested; this must be reduced to 10% to make dry spices**.**
- Sun-drying has traditionally been used to achieve this without any additional treatment after harvesting.
- After harvesting, fresh fruits are stored indoors for 2 or 3 days so that any partially ripe fruits fully ripen and the entire crop develops a uniform red color.
- Nowadays, sun drying is still the most common method in the world.
- After collecting the fruits, they are spread out in the sun on hard, dry ground, concrete floors, and even flat roofs.
- As a result, frequent stirring is performed during the day to ensure uniform drying and prevent discoloration or mould formation.
- At night, the dried fruits are piled up and covered with tarpaulins or gunny bags, while during the day they are spread out.
- In larger pods, the pods are tramped or rolled flat after 2 or 3 days to make packing into bags for storage and transportation easier.
- Depending on the weather, this method of drying takes 5-15 days.
- From 100 kg of fresh fruits (25-35 kg), dried fruits can be obtained.
- The fresh food that is dried on open spaces such as roadsides and exposed to the elements for the duration of the drying period (5-15 days) may be contaminated with dust and grime, as well as harmed by rain, animals, birds, and insects.. This approach may result in losses of 70-80% of the overall supply.
- As a result of poor handling during the traditional process of harvesting and sun drying, fruits were bruised and split.
- The result of bruises and splits is an excess of loose seeds in a shipment, which results in a significant weight and price loss.

  Without adequate drying and protection from weather and pests, the colour, glossiness, and pungency of the harvested fruits will be lost.

Sun-drying method improved by CFTRI:

A four-tier wire-mesh tray system or a single perforated aluminum tray has been developed by CFTRI. Traditional sun drying takes around 3 weeks to get moisture content of 15-20%, and it took 14 days in the sun to dry fruits with a moisture content of 72 to 74 percent and reduces it to about 6%.

3.4 AFTER HARVEST LOSSES :-

- It's critical to harvest Capsicum species at the right period of development without causing major physical damage.
- Chilli, like all agricultural commodities, has a high moisture content when harvested (60-85%) that must be decreased to 8-12% moisture before usage.
- Around 10% of India's food grains are wasted during processing and storage, according to estimates.
- Chilli is dried in the open air for the most part..
- The most common cause of loss was driage, which accounted for 20-15 percent of the pods' overall weight.

Chilli Post-Harvest Losses Estimated at the Producer Level

S no	Causes	percentage of total production losses
1	Assembling to distribution	2-5%
2	Farm to assembling	05-10%
3	Moisture	15-25%
4	Spoilage in field	01-10%

Table 1 : Chilli Post-Harvest Losses Estimated at the Producer Level

3.5 Harvesting and Post harvest care:-

- Harvesting should be done early in the mornings, rather than during or immediately after showers.
- When harvesting fruits, be sure to keep the stalks securely in place and gently pull the fruit upward, breaking the stalk's base.
- When it comes to dried chilies, it's important to make sure the fruit isn't overripe.
- Harvesting should not be postponed since it causes problems and Produce of poor quality.
- The collected fruits should be stacked indoors for 2-3 days to allow the partially ripe fruits to develop a uniform crimson colour across the produce.
- The temperature required for ripening is 22-25°C, and direct sunshine should be avoided because it might cause white areas.
- The ripe pods should be laid out in the sun to dry on clean, dry polythene sheets in a paved drying yard.
- The moisture level of dry pods should be kept between 8 and 10% and using a reversing sun drier to dry reduces drying time.
- Chilies should be placed at a distance of 50 to 60 cm from the wall.
- Except in cold storage with moisture-proof plastic liners (polythene bags) at a temperature of 0-10o C and 65-70 percent humidity, the product should not be stored for an extended period of time.
- To reduce mechanical damage while shipping from the field, utilize plastic field boxes instead of sacks if possible.

3.6 GRADING:

Grading is a prerequisite for modern commodity marketing, commerce, and economy development. The majority of Indian chilies are graded. Before they are brought to sale, farmers sort them by colour and size. The depending on the market, broken, discolored, and immature pods are remove demand. However, other key quality parameters at the trade level are stalks and wetness. Excess moisture not only makes the pods heavier, but it also promotes fungal growth. Similarly, if the pods' stalks are injured, the seeds may totally fall out. Insufficient moisture may cause the pods to crack and release the seeds. As a result, the seed to pod ratio of a lot is an important grading factor.

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Figure 8 : Grading system.

Quite apart from the colour, size, wetness, and stem of the pods, the following qualities play a role in chili grading.

(a) Ratio of seeds to fruits (pods).

(b) Size and toughness of seeds.

(c) The skin thickness of the pod and

(d) Pungency.

The end user selects the variety of chilies for various purposes. There are two sorts of end users.

- Domestic retail users.
- Industrial wholesale users.

Color-pungency, fleshy skin, and fewer seeds are preferred by industrial users who manufacture Chilli powder. Domestic users, on the other hand, like all sorts for various circumstances. Farmers, village merchants, and itinerant merchants follow a variety of local and standard grades. Visual evaluation of grades by looking at lots/heaps and selecting a few pods to evaluate, allowing traders to accurately and appraise prices in both open and closed auction.

3.7 Producer's Level Grading:

As regulated markets command a higher price, produce is often well dried and cleaned. Sorting out discolored, white, and rotten chillies at the time of harvest is normally done at the producer level before taking it to markets. It's drying to earn a higher price when it's sold. In a controlled market, Chillies are graded further by producers based on variety, size, colour, taste, and other factors. Deep and Chillies with a vivid red colour and a low seed content are usually more expensive. Price. Pungency, size, and shape all rely on personal preference.

In our communities, grading with the goal of conforming to defined or definite criteria has not developed successfully. Attempts to grade chilies at the producer or commercial level. The Directorate of Marketing and Inspection assigned grades. D.M.I. introduced the scheme of "Grading at Producer Level" programmer in 1962-63. The major goal of this strategy is to put the produce to a simple test and assign a grade before selling it. The State Government is implementing the scheme, and as of March 31, 2008, 2113 grading units had been established around the country. About 13014.74 M.T. of chili worth Rs.3651.41 lakhs was graded at the producer level in 2006-07 and 2007-08. At the moment, producer grading is largely done in Karnataka, Maharashtra, and Andhra Pradesh.

Producers have discovered that grading their products results in higher prices for higher quality. Producer grading should be encouraged, especially in regulated markets and cooperative marketing organizations, so that good grade chilies are available for sale, with buyers benefiting from the desired quality and sellers benefiting from a premium price.

3.8 PACKAGING:

Packaging plays a crucial role in the marketing of any product, including chillies. It is customary to protect produce against damage during storage, transportation, and other components of the marketing process. From the producer to the consumer, it is required at every level of the marketing process. Packaging has become increasingly essential in the marketing of produce in recent years. Chilli packaged well not only makes transportation and storage easier, but it also encourages customers to spend more. Packaging lowers marketing costs while while protecting product quality.

