MARKETING AND MARKETS BEYOND MIZORAM: A STUDY ON SELECT SPICES PRODUCED IN THE STATE

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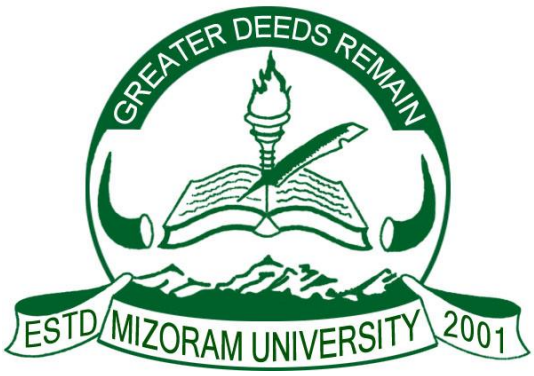

DEPARTMENT OF COMMERCE

SCHOOL OF ECONOMICS, MANAGEMENT AND INFORMATION SCIENCES

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MARKETING AND MARKETS BEYOND MIZORAM: A STUDY ON SELECT SPICES PRODUCED IN THE STATE

BY

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Submitted

In partial fulfillment of the requirement of the Degree of Doctor of Philosophy in Commerce of Mizoram University, Aizawl.

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CERTIFICATE FROM THE SUPERVISOR

This is to certify that the thesis entitled "Marketing and Markets Beyond Mizoram: a Study on select spices produced in the state" submitted by ZOLIANZUALI (MZU/Ph.D/941 of 31.10.2016) for the degree of Doctor of Philosophy(Ph.D) of the Mizoram University, embodies the record of original investigation carried out by her under my supervision. She has been duly registered and the thesis presented is worthy of being considered for the award of the Ph.D degree. This work has not been submitted in the past for any degree in this or any other Unniversity or Institute of learning.

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DECLARATION

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October, 2023

I **ZOLIANZUALI**, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to do the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other university/Institute.

This is being submitted to the Mizoram University for the Degree of **Doctor of Philosophy in Commerce.**

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PREFACE

This work is a study on the traders buying attitudes towards the attributes of the select spices namely turmeric, ginger and bird's eye chilli and also production and marketing practices of these spices cultivated by the farmers. Agriculture can be term as one of the most important sectors in the global economy and is the main source of food and forage with a notable impact on the environment. Horticulture is the branch of agriculture that deals with the art, science, technology and business of growing plants.

Horticulture occupies a very important place in India and horticultural crops play a unique role in India's economy. Spices play an important role in the economy of India and Mizoram as India is a major producer, consumer and exporter of spices in the world. 75 different varieties out of 109 different spices listed by ISO are grown in India because of varied agro-climatic conditions and soil types. India produces more than 100 Lakh MT of spices, of which, about 15.78 Lakh MT (15 per cent) is exported to more than 180 countries (Ministry of Commerce and Industry, Government of India, Spice Board India 2023).

In Mizoram, Spices like ginger, turmeric, black pepper and bird's eye chillies are grown in large areas of land estimated around 2,2470 ha with total production of major spices of 59,620 MT. The ginger variety thingpui and thinglaidum has received Geographical Indication(GI) tag in 2021. Mizo Chilli that is bird's eye chilli received Geographical Indication(GI) tag in 2015. Total horticulture production in Mizoram was 687.36 thousand metric tonnes as per advance estimates 2021-22. In the financial year 2020, the state produced 344.91 thousand tonnes of fruits under an area of 63.77 thousand hectares. Similarly, 101.49 thousand tonnes of spices were produced in the state under an area of 28.22 thousand hectares in the financial year 2020.(Ministry of Commerce and Industry, Govt. of India).

The present study is divided into five chapters. Chapter 1 presents the thematic review of literature covering agriculture, about spices, the growth of Indian spices, relevance of spices to the Indian economy, about Mizoram, turmeric, ginger and

bird's eye chilli as a spice. It also includes significance and scope of the study, research gap, statement of the problem and the research methodology.

Chapter 2 focuses on the role and significance in Indian economy and the economy of Mizoram.

Chapter 3 presents marketing practices of growers of turmeric, ginger and bird's eye chilli in Mizoram. The four P's namely, product, price, place and promotion of the farmers cultivating turmeric, ginger and bird's eye chilli practices by them are shown in this chapter.

Chapter 4 attempts to understand the buyers' attitudes, preference and perception of enterprises towards the attributes of turmeric, ginger and bird's eye chilli. The attributes of turmeric includes curcumin, aroma, price, organic and packaging. The attributes of ginger includes appearance, price, aroma, organic and pungency. The attributes of bird's eye chilli includes distinct appearance, price, organic, pungency and geographical indications. The enterprises are export and import, food manufacturing, retail business, service company and specialized organic.

Chapter 5 provides the overall summary of the present study, highlighted its prospects and challenges and also offers suggestions based on the major findings of the study. Scope for further studies is also included in this chapter.

The thesis concludes with questionnaire administered to the traders of BIOFACH – India followed by Bibliography.

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Date: **ZOLIANZUALI**

Place:

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LIST OF ABREVIATIONS

APEDA	Agricultural and Processed Food Products Export Development Authority
ISO	International Organisation for Standardization
ICAR	Indian Council of Agricultural Research
SLEC	State Level Executive Committee
CAP	Common Agricultural Policy
AMA	American Marketing Association
WIPO	World Intellectual Property Organization
NER	North East Region
MOFPI	Ministry of Food Processing Industries
IISR	Indian Institute of Spices Research
NHB	National Horticulture Board
BEC	Bird's Eye Chilli
GOM	Government of Mizoram
MNF	Mizo National Front
GOI	Government of India
FAO	Food and Agriculture Organization of the United Nations
GI	Geographical Indications
ASEP	Association for Environment Protection
PHC	Primary Health Centre
MIRSAC	Mizoram Remote Sensing Application Centre
NIC	National Information Centre
KVK	Krishi Vigyan Kendra
FPO	Farmers Producer Organisation
MOM	Mission Organic Mizoram
MOVCD-NER	Mission Organic Value Chain Development for North East

	Region
NMSA	National Mission for Sustainable Agriculture
IBD	Inflammatory Bowel Disease
FDA	Food and Drug Administration
IFAOM	International Federation of Organic Agriculture Movements
SHU	Scoville Heat Unit
TRIPS	Trade Related Aspects of Intelligent Property Right
WTO	World Trade Organisation
IPs	Indigenous Peoples

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION:

Agriculture can be term as one of the most important sectors in the global economy and is the main source of food and forage with a notable impact on the environment. Agriculture is the largest users of water resources, about 70% of fresh water is used for agriculture in most part of the world and is an anthropogenic source of green house gases(Wallace,2000;Labedzki and Bak,2017;Neethu et al.,2018;Piwowar and Harasym,2020). According to Merriam Webster Dictionary, Agriculture is the science, art, or practice of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation and marketing of the resulting products. Agriculture or farming is the practice of cultivating plants and livestock. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. The history of agriculture began thousands of years ago(Wikipedia).

Agriculture is the backbone of Indian economy, it not only provides food requirements to such a huge population of India but also provides opportunities for employment generation, saving, contribution to industrial goods market and earning foreign exchange(Rehman et al.,2012, Yadav,2016). Agriculture, in most developing economies, is the core sector providing a livelihood to a significant proportion of the population, especially in rural areas. In India, agriculture continues to be the core sector of the economy as over 60 per cent of the population is dependent on agriculture for their livelihood(Mathur et al.,2006).

1.2 HORTICULTURE:

Horticulture is the branch of agriculture that deals with the art, science, technology and business of growing plants. It includes the cultivation of medicinal plants, fruits,vegetables,nuts,seeds,herbs,sprouts,mushrooms,algae,flowers,sea weeds and non food crops such as grass and ornamental trees and plants.

Horticulture in India has today emerged as one of the most important sectors for diversification in agriculture with a total production of 280 millions tons

annually. Presently, India ranked as the second largest producer of fruits and vegetables in the world with annual production 81.285 million tonnes of fruits and 162.19 million tonnesof vegetablescontributing 12.6 percent and 14.0 percent of the total world production of fruits and vegetablesrespectively Banana,Mango,Citrus,Papaya,Guava,Grape,Potato,Tomato,Onion,Brinjal,Cabbage,Cauliflower and Tapioca account for major share in total fruit and vegetables production in India. (Ministry of Agriculture, Govt of India, 2013)

Horticulture occupies a very important place in India and horticultural crops play a unique role in India's economy. India, with diverse soil and climate comprising several agro-ecological regions provide ample opportunity to grow a variety of horticulture crops. These crops contributed a significant part of total agricultural produce in the country comprising of fruits,vegetables,root andtuber crops, flowers, ornamental plants, medicinal and aromatic plants, spices, condiments,plantation crops and mushroom. Cultivation of these crops is labour intensive thus, generating a lot of employment opportunities for the rural population.(Datta,2013).

India is the seventh largest country in the world with a total geographical area of 328.73 M ha and has second largest population of 121 crores(2011), after china. Around 60 percent of the total population depends on agriculture and allied activities.. This vast production base offers India tremendous opportunities for export.During 2013-14, Indian exported fruits and vegetables worth ₹3298.03 crores and vegetables worth₹5462.93 crores.(APEDA, 2013).

The Indian system of medicines,popularly known as Ayurveda, Unani and Siddha drugs are of great demand and India has been considered as a treasure house of valuable medicinal and aromatic plant species. 9,500 plant species have been documented by the Government of India and out of these about 65 plants have large and consistent demand in world trade.In terms of market share in production value, India ranks sixth place with a 7 percent shares at the global level. (National Portal Content Management Team,2011).

1.3 SPICES:

India is a predominant player in global spices trade.It is the major producer, consumer and exporter of spices in the world. Out of the 109 different spices listed by International Organisation for standardization(ISO), 75 different varieties of spices are gropwn in India because of varied agro-climatic conditions and soil types. India produces more than 100 Lakh MT of spices, of which, about 15.78 Lakh MT (15%) is exported to more than 180 countries.Despite the COVID Pandemic, spices export from India continued its upward trend during 2020-21, attaining an all-time high of US $ 4.0 billion mark for the first time in the history of spices export. .During 2021-22, the export of spices/spice products from India was 15,31,154 tons valued ₹30,576 crore (4102.29 million US$)(Ministry of Commerce and Industry, Government of India, Spice Board, India,2023).

Mizoram has emerged an important producer of turmeric, ginger and bird's eye chilli in India. For the year 2021-22, Mizoram ranked high in production of the three spices amongst the states of India inspite of being a small state in terms of population and area. Mizoram ranked 10th amongst the highest producers of turmeric in India with a total production of 29,570 tonnes and a share of 2.52 percent in the total production of turmeric in India. In the production of ginger, Mizoram ranked 11th with a total production of 60,830 tonnes and a share of 2.74 percent in the total production of ginger in India. In the production of chilli, Mizoram ranked 13th with a total production of 10,920 tonnes and a share of 0.58 per cent.

The present study includes three main spices viz turmeric, ginger and bird's eye chilli.

1.4 TURMERIC:

The botanical name of turmeric is Curcuma domestica Val. Syn..Curcuma longa L, belonging to the family Zingiberaceae (Williamson,2002). Turmeric falls under the order Zingiberales of monocots and is an important genus in the family. The family is composed of 47 genera and 1400 species of perennial tropical herbs, found usually in the ground flora of lowland forests (Nair,2017). Out of the 100

turmeric species, 41 is believed to occur in India, of which at least 10 are endemic to the Indian subcontinent. In the region of Western Ghats and Himalayas in India, the ecology of the turmeric species varies so much that their habitat ranges from the sea level (sandy coastal habitat) to high altitude, such as more than 2000msl(mean sea level).Species diversity is maximum in south and north east India and the Andaman and Nicobar islands(Velayudhan et al.,1999).It is also called "Indian saffron" because of its deep yellow orange colour (Tiwari and Agarwal,2004).

Among the Curcuma species, Curcuma longa L, is the most widely recognised and cultivated plant, grown in a warm climate in many regions of the world(Wu,2015). Turmeric is an erect perennial herb, grown as an annual and also as a biennial in certain cases. The height of the plant is usually of around 120cm, significant variations can been seen in plant height among varieties as well as in plants grown under different agro-climatic conditions(Rao et al.,2006). The taxonomic identity of turmeric is very complicate because of its extremely short period of flowering and herbarium preparation due to the flashiness of tubers, rhizomes and inflorescence(Jadhao and Bhuktar,2018).Rhizomes are the most commonly used plant part composed of a wide variety of compounds(Lakshmi et al.,2011).

1.5 GINGER:

Ginger, Zingiber officale Rose., is a monocotyledonous plant, belonging to the family *Zingiberaceae* in order of zingiberales and sub-family Zingiberoideae. Ginger plant is aromatic, with unbranched aerial stems, distichous leaves, open sheaths and hypogeal germination which is found mostly in the tropical area all over the world with the centre of distribution in Indo-Malaysia (Arya,2001).The name of ginger derives from a Sanskrit word denoting "horn shape"in reference to the protusions on the rhizomes(Ghosh et al.,2011).Ginger is a plant, its rhizome is used as a spice, food , flavouring agent and medicine(Sharma,2017). It is a herbaceous perennial plant grown as an annual crop with narrow, bright green, grass-like leaves, and yellowish green flowers(Liu et al.,2014).

The ginger stems are erect, oblique, round with a smooth leaves and can grow upto 2 or 3 feet in height. Depending on variety, the ginger rhizomes can be yellow, white or red in color and is covered with a brownish skin that may either be thick or thin(Gupta and Sharma,2014). Ginger is a biennial while the stem is annual and is propagated through rhizomes(Arya,2001). The ginger plant is erect, with a number of fibrous roots, aerial shoots(pseudostem) with leaves and underground stem (rhizhome) and the roots of ginger is of two types that is fibrous and fleshy. The roots which are fibrous are thin accompanied by root hairs and their main function is absorption of plant nutrients and water from soil.

From the lower nodes of mother rhizome and primary fingers, numerous fleshy roots are produced as the ginger plants grow further. The fleshy roots are thicker, milky white in color with a few hair and no lateral roots and their main functions is of anchorage and conducting vessels for water and nutrient absorption (Nair,2013).Ginger, is a monocotyledon, with a slender, perennial herb-like habit, but is mostly grown as an annual. It is 30-100cm tall, with a robust branched rhizome borne horizontally near the surface of the soil, bearing leafy shoots close together. The fleshy rhizome is hard, thick and is usually pale yellow within(Farooqi et al.,2005).

1.6 BIRD'S EYE CHILLI:

The botanical name of bird's eye chilli is *Capsicum frutescens*, belonging to the family solanaceae(Vaishnavi et al.,2018). Capsicum frutescens is one among the five cultivated species of the genus solanaceae and is closely related to capsicum chinense Jacq(Heiser and Smith,1953). There are various varieties and forms of Capsicum, which belongs to the family Solanaceae(Smith et al.,1987 and Bosland,1992). The genus Capsicum consists of about thirty-seven species composing of wild, semi-domesticated and the five well-known domesticated species, namely, *Capsicum annuum* L.,*Capsicum baccatum* L., *Capsicum chinense* Jacq., *Capsicum frutescens* L., and *Capsicum pubescens* Ruiz and Pav with more than 200 varieties(Bosland et al.,2012). Almost all Capsicum species are diploid with 12 chromosome pairs(Moscone et al.,1996).

Chillies are herbaceous or semi-woody annual and the chilli plants are erect, profusely branched with a leaves that are variable in size and simple. The flowers of chilli are usually borne single,are terminal and are bisexual and their colour varies from white to blue. The fruits of chilli are borne singly at nodes, variable in size, shape, colour, and degree of pungency. The colour of the unripe fruit of chilli is green or purplish,ripening to red or orange, yellow, brown, cream or purplish and the seed is pale yellow. Chillies can be grown in both tropical and subtropical areas. For growth a warm humid climate is most suitable while warm and dry climate increases fruit maturity. Chillies can grow in different types of soils on condition that they are deep, well drained, well aerated and fertile.(Farooqi et al.,2005). Bird's eye chilli is a wild form of chilli and usually used to denote any small sized pointed chilli of high pungency due to its resemblance to an avian pupil(Chatterjee et al.,2012). In 1912, Wilbur Scoville developed a scale to measure the heat levels of chilli peppers. According to the scale one part per million of heat is equivalent to 1.5 Scoville units(Bellringer,2001).

1.7 MIZORAM: A PROFILE

Mizoram(the land of the Mizos) is nestled in the steep hill folds, which is one of the fabled 'seven sisters'of north-east India namely, Assam, Arunachal Pradesh, Manipur, Mizoram, Nagaland, Meghalaya and Tripura. Mizoram is a mountainous region, it lies between 21° 31'N(285 Kms from north to south) and spans across 92°16'E longitude(115 kms east to west), covering an area of 21,087 square kilometres(Pachuau,1994). Mizoram is a land of rolling hills, valleys, rivers and lakes and the average height of the mountains is 1000 meters(3,300ft). The state is covered with 76% forest, 8% fallow land, 3% which is barren and uncultivable and the rest constitutes cultivable area. As Mizoram is a landlocked state, whose southern part shares 722 kilometers long international borders with Myanmar and Bangladesh, and northern part share domestic borders with Manipur, Assam and Tripura(Economic suervey,GOM,2013). The international boundaries of Myanmar is in the east and south, Bangladesh in the west and the national boundaries of Manipur in the northeast, Assam in the north and Tripura in the northwest(Sati,2022).

The Tropic of Cancer(23p 30')divides Mizoram into almost two equal parts. On the basis of structural and relief characteristics, the state Mizoram can be mainly divided into three physiographic units of Eastern High hills, Western Low Hills and Inter montane Flatlands. Mizoram is blessed with abundant green vegetative cover varying from tropical wet evergreen to montane sub tropical alpine type(Singh,2017). Mizoram has an average altitude of 1,000 m, while Phawngpui(Blue Mountain) is the highest peak with 2,157 m above sea level(m.asl). Mizoram has 11 districts and 26 administrative blocks(Sati,2022).

Mizoram has a climate ranging from moist tropical to moist sub-tropical. There are three seasons which is noticed in the state, they are cold season or winter(November to February), warm season or spring(March to May) and rainy season or summer(June to September). Rainy season is the longest season and rainfall is heaviest during June to August which covers 89% of the total annual rainfall. The storms come in the middle of April to herald the beginning of the summer(Das,2011). The annual rainfall ranges between 2,100 mm to 3,500 mm and the annual temperature during summer is between 18°C to 29°C and in winter it is 11°C to 24° C(Lawlor and lalthanzara,2021).

Regarding, the origin of Mizos like many other tribes in north-eastern India, there is no common consensus. It is generally accepted idea that they came to Burma(now Myanmar) as part of the greater Mongoloid wave of migration from China. The journey of the Mizos from Burma in the eighteenth century is an epic of fierce struggles and heroic deeds. Mizoram was a part of Assam after the annexation by the British, which was known as Lushai Hills District and in 1954, it was renamed as Mizo Hills District by the act of the Parliament(Das,2011).

The mautam or famine in 1959, caused due to bamboo flowering and proliferation of rats led to economic scarcities and resulted in a violent insurgency movement by the Mizoram National Front(MNF), led by Laldenga in the 1960s. In spite of the long violent struggle by the MNF, they signed an accord, known as the peace accord in 1986 with the Government of India. Mizoram became the 23rd state of the Union of India on 20th February 1987. Aizawl, the state capital of Mizoram

has an area of 128.98 sq km and stretches from Sihphir in the North and South Hlimen in the South, Zemabawk in the East and Tanhril and Sakawrtuichhun in the West(Lalzarzovi and Lalramnghinglova,2016).