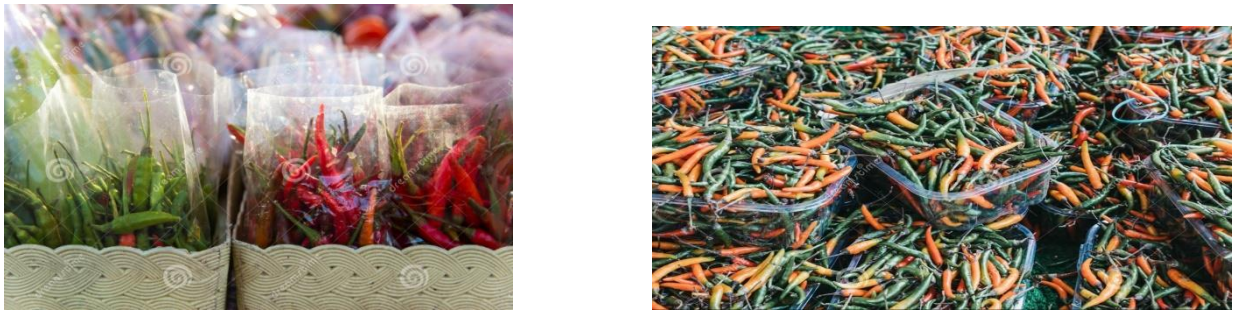


Figure 9 : Different types packing

Packaging materials:

The following qualities must be included in a suitable packaging material:

- It must guarantee both quantity and quality.
- It must keep food fresh during transportation and storage.
- It must include details such as quality, variety, packaging date, weight, and price.
- It must be simple to handle operations.
- It has to be easy to stack.
- It must be inexpensive, clean, and appealing.
- must be devoid of harmful substances
- It must decompose naturally.

3.9 Method Of Packing :

Chillies are mostly wrapped in gunny bags and bamboo baskets in India (North eastern states). There is no consistency in the packing size of chillies across the country. Different states have different packing materials and packaging capacities. In the North Eastern States and Punjab, gunny bags have a capacity of 20-25 kilogram's. In Tamil Nadu and Andhra Pradesh, the pack size exceeds 40 kilograms, and in Prakasam districts in Andhra Pradesh the Pack size in 100 kilogram's. The basket packing capacity is 20-30 kilogram's. Farmers in Maharashtra use bullock carts draped in gunny cloth to deliver chilies in bulk. This style of packing is known as "GONT," and it has a capacity of 400-500 kg. Most farmers wrap their chilies in old gunny sacks before selling them.

In India, only the chillies packaged in large bags and repackaged by importers into new bags some tomes using a polythene liner to package the chilies inside a bag. it is not uncommon for polythene bags to package chillies. The pack size varies from district to district in several states, such as Kerala, Maharashtra, Andhra Pradesh, and Tamil Nadu.

The capacity of the bags determines the size of the bags. 3000 gauge low density polyethylene film pouches with a shelf life of 3 to 6 months are utilized for 100 g consumer unit packs. In tropical climates, 200-gauge low and high density polyethylene sheets can be used to package complete chilies in 250-gram packets. In a cool, dark, and dry environment, such packages can last for about a year.

Figure 10 : Gunny bags and plastic boxes chillies packing

3.10 TRANSPORTATION:

Every commodity produced requires transportation from the producing area to the distribution stage, so transportation is critical for a country's economic success. Transport that is quick, affordable, dependable, and convenient is critical for increasing production and trade.

Chillies are typically transported in gunny bags (new or old) and bamboo baskets. Chillies are transported in two phases: I from the farm to the assembly market, and (ii) from the assembling market to the consuming markets/places. Producers and village/itinerant merchants are active in the first phase, whereas wholesalers and processors are involved in the second phase. Depending on the economic state and land holdings of the Chilli producers in the area, head loads, cartloads, and tractor loads are commonly used. Of course, none of this has anything to do with the chilli deliveries from the markets.

Chilli growers in Andhra Pradesh bordering areas with Orissa carry their crop to market on their heads since they are poor and have small land holdings. In Coastal Andhra, however, Chillies are typically transported to the market by carts. Rich farmers in other parts of the state transport Chillies to markets using trucks and tractor/trolleys. Tractors were used sparingly in market dispatches, while trucks were the primary mode of delivery. Chillies are also distributed via rail, bus, and other forms of transportation. Tractor/trucks, on the other hand, were a common means of transportation.

In Assam, the majority of the produce is delivered by head loads, pack animals, or buses. Chillies are mostly brought in as head loads by producers (50-70 percent). Where a bus service is available and the markets are within walking distance, Buses are used to convey the produce. Farmers and village merchants can use pack animals as a cheap and convenient form of transportation. Tractors and vehicles are used by distributors and processors. In this state, buses and other kinds of transportation are also in use.

Chillies are transported by trucks and other routes in several Kerala marketplaces in the second phase. Producers and local merchants transport Chillies by truck/tractors in Madhya Pradesh, while entire sellers dispatch them by truck and train Except in Sangli, Dhule, Jalgaon, and Chandapur, where wholesalers transport Chillies by trucks, Maharashtra's produce is conveyed to market yards by carts, with just a small percentage transported by trucks and tractors. In Orissa, head loads, pack animals, and tractor/trucks are all used in similar proportions.

At different stages of the marketing process, several modes of transportation are used. :

Agencies	The Marketing Stages	Modes of Transportation
Farmers.	From the field to the primary market or village market.	Tractor trolley, head load, pack animal, bullock or camel cart.
Traders/Millers.	From primary to secondary whole sale and miller markets.	Railways and trucks.
Millers/Retailers.	From wholesale marketplaces to millers to retailers, we've got you covered.	Tractor trolleys, trucks, railways, tiny trucks.
Consumers.	From the retailer to the customer.	Handcart, bicycle, and rickshaw.
Exporters/ Importers.	For both exporting and importing.	By train and by ship.

Table 2 : At different stages of the marketing process, several modes of transportation are used

Access to less affordable and more convenient modes of transportation:

- Chill transit makes use of various modes of transportation. Internal markets are frequently served by road and rail, while export and import are usually handled by sea. The following are the most often utilized types of transportation:
- **Transportation by road :**
- Road transportation is the most popular means of transport for cold from the growing areas to the final customer. Chilies are transported across the country by head load, cant, tractor, trolley, bus, and other modes of road transport.

Transport by Water Ways:

- It is considered one of the earliest and most affordable modes of transportation. It comprises transportation by river, canal, and sea. Internal canals, on the other hand, transport a small number of chilies. Chilies are primarily exported and imported by sea. This mode of delivery is slow yet inexpensive, making it suitable for transporting huge amounts of chilies.
- **Transportation by Railway :**

  Chilies are shipped via train, which is one of the most important modes of transport. Railway travel is less expensive than vehicle travel and is better suited to long distances and large volumes. Distance, quantity, and other factors influence the cost of carrying chilies. Due to loading and unloading fees, as well as local transit costs, railway freight has a higher handling cost.

Mode of Transportation Selection:

The following factors should be considered while choosing a form of transportation:

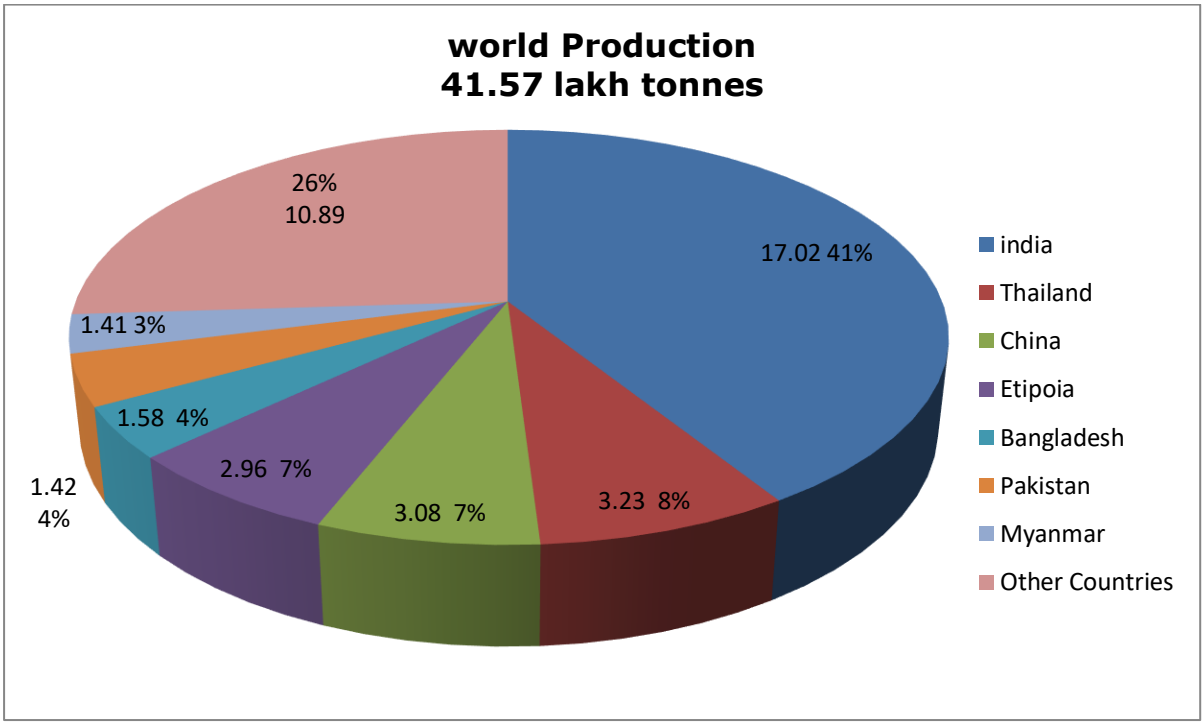
- The means of transportation should be the cheapest one available.
- It must be practical for loading and unloading Chili.
- It must safeguard Chili against inclement weather during transit.
- It must provide Chili to the consignee within the specified time frame, as the price fluctuates daily. It should be accessible, especially during the post-harvest period.