The tribes of Mizoram may be broadly divided into nine major and 13 minor tribes and sub-tribes(Verghese and Thanzawna,1997). The entire Mizo society is knitted by traditional code of social ethics, *Tlawmngaihna* which is an untranslatable term meaning on the part of everyone to be hospitable kind, unselfish and helpful to others. Another important code of social ethics is *Hnatlang,* it is a community work on free services rendered by the people when need arose. These two codes of ethical behavior govern the social fabric of the Mizo society.

Traditionally, the Mizo village was usually set up on top of a hill, with Zawlbuk at the centre of the village in close proximity with the chief's residence. Zawlbuk is a traditional bachelor's dormitory which is the pillar of modern society and it is where all the young bachelors slept. The Zawlbuk provided an adequate educational structure which shaped young boys into responsible adults who were educated in the social norms and ways of life thus ensuring healthy and peaceful social life.

According to 2011 census Mizoram has a population of 10,91,014 making it the second least populous state in the country. Presently the literacy rate in Mizoram has seen upward trend and is 91.33 percent as per latest population census, male literacy stands at 93.35 percent while female literacy is at 89.27 percent. The majority of the Mizos are Christians being 87 percent and the rest are Buddhist, Hindus, Judaism, Muslims, Sikhs, Jains and other religions.

The Mizos have been agriculturists dated back to the beginning of the 18^{th} century. Shifting cultivation which is commonly known as Jhum cultivation in the north eastern region of India, is an integral part of the sociocultural life of the Mizos. Jhuming locally known as 'Tlangramloneih' is the main occupation of the Mizos and has a close link to their culture and tradition. Shifting cultivation is also referred to as slash and burn cultivation and it is the primary means of subsistence for indigenous tribal communities. Almost all the activities of the Mizos revolve around jhuming as

it can be seen from the very fact that their three main festivals such as Chapchar Kut, Mimkut and Pawl kut are closely related to Jhum operations(Lalengzama,2019;Pachuau and Devi,2020;Mandal and Raman,2016). According to 2011 census, about 48.5% of the population lives in rural area and their major occupation is agriculture(Sati,2022). The main crops of the Mizos are rice and maize and rice is the staple food of the people(Mate,2014).

Horticulture Department was bifurcated from Agriculture Department temporarily in the year 1993 and became a full fledged Department on 2.9.1997. Despite its young existence, the contribution and achievement of the Department towards horticulture development in the state of Mizoram has been tremendous. From the geographical area 21,087 sq. kms., the horticulture potential area is 11.56 lakhs Ha. At present, the total area under Horticulture crops is 1.10 lakh Ha. The geo-climatic situation of Mizoram offers an excellent scope for growing different horticulture crops including fruits, vegetables, spices, plantation crops, medicinal and aromatic plants of high economic value(Department of Horticulture, Govt. of Mizoram).

1.8 PRODUCTION OF SPICES IN INDIA:

Indian spices have a global presence with a considerable share in the world market. Indian spices are valued globally, for their exquisite aroma, texture, taste and medicinal value. The varying climatic conditions in India provide ample scope for the cultivation of a variety of spices. Almost all Indian states produce spices, with the total area under spice cultivation being 3.21 million hectares with the passage of time, the Indian spices has evolved and matured as a technology based, quality-conscious, customer-centric and market-driven industry. India is the world's largest producer, consumer and exporter of spices and the country produces about 75 of the 109 varieties listed by the International Organization for standardization (ISO) and also accounts for half of the global trading in spices. (Spice Board of India,2014).

Table1.1:Top Ten Ginger producing countries in the World (Area in ha, Production in tones)

Country	2015		2016		2017		2018		2019	
	Area	Produc-tion	Area	Produc-tion	Area	Produc-tion	Area	Produc-tion	Area	Produc-tion
India	1,42,000	7,60,000	1,65,000	11,09,000	1,68,000	10,70,000	1,65,000	17,62,000	1,64,000	17,88,000
Nigeria	68,282	4,13,382	85,359	7,74,887	96,059	8,34,634	86,529	7,00,000	84,156	6,91,239
China, main-land	46,642	4,95,923	52,000	5,50,000	51,435	5,46,306	53,415	5,69,520	55,059	5,81,137
Nepal	23,826	2,42,547	21,869	2,71,863	22,649	2,79,504	23,000	2,84,000	22,132	2,97,512
Indonesia	15,324	3,13,064	12,932	3,40,341	10,556	2,16,587	10,227	2,07,412	8,077	1,74,380
Thailand	9,656	1,62,404	9,834	1,66,346	10,112	1,68,025	10,067	1,66,196	10,118	1,66,923
Cameroon	5,809	83,004	8,066	79,273	9,042	88,709	8,618	85,060	8,145	83,434
Bangladesh	10,216	83,004	9,473	77,290	9,307	77,478	9,609	79,438	9,610	80,234
Japan	1,840	49,400	1,810	50,800	1,780	48,300	1,750	46,600	1,729	45,506
Philippines	3,805	26,623	3,832	26,787	3,908	27,482	3,930	27,926	3,924	26,929
Total	3,27,400	26,01,775	3,70.174	34,46,587	3,82,848	33,57,025	3,72.145	39,28,152	3,66,950	39.35,294

Source: Spices Statistics at a Glance 2021

Directorate of Arecanut and Spices Development, Ministry of Agriculture & Farmers Welfare, GOI.

Ginger which is commonly known as '*Adrakh*'(in Hindi) in India, is one of the most important spice crop. It can be seen from the table 1.1 that India rank first in the world in the production of ginger, with a total production of 64,89,000 tones by producing 45.43% of the total production of the top ten countries during the year 2019. Nigeria ranked second with a total production of 34,14,142 tones having a share of 17.56%, which is nearly half of what India is producing. China ranked third(14.76%), followed by Nepal(7.56%). Fifth and sixth position is obtained by Indonesia(4.43%) and Thailand(4.24%) respectively. Cameroon(2.12%) ranked seventh position, while Bangladesh(2.03%), Japan(1.15%) and Philippines(0.68%) secured eighth, ninth and tenth position respectively.

Out of the top ten, eight countries are from Asia, two countries that is Nigeria and Cameroon are from Africa. For the country India, there is a remarkable increase in the production of ginger for the year 2015 to 2019 by 10,28,000 tones, while the increase in the area of production by 22,000 hectares only.

Table 1.2:Top Ten Chilli producing countries in the World (Area in ha, Production in tones)

Country	2015		2016		2017		2018		2019	
	Area	Produc-tion	Area	Produc-tion	Area	Produc-tion	Area	Produc-tion	Area	Produc-tion
India	7,61,000	16,05,000	8,11,140	15,20,390	8,40,000	20,96,000	7,52,000	21,49,000	7,80,000	17,43,000
Thailand	85,645	3,48,223	88,435	3,72,736	93,935	3,48,235	88,672	3,40,639	89,040	3,48,102
China, main-land	45,754	3,05,809	46,102	3,09,019	46,830	3,14,693	47,553	3,20,366	48,273	3,26,040
Ethiopia	1,42,795	2,89,677	1,80,701	3,29,804	1,52,753	2,64,723	1,72,142	3,07,457	1,74,464	3,13,115
Cote d'Ivoire	25,804	1,40.779	26,432	1,49,427	27,002	1,58,204	27,533	1,66,981	28,029	1,75,758
Banglades h	92,167	1,23,207	1,01,972	1,30,260	1,03,380	1,36,872	1,01,072	1,41,171	96,800	1,49,473
Myanmar	1,10,075	1,26,800	1,10,051	1,29,361	1,09,224	1,30,592	1,07,420	1,28,072	1,08,602	1,37,110
Ghana	14,910	1,10,454	15,221	1,14,412	15,519	1,18,372	15,812	1,22,332	16,099	1,26,291
Vietnam	65,789	93,304	67,491	97,189	68,833	98,745	70,161	1,00,269	71,482	1,01,766
Pakistan	64,829	1,42,200	64,829	1,42,163	63,619	1,42,730	65,275	1,48,114	47,349	1,01,659
	14,08,768	32,87,453	15,12,374	32,94,761	15,21,095	38,45,166	14,47,640	39,24,407	14,60,138	35,22,314

Source: Spices Statistics at a Glance 2021

Directorate of Arecanut and Spices Development, Ministry of Agriculture & Farmers Welfare, GOI.

It is evident from table 1.2 that India ranked first in the production of Chilli in the world, India could produced 91,58,390 tones during 2015 to 2019 . During the year 2019 India produced 17,43,000 tones with a share of 49.48% which is nearly half of the other nine countries in the top ten. Next to India is Thailand with a production of 17,57,935 tones, having a share of 9.88% which is only around 20% of what India is producing. China(9.25%) ranked third, while Ethiopia(8.88%) could secured fourth position followed by Cote d'Ivoire(4.98%). The sixth, seventh, eighth, ninth, tenth position is obtained by Bangladesh(4.24%), Myammar(3.89%), Ghana(3.58%), Vietnam(2.89%) and Pakistan(2.88%) respectively.

Table1.3: PRODUCTION OF SPICES IN INDIA (Production in Tons)

Spices	2011-2012		2021-22(ADV.EST)	
	Prodn.	Share in Prod.	Prodn.	Share in Prod.
Pepper	43,000	0.706	60,000	0.556
Cardamom(Small)	15,000	0.246	23,340	0.216
Cardamom(Large)	3,860	0.063	8,812	0.081
Chilli	14,48,215	23.781	18,66,108	17.304
Ginger(fresh)	9,24,417	15.180	21,20,643	19.665
Turmeric(dry)	13,98,862	22.291	13,30932	12.349
Coriander	4,28,687	7.039	8,00,742	7.425
Cumin	4,62,645	7.597	7,25,651	6.728
Celery	5,271	0.065	6,103	0.056
Fennel	1,44,112	2.266	1,37,280	1.272
Fenugreek	1,21,775	1.989	2,48,203	2.301
Garlic	8,98,438	14.743	32,77,428	30.391
Tamarind	1,82,089	2.990	1,62,038	1.502
Clove	1,035	0.169	1,335	0.012
Nutmeg	12,138	0.195	15,384	0.142
Grand total	**60,89,544**	**100.00**	**1,07,83,999**	**100.00**

Source: State Agri/Horti Departments/DASD Kozhikkode

Table 1.3 shows the production of spices in India for 2011-12 and 2021-22. The highest share of spices production for the year 2011-12 is chilli with a percentage of 23.781, next is dry turmeric with a percentage of 22.291 and third highest is ginger(fresh) with 15.180 percent. For the year 2021-22, the highest is garlic with a share of 30.391 per cent, second is ginger (fresh) with 19.665 per cent and third is chilli with 17.304 per cent.

1.9 PRODUCTION OF SPICES IN MIZORAM:

Table 1.4: PRODUCTION OF TURMERIC, GINGER AND BIRD'S EYE CHILLI IN MIZORAM FOR THE YEARS 2011-2021

		TURMERIC		GINGER		BIRD"S EYE CHILLI	
Sl. No	Year	Area (Ha)	Production (MT)	Area (Ha)	Production (MT)	Area (Ha)	Production (MT)
1	2011-12	5,580	29,240	7,010	34,460	8,900	9,790
2	2012-13	6,050	22,990	7,280	28,390	9,025	8,210
3	2013-14	6,250	24,700	7,480	29,920	9,040	9,100
4	2014-15	6,350	25,130	7,650	31,200	9,140	9,330
5	2015-16	5,950	24,730	7,340	30,790	9,140	9,330
6	2016-17	7,480	28,890	8,550	62,740	11,170	10,730
7	2017-18	7,738	29,823	8,553	62,743	11,195	10,918
8	2018-19	7,738	29,823	8,553	60,131	11,196	10,918
9	2019-20	7,738	29,823	8,553	60,131	11,196	10,198
10	2020-21	7,738	29,823	8,553	60,131	11,196	10,918

Source:Mizoram Statistical Abstract (2021), Directorate of Economics&Statistics, Govt. of Mizoram.

Table 1.4 shows the area and production of turmeric, ginger and bird's eye chilli for the last ten years that is from 2011 to 2020. It can be seen that as the area of cultivation increases, production also increases. The area and production of the three spices is more or less the same from the year 2017 to 2020. The highest production can seen for the three years viz 2017-18, 2018-19 and 2020-21 with a production of 10,918 metric tonnes. The production of bird's eye chilli for the year 2011-12 was 9,790 metric tonnes, while in 2020-21 it was 10,918 metric tonnes registering an increase of 10.33 percent.

1.10 BUYERS' ATTITUDES:

In a consumer behavior context, an attitude is a learned predisposition to behave in a consistently favourable or unfavourable way with respect to a given object. (Leon & Leslie, 2007)An attitude is lasting because it tends to endure over time. Consumers have attitudes toward a wide range of attitude objects, from very product-specific behaviors to more general, consumption related behaviors.

Psychologist Daniel Kalz developed the functional theory of attitudes to explain how attitudes facilitate social behavior. According to this pragmatic approach, attitudes exist because they serve some function for the person. Consumers who expect that they will need to deal with similar situations at a future time will be more likely to start to form an attitude in anticipation. Two people can each have an attitude toward some object for very different reasons. As a result, it is helpful for a marketer to know why an attitude is held before he or she tries to change it.

The following are different attitude functions:

(a)Utilitarian function: The utilitarian function relates to the basic principles of reward and punishment.Attitudes is developed towards products simply because they provide pleasure or pain. Advertisement that stress straight forward product benefits appeal to the utilitarian function.

(b)Value-expressive function: Attitudes that perform a value-expressive function relate to the consumer's central values or self-concept. A person forms a product attitude in this case because of what the product says about him or her as a person. Value-expressive attitudes also are highly relevant to the psychographic analysis which consider how consumers cultivate a cluster of activities, interests and opinions to express a particular social identity.

(c)Ego-defensive function: Attitudes we form to protect ourselves either from external threats or internal feelings perform an ego-defensive function.

(d)Knowledge function: A knowledge function applies when a person is in an ambiguous situation or he/she confronts a new product.(Solomon,2014)

1.11 ATTITUDE MODEL:

Attitude model specify the different elements that might work together to attitude toward an attitude object (Ao) depends on the beliefs he or she has about several of its attributes. When a multiattribute model is used assumptions is made to identify these specific beliefs and combine them to derive a measure of the consumer's overall attitude. Basic multiattribute models contains three specific elements:

(a)Attributes arecharacteristics of the Ao. A researcher tries to identify the attributes that most consumers used when they evaluate the Ao.

(b)Beliefs are cognitions about the specific Ao. A belief measure assesses the extent to which the consumer perceives that a brand possesses a particular attribute.

(c)Importance weights reflect the relative priority of an attribute to the consumer. Although people might consider an Ao on a number of attributes, some attributes are likely to be more important than others.(Solomon, 2014)

1.12 SIGNIFICANCE OF THE STUDY:

Agriculture is the mainstay of the Indian economy. Horticulture plays on important role in the agricultural production in India with a total production of 280 million tons a year. Spices have a significant share in the export earnings of the country ₹14,899.68crores during 2014-15. In the back drop it is important to understand the marketing practices of bird's eye chilli, ginger and turmeric having a share of 56.92 percent in the production of spices and contributing ₹4,592.78crores to the export earnings in the year.(Spice of Board, 2014-15).

In view of the large share in the production of these spices in the national level (56.92 percent) and an overwhelming share (99.91 percent) share in the production of spices in Mizoram, the researcher was prompted to understand the marketing practices adopted by the grower of these spices in Mizoram.

Bird's eye chilli, ginger and turmeric are vastly grown in Mizoram with a total production of 65,660 metric tones in the year 2014-15 (Govt. of

Mizoram,2015). This is attributed to the congenial geo climatic conditions prevalent in this remote hilly state of India. However, the market for these spices appeared to be largely restricted to Mizoram. Spices play an important role in the growth of horticulture in the state and hence the researcher was prompted to examine the marketing practices of the farmers association and identify the potential market for these spices outside Mizoram.

1.13 SCOPE OF THE STUDY:

In view of the export share of these spices namely turmeric, ginger and bird's eye chilli and their production in Mizoram, the researcher was prompted to select these spices namely turmeric, ginger and bird's eye chilli for identifying their marketing practices and to examine their market potential outside Mizoram. In view of the share of these spices in the share of production at the national level (56.92 percent) and in the production of spices in Mizoram (99.91 percent), the researcher was prompted to focus on these spices in the present study. Although garlic has asignificant share in the production of spices at the national level (21.36 percent), due to its meagre share (.018 percent) in the production of spices in Mizoram, it is excluded from the purview of the present study. In the present study buyer includes trade visitors and customers who visit the exhibition. The visitors include trade visitors such as catering business, food wholesaler, beverages wholesaler, food manufacturing and processing, specialized organic shops.

1.14 REVIEW OF LITERATURE

The main objective of this section is to review the available literature on agriculture, spices, turmeric, ginger and chilli as a spice. Relevant literature in respect of these important areas was drawn to understand the current status of research.

1.14.1 AGRICULTURE

Rehman et al.,(2012), attempted to assess and reviewed on Indian agricultural marketing. They highlighted on the problems, challenges, recommendations and opportunities of agricultural marketing in India.

Yadav(2016), attempted to highlight the problems and prospects of agricultural marketing in India. He mentioned the role of government for the upliftment of agricultural marketing and also suggestions for its improvement .

Mathur et al.,(2017), reviewed the trends in the growth of agricultural production in India, and they also identified factors that affect agricultural growth.

Garbowski et al.,(2023) conducted a study on natural soil amendments used in agriculture, which are divided into three groups: organic, organic-mineral, and mineral amendments. They observed that soil amendments provide an alternative to chemical fertilizers and pesticides. Their wide spectrum of operations can be fully used with modern processing and production technology. They concluded that in order to choose the right soil amendment, there are some important factors which should be considered before applying a particular substrate.

1.14 .2 About Spices

In this section the researcher has attempted to study the history of spices, growth of spices and relevant of spices to the Indian economy.

1.14.2.1 *Spices a historical perspective*

Williamson(2002), documented about the history of turmeric. He also highlighted that the botanical name of turmeric and also how turmeric derives its name.

Tiwari and Agarwal(2004), examined the production technology of the different spices grown in India.

Farooqi et al.,(2005), attempted to highlight the cultivation of different spices like turmeric, ginger and chilli. Their study consisted of cultivation practices, uses and the diseases of the different spice crops.

Nybe et al.,(2007), examined the chemical composition, cultivation practices and crop management of some of the popular spices cultivated in India.

Parthasarathy et al.,(2008), discussed in details the different spice crops cultivated in India. The study include history and origin, botany of the spices, genetics and breeding, biotechnology, cultivation and harvesting of spice crops.

Dubey(2017), studied on Indian spices and their medicinal value and highlighted the history of spices and commerce of spices.

Ghate et al.,(2019) attempted to highlight spices in the eastern Indian laterite soil have more polyphenols.

1.14.2.2 *Growth of Indian Spices*

Anantha and Sidana(2019)examined the growth performance of Indian spice trade. They highlighted on the growth and instability in export and import of Indian spices.

Palani(2019)made an analysis of spices export in India. The objectives of his study includes to study the growth of spices in India and to analyze the degree and direction of spices export in India. The study revealed that the export is higher in spices during the period 2000 to 2010 and low level of growth during the period 2010 to 2017.

1.14.2.3 *Relevance of spices to Indian economy*

Salma and Ramakrishnan(2017), conducted a study on most frequently consumed spices in households and the consumer's knowledge and preferences to organic spices in Coimbatore district, Tamil Nadu, India. They concluded that the need for organic food is steadily increasing in the highly developed countries while developing countries still need to go a long way.

Bagal et al.,(2020) elaborated on an instability analysis of export of spices from India. The study area includes the whole of India at aggregate level for analysis so as to facilitate data compilation and prices in the international market. They also highlighted the export of major spices from India and growth rate of export spices from India.

Ralte and Ekhe(2022), made a review on major spices of north eastern hill region of India. They highlighted on the status of the different spices like ginger, turmeric, chilli and cardamom. Their study concluded that north eastern hill region holds potential for production and commercialization of various spices of high value which could earn revenue for the region and for India.

1.14.3 About Mizoram

Kumar Das(2011), attempted to highlight an insight of Mizoram. He highlighted on the history, topography, culture, caste and religion, transportation and communication and also agriculture of Mizoram.

Sailo and Lalmuankimi(2012), conducted a study on conservation of Reiek Tlang: a brief assessment f the adverse effect of vehicles and a plea for its cessation

Sharma and Vanlalhumi(2013), made an analysis on the adoption, marketing and problems of turmeric growers in Mizoram of Reiek turmeric farmers. They concluded that the income generated from turmeric farming alone is not adequate to provide a satisfactory means of livelihood for most of the farmers.

Mate(2014), examined the economic growth and development of pre-independence era of Mizoram. He studies includes agricultural practices, hunting and fishing, cottage industry and other activities of the Mizo people.

Mandal and Raman(2016), attempted to highlight the importance of shifting agriculture supported more tropical forest birds than oil palm or teak plantations in the state of Mizoram. They concluded that oil palm plantations had significantly fewer bird species, especially forest bird species, compared with teak, jhum and rain forest strata.

Lalzarzovi and Lalramnghinglova(2016), conducted a study traditional use of medicinal plants found within Aizawl city in Mizoram. They concluded that the study area is rich in medicinal plant and utilized by the local people for treating different diseases.

Singh(2017), critically analysed the characteristics and correlates of urbanization in Mizoram. He concluded that urbanization in Mizoram has been greatly influenced by politico-administrative processes.

Rohit el al.,(2018), made a study on vegetable production by conducting a survey based study in Mamit District. They concluded that implementation and adoption of appropriate technology in the farmers' field is the need of the hour to increase the productivity and to meet the demand of vegetables of this region.

Lalengzama(2019), attempted to assess the impact of transformation from shifting cultivation to settled agriculture on agrarian structure in Mizoram. He presented agrarian structure and transformation into six parts, nature of land possession, pattern of land possession, ownership of livestock, cropping pattern, tools used in cultivation, input use and perception on ecological consequences of shifting cultivation.

Lalruatkimi.C.,et al.,(2019), attempted to highlight the diversity and abundance of birds in Reiek Biodiversity Spot, Mizoram, north-eastern India. They concluded their study by stressing that the area supports a rich and diverse bird community.

Pachuau and Devi(2020), carried out a study of subsistence to profit in Mizoram on shifting cultivation and environment. They highlighted that some of the shifting cultivators have converted from a subsistence-oriented level of production towards the profit-oriented level of production and land use.

Lawlor and Lalthanzara(2021), carried out a study on the diversity of aquatic avifauna in Mizoram. Their studies included the avian fauna and the aquatic avifauna and concluded that confirmable reports of aquatic avifauna number only about 14 species which is mostly from the Palak Lake in southern Mizoram.

Sati(2022), conducted an empirical study of Mizoram on reconciling the issues of shifting and permanent cultivation. He concluded that shifting cultivation is no longer viable and sustainable and the permanent agriculture system offers multiple benefits.

1.14.4 Turmeric as a spice

Vogel and Pelletier(1815), identified that, turmeric contains different curcuminoids, although curcumin was found to be the most active one, first isolated in 1815. They also highlighted the plant turmeric has historic background which begins in Far Eastern medicine and dates back 5,000 (Ayurveda) and 2,000 (Atharveda) years ago, respectively.

Arora et al.,(1971) brought out the importance of turmeric as it exhibits high anti-inflammatory properties as it encloses numerous natural cyclooxygenase inhibitors. They further identified that turmeric extracts, turmeric oil and curcuminoids is used for the treatment of arthritis due to their high anti-inflammatory properties.

Deodhar et al.,(1980), conducted a study on turmeric and observed that it has the capacity to reduce histamine levels while it boost the production of cortisone by the adrenal glands.

Norman(1991) and Govindarajan(1980), brought out the importance of turmeric which has been used for various purposes since ancient times. It has been used to flavor and color for the preparation of both the vegetarian and non-vegetarian food.

Chen and Huang(1998), emphasized that, curcumin which is present in turmeric has a strong anticarcinogenic activities and it hampers cell-cycle advancement, which helps in inhibiting the growth of cancerous cell in rats aortic muscle cells.

Velayudhan et al.,(1999), elaborated that species diversity is maximum in south and north east India and the Andaman and Nicobar islands. They also stated that, in the region of Western Ghats and Himalayas in India, the ecology of the turmeric species varies so much that their habitat ranges from the sea level to high altitude.

Williamson(2002),mentioned that botanical name of turmeric is Curcuma domestica Val. Syn..Curcuma longa L,belonging to the family Zingiberaceae and it derives its name from the Latin word "*terra merita*", meaning meritorious earth, which refers to the colour of ground turmeric, resembling a mineral pigment.

Rao et al.,(2006), carried out a study on turmeric and stated that, turmeric is an erect perennial herb, grown as an annual and also as a biennial in certain cases. They also highlighted that significant variations can been seen in plant height among varieties as well as in plants grown under different agro-climatic conditions.

Remadevi et al.,(2007), observed that turmeric is one of the main ingredients of curry powder and it is used in sauces, mustard blends and pickles in the western part of the world. Turmeric tea is popular in certain areas of Japan, especially in Okinawa and it has also been traditionally identified as an agent of beauty and health.

Vankar(2008), examined the properties of turmeric and observed that the aqueous extract of fresh rhizomes displayed higher antioxidant properties as compared to the extracts from dry rhizomes, the dry turmeric powder had the least antioxidant properties.

Boonjaraspinyo et al.,(2009), observed that turmeric showed its activity by decreasing the aggregation of inflammatory cells surrounding the hepatic bile ducts which correlated with a reduce in serum alanine transaminase level.

According to Palanikumar and Panneerselvam (2009), turmeric is popularly consumed as a flavouring, preservative and colouring agent in South Asia, India and China.

Surojanametakul et al.,(2010), elaborated that turmeric has a long history of use as spice and food additive, widely used to ameliorate foodstuffs' palatably and storage stability through its specific yellow color, taste and antioxidant potential.

Lakshmi et al.,(2011) emphasized that the turmeric rhizomes are the most commonly used plant part composed of a wide variety of compounds.

Pezeshk et al.,(2011), studied on the medicinal properties of turmeric and identified that it has exhibited to hinder the growth of numerous microorganism which includes bacteria, viruses, and fungi and has displayed to act as a preservative by retarding microbial growth.

Gupta et al.(2013), brought out the importance of turmeric, and this rhizomes has become so popular that it is used in beverages, cosmetics, food preparations and numerous health-care.

Wu(2015), stated that among the Curcuma species, Curcuma longa L, is the most widely recognised and cultivated plant, grown in a warm climate in many regions of the world.

Duraisankar and Ravindran(2015), assessed the turmeric rhizomes' organoleptic features and observed that they are yellowish in color, have an aromatic odor and a slightly bitter taste.

Nair(2017), examined the agronomy and economy of turmeric and ginger. His studies include the chemistry, agronomy, botany, genetics, harvesting and postharvest management of turmeric and ginger.

Jadhao and Bhuktar(2018),in their study observed that, the taxonomic identity of turmeric is very complicate because of its extremely short period of flowering and herbarium preparation due to the flashiness of tubers, rhizomes and inflorescence.

Singh et al.,(2020), made a value chain analysis of the production of turmeric in north east hill region of India. They highlighted on the results and discussion of costs and returns of turmeric production in north eastern hill region. They concluded that from the analysis of cost of production of turmeric and its by-product it is clear that the processed products have fetched higher returns for the product.

1.14.4.1 *Curcumin - Turmeric*

Luthra et al.,(2001), critically analyzed on the therapeutic uses of curcuma longa(turmeric). They highlighted on the different activities of turmeric as an antioxidant, anticancer, anti-inflammatory, antifungal, antibacterial, antiviral and also antiallergic and immunogical system activating properties.

Chattopadhyay et al.,(2004) discussed on the different biological actions and medicinal applications of turmeric and its component curcumin. They also highlighted that, curcumin is a non-toxic, highly promising natural antioxidant compound having a wide spectrum of biological functions.

Maheshswari et al.,(2006) further identified the multiple biological activities of curcumin. Their studies demonstrated that curcumin modulates cytokines, growth factors and transcription factors, which may be responsible for its beneficial effects during tissue injuries caused by wound, trauma and hemorrhagic shock.

According to Goel et al,.(2008);Jurenka(2009), curcumin was first isolated in 1815and the actual chemical configuration was determined by Whiting and Roughley in the year 1973. They also highlighted that among all curcuminoids, curcumin I is considered to have minimum stability while curcumin III is the most stable. Curcumin is not soluble in water at acidic and neutral pH, it is soluble in acetone, methanol, and ethanol.

Rahman and Biswas(2009), brought out the importance of curcumin and opinion that it is determined to be an anti-inflammatory and this property is due to hydroxyl and methoxy groups.

Aggarwal and Harikumar(2009);kannappan et al.,(2011), elaborated that many researchers over the past three decades has shown that curcumin has therapeutic potential against a considerable number of diseases such as cancer, lung diseases, neurological disease, liver diseases, metabolic diseases, autoimmune diseases, cardiovascular diseases, and various other inflammatory diseases.

Gupta et al.,(2012) studied on the different biological activities of turmeric. They concluded that turmeric is a golden spice derived from the rhizomes of the plant C. *longa* and this spice has numerous health benefits because of its different biologically active constituents.

Shehzad et al.,(2013) observed that curcumin shows its effectiveness by inhibiting inflammatory cell proliferation, metastasis, and angiogenis by various molecular targets.

Shehzad et al.,(2013) observed that curcumin shows its effectiveness by inhibiting inflammatory cell proliferation, metastasis, and angiogenis by various molecular targets.

Ghorbaniet al.,(2014) identified that curcumin has properties such as reducing hepatic glucose production, sudueing inflammatory response stemming from hyperglycemia.

Prasad et al.,(2014) examined chemical and physical properties of curcumin, a component of a golden spice turmeric. They emphasized on biological activities and disease targets of curcumin.

Nisar et al.,(2015) attempted to highlight the properties of turmeric as a promising spice for phytochemical and antimicrobial activities. They made a conclusion that turmeric is highly considered as a universal panacea in herbal medicines with varied pharmacological and antimicrobial activities.

Devassy et al.,(2015) studied on the health-promoting effects of curcumin, especially its antineoplastic effects by using Health Canada as a model regulatory jurisdiction. The specific aim of their study is to review the current regulatory framework in Canada for allowing health claims to appear on food labels and to evaluate the available clinical evidence of the anti-cancer properties of curcumin.

Kocaadam and Sanilier(2017) brought out the importance of curcumin, an active component of turmeric and its effect on health. They also highlighted that the results of clinical studies on in vitro, in vivo and human indicate that curcumin may

be effective in prevention and treatment of amny diseases, particularly cancer, by affecting various molecular targets.

Rad et al.,(2020) made a study on turmeric and its major compound curcumin on health and its bioactive reffects and safety profiles for food, pharmaceutical, biotechnological and medicinal applications. They concluded that, bioavailability is the major curcumin therapeutic limitation and to solve this problem new nanomedicine formulations have been developed to improve curcumin targeting, pharmacokinetics, efficacy and cellular uptake.

1.14.4.2 *Aroma of Turmeric*

Leela et al.,(2002) made a comparative study on the components of the oil from leaves, flowers, rhizomes and roots of turmeric. They concluded that rhizomes and roots possessed more similarity as compared to leaves and flowers which imply the presence of biogenetically linked characters.

Sasaki et al.,(2002) stated that Food and Drug Administration (FDA) approved turmeric oil as food additive mentioned as safe drug.

Longo and Sanroman(2006), observed the production of food aroma compounds. They concluded that the production of relevant aroma compounds for the food processing industry by the use of microbial cultures or enzyme preparations offers several advantages over traditional methodologies.

Chempakam and Parthasarathy(2008), brought out the importance of volatile turmeric oil which is normally extracted by steam distillation and processing and the techniques of extraction play a crucial role in maximising oil yield, pigments and their constituents.

Funk et al.,(2010), attempted to highlight the properties of turmeric and evaluated that it also possess anti-inflammatory, antioxidant, anti-arthritic and antinociceptive properties.

Daimei et al.,(2012), critically analyzed the finest lakadong variety of turmeric from the Jaintia hills of Meghalaya, India. They highlighted on the pre and post harvest management practices of lakadong variety of turmeric.

Saiz(2014);Meng et al.,(2018), observed that the volatile oils of flowers and leaves of turmeric constitutes mainly monoterpenes, while roots and rhizomes contains mostly sesquiterpenes. The essential oil gives the rhizomes a particular spicy and aromatic flavour.

Hasegawa et al.,(2015) examined on the aroma of turmeric and its dependence on the combination of groups of several odor constituents. Their results show that the odor of turmeric was characterized by the group consisting mostly of tumerones.

Verma and Kumar(2015) conducted a study on pharmacological profile of turmeric oil. They highlighted that turmeric oil is a secondary metabolite of turmeric and obtained by steam distillation of its rhizomes. They also observed that turmeric oil a lipophilic fraction from turmeric, exhibits several therapeutic potentials.

Maria and Maria(2020), made a review on curcuma longa L. rhizome essential oil from extraction to its agri-food applications. In their paper they highlighted on the extraction methods to obtain essential oil from turmeric rhizomes, chemical analysis of the essential oil obtained from turmeric and potential applications of c.longa essential oil obtained from rhizomes in the agri-food industry.

1.14.4.3 *Price – Turmeric*

Low and Tan(1995), stated that price is the only variable in the marketing mix that must be set in relation to the other three Ps.

In his study of marketing mix, Janakiraman(1999), observed that concepts and insights have been applied not only for consumer goods and services but also have been extended to non-profit organizations and social development problems. He also concluded that segmenting and designing marketing mix strategies are closely interconnected.

Kotler and Armstrong(2005), opinion that price is the amount of money charged for a product or service, or the sum of the values that consumers- exchange for the benefits of having or using the product or service.

Lee(2008), conducted a study on the four P's of marketing mix that is product, price, place and promotion and concluded that all parts of marketing mix are equally important, since a deficiency in any one can mean failure.

Bennett(2010); Pride & Ferrell(2014), carried out a study on marketing mix and observed that price is a sensitive and flexible element of the marketing mix because it can be modified quickly in response to changes in the market.

Manafzadeh et al.,(2012), elaborated that price being one of the elements of the marketing mix that companies use to accomplish their marketing objectives.

Pour et al.,(2013), attempted to highlight marketing mix components and observed that it should be modified holistically in meeting changing needs of customers without definite emphasis on one or two element.

According to Sunyoto and Susanti(2015), pricing activities play an important role in the marketing mix process, because pricing is directly related to the revenue received by the company. The pricing decision is also important in determining how much a service is valued by the consumer and also in the image building process, pricing also gives a certain perception of quality.

Amofah et al.,(2016), made a study which focuses on the influence of service marketing mix on customers' choice of registered restaurants in the Kumasi Metropolis-Ghana.

Papang et al.,(2016), brought out the importance of economies of turmeric marketing in Jaintia hills district of Meghalaya. In their study they highlighted the marketable, marketed surplus, marketing channels, constraints in marketing and suggestion to overcome the problems in marketing.

Octari et al.,(2018), examined the impact of marketing mix strategy on consumers decision. The result of the research showed that, the variable of marketing mix had significant influence on consumers decision to buy on credit.

Adelhady et al.,(2019), brought out the importance of marketing mix elements on passengers' purchasing decision making. They also pointed out that influencing customer behaviours is very significant for companies which aim to be successful in such an intensely competitive environment.

1.14.4.4 *Organic – Turmeric*

Lapple& Van Rensburg(2011), sted that the relevance of development of organic farming has become an important element of the Common Agricultural Policy(CAP) and most of the European Member States are interested to promote and do well in organic agriculture by increasing the land for organic farming.

Sarkar(2015), attempted to highlight the evolution and benefits of organic farming and green marketing. He focus on preserving long-term sustainability and environmental quality and also on the future perspective of organic farming.

Chand and Wani(2016), studied the concepts, applications and advances of organic farming. They highlighted that the immense commercialization of agriculture had a very negative effect on our environment.

Mitra and Devi(2016), discussed on organic horticulture in India. They highlighted about organic farming, Indian initiatives, current status, quality regulation, key opportunities in India and Indian organic food market. They concluded that India's organic export markets would grow with the support of the industry, the government and NGO's coming together to work with farmers.

Santhoshkumar et al.,(2017) reviewed on organic farming. They highlighted on the components and benefits of organic farming. They also concluded that organic farming is the system of farming that promotes environmentally, socially and economically sound products of food and fibers.

Eneizen(2017), emphasized on the importance of adopting organic farming in Jordan. They observed that the main obstacles are that the absence of an organization to assess and certify organic produce.

Ramesh et al.,(2021), conducted a survey in Maharashtra, Karnataka, Tamil Nadu, Kerala and Uttarakhand to know the status of organic farming in India. The survey involves 50 certified organic farms and 50 comparable conventional farms. The study provided insights into the real organic farming situation in India.

1.14.4.5 *Packaging – Turmeric*

Coles(2003), emphasized on the main roles of food packaging which is to prevent food products from outside pressure and damage, to contain the food, and to furnish consumers with ingredient and nutritional information.

Marsh and Bugusu(2007), critically analysed the roles, materials and environmental issues on food packaging. They concluded that the impact of packaging waste on the environment can be minimized by prudently selecting materials ,following EPA guidelines, and reviewing expectations of packaging in terms of environmental impact.

Wilson(2007), studied on the history of packaging and elaborated that with the Invention of canning by Nicholas Appert in the 19th century, modern food packaging is believed to have started during this time. He also highlighted that Samuel C. Prescott and William I. Underwood work in the creation of the fundamental principles of bacteriology which is applied to canning processes after the inauguration of food microbiology by Louis Pasteur and his colleagues in the 19th century.

Brody et al.,(2008), carried out the solutions for innovative food packaging and they pointed out the importance of active and intelligent food packaging.

Lord(2008), observed that the advancement of polypropylene, polyester and ethylene vinyl alcohol polymers led to the use of plastic and flexible packaging instead of metal, glass and paperboard packaging.

According to Dainelliet al.,(2008), changes in customer interest, industrial production trends, retailing practises and consumer lifestyles are the major forces driving the growth of novel and innovative packaging techniques that provide and monitor food safety and quality, lengthen shelf-life and minimize the environmental responsibility of food packaging.

Carocho,Moral&Ferreira(2015);Narayananet.al.,(2017);Santosetal.,(2017), brought out the importance of food packaging as bit is used to guard food from environmental contamination and other influences(such as odors, shocks, dust, temperature, physical damage,light microorganism and humidity) and also it is a key to assuring the quality and safety of food, while also enhancing shelf-life and reducing food losses and wastage.