Figure 11 : Different Types Modes Of Transportation Images

3.11 Chillies Export Data from – January to December 2021

Spices are aromatic plant compounds that are used to season meals. Chilli is an important spice that is used in various forms all over the world. The international chili market has been dominated by Indian chilies. India is not just the world's largest producer of chili, but also its largest consumer and exporter. Chilli alone accounts for 42 percent of the country's total spice exports, with the majority of it going to China, Vietnam, Thailand, Sri Lanka, Indonesia, and Malaysia. The color and pungency levels of Indian chili are regarded to be essential economic features. With 1.98 million tonnes, India is the largest producer, accounting for 43% of global chili production, followed by China, Ethiopia, Thailand, Pakistan, and Bangladesh.

Figure 11 : Major chili-producing nations worldwide in 2020. (production in lakh tonnes)

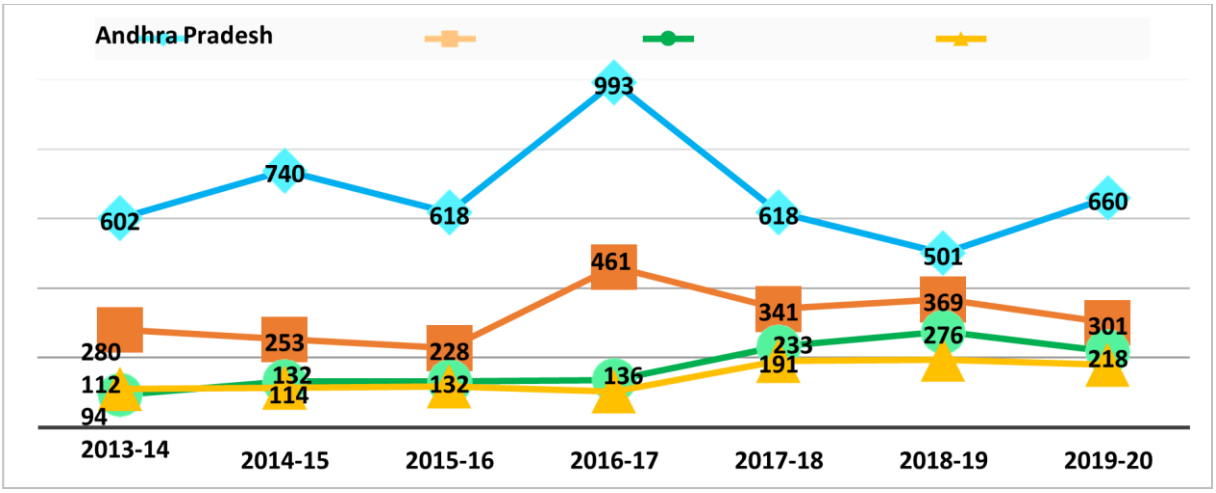


Source: www.indiastat.com

Andhra Pradesh will produce the most dried chili in India in 2020-21, with 7.97 lakh tonnes planted on 1.77 lakh ha and 4489 kg/ha productivity, ahead of Telangana, Madhya Pradesh, Karnataka, and West Bengal. Figure 2 depicts the output of chilies in India by state. Guntur chili yard, Asia's largest chili market, has an effect on domestic and international chili prices. Andhra Pradesh Guntur district generates 15% of all chilies produced in India, and the state of Andhra Pradesh as a whole produces 40% of all chilies produced in India (des.ap.gov.in, 2020). Chilies are available in over 400 varieties

over the world, with exporters favoring certain cultivars. The key chilli-growing districts in Andhra Pradesh are Guntur, Prakasam, Kurnool, and Krishna. Exporters' favorites are Teja, Byadgi, DD Best, 341, 273, 334, and other premium varieties.

Figure12 : Chilli output in India by state (in '000 tonnes)



Source: www.indiastat.com

According to the Government of Andhra Pradesh final estimations, chili production in 2020-21 will be 7.97 lakh tonnes cultivated on 1.77 lakh ha with a productivity of 4489 kg/ha. Chilies were cultivated on 2.29 lakh hectares in 2021-22, with a production of 10.78 lakh tonnes and a productivity of 4707 kg/ha, according to 2nd advance estimations.

Table 3 : Red Chili Supply and Demand in India (lakh tonnes)

Particulars	2016-17	2017-18	2018-19
Opening Stock	3.84	1.87	2.39
Production	10.73	13.76	10.5
Import	0	0	0
Total Supply	14.57	15.63	12.89
Consumption	8.7	8.8	8.5
Exports	4	4.44	3.85
Total Demand	12.7	13.24	12.35
Ending Stock	1.87	2.39	0.54
Average Monthly Consumption	0.73	0.73	0.71
Stock to Month Use	2.58	3.26	0.76
Stock to Consumption Ratio %	14.72	18.05	4.37

Source: www.indiastat.com

As per the table 1 shows that production decreased from 2017-18 to 2018-19, and that the whole demand for chili (12.35 lakh tonnes) was comfortably fulfilled by the total supply (12.89 lakh tonnes).

Table 4 : Major Chili Importing Countries in India (2019-20) :

Major Importing countries	Quantity	Rank	Value (in Lakh)	Rank
	(Tonnes)			
China	139966.14	1	217826.76	1
Thailand	59363.72	2	90302.24	2
Sri Lanka	50835.35	3	62302.03	3
United Arab Emirates (UAE)	40779.24	4	28798.99	8
Bangladesh	39551.2	5	43359.44	6
Indonesia	36601.82	6	46411.2	5
United States of America (USA)	30688.19	7	52154.04	4
Malaysia	26083.47	8	40198.63	7
Vietnam	9435.24	9	13598.18	9
United Kingdom (UK)	8334.88	10	11287.78	10
India	496000		671039.53	
Share (%)	89.04%		90.34%	

Source: www.indiastat.com

Chilli exports to these ten largest countries account for 89 percent of India's total chili exports, as seen in Table 2. Thailand, Sri Lanka, Indonesia, Malaysia, Vietnam, and the United Kingdom were the top importers of Indian chilies.