Wyrwa and Barska(2017), attempted to highlights the advantages of active packaging especially for food industry. They concluded that the most important advantage resulting from using active packaging is reduction in loss of food products due to extension of their shelf life.

Han et al.,(2018), discussed about food packaging, its review and future trends and concluded that food packaging technologies are improving continuously in response to lifestyle changes and the ever increasing demand for high quality and safe foods.

Schaefer and Cheung(2018), documented that packaging of products also provides as useful means of marketing for the customers as product comes in different shapes and sizes and as a user interface, serves the customers with both ease of use and convenience.

1.14.5 Ginger as a spice

Rosegarten(1969), observed that in the fifth century A.D, ginger plants were grown in pots and were transported abroad , especially between China and Southeast Asia by a long sea voyages as to serve as fresh food and in preventing scu rvy.

Purseglove et al.,(1981) studied the history of ginger and pointed out that it is believed to be a native of South Eastern Asia . Ginger is also considered to be the first oriental spice to be extensively introduced outside its origin. In the thirteenth century the Arabs took the ginger plant from India to East Africa and in the sixteenth century, the Portuguese brought to West Africa and other parts of the tropics.

Gugnani and Ezenwanze(1985);Zadeh and Moradi-kor(2013), critically analyzed the chemical composition of ginger and observed that the chemical content of ginger varies according to the type, variety, agronomic conditions, curing methods, drying and storage conditions.

Santos and Silva(1997), conducted a study on the anatomy of ginger, which can be classified as the first order rhizome which is directly from the seed. They also highlighted that from the bud of the first order rhizome arose the second order rhizome and the third order rhizome originated from the second order. The third order rhizome produced a reproductive or a vegetative structure and from this rhizome a fourth order rhizome is developed. The fifth and sixth order rhizomes originated from buds formerly developed on the fourth order rhizome.

Shukla and singh(2007) elaborated that ginger has been grown in South-East Asia for many years and has become popular as a result of its therapeutic effects in most of the European and African countries. They also observed that ginger popularity as a traditional medicinal systems is because of its rich phytochemistry and diseases preventive properties.

Ghosh et al.,(2011), highlighted that the name of ginger derives from a Sanskrit word denoting “horn shape“in reference to the protusions on the rhizomes.

Ravindra and Babu(2012), has given an overview of ginger-the genus zingiber. This book discussed about botany, crop improvement, chemistry, issue culture, diseases, pharmacology, properties and medical uses of ginger. They also discussed about postharvest, industrial processing, production, marketing and economics of ginger.

Liu et al.,(2014) pointed out that ginger is a herbaceous perennial plant grown as an annual crop with narrow, bright green, grass-like leaves, and yellowish green flowers.

Kaushal et al.,(2017) carried out a study on the history of ginger and contented that ginger belongs to the family *Zingiberaceae* and the botanical name Zingiber officinale was given by an English botanist William Roscoe (1753 – 1831) in the year 1807.

Sharma,(2017), brought out the importance of ginger as a plant anits rhizome is used as a spice, food, flavouring agent and medicine.

1.14.5.1 *Appearance*

Arya(2001), discussed the production technology of ginger. His studies included the origin and historical background, chemical constituents, chemistry, post- harvest management and uses of ginger.

Singh and Selvan(2003), made a study on Indian Ginger and its production and utilization. They also attempted to highlight organic agriculture and possibilities for organic production of ginger in Mizoram. They concluded that ginger has a wide applications in flavour, spice and drug industries and various primary and secondary products of ginger are available in the market.

Nain et al.,(2009), analysed on properties and utility of commonly used natural spices.They concluded that natural spices like clove, cinnamon, black pepper, garlic and ginger possessed powerful antimicrobial and antioxidant properties and medicinal values.

Shoaib et al.,(2016), attempted to highlight an overview on ginger,a tremendous herb. They stressed on the importance of pharma foods which is a novel trend.

Zhukovets and Ozcan(2020), discussed the composition, use and bioactive properties of ginger rhizomes.

1.14.5.2 *Price- Ginger*

Kotler and Armstrong.,(2008), examined price as one of the most flexible marketing mix elements. They further identified that even though price is the most flexible element of marketing mix but, it is the number one problem faced by many marketing executives and there are some factor's to be considered when setting prices by companies.

Goi(2011), emphasized that pricing as compared to the other elements of marketing mix is one of the most important and the only element which generates a turnover for the organization.

Isoraite(2016), carried out a study on marketing mix and identified that marketing mix includes commodity, delivery, marketing, and pricing methods for the growth and handling of exchanges and the accomplishment of target markets. He also highlighted that, price is considered to be one of the most crucial components in the marketing mix.

Sulaiman et al.,(2017), brought out the importance of the function of marketing mix and consumer preferences on healthy food consumption among UUM students. The study was conducted in Malaysia and they concluded that as nutritional level is still low in the country, the people should take steps to maintain daily nutritional level.

Wu and Li(2018), observed that in the development of marketing science, the marketing mix also played a significant role as a main principle in commercial philosophy.

Sahir and Rosmawati(2020),examined marketing plan strategic for improving marking mix in coffeeshop business in Indonesia. The study is based on porters five competitive forces.

1.14.5.3 *Aroma – Ginger*

According to Govindarajan(1982), the sensational perception of ginger appears from two definite groups of chemical namely volatile oils or essential oils and non-volatile pungent compounds. and these volatile oils contribute to the distinct aroma and taste of ginger.

Balladin et.al.,(1998), observed that the ginger rhizomes consists of two classes of constituents, the essential oils and the oleoresins.

Evans(2002), observed that the volatile compounds which is present in ginger rhizomes have a very low boiling point and can freely evaporate from it even at room temperature.

Abeysekera et al.,(2005), carried a study on comparison of ginger varieties dried at different temperatures for oil and oleoresin contents. A sensory evaluation was conducted to evaluate the preference for the dehydrated products in terms of colour, taste and aroma.

According to Sultan et al,.(2005), the volatile oil are also called essential oils of ginger and these oils can be extracted by different techniques. The concentration of volatile or essential oils in ginger rhizomes ranges 1-3 percent.

Longo and Sanroman(2006), elaborated that flavour is normally the result of the outcome of many volatile and nonvolatile components possessing diverse chemical and physicochemical properties which is present within the complex matrices. They also emphasized that the nonvolatile compounds contribute mainly to the taste, while the volatile compounds have an impact both taste and aroma.

Purnomo et al.,(2010), brought out the importance of ginger as a popular food additive in numerous foods and beverages and valued because of the volatile

components particularly the aromatic compounds which display a spicy, pungent and pleasant smell.

Gupta and Sharma(2014), examined on morphology, chemical composition, nutritional profile and medicinal properties of ginger. They made a conclusion that ginger(Zingiber officinale) is an important plantwith several medicinal, ethno medicinal and nutritional values used in traditional medicine.

Lemma and Egza(2019), conducted a study on extraction and characterization of essential oil from ginger rhizome which is collected from Arba Minch market in Ethiopa. The study showed that the volume of oil extracted increases with the time of heating.

1.14.5.4 *Organic – Ginger*

Lampkin(1994), stated the definition of organic farming as "to create integrated, humane, environmentally and economically sustainable production systems, which maximize reliance on farm-derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop, livestock and human nutrition, protection from pests and disease, and an appropriate return to the human and other resources."

Mannon (1995), mentioned organic farming as holistic view of agriculture that tries to reflect the profound interrelationship that exists between farm biota, its production and the overall environment.

Rigby and Caceres(2001), examined the sustainability of agricultural systems of organic farming. The study focused on agricultural sustainability, and its relationship to various alternative agricultural approaches.

Darnhofer et al.,(2010), made a review on conventionalisation of organic farming practices and an assessment of structural criteria based on organic principles.

Amarnath and Sridhar(2012), studied on an economic analysis of organic farming in Tamil Nadu, India. They also mentioned the costs and returns in both organic and conventional farming.

Subrahmanyeswari and Chander(2013), emphasized on integrating indigenous knowledge of farmers for sustainable organic farming. The study was conducted in Uttarakhand State of India. They concluded that organic farming has revived the interest of farmers, policy makers and development workers in indigenous knowledge.

Brajendra et al.,(2018), made a prospective review on organic farming in Mizoram. They mentioned in their study the important reasons, for adopting organic farming in Mizoram.

Rehber et al.,(2018), studied about the historical perspective of organic farming and its development. They concluded and argued that after almost three decades, coventionalism of organic farming has been an unavoidable result in the contemporary global economic environment.

Alagappan S.,(2020), attempted to highlight a summary of organic farming in India. The conclusion of the study is that organic food production costs are higher in the developed countries as compared to India.

1.14.5.5 *Pungency – Ginger*

Greenberg and winnick(1940), observed that pungency and aroma is a significant attributes of ginger, the pungency of ginger is due to the presence of zingerone, shogaol and gingerol.

Kelly et al.,(2002), identified that gingerols are very sensitive to heat and when it is subjected to high temperature they are converted into homologous series of degraded compounds that is shogoals that hold strong antioxidant activity.

Young et al.,(2002), evaluated the analytical and stability studies of ginger preparations. The 6-gingerol contents in different preparations were evaluated

Chrubasik et al.(2005), conducted a study on the pungency in ginger rhizomes and observed that,t he name “pungent principles” given to gingerols are the active component of fresh ginger and responsible for the taste of ginger.

Wohlmuth et al.,(2005), examined the pungency in fresh ginger, it is due to the series of homologous phenolic ketones of which 6-gingerol is the major one. They also further identified that, during processing the gingerols are converted into shogoals and exhibit more pungency as compared to the gingerols.

Malu et al.,(2009), conducted a study on antibacterial activity and medicinal properties of ginger. They concluded that the antibacterial activity and inhibition activity of ginger extracts could be attributed to the chemical properties of ginger.

Sanwal et al.,(2010), attempted to highlight the gingerol content of different genotypes of ginger. For this purpose eighteen different ginger genotypes were analyzed twice, just after harvesting and after storing for four months.

Wang et al.,(2011), evaluated that the bioactive compounds of ginger rhizomes are gingerols, shogoals, zingerone, paradol, gingerenone, galanal, gingerdiols, gingerdiones. The most abundant gingerol found in ginger is 6-gingerol.

Jaleel and Sasikumar(2012), attempted to highlight gingerols as the main bioactive components of non-volatile pungent compounds of ginger rhizomes and this produces hot sensation in the mouth. Gingerols are a chain of homologs molecules, which are characterized on the bases their unbranched alkyl chains length.

Gupta et al.,(2016), elaborated on the phytochemistry and pharmacological activities of active ingredients of ginger. The active ingredients includes gingerol, zin gerone, shogoal, paradol and zingiberene.

Kont and Furst(2021), critically analysed the benefits of ginger and its constituent 6-Shogaol in inhibiting inflammatory processes. The studies include anti-inflammatory action of ginger extracts, ginger constituents, identification of ginger constituents associated with anti-inflammatory actions and the effects of 6- shogoal on inflammation- related processes.

1.14.6 Bird's Eye Chilli as a spice

Rowland et al.,(1983), identified that capsaicin is the substance that produces all of the heat sensation and this capsaicin is made by a specialized gland

cells found in the cross- walls or the ribs of the pepper and is composed of several different alkaloids which vary in amounts depending on the species.

Govindarajan(1986) and Manirakza et al.,(1999), attempted to highlight the uses of capsicum fruits which in various forms are used in many parts of the world as additives in food for their strong pungency and aroma and for their pharmacological and therapeutic effects as a stimulant and counter irritant.

Wilson et al.,(1991), brought out the importance of chilli and it is named as wonder spice and also regarded as one of the most important commercial spice crop is popularly used universal spice.

Knneth et al.,(2000), studied the history of chilli and it is believed that the monks of the Royal Monastry of Santa Maria de Gaudalupe, in Estremadura, Spain were the first European to come across the taste of hot pepper introduced the chilli to their kitchen. They also identified that the seeds of the chilli which were first cultivated in the monasteries were spread throughout Spain and Europe by traveler monks.

Tainter and Grenis(2003), evaluated the genus capsicum and identified that bell pepper, paprika, chilli and red pepper are the types of spices which belongs to the genus Capsicum. They documented that the Capsicums within each category also differ extremely and the species designation is not always clear cut. They also elaborated that paprika is from the mild and sweet varieties of Capsicum, whereas red and chilli peppers are mixture of different varieties or more pungent peppers.

Baruah and Barua,(2004), documented on the history of bird's eye chilli also highlighted that it is called by numerous other synonyms like African pepper, chilli pepper, goat's pod, Mexican chilli, red pepper, Tabasco pepper, Zanibar pepper and Cayenne pepper.

Melendez et al.,(2009), observed *C.annuum, C. chinense* and *C. frutescens* are phylogenecally close sister species and are sometimes mentioned as "*annuum-chinense – frutescens*" complex for their overlapping morphological features.

Sudre' et al.,(2010); Zonneveld et al.,(2015), discussed about *Capsicum* species which can be identified based on their flower morphology where anther colour is the main character. *C.baccatum* accessions possess yellow anther while *C. annuum* have purple anthers. They further identified that the species *C. annuum* , *C. chinense* and *C. frutescens* have flowers with greenish to white coloured petals and yellow seeds.

Ozgur et al.,(2011), attempted to highlight that in India bird's eye chilli is cultivated as homestead crop and consumed extensively across mainland regions of South Karnataka, Kerala, Tamil Nadu and North-Eastern India, especially in the states of Mizoram and Manipur. Among the north- eastern states of India, Mizoram is famous for the habitation of wonderful diversity of bird's eye chilli, with respect to fruit shape,size, colour, pungency, plant type, physiological characteristics, reactions to diseases and pests, adaptability and distribution.

Bosland et al.,(2012), conducted a study on the genus Capsicum which consisted of about thirty-seven species composing of wild, semi-domesticated and the five well-known domesticated species, namely, *Capsicum annuum* L.,*Capsicum baccatum* L., *Capsicum chinense* Jacq., *Capsicum frutescens* L., and *Capsicum pubescens* Ruiz and Pav with more than 200 varieties.

Rodriguez et al.,(2014) and Koeda et al.,(2014), assessed the quality of *Capsicum* fruits which is determined by its colour, pungency and flavor attributes, which are imparted by its pigments, especially carotenoids mixture, pungent capsicinoids and volatile compounds profiles, respectively.

According to Dutta el al.,(2015), the north-eastern hill region of India is one of the hot-spots of biodiversity in the Indian gene centre and is also noted for its richness in ethnic diversity and traditional culture.

Norazian et al.,(2019) examined the fruit of chilli which is perceived as a carotenoids –rich non-leafy vegetable. They also identified that the diverse carotenoids are present in the sacrocarps and can be grouped into yellow, orange and red carotenoids, which impart pale yellow to dark red colours to the fruits.

1.14.6.1 *Distinct Appearance – Bec*

Bosland(1993), brought out the importance of carotenoids in bird's eye chilli as the colour of its fruit is controlled by carotenoids. They further observed that the red colour of the fruit is due to carotenoids, capsanthin and capsorubin, while the yellow orange colour is from beta carotene and violaxanthin.

Deli et al.,(2001), studied on *Capsicum* species and its fruit is acknowledge as a carotenoids –rich vegetable and these carotenoids develop and accumulate rapidly as the fruit ripens. They further identified that at the initial stage the fruit is green in colour, which is full of chloroplast containing approximately 68% chlorophylls, whereas carotenoids at 32% is the lowest level.

Chatterjee et al.,(2012), discussed about production of bird's eye chilli. They suggested that development program should be taken to improve the productivity and quality of bird's eye chilli.

Vaishnavi et al.,(2017), conducted a study on genetic diversity by using bird's eye chilli accessions through Mohalanobis D2 and principal component analysis for twenty seven quantitative characters.

Vaishnavi et al.,(2017), evaluated bird's eye chilli accessions for growth and yield traits. They concluded that the study revealed substantial differences among the accessions for all characters indicating the presence of wide genetic variability and ample scope for their improvement.

Srinivas and Thomas(2018),examined the appearance of bird's eye chilli and observed that it is a slow-growing short-term perennial or perennial sub-shrub and the flowers of bird eye chilli are in clusters of 2 or more, waxy greenish white and are usually erect. They further identified that the fruits of bird eye chilli are elongate, upright, small and narrow and the colour is green to cream and yellow when immature, orange to red when mature and are extremely pungent.

Vaishnavi et al., (2018), evaluated thirty six bird's eye chilli accessions, to select the promising accessions for qualitative traits that is capsaicin, vitamin C, oleoresin and capsanthin contents.

Sreenivas et al.,(2019), conducted a study on characterization and evaluation of indigenous and exotic genotypes for identification of spice chilli lines. They concluded that, the comparative analysis between qualitative and quantitative traits revealed that, there are qualitatively identical landraces that are quantitatively different and vice versa.

Madala and Nutakki(2020), attempted to highlight the history, production and health benefits of hot pepper. They also stressed that chilli is one of the most important commercial crops of India and more than 400 different varieties are found all over the world.

Sharma studied on sustainable economic analysis and constraints faced by the Naga king chilli growers in Nagaland. He observed that, on rank based quotient some of the foremost constraints like lack of warehouse, market information, transportation facilities etc.

Santhosha(2020), studied on the genetic diversity in bird's eye chilli. The experiment was conducted at the ICAR-KVK, Uttara Kannada farm. He concluded that highest inter cluster diatance between clusters namely III and cluster VII indicated the presence of large diversity among genotypes.

1.14.6.2 *Price – Bec*

Evans(1995), observed that if the perceived price of a product is much higher than its perceived value, the customers will turned away from the product. He further stressed that on the other hand, if the perceived price is too less, buyers will have a doubt regarding the quality of the product.

Batra(2006), further identified tourism marketing for sustainable development. He stressed on the importance of the four marketing mix namely, product, price, place and promotion for the sustainability of tourism.

Singh(2012), emphasized that price is the second element in the marketing mix concept, namely product, price, place and promotion and it depends on the purchasing power of the consumer/buyer and also considered to be the important element in the purchasing decision.

In his study, Fu Ho(2014), attempted to highlight the necessity of a sound marketing plan for the survival of schools at the elementary level in Taiwan, where there is rapidly decreasing birth rate.

Mahmood and Khan(2014), attempted to highlight and identify the relationship between 7Ps of service marketing and customer perception. The study was conducted on Eastern Bank Limited, Bangladesh.

Linh and Ha(2016), conducted a survey on customer attitude towards marketing practices in Vietnamese Smartphone Market. Their finding was that among the four component of marketing mix, product component has the most notable impact on consumer satisfaction.

Mustapha(2017), examined the effect of marketing mix strategy on performance of small scale business. The study was conducted in Maiduguri, Borno state, Nigeria. The objectives is, to explore how marketing mix are managed and its impact on the performance of small scale enterprises.

Ismail et al.,(2018), examined on the application of entrepreneurial marketing to the marketing mix and its affect to SMEs in Malaysia.

Al Badi(2018), tried to highlight the role of marketing mix on achieving the competitive advantage in the small and medium sector. The study was conducted in the Al Buraimi Governorate in Oman.

Barusman(2019), highlighted the marketing mix component and their impact on student parents' decision for disable students with special needs.

Shamami and Kheiry(2019), examined the result of the marketing mix and after sale services on three dimensions of brand equity namely, perceived quality,

brand loyalty and brand awareness using the Aakar Model. They concluded that, brand loyalty is the only factor that directly affects brand special value..

1.14.6.3 *Organic- Bec*

Drinkwater et al.,(1998); Stolze et al.,(2000), identified that due to the ban of chemical fertilizers on organic farms, 35-65% less nitrogen leaches from arable fields into soil zones where it could degrade the ground and drinking water quality.

Maderetal.,(2002);Marriot and Wander(2006);Edwards(2007) and Fliebachet al.,(2007), brought the importance of organically managed soils as it exhibits a high organic matter content, high biomass, immense enzyme activities of micro-organisms, improved water infiltration and retention capacities and low susceptibility to water and wind erosion.

Gattinger et al.,(2005), elaborated that the most effective technique used by organic farmers for building soil fertility are fertilization by animal manure, composted harvest residues and leguminous plants as main and intermediate crops.

Altieri and Nicholls(2006), evaluated that diversity is the key factor for the stability of agro-ecosystems and therefore, a regularly stable supply of food.

Niggli(2013), presented the challenges and innovations of sustainability of organic food production. He highlighted that organic agriculture can be characterized as being less driven by off-farm inputs and being better embedded in ecosystem function.

Chand and Wani(2016) has given an overview of organic farming in India. This book discussed about concept, benefits and principles of organic farming. The book also highlighted about organic crop production technique, certification and legislation of organic food and market opportunities of organic farming.

Reganold and Watchter(2016), observed that organic agriculture systems lean to have greater and more various crop rotations, considerable plant-based weed

suppression through cover crops, more biologically-based pest regulation and better nutrient cycling relative to conventional chemical systems.

Aulakk and Ravisankar(2017), carried out a study on a perspective of organic farming in Indian context. They studied about the management of soil health, pest, disease and weed. They also highlighted the perception of farmers and consumers.

Uriel et al.,(2020), attempted to highlight the effect of farming system on biologically mediated plant –soil feedbacks.

Yadav et al.,(2021), evaluated the importance of organic farming for sustainable agriculture. Their studies includes components and method of organic farming. They concluded that organic farming is a system of farming that promotes environmentally, socially and economically sound products of food and fibres.

1.14.6.4 *Pungency – Bec*

Scoville(1912); Govindarajan et al.,(1977) observed that the pungency level of chilli is measured by the Scoville organoleptic test which is the first laboratory test reported. They further highlighted that one 'Scoville Heat Unit'(SHU) corresponds to about fifteen parts per million (ppm) of the capsaicin.

Narayanan et al.,(1979), documented on the fact that Chilli is made up of 40 percent pericarp containing an inner sheath known as dissepiments, 56 per cent seeds and 4 per cent stalks. They also pointed out that almost all the pungency is contained in the pericarp, while the chilli seeds contain only traces of pungency with a capsaicin content of 0.005 per cent. The pungency of the pericarp is mostly concentrated in the dissepiments.

Rowland et al.,(1983), opinion that capsaicin is formed by specialized gland cells which is found in the cross-walls or ribs of the pepper and is made up of various different alkaloids.

Hoffman et al.,(1983);Claver et al.,(2006), observed that Chilli is one of the most popular cultivated spices globally valued for their sensory attributes of colour,

aroma and pungency. They also highlighted that the pungency in chilli is due to the presence of closely related to the alkaloids called capsaicinoids which is found only in the genus Capsicum. The nature of the pungency has further been established as a mixture of seven homologous branched-chain alkyl vanillyamides.

Bosland(1995), defined pungency as a "sharp, piercing, stinging, biting or penetrating quality" or "power to excite or stimulate".

Borges(2001), studied on the reasons of pungency in chillies. He highlighted that the sensation of heat and pain in the mouth are the result of capsaicin. He also stressed on the history of chilli.

Prasath and Ponnuswami(2008), attempted to highlight a review on breeding for extractable colour and pungency in capsicum. They also stressed on the need for international development of capsicum for high colour and low or nil pungency through germplasm, genetics and breeding.

Nadeen et al.,(2011), evaluated the antioxidant potential of bell pepper. The observed that, nutritionally, sweet peppers are good source of mixture of antioxidants, flavonoids including ascorbic acid, carotenoids,flavonoids and polyphenols.

Ananthan et al.,(2014), made assessment on the nutrient composition and capsaicin content of some red chillies in India. They concluded that the nutrient and bioactive substances in chilli varieties consumed in India exhibits the diversity within the capsicum species.

Mozsik et al.,(2014), studied on the benefits of capsaicin, which is the cause of pungency in birds eye chilli is believed to reduce risks of organ dysfunction and keep a healthy body and a diet containing capsaicin shows a significant features to enhance and boost the immune system.

Nag et al.,(2017), examined the validation of capsaicin in Indian capsicum species through RP-HPLC. Method validation was executed by linearity, specificity,

accuracy and precision,limit of quantification and limit of detection on the basis of International Conference on Harmonization(ICH) guideline.

Hassan et al.,(2019), conducted a study on carotenoids of capsicum fruits, its pigment profile and health – promoting functional attributes.

Sreshtaa et al.,(2021), brought out the importance of capsaicin in a diet and its numerous health benefits. They observed that capsaicin contains phytochemical that exhibit multiple characteristics.

1.14.6.5 *GI - Bec*

Rajashekhar,.C(2007), studied on the protection of geographical indication of goods. In his study he mentioned about protection and implications of GI and also Trip Agreement. He concluded that goods marketed under GIs are known for thei high quality.

Larson(2007), observed that a GI- labeled product treated a public good due to its intrinsic characteristics are the result of a local heritage, a reputation built up over a generations that belongs to no one in particular.

Echols(2008); Mottet et al.,(2011); Calboli et al.,(2017); Parasecoli,(2017);Bonanno et al.,(2019), Studied the history of geographical indications, and highlighted that in the middle ages, the seals of the European guilds were regarded to be a symbol of the quality of local foods. They further stressed that the development of international agri-food trade during the 19^{th} century led to the signing of the 1883 Paris Convention for the Protection of Industrial Property, an agreement which influences to the first international GI accord.

Bowen(2010), carried out a study on the the potential for geographical indications and its development. He wrote about GIs and rural development and implementing GIs in the Global South.

Dogan and Gokovali(2012), attempted to highlight about geographical indications and the aspects of rural development and marketing through the

traditional products. They also highlighted that GIs established a connection between the product and the name of the geographical region where the product is originated.

Sekiguchi(2012), emphasized on the fact that GI and patrimonization are sometimes concerned with IPs(Indigenous Peoples) as they are inheritors and practitioners of unique and traditional cultures and a way of life closely related to the environment through farming, gathering, hunting, fishery and animal husbandry.

According to Calboli(2015), Geographical indication is a name or a sign used on products relating to a specific geographical location or origin.GI are regarded to recognize product quality, highlight brand identity and reputation.

Kumar and Srivastava(2017), conducted a study on the legal status of geographical indications in India.They highlighted the legal framework and registration procedure of GIs in India.

Divya and Anoop(2018), brought about the importance of geographical indications through rural development. They mentioned the Social, Economic, Consumer's and Producer's Benefits of geographical indication. They also highlighted that GI helps in creating a relationship between the specific product and to the area to which the item belongs or is originated from.

Sekine(2021), critically analysed the case of Cordillera Heirloom Rice in the Philippines. His study is about the potential and contradictions of geographical indication and patrimonization for the sustainability of indigenous communities.

1.14.7. Reports Reviewed

Malhotra(2021) has given an overview of Indian spices. This report discussed about the export of different spices from India, the state-wise production of different spices and also the import of spices from other countries.

Reports of Spice Board of India, ICAR-Indian Institute of Spices Research, APEDA- Agricultural and Processed Food Products, IBEF-India Brand Equity Foundation, ICAR-Indian council of Agricultural Research, IISR- Indian Institute of Spices Research, Spices Statistics at a Glance 2021, Business Case for

Spices Production & Processing-YES BANK and MOFPI-Ministry of Food Processing Industries were also reviewed.

1.14.8. Books Reviewed

Solomon(2014) discussed in details about the consumers in the marketplace, consumers as individuals , consumers as decision makers and consumers and subcultures. He also highlighted on buying, having and buying.

1:15 RESEARCH GAP:

There is no substantial evidence of research conducted on marketing practices and buyers attitude of the three spices namely, turmeric, ginger and bird's eye chilli in the state of Mizoram. Hnamte et al (2012) and Vanrammawia and Thanga (2013) pointed out to the infrastructural constraints and pricing practices of spices grown in Mizoram. There appears to be no substantial evidence of work done on the marketing practices of turmeric, ginger and bird's eye chilli and probing the market potential of turmeric, ginger and bird's eye chilli at the national/international level on the basis of an appraisal of the perceptions/attitudes of traders beyond the realm of local markets in Mizoram. The present study is an attempt to explore the markets for these spices beyond Mizoram.

1:16 STATEMENT OF THE PROBLEM:

Evidently, these spices namely turmeric, ginger and turmeric birds eye chilli have a substantial share in the production of spices in India(56.92 percent). Moreover they also contribute substantially to exports (Rs. 36451.732 millions in 2013-14 and Rs. 459278 millions in 2014-15) Mizoram produces 59,588 metrictonnes of bird's eye chilli,ginger and turmeric. These spices are cultivated in traditional methods of farming therefore, making them a highly valued organic spice. With Agriculture being the mainstay of the Mizo economy, there is need to formulate strategies to enhance the markets for spices grown in Mizoram. The spices grown in the North East have a huge potential in the domestic and world market(Hnamte,2012). A key aspect in expanding markets is the perceptions and attitudes of customers towards the spices grown in the state. The present study proposes to focus on the marketing

aspects of the spices grown in Mizoram. The study proposes to identify the features of the products, the pricing practices of the farmers, the distribution channels and promotional methods. It appears that the market for these spices grown in Mizoram are presently restricted to the local market. Further more, an attempt is made to understand the market for these spices outside Mizoram.

1:17 OBJECTIVES :

The main purpose of the proposed study is to identify and analyse the marketing practices adopted by the farmers of the select spices namely, bird's eye chilli, ginger and turmeric in Mizoram with a view to explore the market for these spices beyond Mizoram. The objectives of the proposed study are as follows :

1.To study the role and growth of select spices in the Indian economy and the economy of Mizoram.

2.To identify the marketing practices of spice growers-unique features of the product, the pricing practices of the farmers, the distribution channels and promotional methods.

3.To study the buying attitudes, preference and perception of buyers/trade visitors with respects to the select spices.

4. To analyse the challenges of marketing of select spices and offer suggestions to the growers of spices in Mizoram and other stakeholders and facilitating agencies.

1:18 RESEARCH METHODOLOGY:

The study focuses on the analysis of the marketing practices of spices namely turmeric, ginger and bird's eye chilli, of the horticulture products in Mizoram.

Sources of Data: The researcher rely on secondary data as well as primary data as detailed below:

1.The secondary data is collected by consulting relevant reports, journal, magazines, books, newspapers and websites.

2.Primary data:

a) Buying attitudes, preferences and perceptions is assessed from customers of select spices of Mizoram at the national level. The researchers administered a structured questionnaire at the point of purchase in the Mizo spices stalls in BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation(NSIC) Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016 which was displayed by the farmers, sponsored by Horticulture Department, Govt of Mizoram. Thereafter, farmers from Mizoram have not participated in this exhibition.

(b) The researchers have examined the production practices and identified the 4Ps of marketing viz; product, price, place and promotion of turmeric, ginger and bird's eye chilli agripreneurs in the main growing centres of Mizoram.

The researcher conducted interviews and FGDs with 50 farmers of Multi-farming Cooperative, producing turmeric in Reiek village, in Mamit district and 50 farmers fromTlangsam Tumeric Growers Society in Champhai, Champhai district, the main centres of organised farming practices in turmeric production in Mizoram. The researchers conducted interviews and FGDs with 50 farmers in Khanpui village, East Phaileng village and Pehlawn village in Aizawl district; 25 farmers in Reiek village in Mamit district and 25 farmers in Champhai, Champhai district which are the main ginger growing centres in Mizoram. The researcher also conducted interviews and FGDs with 50 farmers of Bird Eye chilli Grower Society producing bird's eye chilli in West Phaileng village, in Mamit district, 25 farmers in Reiek village in Mamit district and 25 farmers in Champhai, Champhai district which are the main bird's eye chilli growing centres in Mizoram. These farmers were represented in the BIOFACH India 2016. The data was collected through interviews and FGDs in 2018 and 2019.

Purposive sampling technique was adopted to collect primary data from traders. Purposive sampling implies collecting information from members of the population who are available at the point of purchase in the Mizo spice stalls in exhibitions organised in New Delhi. Sample consisted of all traders who showed interest in buying these spices.

Questionnaires was designed to assess the traders attitudes towards Mizo spices products, on turmeric, ginger and bird's eye chilli based on their attributes and benefits. The product attributes include each spice attributes namely, curcumin, aroma, price, organic and packaging for turmeric, appearance, price, aroma, organic and pungency for ginger, distinct appearance, price, organic, pungency and geographical indications for bird's eye chilli. The 116 respondents were asked to give their preferences of the attributes of the turmeric displayed in the Mizo Stall. Out of the many enterprises who visited this exhibition, 113 enterprises showed interest in this product and they were asked to give their preferences of the attributes of the ginger displayed in the Mizo Stall. From the number of enterprises who visited the exhibition, 100 enterprises showed interest in birds eye chilli displayed in the Mizo Stall and were asked to give their preferences of the attributes.

For this purpose, the multi-attribute model developed by Fishbein(1985) is applied. The model measures three components of attitudes :

(a) Salient beliefs people have about an object Ao,

(b) Object-attribute linkages, or the probability that a particular object has an important attribute and

(c) Evaluation of each of the important attributes.

Attributes such as curcumin, aroma, price, organic and pakaging for turmeric, appearance, price, aroma, organic and pungency for ginger and distinct appearance, price, organic, pungency and GI bird's eye chilli.

The basic formula is:

$A_{ijk} = \sum B_{ijk} I_{ik}$ Where:

i=attribute

j=product

k=consumer

I=the importance weight given attribute i by consumer k.

B=consumer k's belief regarding the extent to which product j possesses attribute i.

A=a particular consumer's (k's) attitude score for product j.

The overall attitude score for each of the selected spices was computed after weighing each by its relative importance on the basis of the formula.

2. The secondary data is collected by consulting relevant reports, journal, magazines, books, newspapers and websites. Such data will be collected from various reports.

Chapterisation

1.Introduction.

2. Indian spices: Role and significance in Indian economy and the economy of Mizoram.

3.Marketing practices of growers of bird's eye chilli, ginger and turmeric in Mizoram.

4. Buyers' attitudes, preference and perception towards select spices.

5. Conclusions, Prospects, Challenges and Suggestions

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CHAPTER 2

INDIAN SPICES: ROLE AND SIGNIFICANCE IN INDIAN ECONOMY AND THE ECONOMY OF MIZORAM.

2:1 ROLE AND SIGNIFICANCE OF SPICES IN INDIAN ECONOMY:

India is usually referred as 'spice bowl of the world' owing to the cultivation of 75 varieties of spices out of 109 shortlisted by International Organization for Standardization(ISO) and it is also for her production of different variety and superior quality spices India has highest number of spice varieties in the world (Ralte and Ekhe,2022;Anantha and Sidana,2019).This is due **to the** varying climatic conditions in India which provide ample scope for the cultivation of a variety of spices. Indian spices are the most sought-after globally, given their exquisite aroma, texture, flavour and medicinal value. India has the largest domestic market for the spices of the world(Palani,2019). Over the years, the Indian spice community has evolved and matured as a technology-based, quality-conscious, customer-centric, market-driven industry. With Karnataka and Kerala on the front foot, almost all Indian states produce spices, with a total area under spice cultivation being 3.21 million hectares(Spice Board of India, 2016). In financial year 2022, the area under cultivation of spices was estimated to be 4.49 million hectares across India(****)

According to Spices Board of India, in the year 2021-22, the country produced about 10.9 Mn MT of spices in 4.4 Mn Ha (adv. estimates) with average productivity of nearly 2.5 MT/Ha. Over the period (2010-11 to 2020-21), the production increased at a CAGR of about 7% from 5.35 Mn MT in 2010-11 to 11.04 Mn MT in 2020-215. The acreage has also increased at a CAGR of nearly 4% from 2.9 Mn Ha in 2010-11 to 4.5 Mn Ha in 2020-2(Spice Board of India, 2023). It is interesting to note that the glory of Indian spices prevails all over the world and that helps India holding a commanding position in the global spice trade. Indian spices can be found in abundance in the highlands, tropical rain forests, marshes, marshy woods, fertile valleys, and beautiful green plains.

India is also named as 'Home of Spices' due to the fact that, it is the largest producer, consumer and exporter of spices in the world. Spices play an important role in augmenting farmers income and also export market(Papang et al.,2016). The term 'spice and condiments' applies to natural or vegetable products or mixtures that

are used in whole or crushed form mainly for the taste, aroma, for colour of food or for tempering of foods and beverages such as soups and also for medicinal properties. Spices are a natural plant products that are utilized to enhance the taste, aroma and colour of food products. Spices refer to the dried part of a plant that contains volatile oils or aromatic flavours(Salma and Ramakrishnan,2017).

The most produced and exported spices are pepper, cardamom, chilli, ginger, turmeric, coriander, cumin, celery, fennel, fenugreek, garlic, nutmeg & mace, curry powder. Spices oils and oleoresins. From the spices produced in India, chilli, cumin, turmeric, ginger and coriander make up about 76% of the total production(Spice Industry and Export in India,2022). Nearly all the states and union territories in India cultivate at least one of the spice due to the favourable climatic conditions prevailing in all the states and union territories(Rajanbabu et al.,2022). In terms of the value of the world trade, pepper, cardamom, ginger, turmeric, chilli, cinnamon, nutmeg/mace, cloves and vanilla are the most important spices crop from tropical regions and cumin, coriander, sesame seeds, mustard, sage, bay, oregano and mint are the spices crop from the non-tropical regions(FAO,2005). India is the largest exporter of spice and spice products. During the year 2020-21, the country exhibited an upward trend and exported spices worth US $4.18 which was a 34% increase from that of 2019-20. United States of America (USA) imports the highest quantity of spices in the world (Sharangi and Pandit, 2018) with a value of 1,701 thousand USD which contributes 16.35 per cent of world import value whereas India ranks third with a value of 596 thousand USD with a total share of only 5.73 per cent in the import value of the world (Yes Bank and IDH, 2018)

The word *spice* comes from the old French word espice(Dubey,2017). Spices can be in various forms, it can be in the form of fresh, prepared, dried or broken, it can also in the form of barks, leaves, buds, roots, seeds etc that cause the smell, flavour, taste, sharpness in the food items apart from the seasoning aspect. Spices are distinguished from herbs, which are leaves, flowers or stems from plants used for flavouring or as a garnish(Dubey,2017). Spices can be said to be an integral to the Indian community as influences the Indian history. Spices is an important

additive in all the Indian cuisines as it offers culinary value in exquisite aroma, texture and taste and spices also possess tremendous nutritive and therapeutic value(Dini,2019; Bower et al.,2016); Srinivasan,2014).

Spices have become very popular today not only because of its flavouring, colouring and preserving nature but also for its medicinal value. Active ingredient, anti-oxidant, functional foods, super-food are keywords in health and agriculture today(Wilson et al.,2013). According to Bagal et al.,(2020), spices refer to such natural plants or vegetable products or mixtures in whole or ground form and as used for imparting flavour, aroma and pungency to and for seasoning of foods. Spices may be made up of various parts such as floral parts(clove), fruits(cardamom, chillies), berries(black pepper), seeds(cumin, coriander), rhizome(ginger, turmeric), roots(horse radish), leaves(tejpat), kernel(nutmegs), aril(mace), bark(cinnamons) and bulbs(garlic, onion) or any other part of spice plants.