Table5 : Chili export and import proportion of total spices export and import in India during the triennium years:

	Exports (000' tonnes)				Imports (000' tonnes)		
Years	**Chilli**	**Spices**	**Per cent share**	**Years**	**Chilli**	**Spices**	**Per cent share**
1993-96	35.68	180.25	19.79	2000-03	1.07	83.95	1.27
1996-99	53.52	236.08	22.67	2003-06	1.11	100.62	1.11
1999-02	65.35	238.24	27.43	2006-09	0.96	100.11	0.96
2002-05	101.89	289	35.26	2009-12	1.16	101.54	1.15
2005-08	156.89	389.45	40.28	2012-15	0.69	133.48	0.52
2008-11	210.67	499.67	42.16	2015-18	0.98	191.78	0.51
2011-14	284.83	715.93	39.78	-	-	-	-
2014-17	364.92	906.16	40.27	-	-	-	-
2017-20	465.47	1103.77	42.17	-	-	-	-

Source: www.indiastat.com

Table 3 shows that between 1993 and 2020, the percent proportion of chili exports to total spices exports climbed from 19 to 42 percent, while the percent share of chili imports to total spices imports declined from 1.27 to 0.51 percent. The findings show that the chili crop contributes the most to overall spice exports, which in turn contributes to the country's GDP.

Table 6 : Comparison of area and production of chili before and after bifurcation of Andhra Pradesh :

	Before Bifurcation		**After Bifurcation**					
	2010-11		**2015-16**		**2020-21**		**2021-22**	
	AP	**India**	**AP**	**India**	**AP#**	**India***	**AP****	**India**
Area (in 000' ha)	195.47	792	156.06	810.74	177	729	229	NA
Production (in '000 tonnes)	638.3	1223.4	618.42	1519.8	797	2092	1078	NA

Source: www.indiastat.com

Table 4 details the contrast in chili acreage and output after the states of Andhra Pradesh and Telangana were split. Between 2010-11 and 2020-21, the area increased from 1.95 to 2.29 lakh ha, while output increased from 6.38 to 10.78 lakh Tonnes, thanks to an increase in yield from 3265 to 4707 kg/ha.

Table 7 : Chili Inter-District Comparison in Andhra Pradesh (2019-20):

Major Districts	Area (in ha)	Rank in Area	Production (in tonnes)	Rank in Production
Guntur	77000	1	456000	1
Prakasam	35000	2	132000	2
Kurnool	15000	3	70000	4
Krishna	14000	4	101000	3
Anantapuram	4000	5	13000	5
East Godavari	2000	6	10000	6
Total	147000		782000	
Other districts	6000		21000	
Andhra Pradesh	153000		805000	
Share (%)	96.07		97.14	

Source: Agricultural statistics at a glance, Andhra Pradesh, des.ap.gov.in

Table 5 compares chili production among districts in Andhra Pradesh (2019-20). Guntur is the most populous and productive district in India. Guntur, Prakasam, Kurnool, Krishna, Anantapur, and East Godavari are the six districts of Andhra Pradesh that cover 96 percent of the state's area and 97 percent of the state's production.

3.12 Chili Price Forecast :

As fresh crop supply continues in the spot market and output is likely to expand this year, red chili supply in the Guntur market is forecast to reach 737,370 MT from January 1 to December 31, 2021, up 20.44 percent from the same time last year (612,225 MT).

Table 8 : Monthly Dry (Red) Chilli Arrival Scenario in Guntur and Warangal markets :

State	Market	% Change Over Previous week	24th Dec - 30th Dec 2021	17th Dec - 23rd Dec 2021	24th Dec - 30th Dec 2020
Andhra Pradesh	Guntur	-4.65	4.1	4.34	2.5
Telangana	Warangal	-16.98	0.44	0.53	0.13
Total		-6	4.54	4.83	2.63

Source: agriwatch.com

Units – lakh bags (1 bag = 45 kg).Table 6 depicts the chili arrival scenario in Andhra Pradesh and Telangana. Chilli arrivals in Guntur market reached 2.5 lakh bags in the last week of December 2020, and 4.1 lakh bags in December 2021. Between the third and last weeks of December 2021, there was a significant drop in arrivals at the Warangal market.

Table 9 : Displays From 2015 to 2021 he seasonal indicators of arrivals and pricing of dry chili at Guntur AMC:

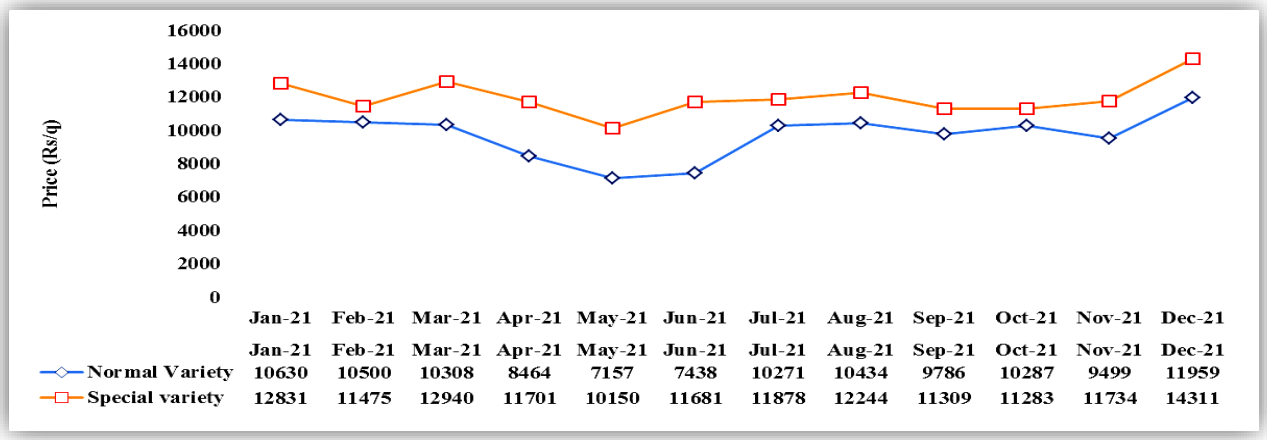
Months	Arrivals	Prices
January	88.72	103.42
February	129.26	102.69
March	142.14	112.52
April	97.46	72.72
May	59.27	108.87
June	104.15	96.57

July	99.84	105.8
August	117.42	104.92
September	95.55	78.15
October	89.76	105.67
November	93.76	107.51
December	82.67	101.17

Source: Data obtained from AMC, Guntur.

Seasonal indicators illustrate the monthly percent variance from average arrivals and price from 2015 to 2021. Seasonal indicators of chili arrivals and pricing from Guntur AMC are shown in Table 7, with arrivals peaking in March and February and prices peaking in March and May. The average monthly charges in Guntur AMC for September, October, November, and December 2021 for the standard variety were Rs 10457, 10131, 10403, and 13131, respectively, while the rates for the special type were Rs 13650, 12761, 12572, and 15105.Farmers are uprooting their Red Chilli standing crop in AP and Telangana, according to information given by Agricultural Marketing Intelligence Centre (AMIC), ANGRAU. Heavy rains in Karnataka's chili-growing districts are expected to have an impact on the standing crop. According to the early report, present conditions may cause chili crop damage of 8 to 10%. Farmers are also concerned about chili quality. There was a strong demand for cold storage inventories, as buyers were concerned about quality degradation for the next chili harvest, which is expected to begin in January at the Guntur market. As of December 29, 2021, 2.02 lakh hectares of chilies had been planted in Andhra Pradesh, compared to 1.7 lakh hectares the previous year (apagrisnet.gov.in).

Figure13 : Monthly average chili prices in Andhra Pradesh:



Source: Data obtained from Andhra Pradesh AMCs.

In this context, the AMIC, ANGRAU, is here to provide the most up-to-date information on the anticipated price range of Rs. 13,500 – 15,000 per quintal for the standard variety and Rs. 17,000 – 18,000 per quintal for the special type of chili for the Rabi marketing/harvesting season 2021-22.

3.13 STORAGE:

Storage is a key aspect of marketing that has a direct effect on costs. Storage facilities that are adequate will aid in effective distribution and marketing at all times and in all locations. The storage function is thus. The person in charge of balancing supply and demand.

Different states in India use different storage systems. Chillies are preserved for 5 to 30 days in markets with commission agents in their stores in some states. Chillies were also preserved in the houses for 5 to 15 days. Chilies are often stored in gunny bags by manufacturers, wholesalers, and exporters for 1 to 6 months, depending on market conditions. Producers in regions like Orai keep chilies in earthen jars for up to a year.

Chillies are preserved in bamboo baskets by farmers in their own homes in West Bengal cities like Murshidabad and Jalpaiguri.

The country's farm-level storage capacity for chilli growers is insufficient. More farmers would keep Chillies in market yards if they had well-maintained storage containers with affordable and consistent storage fees. This would strengthen their negotiating power.

Table 10 : Maintenance of storage facilities in Andhra Pradesh :

S no	Ware house	Andhra Pradesh	
		Number	Capacity in Lakh M.T
1	Godowns Existing up to 2004	678	3.78
2	Godowns Existing 2004-2009	289	2.38
	Godowns Existing 2009-2016	60	1.69
4	Godowns under Progress in RDF	33	0.63
	Total	**1060**	**8.48**

Source: Agricultural Marketing Department Govt of Andhra Pradesh

Godowns have been built with enhanced technology of trustless roofing systems with turbo ventilators since 2011. Because of this, godown roof panels are mechanically seamed (inter-locked) and are free of holes, nuts, bolts, and overlaps, requiring no maintenance and being resistant to adverse weather conditions. 33 godowns have been approved in 13 districts of A.P., with a capacity of 62500 MT and an estimated cost of Rs. 3710.00 lakh. All of the godowns are in various levels of completion. Agricultural Market Committees' godowns have been accredited and registered with the Warehousing Development and Regulating Authority (WDRA) in order to make them suitable for scientific storage. In 210 Godowns, repairs and upgrades have been completed.

Major storage pests and management methods:

When preserved, dried chilies are frequently attacked by drugstore beetle. The cigarette beetle Lasioderma serricorne and Stegobium paniceum (Linn). Artbrodeis species eat chilies as well, albeit the amount of damage they cause is minor. If your chilies are contaminated with storage pests, spread them out in thin layers and expose them to sunlight to kill the infection. Fumigation is the only way to get rid of these pests in significant quantities.

Figure 14 : Lasioderma serricorne and Stegobium paniceum (Linn).

Structures for storing items:

These facilities are used to store products such as the ones listed below:

Containers:

Gunny sacks, plastic bags, glass jars, and various containers made of metallic slate, clay pots, and other materials may be used.

Open Areas:

This might be a drying floor or any open place near the home, for example

Shelves:

This refers to any shelves in the house or barn that can be utilized to store items.

Chambers of Underground Storage: These are underground chambers constructed to save space or for other purposes such as lower temperatures, simpler rodent and bird control, and so on.

Figure 15 :Road/High Storage Structures Image and Storage house/Building.

Storage Facilities :

There are three types of storage facilities:

1. Storage for farmers and producers
2. Rural/Mandi Godowns Community Storage.
3. Storage for commercial purposes (Central and State Warehousing Corporations):

1 Storage for farmers and producer : This is produced from resources that are readily available in the area. The produce is stored in mounds on the ground for anywhere from a few days to a month or more before being moved to temporary shelters.

2 Rural/Mandi Godowns Community Storage:

Farmers' cooperatives, farmer associations, and other sorts of communal establishments operate storage facilities.

3 Storage for commercial purposes (Central and State Warehousing Corporations):

Storage facilities are owned by middlemen, millers, exporters, and producers (of some industrial commodities) for their own commercial advantage. This form of storage is generally more contemporary than the first two, with superior building materials and architecture, as well as fumigation capabilities. The capacity is also much higher than in the previous two models. Broad-spectrum synthetic pesticides are becoming more prevalent in commercial storage facilities. Examples include rural godowns, Mandi godowns, the Central & State Warehousing Corporation, and various commercial storage facilities.

Figure 16 : Chillies Cold storage stock images.

Figure 16 : Guntur Mirchi yard images.

3.14 Pledge Funding:

Small and marginal farmers make up the majority of the Indian farming community. According to micro level studies, small agricultural holdings account for around 54% of marketable surplus, while distress sales by these small farmers account for roughly 50% of marketable surplus. Farmers

frequently sell their produce soon after harvesting to pay off their debts. The answer to this dilemma is to give them access to secure and scientific storage as well as quick marketing credit. Promoting pledge financing through a network of rural godowns and a negotiable warehouse receipt system should be the solution.

Farmers currently have limited access to formal banking channels for crop marketing finance (pledge financing). In comparison to crop production loans, the amount of pledge financing done by commercial banks and cooperative banks is quite small. Pledge finance loans are not separately represented in the existing monthly income system since the amount is tiny, and they are combined with short-term direct agricultural loans for agriculture. The amount of pledge financing now taking place in the country, according to NABARD, is approximately Rs.1200 crores every year.

Advantages of Pledge Finance :

- Producers' distress sales should be avoided.
- Encourages the cleaning, drying, and grading of farm gates.
- Encourages suitable storage facilities.
- Makes it easier for farmers to get a better price.
- Prevents market oversupply.

Individual farmers are being directly financed by District Central Co-operative Banks (DCCBs) in various states. Market Committees implement pledge finance schemes in states such as Andhra Pradesh, Tamil Nadu, Bihar, Uttar Pradesh, Rajasthan, and Haryana (APMCs). Table 1 shows the pledge finance arrangement for agricultural produce offered by the Agricultural Produce Market Committees in several states.

Table 11 :Advances from Market Committees in Different States / U.T. (s): Agricultural Produce Pledge Finance:

Sno	Name of State/ Union Territory	Details of Pledge finance advance to Producers
1	Andhra Pradesh	A Scheme under Andhra Pradesh (Agri .Produce & Live Stock) Markets Act, 1966 provides advances against pledge to the producers. The advance is given to the extent of 75 per cent of the value of the produce pledged with the

		Market Committee subject to maximum limit of Rs.50,000/-. The pledge stocks may be Sold within 90 days. The development is liberated from interest for the Initial 90 days. Interest @ 6% per annum is charged from the 91st day till the Date of Removal.
2	Tamil Nadu	Controlled Markets are giving promise credits to ranchers to limit trouble Deals By little and negligible ranchers during the pinnacle season. Ranchers can store their agrarian produce in the godowns of Regulated Markets for a limit of a half year under this arrangement and get a promise credit of 75% of The Absolute worth of the produce up to Rs. 1, 00,000. Brokers can likewise take utilization of vow credit offices, which accompany a variable financing Cost. Dealers are charged revenue at a pace of 9% on Promise acquiring offices.
3	Uttar Pradesh	Market Committees are accountable for a vow supporting component. As indicated by the plan, little and minimal ranchers are given advances up to 75% of the worth of the yield committed with the market board of trustees, With a Greatest cutoff of Rs.5000/ - and Rs.2500/ - , individually. For the Initial 30 days, The development is sans interest. The financing cost is 6% Each year from The 31st day till the date of removal. The Market Committee forces no expenses For the initial seven days, Any go down lease is free. The charges increment to 10 paisa per pack every month or part thereof on the eighth day. In 90 days, The promised stocks can be sold.

4	Karnataka	he province of Karnataka has executed a promise credit conspire, in which market councils advance credits to farmers in return for Horticultural Item promises. Truth be told, market advisory groups are Expected to save 10% of their yearly income for this reason. This framework started on April 1, 1994, and it at present works in just 132 business sectors across the state. Agriculturists can ensure their produce in APMC godowns or stockrooms during cost drops furthermore, get a momentary credit up to Rs.50, 000/ - or 60% of the worth of the Horticultural produce, whichever is lower, for a time of 90 days. For the Initial 30 days, no premium is charged; from there on, premium at 8% and 12.5 percent is demanded for the following two 30-day time frames, Separately. Assuming the rancher neglects to return the credit, the market Panel has the power to sell the produce following 90 days.