Table 2.1: SPICE WISE AREA AND PRODUCTIION

(Area in Hec, Production in Tons)

Spices	2011-2012		2017- 2018		2021-22(ADV.EST)	
	Area	Prodn.	Area	Prodn.	Area	Prodn.
Pepper	2,01,381	43,000	1,39,487	64,000	2,88,118	60,000
Cardamom(Small)	71,285	15,000	69,330	20,650	69,190	23,340
Cardamom(Large)	26,460	3,860	26,617	5,906	45,039	8,812
Chilli	7,93,921	14,48,215	6,78,880	17,18,200	6,94,313	18,66,108
Ginger(fresh)	1,25,374	9,24,417	1,68,989	17,94,560	1,90,686	21,20,643
Turmeric(dry)	2,51,824	13,98,862	2,31,637	8,63,460	3,49,642	13,30,932
Coriander	3,62,148	4,28,687	5,44,240	7,21,390	6,31,698	8,00,742
Cumin	8,43,401	4,62,645	9.66,170	6,89,420	10,36,713	7,25,651
Celery	4,176	5,271	4,010	5,510	4,331	6,103
Fennel	92,446	1,44,112	65,810	1,03,830	82,224	1,37,280
Fenugreek	96,304	1,21,775	1,49,330	2,13,340	1,67,468	2,48,203
Garlic	1,71,800	8,98,438	4,09,720	31,13,740	4,01,167	32,77,428
Tamarind	52,788	1,82,089	45,340	1,75,470	44,994	1,62,038
Clove	2,100	1,035	2,210	4,290	2,210	1,335
Nutmeg	18,407	12,138	23,470	15,110	24,080	15,384
Grand total	34,12,941	60,89,544	35,25,240	95,08,876	40,31,873	1,07,83,999

Source: State Agri/Horti Departments/DASD Kozhikkode

Spices play an important role in the economy of India as India is one of the largest producer of spices in the world. Spices production in the country grew from 67.64 lakh tonnes in 2014-15 to 106.79 lakh tonnes in 2020-21 with an annual growth rate 7.9%, following an increase in area from 32.24 lakh hectare to 45.28 lakh hectare. Among the major spices, Cumin (14.8%), Garlic (14.7%), Ginger (7.5%), Fennel (6.8%), Coriander (6.2%), fenugreek (5.8%), Red chilli (4.2%) and Turmeric (1.3 %), show significant growth rate in production(Spices Statistics at a glance 2021). Table no.1.1 shows the area and production of fifteen spices for 2011-12 and 2017-18 and advanced estimates of 2021-2022 in India. The three spices namely Chilli, turmeric and ginger ranked first, second and third among the fifteen spices produced during 2011-12. For the year 2017-18 and 2021-22, the highest production is for garlic and followed by chilli, ginger and turmeric.

Table 2.2: Decadel growth/Decline in the total share of Production

Name of Spices	Share in Production 2012(%)	Share in Production 2022(%)(ADV.EST)	Increase(+)/ Decrease(-)
Pepper	0.706	0.556	(-)0.15
Cardamom(Small)	0.246	0.216	(-)0.03
Cardamom(Large)	0.063	0.082	(+)0.019
Chilli	23.782	17.304	(-)6.478
Ginger(fresh)	15.180	19.665	(+)4.485
Turmeric(dry)	22.972	12.342	(-)10.63
Coriander	7.040	7.425	(+)0.385
Cumin	7.597	6.729	(-)0.868
Celery	0.087	0.057	(-)0.03
Fennel	2.367	1.273	(-)1.094
Fenugreek	2.00	2.302	(+)0.302
Garlic	14.754	30.392	(+)15.638
Tamarind	2.990	1.503	(-)1.487
Clove	0.017	0.012	(-)0.005
Nutmeg	0.199	0.143	(-)0.056
Total	100.00	100.00	

Adapted from Source: State Agri/Horti Departments/DASD Kozhikkode

Table 2.2 gives complete decadel growth/decline in the total share of Production of spices in India. It is observed from the table that there is decadel growth only in five spices out of the fifteen spices. Garlic, ginger have registered an increase in growth with garlic registering a substantial growth of 15.64% and ginger

(4.49%). Coriander(.39%), fenugreek(.30%) and cardamom large(.02%) have also shown an increase. However all the other spices have shown a decline. This may be attributed to due to many reasons like the pandemic Covid-19, low yield, damage to standards, crop loss due to pests and diseases, post-harvest losses fluctuating prices and also less rainfall. The main reason can be regarded as the pandemic Covid-19 which greatly effects not only the economy of India but also the rest of the world.

Table 2.3: Area of Production of Spices in India

Spices	2012	2022	**Increase(+)/ Decrease(-)**
	Area	**Area**	
Pepper	2,01,381	2,88,118	(+)86,737
Cardamom(Small)	71,285	69,190	(-)2,095
Cardamom(Large)	26,460	45,039	(+)18,579
Chilli	7,93,921	6,94,313	(-)99,608
Ginger(fresh)	1,25,374	1,90,686	(+)65,312
Turmeric(dry)	2,51,824	3,49,642	(+)97,818
Coriander	3,62,148	6,31,698	(+)2,69,550
Cumin	8,43,401	10,36,713	(+)1,93,312
Celery	4,176	4,331	(+)155
Fennel	92,446	82,224	(-)10,222
Fenugreek	96,304	1,67,468	(+)71,164
Garlic	1,71,800	4,01,167	(+)2,29,367
Tamarind	52,788	44,994	(-)7794
Clove	2,100	2,210	(+)110
Nutmeg	18,407	24,080	(+)5,673
Grand total	34,12,941	40,31,873	

Adapted from Source: State Agri/Horti Departments/DASD Kozhikkode

During the past years, there has been a steady increase in area production of spices in India. The annual growth rate of area of production of spices in India is estimated to be 3.6%. As shown in the table 2.3, the total area under spices cultivation is 34.12 lakhs hectare in 2012 and 40.31 lakhs hectare in 2022 that is an increase of 6.19 percent. Madhya Pradesh, Telangana, Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, Orissa and North Eastern States are important states for spices production.

Among the fifteen popular spices cultivated in India, an increase in the area of production can be seen from the eleven spices viz; coriander, garlic, cumin, turmeric(dry), pepper, fenugreek, ginger(fresh), cardamom(large), nutmeg, celery

and clove. Coriander spice has registered the biggest increase with a large margin of 2,69,550 hectares followed by garlic with an increase of 2,29,367 hectares.

Table 2.4:Major state-wise area and production of spices in India

(Area in Hectare, Production in Tons)

STATES	2019 - 20		2020 – 21		2021 – 22(F)		2022 – 23(*)	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Madhya Pradesh	6,66,705	30,75,980	7,24,777	33,72,216	7,32,667	35,38,199	7,40,375	35,94,787
Rajasthan	10,20,350	10,58,915	9,66,888	11,83,714	8,15,849	10,45,937	8,75,816	11,17,360
Gujarat	6,99,060	10,09,930	7,42,164	11,13,843	5,83,502	10,18,120	6,20,008	10,00,102
Karnataka	3,18,040	5,80,226	4,05,451	9,10,870	4,27,180	9,61,799	3,94,536	8,98,800
Telangana	1,42,390	8,53,095	1,36,453	8,93,675	1,96,106	9,16,297	1,96,154	8,36,197
Andhra Pradesh	2,00,130	8,96,180	2,17,061	8,85,679	2,60,163	5,12,313	2,66,259	7,20,236
Maharashtra	76,335	3,88,040	83,581	4,33,058	1,30,207	5,89,891	1,06,759	4,65,517
Orissa	1,48,195	2,97,260	1,48,196	2,97,260	1,52,446	4,18,704	1,55,174	4,39,535
Assam	1,04,613	3,31,009	1,03,217	3,38,539	1,00,135	3,17,238	1,00,807	3,16,110
Uttar Pradesh	3,86,030	2,64,575	4,04,917	2,66,968	4,30,548	3,19,693	4,03,518	2,77,650
West Bengal	61,226	2,53,312	63,942	2,60,666	64,163	2,65,574	74,355	2,75,018
Tamil Nadu	1,02,955	1,90,555	1,12,735	1,85,817	1,14,277	2,21,307	1,10,473	1,88,318
Kerala	1,63,042	1,42,670	1,59,191	1,51,426	1,52,055	1,56,447	1,61,425	1,62,866
Total	40,89,251	93,41,747	42,68,573	1,02,93,731	41,59,298	1,02,81,519	42,05,659	1,02,92,496

Source : State Agri/Horticulture Departments/DASD Kozhikkode

(*): 1st advance estimate F: FINAL

As India is the largest producer of spices in the world, spices are cultivated across the country. Table 2.4 shows major state-wise area and production of spices in India from the year 2019-20 to 2022-23. It can be seen that Madhya Pradesh ranked number one in the production of spices by producing 35,94,787 tons for the year 2022-23 with a share of 34.92 % from the total production. Rajasthan ranked number two with a production of 11,17,360(10.85%) followed by Gujarat having a share of 9.71% . The fourth position goes to Karnataka (8.73%) followed by the state Telangana(8.12%). Among the north-eastern states Assam could secured the ninth position with a share of 3.07%.

Table 2.5: State wise Total Area and Production of Turmeric from 2017 - 2021(Area in Hectare, Production in Tons)

STATES	2017 - 18		2018 - 19		2019 – 20(*)		2020 – 21(Final)		2021 – 22(adv.est)	
	Area	**Prod.**	**Area**	**Prod.**	**Area**	**Prod.**	**Area**	**Prod.**	**Area**	**Prod.**
Maharashtra	15,760	38,590	17,224	38,310	54,248	2,18,873	59,576	2,30,741	1,02,625	3,67,985
Telangana	50,150	2,94,560	53,104	3,45,270	55,444	3,86,596	41,014	3,19,760	50,058	3,30,257
Karnataka	19,340	1,22,760	26,579	1,53,770	20,740	1,32,668	20,555	1,31,138	21,308	1,30,970
Tamil Nadu	18,080	73.130	23,351	92,360	18,432	96,254	20,894	86,513	24,221	1,04,402
Andhra Pradesh	19,620	79,730	28,921	69,410	29,717	71,321	30,518	73,224	25,592	74,687
Madhya Pradesh	11,700	41,290	13,,666	47,660	16,272	57,067	17,764	62,995	19,507	69,886
Orissa	27,870	43,610	27,869	43,615	27,869	43,615	27,870	43,615	31,680	68,826
West Bengal	17,450	44,700	17,737	45,460	17,812	45,648	18,482	48,183	18,795	50,834
Mizoram	7,740	29,820	7,738	29,820	7,653	29,510	7,738	29,820	7,670	29,572
Assam	16,870	20,790	15,896	19,395	17,629	22,829	17,757	24,665	16,991	20,885
Gujarat	4,010	15,780	4425	17,386	4,570	18,181	4,692	18,191	4,281	16,834
Haryana	830	2,180	921	2,195	1,753	4,061	1,331	3,009	2,520	7,560
Total	2,09,420	8,06940	2,37,431	9,04,651	2,72,139	11,26,623	2,68,191	10,71,874	3,25,248	12,72,698

Source: State Agri/Horti Departments/DASD Kozhikkode

Figures from 2018- 19 onwards are subject to revision

(Est): Estimate; (*) Provisional

Turmeric, a powerful spice and commonly known as the Golden Spice of India is a rhizome or underground stem of the curcuma longa plant. Because of its brilliant yellow color, turmeric is also known as “Indian saffron”. Turmeric is a perennial, rhizomatous, herbaceous plant and has a warm, bitter, black pepper-like flavor earthy and a little bit gingerly, mustard-like aroma. India is the largest producer, consumer and exporter of turmeric in the world as India produces 80% of the world’s turmeric and 60% of the world’s exports. It is used in diversified forms as a condiment, flavouring and colouring agent and as a principal ingredient in Indian culinary as curry powder. It has anti cancer and anti viral activities and hence finds use in the drug industry and cosmetic industry. Turmeric, the golden spice contains the highest diversity comprising 40 species. Some important varieties which are exported outside comprises of alleppey finger, rajapore, karhadi, waigon, nizamabad, armoor, erode local, pattant and lakadong(Asraf et al.,2017).

Table 2.5 presents state wise total area and production of turmeric from 2017 – 2021, it can be seen from the table that the state Maharashtra ranked number one among top thirteen turmeric producing state in India. The estimated production for Maharashtra during the year 2021-22 is 3,67,985 tonnes which is 28.91% of the total production of the top thirteen states. The state Telangana was number one producer in India for the five years that is from 2017 to 2021, for the year 2022 the state ranked second with a production of 3,30,257 tonnes with a share of 25.95%. The third position goes to the state Karnataka with a share of 10.29% followed by Tamil Nadu having a share of 8.20% and the state Mizoram could secured 10^{th} position by producing 29,572 tonnes that is 2.32% of the total production.

Table 2.6: State wise Total Area and Production of Ginger from 2017 - 2021

(Area in Hectare, Production in Tons)

STATES	2017 - 18		2018 - 19		2019 – 20(*)		2020 – 21(Final)		2021 – 22(adv.est)	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Madhya Pradesh	23,431	3,77,480	24,964	4,14,280	27,480	4,38,394	29,762	4,77,563	31,989	5,15,741
Karnataka	20,809	2,49,920	15,858	2,44,070	22,388	2,34,171	45,564	5,32,073	30,000	3,06,344
Assam	18,105	1,61,600	17,865	1,66,270	19,351	1,83,157	19,451	1,85,951	18,481	1,70,729
West Bengal	12,250	1,33,750	12,418	1,35,590	12,510	1,36,610	12,700	1,38,998	12,875	1,41,356
Orissa	16,575	1,28,020	16,575	1,28,020	16,575	1,28,020	16,575	1,28,020	17,655	2,26,840
Gujarat	4,870	1,08,250	5,037	1,10,401	5,038	1,13,223	5,069	1,10,896	4,933	1,09,124
Kerala	4,370	86,270	3,275	70,330	2,819	55,414	1,700	56,242	2,675	54,260
Sikkim	12,300	55,900	15,638	85,116	15,643	85,152	15,222	81,500	15,276	81,796
Meghalaya	9,944	66,200	9,953	66,270	9,939	66,156	9,972	66,440	9,952	66,270
Mizoram	8,553	60,130	8,553	60,130	8,553	61,001	8,553	60,131	8,553	60,827
Arunachal Pradesh	7,650	56,580	4,001	23,770	4,001	23,766	3,278	13,384	4,743	30,897
Uttaranchal	2,325	25,710	4,911	48,468	5,061	49,684	5,094	50,683	3,888	39,016
Telangana	1,840	12,980	1,623	11,221	2,409	15,903	2,594	23,100	2,097	15,459
Andhra Pradesh	381	1,440	295	2,492	294	2,930	459	3,999	388	3,820
Total	1,43,403	15,24,230	1,40,966	15,56,428	1,52,061	15,93,581	1,75,993	19,28,980	1,63,505	18,22,479

Source: State Agri/Horti Departments/DASD Kozhikkode

Figures from 2018- 19 onwards are subject to revision

(Est): Estimate; (*) Provisional

Ginger is an herbaceous perennial crop grown as an annual, the rhizomes of which are used as a spice. Ginger, an indigenous plant, is an important spice crop of the world. Ginger is used for the manufacture of oil, oleoresin, essence, soft drink, non-alcoholic beverages and medicine. India is the largest producer and exporter to more than 50 countries accounting for more than 70% of world production. It is marketed in different forms such as raw ginger, dry ginger, ginger powder, ginger oil, ginger oleoresin, ginger ale, ginger candy, ginger beer, brined ginger, ginger wine, ginger squash, ginger flakes etc.

Table 2.6 gives the detailed state wise total area and production of ginger from 2017 – 2021. It can be observed that Madhya Pradesh ranked first in the production of ginger with a total estimated production of 5,15,741 tonnes, having a share of 28.29% for the year 2022-23. The second ranked is secured by Karnataka with a share of 16.80%, followed by Assam (9.36%). The state Mizoram could secured the tenth position with a share of 3.33% of the total estimated production.

Table 2.7: State wise Total Area and Production of Chilli from 2017 - 2021

(Area in Hectare, Production in Tons)

STATES	2017 - 18		2018 - 19		2019 – 20(*)		2020 – 21(Final)		2021 -22(adv.est)	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Andhra Pradesh	1,19,920	6,18,350	1,58,428	5,01,410	1,53,082	8,05,026	1,77.456	7,96,653	1,60,000	7,00,000
Telangana	73,780	3,40,800	82,521	3,69,020	80,579	4,36,380	89,156	5,36,541	85,000	4,33,122
Madhya Pradesh	94,410	2,32,700	87,839	2,17,550	88,675	2,08,634	1,22,198	3,15,598	1,18,295	3,03,069
Karnataka	1,00,340	1,91,480	1,57,587	1,94,760	74,078	1,29,238	85,598	1,47,049	1,00,000	1,84,533
Orissa	71,700	69,280	71,700	69,280	71,700	69,280	71,700	69,280	71,699	69,257
Tamil Nadu	44,120	18,100	45,950	14,000	47,991	29,618	55,716	25,648	53,518	24,117
Gujarat	11,350	22,070	11,335	21,444	11,299	18,905	11,930	23,345	11,990	22,359
Assam	20,240	18,990	19,847	18,980	2,196	4,713	20,459	20,189	20,691	19,648
Maharashtra	7,050	14,140	5,698	14,030	6,508	22,434	5,605	24,484	5,648	18,546
Punjab	7,500	14,080	8,770	16,656	8,776	16,955	8,777	17,630	8,265	15,882
Rajasthan	7,990	13,280	8,480	14,356	9,832	20,033	6,603	10,925	7,598	12,915
Uttar Pradesh	13,640	12,580	13,763	12,716	13,547	11,808	13,600	12,065	13,619	11,885
West Bengal	65,550	1,05,750	5,292	8,300	5,450	8,576	4,930	7,821	4,507	7,781
Nagaland	180	810	1,372	1,798	1,379	1,754	1,980	4,328	1,377	1,748
Total	6,37,770	16,72,410	6,78,582	14,74,300	5,75,092	17,83,354	6,75,708	20,11,556	6,62,207	18,24,862

Source: State Agri/Horti Departments/DASD Kozhikkode

Figures from 2018- 19 onwards are subject to revision

(Est): Estimate; (*) Provisional

Chilli, an universal spice, named as wonder spice is the fruit of a chilli plant that come from the genus ‘Capsicum,’ belonging to the family of ‘Solanaceae’. Chilli plant are herbaceous or semi-woody annuals or perennial and its fruits vary in shape, size, colour and degree of pungency. The leaves are ovate, tapering to a sharp point and the fruits are of diverse shapes and sizes depending upon the variety. Chillies are essential and the major ingredient in many different cuisines around the world as it adds pungency, taste, flavour and colour to the dishes.. Chilli is one of the most important commercial crops of India and is grown almost throughout the country. Indian chilli is famous worldwide due its two important commercial qualities that is its colour and pungency levels. Its interesting to note that there are more than 400 different varieties of chillies found all over the world.