CHAPTER 4

MARKETING OF GUNTUR CHILLIES

4.1 ASSEMBLING:

Primary farmers usually bring chillies to controlled marketplaces in various sections of the nation. Unlike other perishable commodities, dry chillies are sold in stages by various market manufacturers. The manufacturers aim to take advantage of the prices as much as possible. They keep the produce as long as possible and sell it when market prices are favorable. Only during a glut can producer-sellers bring their full crop to the market and try to sell it as quickly as possible since storage and selling might result in more losses owing to a price drop. Other vendors in the market yard include local merchants, itinerant merchants, wholesalers, commission agents, and cooperatives. Unfortunately, cooperatives have a little role in bringing Chillies to market. Only in Tamil Nadu is it stated that local cooperative societies bring 1% of the total arrivals in Tirunelveli and Kovilpatti marketplaces. The cooperatives were also engaged in the Kerala and Maharashtra marketplaces of Kozhikode and Sangli. Andhra Pradesh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, and Punjab are the states involved. Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal are the most significant states in terms of production and market arrivals in the country.

4.2 Assembling Markets:

Tabble 12 : Chilli producing states' major markets

States	**Important Markets**
ANDHRA PRADESH	Guntur,khamam,krishna,Warangal,Praksham,Eluru,Nellore,
MAHARASHTRA	Nagpur, Nasik, Ahmednagar, Sholapur, Aurangabad Nanded Lasalgaon Amravati, Dhulia, Chandrapur, JalgaonAnjangaon, Morshi, Dandaichi, Chimur, Amainer, Achalpur and Sangli.
KARNATAKA	Dharwad, Mysore, Hassan, Bangalore, Bellary, Ranebennur, Hubli, Gadag, Byadgi
ORISSA	Bhubaneswar, Jagat Singhapur, Cuttack, Jaleswar and Baripada.

MADHYA PRADESH	Indore, Khargone, Jabalpur, Katni, chindwara, Khandwa, Gwalior, Morena, Bhind, Bhopal
TAMIL NADU	Coimbatore, Ramanathapuram, Tuticorin, Tirunelveli, Virudunagar, Kanayakumari, Salem, Tiruchirappalli, Villupuram, Cuddalore Pollachi, Arialur, Madurai, Theni, Podukottai, Pattukottai, Tanjaur, Pollachi, Thindivaram, and Virudhachalam
UTTAR PRADESH	Orai, Jhansi, Ramnagar, Ujhani, Luck now Bareily, Khurja.
West Bengal	Coochbehar, Haldibari, Dinhata, Mathabhanga, 24 paraganas Gonheta, Amalgora, Salboni, Sat Bankura, Maynaguri, Falakata Dhupguri Diaper and Jhargram

4.3 Arrivals of chillies in major Indian producing states' markets:

STATES	2016-2017		2017-2018		2018-2019		2019-2020		2020-2021	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
ANDHRA PRADESH	209350	992900	119260	618350	158428	501410	153082	805026	180000	836000
TELANGANA	124320	482870	73780	340800	82521	369020	80579	436380	90300	407268
MADHYA PRADESH	98540	303630	94410	232700	87839	217550	88675	208634	113366	292616
KARNATAKA	127600	260140	100340	191480	157587	194760	74078	129238	114901	193904
WEST BENGAL	65120	100340	65550	105750	5292	8300	5450	8576	5460	8567
ORISSA	71700	69170	71700	69280	71700	69280	71700	69280	72000	69000
GUJARAT	14040	26030	11350	22070	11335	21444	11299	18905	12000	22702
ASSAM	20550	18210	20240	18990	19847	18980	2196	4713	20749	19513
RAJASTHAN	11130	18780	7990	13280	8480	14356	9832	20033	9358	16613
PUNJAB	7500	14080	7500	14080	8770	16656	8776	16955	8137	15445
UTTAR PRADESH	13550	10260	13640	12580	13763	12716	13547	11808	13677	12068
MAHARASHTRA	2100	3430	7050	14130	5698	14030	6508	22434	6753	25517
TAMIL NADU	44840	20590	44120	18100	45950	14000	47991	29618	55716	25648
NAGALAND	5580	40890	180	810	1372	1798	1379	1754	1373	1743
Total including others	859790	2411150	678880	1718200	706710	1515560	623446	1841800	732213	1988304

Source: spice board of India.

4.4 MARKETING CONSTRAINTS :

- **Grading :**

  Chillies are graded to ensure better prices for growers and higher quality for customers. However, most markets trail behind in terms of delivering grading services.

- **Lack of marketing information :**

  Producers sell chillies to merchants due to a lack of market knowledge about prices, arrivals, and other factors that exist in other marketplaces..

- **Training of producer :**

  Chillies are harvested, transported, and sold by farmers who are not properly trained. Training will boost their ability to market their produce more effectively.

- **Inadequate cold storage & Other facilities :**

  Farmers are obliged to sell their produce at a lesser price due to a lack of cold storage facilities.

- **Inadequate processing units :**

  During peak season, extra production is sold at a distressed rate or even perished at the farm level due to an insufficient quantity and capacity of processing facilities.

- **Infra-structure facilities** :

- Marketing efficiency suffers as a result of insufficient marketing infrastructure with producers, traders, and at the market level.

- **Financial problem :**

  One of the primary marketing limitations in the operation of the marketing chain is a lack of market finance.

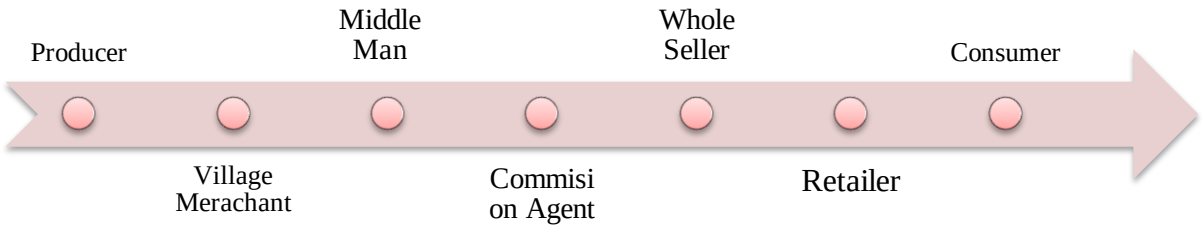
4.5 MARKETING CHANNELS, MARGINS, AND COSTS:

Farmers produce agricultural products in remote settlements, but customers live in semi-urban and urban areas. Produce must be available for use and consumption. This commodity must pass through a number of agencies and activities before reaching the user. As a result, a market channel or distribution channel is defined as the path used in the direct or indirect transfer of a product's title from a maker to an end user or industrial user. As a result, the distribution channel of a product is the path that products take from creator to consumer or industrial user.

4.6 Marketing Channels:

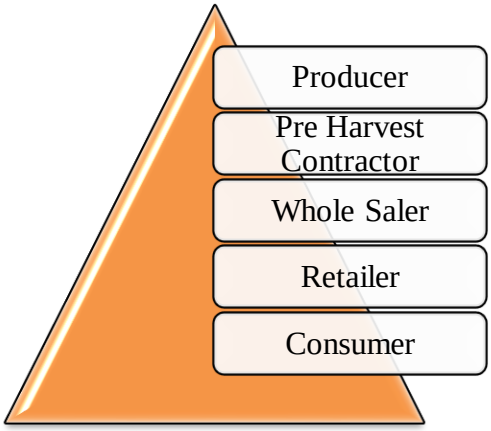
Marketing channels have a major impact on marketing costs, such as transportation and commission fees, as well as market margins received by intermediaries including traders, commission agents, wholesalers, and retailers. The market channel determines the price that the consumer will pay and the share that the farmer producer will receive. A good or efficient channel is one that makes the product available to the consumer at the lowest possible price while also ensuring the biggest possible share for the manufacturer.