Table 2.7 gives state wise total area and production of chilli from 2017 – 2021. It is evident from the table that Andhra Pradesh is the highest producer of chilli for the last five years, followed by Telangana. The third position is secured by Madhya Pradesh and fourth is Karnataka. For the year 2021-22 , it is estimated the state Andhra Pradesh will produced 7,00,000 tons which is38.35% of the total production of the top fourteen states of India while, the state Telangana is estimated to produce 4,33,122 tons that is 23.73% of the total production. The top five states viz; Andhra Pradesh, Telangana, Madhya Pradesh, Karnataka and Orissa shared 92.58% of the total production of the top fourteen states fot the year 2020-21. This shows that the other nine states, Tamil Nadu, Gujarat, Assam, Maharashtra, Punjab, Rajasthan, Uttar Pradesh, West Bengal and Nagaland have a small margin share of only 7.42%.

Table 2.8: State wise Total Area and Production of Turmeric, Ginger and Chilli for 2022-23

(Area in Hectare, Production in Tons)

STATES	**TURMERIC 2022 – 23(*)**		STATES	**GINGER 2022 – 23 (*)**		STATES	**CHILLI 2022 -23(*)**	
	Area	**Prod.**		**Area**	**Prod.**		**Area**	**Prod.**
Maharashtra	83,000	2,78,000	Madhya Pradesh	33,489	5,44,526	Andhra Pradesh	2,25,000	6,27,849
Telangana	40,000	2,50,000	Karnataka	40,000	5,00,000	Telangana	1,50,000	5,50,000
Karnataka	21,323	1,30,074	Orissa	17,678	2,27,479	Madhya Pradesh	1,22,761	3,20,644
Tamil Nadu	25,000	1,00,000	Assam	18,560	1,73,250	Karnataka	1,09,598	1,67,966
Madhya Pradesh	21,896	80,872	West Bengal	12,548	1,37,205	Orissa	74,324	89,000
Andhra Pradesh	26,874	73,678	Maharashtra	9,163	1,31,472	West Bengal	17,146	27,646
Orissa	31,200	69,056	Gujarat	5,040	1,11,302	Gujarat	12,060	22,909
West Bengal	18,050	46,985	Sikkim	15,277	81,804	Tamil Nadu	49,293	22,239
Mizoram	7,740	29,820	Meghalaya	10,157	67,107	Assam	20,643	20,129
Assam	16,949	21,632	Kerala	3,218	65,635	Maharashtra	6,127	18,991
Gujarat	4,528	17,748	Mizoram	8,560	60,130	Punjab	8,749	17,058
Total	2,96,560	10,98,065		1,73,690	20,99,910		7,95,701	18,84,431

Source : State Agri/Horti Departments/DASD Kozhikkode

(*) 1st advance estimate

Table 2.8 presents the first advance estimate of total area and production of turmeric, ginger and chilli for the year 2022-23. It is observed that for the spice turmeric, the state Maharashtra ranked first with a production of 2,78,000 tons having a share of 25% of the total production. Second ranked is Telangana with a share of 22.76%, followed by Karnataka(11.84%) and fourth rank is secured by Tamil Nadu with a share of 9.10%. The state Mizoram could attained ninth rank with a production of 29,820(2.71%).

It can be seen that for ginger, the highest rank has been accorded to Madhya Pradesh by producing 5,44,526 tons with a share of 25.93%. The state Karnataka could secured the second rank with a share of 23.81%, followed by Orissa(10.83%), then Assam(8.25%). There is a small difference in the fifth and sixth rank which is attained by West Bengal(6.53%) and Maharashtra(6.26%) respectively. The state Mizoram could secured eleventh rank with a share of 2.86% of the total production.

For chilli, the first rank is obtained by Andhra Pradesh with a large margin of 33.31% share of the total production. The second rank is attained by Telangana with a big share of 29.18%. The state Andhra Pradesh and Telangana could secured a share of 62.49% out of the total production of the top eleven chilli producing states of India. The third rank is Madhya Pradesh (17.01%), followed by Karnataka(8.91%) and the fourth rank is Orissa with a share of only 4.72%.

Table 2.9: Decadel Growth/Decline in the Total Share of Production in India :Turmeric

State	2011(% share of prod.)	2021(% share of prod.)	Increase(+/Decrease(-)
Tamil Nadu	27.397	21.006	(-) 6.391
Andhra Pradesh	37.693	15.027	(-) 22.666
Karnataka	9.537	26.352	(+)16.815
Gujarat	3.755	3.387	(-) 0.368
West Bengal	2.896	10.228	(+) 7.332
Orissa	15.548	13.848	(-) 1.7
Mizoram	2.175	5.950	(+) 3.775
Assam	0.999	4.202	(+) 3.203
Total	100.00	100.00	

Adapted from Source: State Agri/Horti Departments/DASD Kozhikkode

Table 2.9 gives the decadel growth/decline in the total share of production of turmeric in India. It can be seen that the state Karnataka has an increase in share of production with a large margin of 16.815%, followed by West Bengal(7.332%), next is Mizoram(3.775%) and then Assam(3.203%). The state Andhra Pradesh has a huge margin decrease that is 22.666%, followed by Tamil Nadu(6.391%), Orissa(1.7%) and Gujarat(0.368%).

Table 2.10: Decadel Growth/Decline in the Total Share of Production in India: Ginger

State	2011(% share of prod.)	2021(% share of prod.)	Increase(+/Decrease(-)
Assam	16.378	13.222	(-) 3.156
Gujarat	9.533	8.451	(-) 1.082
Karnataka	12.615	23.724	(+) 11.109
Arunachal Pradesh	7.287	2.393	(-) 4.894
Meghalaya	7.384	5.132	(-) 2.252
Sikkim	6.679	6.334	(-) 0.345
Orissa	18.214	17.567	(-) 0.647
Mizoram	4.654	4.711	(+) 0.057
West Bengal	3.354	10.947	(+) 7.593
Uttaranchal	5.938	3.021	(-) 2.917
Kerala	5.010	4.202	(-) 0.808
Andhra Pradesh	2.953	0.296	(-) 2.657
Total	100.00	100.00	

Adapted from Source: State Agri/Horti Departments/DASD Kozhikkode

It can be seen from table 2.10 that from the twelve states of India, only in three states there is decadel growth viz: Karnataka(11.109%), West Bengal(7.593%) and Mizoram(0.057%). The other nine states have decline share of production from the year 2011 to 2022.

Table 2.11: Decadel Growth/Decline in the Total Share of Production in India :Chilli

State	2011(% share of prod.)	2021(% share of prod.)	Increase(+/Decrease(-)
Andhra Pradesh	62.461	52.751	(-) 9.71
Karnataka	8.313	13.906	(+) 5.593
West Bengal	7.479	0.586	(-) 6.893
Madhya Pradesh	7.402	22.839	(+)15.437
Orissa	5.750	5.219	(-) 0.531
Gujarat	5.323	1.685	(+) 3.638
Tamil Nadu	1.875	1.817	(-) 0.058
Punjab	1.397	1.197	(-) 0.2
Total	100.00	100.00	

Adapted from Source: State Agri/Horti Departments/DASD Kozhikkode

As shown in table 2.11, three states from the nine states have decadel growth, they are Madhya Pradesh(15.437%), Karnataka(5.593%) and Gujarat(3.638%). The other six states having decadel decline in share of production

are Andhra Pradesh(9.71%), West Bengal6.893%),Orissa(0.531%), Tamil Nadu(0.058%) and Punjab(0.2%).

Table 2.12: District-Wise Production of Turmeric, Ginger and Bird's Eye Chilli in Mizoram for 2020-21

Districts	Turmeric		Ginger		Bird's Eye Chilli	
	Area (Ha)	Prod. (MT)	Area (Ha)	Prod. (MT)	Area (Ha)	Prod. (MT)
Mamit	800	8,460	664	9,070	689	1,291
Kolasib	300	4,320	1,406	9,124	1,344	1,000
Aizawl	1,125	2,858	1,447	8,996	2,218	2,246
Champhai	1,064	2,144	1,321	7,891	1,474	1,586
Serchhip	1,280	3,920	1,565	8,442	1,700	1,282
Lunglei	1,295	2,930	835	5,617	1,902	1,597
Lawngtlai	341	2,149	687	5,596	1,194	963
Siaha	1,533	3,042	628	5,395	675	953
Saitual	-	-	-	-	-	-
Khawzawl	-	-	-	-	-	-
Hnahthial	-	-	-	-	-	-
Total	7,738	29,823	8,553	60,131	11,196	10,918

(-) Data not available

Source – Directorate of Horticulture

In Mizoram, there are eleven districts namely, Mamit, kolasib, Aizawl, Champhai, Serchhip, Lunglei, Lawngtlai, Siaha, Saitual, Khawzawl and Hnahthial. Table 2.12 shows the production of turmeric, ginger and bird's eye chilli in the eleventh districts of Mizoram for the year 2020-21. The highest production for turmeric is Mamit district, for ginger it is Kolasib district and for bird's eye chilli it is Aizawl district.

Table 2.13: Item-wise export of spices from India

(Quantity:tonnes, Value: Rs in Lakhs)

SPICES	2016-17		2017-18		2018-19		2019-20		2020-21	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pepper	17,600	1,14,313	16,840	82,078	13,540	56,868	17,000	57,371	16,300	54,446
Cardamom (small)	3,850	42,150	5,680	60,908	2,850	35,625	1,850	42,537	6,500	1,10,675
Cardamom (large)	780	8,264	760	5,647	860	6,106	1,310	7090	1,325	9,126
Chilli	4,00,250	5,07,076	4,43,900	4,25,633	4,68,500	5,41,118	4,96,000	6,71,040	6,01,500	8,42,975
Ginger	24,950	25,705	22,605	21,607	18,150	19,602	60,410	52,905	1,25,700	75,665
Turmeric	1,16,500	1,24,191	1,07,300	1,03,568	1,33,600	1,41,616	1,37650	1,28,691	1,83,000	1,67,660
Coriander	30,300	29,208	35,185	27,275	48,900	35,208	47,135	39,831	57,000	48,983
Cumin	1,19,000	1,96,320	1,43,670	2,41,799	1,80,300	2,88,480	2,14,190	3,32,806	2,99,000	4,25,310
Celery	6,250	6,246	6,480	5,950	6,100	6,649	6,230	6,904	7,650	9,984
Fennel	35,150	30,876	34,550	25,906	26,250	24,413	24,220	23,162	31,800	27,630
Fenugreek	34,680	18,277	29,280	12,689	27,150	13,847	26,570	15,690	38,300	24,642
Other seeds(1)	18,100	15,456	22,175	16,046	29,740	18,736	37,580	22,081	48,800	30,008
Garlic	32,200	30,712	46,980	30,936	29,500	17,110	22,280	17,183	17,950	15,630
Nutmeg& Mace	5,070	23,642	5,500	22,094	3,300	15,015	2,900	13,280	3,875	19,000
Other Spices(2)	40,210	50,595	38,305	65,253	43,300	61,486	37,235	66,546	44,000	70,943
Curry powder/ Paste	28,500	59,910	30,150	61,620	33,850	74,470	38,370	81,279	38,450	89,145
Mint Products(3)	22,300	2,52,750	21,500	3,22,835	21,610	3,74,934	24,470	3,83,202	27,400	3,66,825
Spice Oils	12,100	2,45,533	17,200	2,66,172	12,750	2,19,300	13,000	2,44,683	16,450	3,30,675

and Oleoresins										
Total	9,47,790	17,81,224	10,28,060	17,98,016	11,00,250	19,50,581	12,08,400	22,06,280	15,65,000	27,19,320

(1) Include Ajwan seed, Dill seed, Poppy seed, Aniseed, Mustard etc.

(2) Include Asafoetida, Cinnamon, Cassia, Cambodege, Saffron, Vanilla, Spices(NES) etc.

(3) Include menthol, menthol crystals and mint oils.

Source:Spices Statistics at a Glance 2021, Directorate of Arecanut and Spices Development

The export for the different spices during the year 2016 to 2020 was 58,49,500 tonnes in quantity and Rupees 1,04,55,421 lakhs in values. It can be seen from the table 2.13 that the three spices namely turmeric, ginger and chilli have a large share in the export of spices from India. As India is the largest producer, consumer and exporter of chilli, the table 13 depicted that during the year 2016 to 2020, 24,10,150 tonnes with a value of Rupees 29,87,842(in lakhs) were exported. In the case of turmeric 6,78,050 tonnes with a value of Rupees 6,65,726(in lakhs) were exported and for ginger 2,51,815 tonnes with a value of Rupees 1,95,484(in lakhs) were also exported.

For the year 2020-21, chilli secured first position among the spices exported with a share of 38.43%. Cumin ranked second with a share of 19.10%, followed by turmeric(11.69%). The fourth position is obtained by ginger with a share of 8.03%. Comparing the year 2016 and 2020, these spices have registered an increase, chilli(50.28% in volume,66.24% in value), ginger(403% in volume,194.35% in value),turmeric(53.54% in volume,35% in value), cumin(151.26% in volume and 116.64% in value), cardamom(small)(68.83% in volume,162% in value), cardamom(large)(69.87% in volume,10.43% in value),coriander(88.11% in volume,67.70%),celery(22.4% in value,59.8% in value), fenugreek(10.43% in volume,34.82%), other seeds(169.61% in volume, 94.15% in value),other spices(9.42% in volume,40.21% in value), curry powder and paste(34.91% in volume and 48.79% in value), mint products(22.86% in volume,45.13% in value) and spice oils and oleoresins(35.95% in volume,34.67% in value). The following spices have shown a decrease, pepper(7.38% in volume, 52.37% in value), fennel(22.45 in volume, 59.8% in value), garlic(44.25% in volume, 49.10% in value) and nutmeg and mace(23.57% in volume,19.65% in value).

It is interesting to know that during 2020-21, the export of spices reached an all-time high both in terms of value and volume by registering a growth of 17% in value and 30% in volume. India produces about 75 of the 109 varieties listed by the International Organization for Standardization(ISO). The most produced and exported spices are pepper, cardamom, chilli, ginger, turmeric, coriander, cumin, celery, fennel, fenugreek, garlic, nugmeg & mace, curry powder, spice oils and

oleoresins. Out of these spices, chilli, cumin, turmeric, ginger and coriander make up about 76% of the total production.

Table 2.14: Major-country-wise export of spices from India 2014-15 to 2019-20

(Quantity:tonnes, Value: Rs in Lakhs)

Country	2015-16		2016-17		2017-18		2018-19		2019-20	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
China	14,719	1,19,788	14,921	1,16,970	28,981	1,93,422	93,649	2,73,054	2,13,835	5,05323
U.S.A	75,702	2,81,558	70,795	2,88,660	79,882	3,02,422	82,202	2,83,059	87,804	3,35,127
Bangladesh	36,340	17,737	76,764	57,615	53,154	46,709	80,027	91,018	1,41,032	1,17,703
U.A.E	69,120	76,110	73,199	81,601	77,587	88,593	65,140	83,047	80,203	1,07,833
Thailand	62,291	78,946	63,698	1,06,642	67,043	71,037	74,215	92,242	67,945	1,07,813
Sri Lanka	61,179	63,422	63,227	64,071	65,518	47,723	67,884	61,502	63,927	75,444
Malaysia	61,505	75,233	68,443	82,864	62,545	60,045	64,998	68,474	55,680	74,566
U.K	30,932	71,488	29,436	75,745	30,659	68,138	31,408	69,620	32,112	65,405
Indonesia	24,455	30,848	39,119	54,249	42,286	41,458	40,804	56,060	43,308	64,231
Germany	9,952	46,432	10,727	51,576	10,222	52,249	10,601	46,568	9,218	48,494
Total	4,46,195	8,61,562	5,10,329	9,79,993	5,17,877	9,71,796	6,10,928	11,24,644	7,95,064	15,01,939

Source:Spices Statistics at a Glance 2021, Directorate of Arecanut and Spices Development

India is one of the world's largest, consumer and exporter of spices, and it exported spices and spice products to 180 destinations worldwide in 2019-20. The top destinations among them were China, U.S.A, Bangladesh, U.A.E, Thailand, Sri Lanka, Malaysia, U.K, Indonesia and Germany. These ten destinations made up of more than 78 per cent of the total export earnings in 2019-20. As shown in the table 2.14 that, spices worth Rs.5,15,323 lakhs were exported to China in 2091-20 whish constituted 33.64% of the overall value exported. During the same year U.S.A imported Rs 3,35,127 lakhs(21.31%), while Bangladesh imported Rs.1,17,703 lakhs(7.83%).Spices worth Rs.1,07,833 and Rs.1,07,813 were exported to U.A.E and Thailand consisting of 7.18% and 7.17%.

2:2 ROLE AND SIGNIFICANCE OF SPICES IN ECONOMY OF MIZORAM

The economy of Mizoram is primarily based on agriculture and shifting cultivation is still the dominant mode of agriculture in the state. According to the 2011 census, around 60 per cent of principal workers are employed in agriculture and allied sectors of the economy(Mizoram Economic Survey, 2021-22). Mizoram has geographical area of 21,087 sq. kms. out of which the Horticulture potential area is 11.56 lakhs Ha. At present, the total area under Horticulture crops is 1.10 lakh Ha. The geo-climatic situation of Mizoram offers an excellent scope for growing different Horticulture crops including fruits, vegetables, spices, plantation crops, medicinal and aromatic plants of high economic value. Of the many spice crops, ginger, turmeric and birds eye chilli are the major spice crops of Mizoram(Department of Horticulture, Govt. of Mizoram).

It is interesting to note that, the rich diversity of agro climatic conditions, topographical variations and altitudinal differences offer good scope for horticulture activities in Mizoram. The Government of Mizoram has given optimum effort to not only achieving self-sufficiency in fruit, vegetable, flowers, spices and plantation crops in Mizoram but also building commercial scale production for identified horticulture crops with a mission to enhancement in production, marketing and processing of Horticulture produces for increasing income and employment.

Mizoram accounts for about 13.2% of the total fruits produced in the Northeast. Spices contribute about 13% to the horticulture basket with the key contributors being Ginger, Turmeric and Chili(YES BANK Ltd., IDH India,2018).

2.2.1 Production of Spices in Mizoram:

Mizoram falls under the Eastern Himalayan Zone, according to the demarcation of 15 agro-climatic regions in India. Mizoram enjoys a tropical and sub-tropical climate where most of the horticultural crops flourish. Of the total 21 lakh hectare of land in the state, about 4.40 lakh hectare are suitable for horticulture. The climate in the state is suitable for the cultivation of spices like ginger, turmeric, chilli, pepper, cinnamon, large cardamom and citronella. At present ginger, turmeric and chillies are commonly cultivated in Mizoram. According to the Spice Board of India, Mizoram has congenial grounds for commercial cultivation of spices retaining their unique generic properties.

The Indian Council of Agricultural Research, New Delhi, India funded for the spice improvement in Mizoram was started on February, 2009 through ICAR-AICRP. Spices play an important role in the economic stability of the rural households in Mizoram, the initiation of this Centre helps in scaling up spice production. Major spices like ginger, turmeric and bird's eye chilli produced from Mizoram are unique in their characteristics. Mizoram acquired Geographical Indication (GI) Tag for 'Mizo Ginger' and 'Bird's eye chilli' which creates more market opportunities to farmers due to their uniqueness and qualities(Soni et al.,2022).