Channel I :



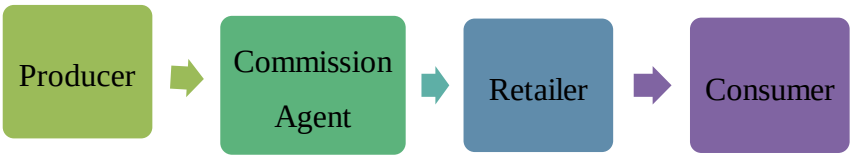
Channel II :

Channel III :



Channel IV :

Channel V :



4.7 Criteria for selection of channels:

Chilli marketing involves a variety of marketing channels. The factors for selecting effective marketing channels are as follows.

- A channel that guarantees an acceptable return to the producer.
- The channel's transportation costs are kept to a minimum.
- Intermediaries such as traders, commission agents, wholesalers, and retailers receive relatively low commissions and market margins.
- Short channel with low market price.

4.8 Marketing Costs And Margins:

Marketing costs:

The actual expenses incurred in getting goods and services from producers to consumers are known as marketing costs.Generally the following costs are included in marketing cost.

- Charges for Handling (Packaging) at local points,
- Assembling Charges.
- Transportation Charges.
- Storage Charges.
- Wholesalers and Retailers' handling charges, etc.
- Expeness on Financing, risk management, and market intelligence are examples of supplementary services.
- Processing Charges.
- Various agencies have different profit margins.

Marketing margins:

The margin is defined as the difference between the price paid and received by a single marketing agency, such as a single store, or any sort of marketing agency, such as retailers or wholesalers, or any combination of marketing agencies across the marketing system. The total marketing margin includes both transportation costs from the manufacturer to the client and revenues from other market participants.

Total Marketing Cost =

Cost involved in moving the chilies from producer to	+	Profits of various market functionaries

The overall marketing margin's absolute value fluctuates from market to market, channel to channel, and time to time. Farmers and dealers incur marketing costs at regulated markets, which includes as given below.

- Market charge:
- Commission.
- Taxes, and
- Other miscellaneous charges.

Market charge:

The market committee is in charge of collecting the market fee. It is calculated using the weight or value of the produce. It is routinely stolen from buyers. Each state sets its own market prices. It fluctuates between 1.5and 3 percent..

Commission. :

Either the vendor or the customer, or both, pays the fee to the commission agency. Payment is usually in cash and varies substantially.

Taxes :

In many marketplaces, several types of taxes, such as tolls, terminal taxes, sales taxes, and octroi, are collected. These taxes vary between marketplaces within the same state and between states. These taxes are often the seller's responsibility.

Miscellaneous charges :

In addition to the costs indicated above, other charges are assessed in markets. These expenses include weighing, loading, unloading, cleaning, and other handling and weighing expenses, as well as a monetary donation to charity. Due to the water man, sweeper, chowkidar, and others, there are expenses for sorting, grading, and mailing. These fees may be paid by the vendor or the customers..

4.9 MARKETING INFORMATION AND EXTENSION :

Marketing information:

Marketing intelligence is a critical decision-making tool for all marketing channel operators, from agricultural production to ultimate consumption. Marketing information is crucial in market-driven production. In terms of trading, it is equally significant for clients and other market players. The

Government of India's Directorate of Marketing and Inspection (DMI) has started the Agricultural Marketing Research and Intelligence Network Scheme to increase market intelligence by gradually connecting all Agricultural Produce Wholesale marketplaces in States and Union Territories.

Marketing extension:

Market extension is an important service that educates farmers about proper marketing and raises their

Awareness of various areas of post-harvest management for more efficient and cost-effective marketing.

Benefits:

- Delivers current information on agricultural product arrivals and pricing in various marketplaces..
- Assists producers in making the best decisions regarding when, where, and how much to create, as well as efficiently marketing the product..

  Informs growers and merchants on post-harvest management.

  a) Harvesting consideration.

  b) Techniques for reducing losses during the post-harvest phase.

  c) Adding value to the produce through proper cleaning, processing, packing, storage, and transportation..
- Provides producers/traders/consumers with information regarding pricing patterns, demand and supply issues, and so forth.
- Informs the producer about the importance of grading, correct storage, co-operative/group marketing, direct marketing, contract farming, future trade, and other related topics.

  Offers information on loan availability, different government programmes, laws, rules and regulations, and so on.

Marketing Source :

The sources of marketing information available in the country are listed below.

S NO	Source /Institution	Marketing information and extension activities
1	Directorate of Marketing and Inspection (DMI). Faridabad	• The Marketing Information Network, a nationwide organization, it provides information. • It helps Consumer, producer, and grader training are all ways to extend marketing.

		• Marketing research and surveys.
2	Spice Board (Ministry of commerce & Industry, Govt of India) Palavarivattom, Kerala, India.	• Farmers are given advice on how to increase and improve the quality of their harvests using scientific farming practices. • Encouragement of organic spice production and export. • Help with studies and research into enhanced processing procedures, failsafe quality management systems, improved grading methods, and efficient Packing methods.. • The export quality is monitored and maintained. • Registration and licensing of all spice exporters. • They are providing financial and material support to Growers.
3	Kisan Call Centers	• These centers are available via toll-free telephone system across the country. • It helps provides farmers with expert advice. • A country-wide common toll free number 1800-180-1551 has been allocated these centers.
4	State Agricultural Marketing Boards.	• These boards Provides marketing-related Information to all of the state's market committees. • Provide training opportunities for producers, Traders and Board personnel. • Organize agricultural marketing-related conferences, workshops, and exhibitions.
5	Federation of Indian Export Organizations (FIEO), New Delhi.	• It provides the updated information on export and import trends to members. • Organize seminars, workshops, presentations, tours And buyer-seller meetings, as well as funding participation in international trade shows and exhibitions and offering consulting services.

		• Provide details on market development assistance Programmes.
6	Agricultural Produces Market Committees (APMC)	• Provide market data from geographically close and other market committees. • Provide market information on arrivals, current Prices, and dispatches, among other things. • Arranges for training, trips, and other activities.
7	Directorate General of Commercial Intelligence And Statistics (DGCIS), Kolkata.	• Export-import data, interstate movement of food grains, and other marketing-related data are collected, compiled, and disseminated.
8	Directorate of Economics and Statistics, New Delhi.	• For development and planning, agricultural data on area, production, and yield is compiled. • Market intelligence is disseminated through publications and the Internet.
9	Agricultural & Processed Food Products Export Development Authority (APEDA). New Delhi.	• Provide Horticulture Crop Market Information Services. • Provide information on export. • Provide services for horticulture promotion.

4.10 ALTERNATIVE SYSTEMS OF MARKETING :

The government's role in market management is dwindling over the world. It is difficult to make Significant modifications to the old marketing structure. The only approach to update marketing is to Promote alternative marketing systems that can work alongside and alongside current marketing Systems. The mission of the recommended alternative marketing strategy is to encourage current trade Practices, which will allow for market transparency and efficiency.

Different types alternatives of marketing:

1. Direct Marketing.
2. E-Commerce.
3. Contract Farming.
4. Co-Operative Marketing.
5. Forward and Future Markets.

1 Direct marketing :

Direct marketing is an innovative concept that involves farmers selling their produce directly to consumers/processors without the use of middlemen. Producers, processors, and other bulk customers can save money on transportation and boost price realization by using direct marketing. It also encourages large-scale marketing organizations, such as processors and exporters, to buy directly from producers. Apni Mandis in Punjab and Haryana have been experimenting with direct marketing from farmers to consumers. Rythu Bazaars' have popularized the concept in Andhra Pradesh, with certain modifications. Other items are sold alongside fruits and vegetables in this market.

Benefits :

- It increases the producer's profit.
- It helps in market-driven production.
- It helps in better chili marketing and saves money on marketing.
- It promotes effective distribution and it encourages the producer to work.
- Direct marketing improves consumer satisfaction because the farmer delivers the produce in an appropriate manner.
- It promotes producers and consumers to deal directly and encourages farmers to sell their produce at retail.

2 E-Commerce :

E-commerce, or full electronic commerce, is the practice of establishing relationships and executing business transactions over computer networks, including the sale of information, services, and items.

Benefits :

- Cost reduction.
- Low-cost marketing and advertising.
- Establishment of a store and product categories.

- Purchasing time is reduced.
- Customers' flexibility and various payment options.
- Comparison of products and prices, quicker responsiveness to buyer/market requests.

3 Contract Farming. :

Contract farming is agricultural production carried out in accordance with an agreement between a buyer and farmers that specifies the terms for the production and sale of a farm product or items. In most circumstances, the farmer agrees to deliver agreed-upon quantities of a certain agricultural item.

Advantages to farmers: -

- Price stability ensures that produce is returned fairly.
- Guaranteed marketing without the involvement of middlemen. Payments that is prompt and accurate.
- Crop insurance, credit facility, and fair trade practices new technology and best practices are introduced.
- Technical advice in the field of production till harvesting, as well as proper production planning.

Advantages to contracting agency:

- Price stability based on mutually agreed-upon contract terms and circumstances. Possibilities to acquire and introduce desired crop kinds.
- Help achieving special customer requirements.
- Better logistical management and improve the buyer-producer connection.
- Control over need-based production/post-harvest processing.
- Ensured availability of produce (raw materials) and Control over product quality.

4 Co-Operative Marketing :

A cooperative marketing agreement is a contract between two businesses to promote or sell each other's goods while also selling their own in order to complement one other's services and achieve mutual advantages. It is the outcome of two or more organizations collaborating to package products or services for a single target client. Products may be complimentary or additional, or they may follow distinct seasonal cycles.

Benefits :

- Increasing the bargaining position.
- Contacts with final buyers.
- Credit provision.
- Market information.
- Transport.
- Standardizing and grading.
- Influencing the market prices.

5 Forward And Future Markets :

A forward contract is a customized, private agreement that settles at the end of the term and is exchanged over the counter.

A futures contract has fixed terms and is traded on an exchange, with prices settled daily until the contract's expiry.

Advantages of Forward Marketing:

Methods to determining price – Producers can acquire a sense of future price and so choose beneficial goods.

Methods to control price risk - It assists the exporter in offering a fair price to manufacturers and dealers, as well as giving hedging or insurance alternatives.

Methods to obtain Stability in Prices - During moments of extreme price volatility, future markets help to stabilize prices.

4.11 Supply Chain Challenge in Andhra Pradesh :

Low-grade packaging techniques:

- The majority of produce is transported to the Mandi/units without sufficient packaging and buffer/insulation, resulting in significant losses in the form of wastages.
- Typically, produce is dumped on the ground in market yards for weighing and pricing and negotiation.

- Before being dumped, some sorting and grading is done manually in the market yards.ack into the transport van for more transit higher costs result from such treatment.

Deficiency in the infrastructure Management Post harvest Management :

- The lack of farm-level post-harvest infrastructure is a significant gap in the state's horticulture crop supply chain.
- Farm-based collection facilities are rare; sorting, grading, washing, packaging, and other crop-specific post-harvest activities are almost non-existent at the farm level.
- This results in larger losses and reduced value realization by value chain participants, particularly producers.

Supply Chain Which Is Long Consisting of Multilayered

- Large numbers of small farmers are unable to effectively demand a better price in wholesale marketplaces, both for food to meet fresh market requirements and for the processing industry.
- Inefficiencies in wholesale markets, combined with small farm sizes, result in a long chain of intermediaries, multiple handling, quality losses, and a widening of the price difference between producer and consumer.
- Consumer prices are disproportionately impacted by intermediaries and system inefficiencies.
- A large number of small merchants, each handling little volumes, creates high overheads, resulting in high produce margins, making the consumer pay for the marketing chain's inefficiencies.

Dearth in the Facilities of cold chain:

- In the state, there is little integrated cold chain infrastructure for horticulture products.
- Even for highly perishable products, refrigerated vehicles are used seldom.
- Horticulture crops such as apple, orange, chilies, turmeric, and tamarind are preserved in the state's current cold stores, but new cold stores near key consumption centre’s are needed.
- However, many cold stores use antiquated technology, resulting in low energy efficiency.
- Moreover, the state lacks skilled human resources for technical operations and administration in cold storage facilities.
- With so many new cold stores opening, owners are having trouble finding and keeping qualified employees.

CHAPTER 5

SUMMARY OF FINDINGS &CONCLUSION

Chilli is a popular vegetable not only in India, but around the world. The chilli's original habitat is tropical America, particularly Brazil, where it may still be seen growing wild. There are around 400 different types of chilies found all over the world..

Chilli is grown in practically every state in India. Chilli was farmed primarily over an area of 774.9 thousand hectares, yielding 1492.10 thousand tonnes with a productivity of 1.93 tonnes per hectare. Andhra Pradesh has the most chili area in India, contributing around 131.3 (16.94%) thousand hectares with a production of 602 (40.35%) thousand tonnes and a productivity of 4.58 tonnes per hectare, followed by Telangana, Karnataka, West Bengal, Gujarat, and Maharashtra. Chilli was produced on an area of 50.7 (6.54%) thousand hectares in Tamil Nadu, with a total yield of 23.1 (1.55%) thousand tones and a productivity of 0.46 tonnes per hectare, followed by Punjab and Assam. The chili was produced on an area of 59.0 (7.61%) thousand hectares in other state, with a total production of 63.7 (4.27%) thousand tonnes and a productivity of 1.08 tonnes per hectare.

Andhra Pradesh is a state in India that is most popular for chilli production because to its enormous potential to develop and export as the climate, soil, irrigation infrastructure, expertise, and varieties of chilies necessary to diverse markets throughout the world's intense farming techniques. India is renowned as "The Spice Kingdom." An Indian dinner isn't complete without the acidic and delightful flavor of Indian Spices, often called locally as "masala" and including chilli as the major component. Indian spices are well-known around the world for their culinary and medicinal properties. Though Indian exports are showing positive trends, India is currently facing stiff competition in the international export market because the price of Indian chilli powder is considered too high for the market, while other competitive countries are providing chilli at very competitive rates to the major importing countries. Exports can be increased if the country can fulfill the stringent quality requirements of the international market. The government must take the necessary steps to encourage exporters in order to sustain India's dominance in the global market.

Findings:

- The most significant barrier confronting farmers and other significant restrictions for chili producers include a lack of transportation, inadequate storage facilities, excessive marketing costs, and late payment.
- These findings were supported by a similar investigation.
- Sustainable economic analysis and limits posed by chilli producers where farmers suffer substantial restraints due to market price fluctuations, a shortage of transportation, and a lack of storage facilities.

Suggestions:

- Improve more warehouses and cold storages for chillies.
- It is very helpful for the farmers if the warehouses and cold storages are maintained by the government agencies or government bodies rather than the private sector.
- The Indian govt and Andhra Pradesh govt have provided Kisan credit card loans for farmers who are having their own farm land but these loans are not being given to the farmers who rent or lease out land in order to produce chillies. These loans have to be extended to everyone in order to increase to rise in production of chillies.

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