Spices like ginger, turmeric, black pepper and bird's eye chillies are grown in large areas of land estimated around 2,2470 ha with total production of major spices of 59,620 MT. Among the spices crop cultivated, turmeric being a short gestation crop, is an ideal crop for the poor farmers. Ginger is cultivated in many parts of Mizoram and has been a good source of income for farmers because of its pungency and longevity. The ginger variety thingpui and thinglaidum has received Geographical Indication(GI) tag in 2021. Mizo Chilli that is bird's eye chilli

received Geographical Indication(GI) tag in 2015¸ which is small in size and very pungent(Directorate of Agriculture, Govt. of Mizoram. Total horticulture production in Mizoram was 687.36 thousand metric tonnes as per advance estimates 2021-22. In the financial year 2020, the state produced 344.91 thousand tonnes of fruits under an area of 63.77 thousand hectares. Similarly, 101.49 thousand tonnes of spices were produced in the state under an area of 28.22 thousand hectares in the financial year 2020.(Ministry of Commerce and Industry, Govt. of India).

Table 2.15 : PRODUCTION OF SPICES IN MIZORAM FOR THE YEAR 2014-15

SPICES	AREA In 1000 ha	PRODUCTION In 1000 MT	SHARE IN PRODUCTION (%)
Ginger	7.65	31.20	47.473
Turmeric	6.35	25.13	38.237
Chillies(Dried)	9.14	9.33	14.196
Coriander	0.06	0.02	.0304
Black pepper	0.070	0.0025	.004
Cinnamon	0.001	0.00025	.0004
Garlic	0.02	0.012	.018
Celery	0.001	0.003	.0042
Others	0.07	0.024	.037
Total =	23.362	65.72175	100.00

Source: Annual Report (2015), Directorate of Horticulture, Govt of Mizoram.

From table 2.15 it can be seen that ginger, turmeric and chilli has a share of 99.906 per cent of the total production of spices in Mizoram for the year 2014-15. The spices coriander, black pepper, cinnamon, garlic, celery and others has a share of just 0.094 per cent.

Table 2.16:District-Wise Production of Spices in Mizoram for 2021-22

Districts	Black Pepper		Chilli(Dried)		Ginger		Turmeric		Garlic	
	Area (Ha)	Prod. (MT)	Area (Ha)	Prod. (MT)	Area (Ha)	Prod. (MT)	Area (Ha)	Prod. (MT)	Area (Ha)	Prod. (MT)
Mamit	-	-	689.1	1,291.2	663.6	9,069.8	800	8,460	-	-
Kolasib	45	1	1,344	1000	1,406.47	9,123.6	300	432	-	-
Aizawl	25	2	2,217.85	2,245.9	1,446.5	8,995.8	1,125	2,858	6.4	3.6
Champhai	-	-	1,474	1,586	1,321.5	7,890.8	1,064.4	2,144.4	6.4	3.6
Serchhip	-	-	1,700	1,282	1,565.5	8,441.8	1,280	3,920	2.4	1.27
Lunglei	-	-	1,902	1,597	834.5	5,617.1	1,295	293	3.4	2.17
Lawngtlai	-	-	1,194	963	687.5	5,596.8	341	2,149	.4	.77
Siaha	-	-	674.8	953	627.5	5,394.8	1,533	3,042	3.8	1
Saitual	-	-	-	-	-	-	-	-	-	-
Khawzawl	-	-	-	-	-	-	-	-	-	-
Hnahthial	-	-	-	-	-	-	-	-	-	-
Total	70	3	11,196	10,918	8,553	60,131	7,738	29,823	22.8	12.41

(-) Data not available

Source – Directorate of Horticulture, Govt. Of Mizoram

Table 2.16 show the production of different spices viz black pepper, chilli(dried), ginger, turmeric and garlic by the eleven districts of Mizoram for the year 2021-22.

Table 2.17: PRODUCTION OF TURMERIC, GINGER AND BIRD'S EYE CHILLI IN MIZORAM FOR THE YEARS 2011-2021

		TURMERIC		GINGER		BIRD"S EYE CHILLI	
Sl. No	Year	Area (Ha)	Production (MT)	Area (Ha)	Production (MT)	Area (Ha)	Production (MT)
1	2011-12	5,580	29,240	7,010	34,460	8,900	9,790
2	2012-13	6,050	22,990	7,280	28,390	9,025	8,210
3	2013-14	6,250	24,700	7,480	29,920	9,040	9,100
4	2014-15	6,350	25,130	7,650	31,200	9,140	9,330
5	2015-16	5,950	24,730	7,340	30,790	9,140	9,330
6	2016-17	7,480	28,890	8,550	62,740	11,170	10,730
7	2017-18	7,738	29,823	8,553	62,743	11,195	10,918
8	2018-19	7,738	29,823	8,553	60,131	11,196	10,918
9	2019-20	7,738	29,823	8,553	60,131	11,196	10,198
10	2020-21	7,738	29,823	8,553	60,131	11,196	10,918

Source:Mizoram Statistical Abstract (2021), Directorate of Economics&Statistics, Govt. of Mizoram.

Table 2.17 shows the area and production of turmeric, ginger and bird's eye chilli for the last ten years that is from 2011 to 2020. It can be seen that as the area of cultivation increases, production also increases. The area and production of the three spices is more or less the same from the year 2017 to 2020. The highest production can seen for the three years viz 2017-18, 2018-19 and 2020-21 with a production of 10,918 metric tonnes. The production of bird's eye chilli for the year 2011-12 was 9,790 metric tonnes, while in 2020-21 it was 10,918 metric tonnes registering an increase of 10.33 percent.

Table 2.18: District-Wise Production of Turmeric, Ginger and Bird's Eye Chilli in Mizoram for 2020-21

Districts	Turmeric		Ginger		Bird's Eye Chilli	
	Area (Ha)	Prod. (MT)	Area (Ha)	Prod. (MT)	Area (Ha)	Prod. (MT)
Mamit	800	8,460	664	9,070	689	1,291
Kolasib	300	4,320	1,406	9,124	1,344	1,000
Aizawl	1,125	2,858	1,447	8,996	2,218	2,246
Champhai	1,064	2,144	1,321	7,891	1,474	1,586
Serchhip	1,280	3,920	1,565	8,442	1,700	1,282
Lunglei	1,295	2,930	835	5,617	1,902	1,597
Lawngtlai	341	2,149	687	5,596	1,194	963
Siaha	1,533	3,042	628	5,395	675	953
Saitual	-	-	-	-	-	-
Khawzawl	-	-	-	-	-	-
Hnahthial	-	-	-	-	-	-
Total	7,738	29,823	8,553	60,131	11,196	10,918

(-) Data not available

Source – Directorate of Horticulture, Govt. Of Mizoram

In Mizoram, there are eleven districts namely, Mamit, kolasib, Aizawl, Champhai, Serchhip, Lunglei, Lawngtlai, Siaha, Saitual, Khawzawl and Hnahthial. Table 2.18 shows the production of turmeric, ginger and bird's eye chilli in the eleventh districts of Mizoram for the year 2020-21. The highest production for turmeric is Mamit district, for ginger it is Kolasib district and for bird's eye chilli it is Aizawl district.

Table 2.19: Fifteen(15) Highest Turmeric Producing States in India with Share

		2021-22	
Sr No.	**State**	**Production (in tonnes)**	**Share(%)**
1	Telangana	3,30,260	28.09
2	Maharashtra	2,62,610	22.34
3	Karnataka	1,30,970	11.14
4	Tamil Nadu	95,570	8.13
5	Andhra Pradesh	74,690	6.35
6	Madhya Pradesh	68,850	5.86
7	West Bengal	45,900	3.90
8	Odisha	43,610	3.71
9	Mizoram	29,570	2.52
10	Assam	20,880	1.78
11	Gujarat	16,830	1.43
12	Sikkim	11,770	1.00
13	Kerala	7,220	0.61
14	Tripura	5,450	0.46
15	Manipur	5,410	0.46
	Other states	26,100	2.22
	Total	**11,75,690**	**100.00**

Source: National Horticulture Board (NHB)

*2021-22 (1st Adv. Estimate)

Opportunity for north-eastern states to prosper by turmeric cultivation and marketing North-eastern states, particularly Mizoram and Sikkim are recognized as abnormally high productivity states in turmeric cultivation because of their higher yield. Also, they have the advantage of recognition for organic production. From table 2.19 it can be seen that Mizoram ranked 9th amongst the highest producers of turmeric in the country with a total production of 29,570 tonnes and a share of 2.52

percent in the total production of turmeric in India for the year 2021-22, in spite of being a small state.

Table 2.20: Fifteen(15) Highest Ginger Producing States in India with Share

		2021-22	
Sr No.	**State**	**Production (in tonnes)**	**Share(%)**
1	Madhya Pradesh	6,92,110	31.18
2	Karnataka	3,06,340	13.80
3	Assam	1,70,730	7.69
4	Maharashtra	1,64,230	7.40
5	West Bengal	1,35,070	6.09
6	Orissa	1,28,010	5.77
7	Gujarat	1,09,120	4.92
8	Sikkim	72,710	3.28
9	Kerala	72,700	3.28
10	Meghalaya	67,670	3.05
11	Mizoram	60,830	2.74
12	Manipur	51,910	2.34
13	Nagaland	40,810	1.84
14	Uttarakhand	39,020	1.76
15	Arunachal Pradesh	30,900	1.39
	Other States	77,310	3.47
	Total	**22,19,470**	**100**

Source: National Horticulture Board (NHB)

*2021-22 (1st Adv. Estimate)

From table 2.20 it can be seen that Mizoram ranked 11th amongst the highest producers of ginger in the country with a total production of 60,830 tonnes and a share of 2.74 percent in the total production of ginger in India for the year 2021-22, in spite of being a small state.

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CHAPTER 3

MARKETING PRACTICES OF GROWERS OF TURMERIC, GINGER AND BIRD'S EYE CHILLI IN MIZORAM

3.1 INTRODUCTION:

The researcher conducted interviews and FGDs with 50 farmers of Multi-farming Cooperative, producing turmeric in Reiek village, in Mamit district and 50 farmers from Tlangsam Tumeric Growers Society in Champhai, Champhai district, the main centres of organised farming practices in turmeric production in Mizoram. The researchers conducted interviews and FGDs with 50 farmers in Khanpui village and East Phaileng village in Aizawl district; 25 farmers in Reiek village in Mamit district and 25 farmers in Champhai village, Champhai district which are the main ginger growing centres in Mizoram. The researcher also conducted interviews with 50 farmers of Bird Eye chilli Grower Society, producing bird's eye chilli in West Phaileng village, in mamit district, 25 farmers in Champhai village in Champhai district and 25 farmers in Reiek village district which are the main bird's eye chilli growing centres in Mizoram.

3.2 AN OVERVIEW OF VILLAGES GROWING TURMERIC, GINGER AND BIRD'S EYE CHILLI

The researcher visited the following prominent areas of cultivation. These villages were selected as they had organization of farmers. The researcher visited these villages and interviewed 150 farmers in all who were engaged in cultivation of turmeric, ginger and bird's eye chilli.

REIEK:

Reiek is a beautiful village located at a distance of 29 km from the state capital, Aizawl. Reiek is under Mamit district, Mamit district is one of the eleventh district of Mizoram which was established in 1988 with an area of 3025.75 sq.km(Rohit et al.,2018). Reiek is located at 23·41'17.36" N longitude and 92degree36'07.79" E latitude, Mizoram. Reiek lies within the Indo-Myanmar Biodiversity hotspot and rests at an elevation of 1,325 m above mean sea level. It is covered and surrounded by semi-evergreen and bamboo forest. The community heads and members of various non-government organisations of Reiek village plays an important role in protecting and conserving the community forest and its fauna.

Some of the villagers still practices felling of trees and collection of firewood. The area of is declared as a ‘ Biodiversity Spot’ by the village in collaboration with Association for Environment Protection (ASEP), an NGOs in Mizoram for protecting and conserving the environment(Lalruatkimi et al.,2019).

A society, namely Multi-farming Cooperative Society was established in 2004 with the assistance from the Department of Horticulture, Govt. Of Mizoram and the Spice Board of India. The Society is registered under the co-operative Society Act and follows the Co-operative Department Rules and regulations.The society is producing turmeric and processing it into turmeric powder which is marketed by the Society. The success story of Reiek farmers has influenced the other farmers of Mizoram to take up turmeric farming as well(Sharma and Vanlalhumi, 2013).

There are 504 household with a population of 1851 and 70 are pursuing Jhum Cultivation for their livelihood. Reiek village is electrified, with a cable network service and internet connectivity. The village has an identified dumping ground/place , primary health centre(PHC), sub centre, rural animal health centre and is declared ‘Open Defecation Free’(Village Profile &Development Indicators 2017-2018, Directorate of Economic & Statistics,Mizoram).

In Reiek, there is a typical Mizo village consisting of the distinctive traditional huts of the different Mizo sub-tribes, Mizo chieftain’s house, a bachelor’s dormitory and that of a widow which has been created and maintained by Tourism Department of Mizoram. The houses are fully furnished bestowing the visitor a peek into the glorious past of the valiant highlanders. A few Mizo modern houses have also been constructed nearby to show the changes that have taken place in the Mizo way of life in keeping pace with the modern developments.

Reiek plays host to Anthurium Festival every year which is one of the biggest cultural events of Mizoram. The festival is celebrated for a dual purpose, which is to boost the cultivation of this stunning marvel of a flower and also to attract tourists to the beautiful bounties of nature in this state and is organized by

Tourism Department and the Horticultural Department with a financial support from the central government.

CHAMPHAI:

Champhai is a headquarter of Champhai district which is one of the eleventh districts of Mizoram state in India and is 194 kilometres from Aizawl, the capital of Mizoram. It is located on the Indo-Myanmar border and is situated in a strategically important location The district is bounded on the north by Churachandpur district of Manipur state, on the west by Aizawl and Serchhip districts, and on the south and east by Myanmar. The district occupies an area of 3185.83 km and accounts for 15.10% of the total geographical area of the state. It is located in the north-eastern part of Mizoram, India between 24 degree 05'03.99" and 23degree 00'03.25" N latitudes and 93 degree 00' 31.29" and 93degree 26' 17.66" E longitudes(MIRSAC,2006).

Champhai District came into existence on 12th December, 1997. The District is divided into three Sub-Divisions i.e Champhai, Ngopa and Khawzawl and consists of four blocks namely Champhai, Khawzawl, Ngopa and Khawbung. The Office of the Deputy Commissioner, Champhai District, Champhai was established on 22nd April 1998. Champhai district has a special place in the history of the tiny north-eastern state and its people. Champhai is a beautiful place with its colourful tribal traditions, orchids and butterflies and it boasts a breathtaking view of the Myanmar hills and it also has a healthy climate and a number of tourist attractions and a chain of green hills encircle luxuriant rice fields, which add to the beauty of this place. It is said that the history of Mizo starts from Champhai and ends in Champhai and it is a storehouse of ancient relics, monuments and memorials connected with legends and folklores, also has a background of rich heritage(NIC Champhai,2022).

Champhai District experiences moderate and pleasant climate due to its sub-tropical location and elevation ranges. It is generally cool in summer and not very cold in winter. The average mean summer temperature that is April to June is 23.5 degree C and that of winter November to February is 15.7 degree C(MIRSAC,2012).

Pre-monsoon rains are experienced from March to May while regular south-west monsoon commences from June till October, with the southern region receiving relatively higher rainfall than the northern region(KVK,Champhai district ,GOM). Champhai district receives heavy rainfall as it is because of the direct influence of south-west monsoon. The average rainfall is 2346.2 mm(MIRSAC,2012). Crops are grown mostly rain-fed depending upon the monsoon rainfall.

Champhai district has 2785sqkm of forest cover, which consists of subtropical forest in the eastern side of the district, where the altitude is higher and tropical wet evergreen forest mixed with semi evergreen and tropical moist deciduous forests comprising mainly of bamboo on the western side. The vegetation consists of a mixture of several species. Depending on the density of the canopy cover, the forests have been divided in to dense, medium dense and less dense forest. In Champhai district, there is a number of rivers which flow towards the north like Tuisa, Tuivai and Tuivawl rivers and the south flowing rivers like Tiau, Tuipui and Tuichang rivers. The drainage systems of Champhai district are dendritic and sub-dendritic pattern in nature (KVK,Champhai district ,GOM).

According to the 2011 census, Champhai district has a total population of 1,25,370(Directorate of Census,2011) and there are 4 notified towns (Economic and Statistics,2010). There are 108 villages and 3 Assembly Constituencies with a literacy rate of 95.91 percent(NIC,Champhai,2022). The economy of Champhai is mainly agriculture and border trade. Champhai is also the main trading centre of Mizoram with goods like clothes, silverware and electronics imported from Myanmar, through the trading post in Zokhawthar (NIC,Champhai,2022).

The researcher interviewed the members of Tlangsam Tumeric Growers Society. This society was established in 2001 with the assistance from Horticulture Department, Govt. of Mizoram. In the year 2005, the Govt. of Mizoram constructed two buildings, Chowkidar quarter and godown for the society. Initially, when the society was established the Department of Horticulture assisted the society members by supplying turmeric seeds. From the year 2018, the society could not produced turmeric powder as the processing machine could not function.

PEHLAWN:

Pehlawn is a small village located in Darlawn Block of Aizawl district of Mizoram state,India. The latitude 23.9007576 and longitude 92.9213408000001 are the geocoordinate of the Pehlawn. . Pehlawn village has a total 147 families with a population 685 of which 334 are males while 351 are females as per Population Census 2011. As per constitution of India and Panchyati Raaj Act, Pehlawn village is administrated by Sarpanch (Head of Village) who is elected representative of village(Census,2011).

The village code of Pehlawn village is 271210, it is 23km away from sub-district headquarter Darlawn (tehsidar office) and 100km away from Aizawl, the capital of Mizoram. Pehlawn village has a literacy rate of 81.17% out of which 82.63% males and 79.77% females are literate. In Pehlawn village there are around 147 houses and the nearby villages of Pehlawn are N Serzawl, Sawleng, Chhanchhuahna khawpui, Kepran, E Phaileng, Khawkawi, khanpui, Khawruhlian, Tuirinikai, Hmunnghak and Lailak(Indian Village Directory).

Pehlawn has two primary school, one middle school only with no high school. The nearest high school is 1 km and higher secondary school is 19 km away from Pehlawn. The people mainly depend on agricultural farming. There is no banks in the village and the distance of the nearest bank is 19km. The village is electrified, has identified dumping ground and is declared open defecation free(Mizoram Profile & Development Indicators 2017-18).

KHANPUI:

Khanpui is village located in Darlawn Block of Aizawl district of Mizoram state with 309 household. The population Khanpui is 1499 of which 792 are males while 707 are females as per Population Census 2011. As per constitution of India and Panchyati Raaj Act, Khanpui village is administrated by Sarpanch (Head of Village) who is elected representative of village(Census,2011).

The location code or village code of Khanpui village is 271212. Khanpui village is located in Darlawn subdivision of Aizawl district in Mizoram. It is 29km

away from sub-district headquarter Darlawn (tehsildar office) and 92km away from district headquarter Aizawl, the capital of mizoram(Indian Village Directory).

Khanpui has 4 primary schools, 2 middle schools and no high school. The nearest bank is 5 km away from Khanpui. The village is declared as "Open Defecation Free". The village has sub-centre facility, but no community health centre, primary health centre and health clinic. The village is electrified. The people of Khanpui village mostly depend on agriculture for their livelihood(Mizoram Profile & Development Indicators 2017-18).

EAST PHAILENG:

The village East Phaileng, is located in Aizawl district of Darlawn Block, Mizoram. According to population census, 2011¸there are 236 families in the village with a population of 1141 out of which 597 are males while 544 are females. As per constitution of India and Panchyati Raaj Act, E.Phaileng village is administrated by Sarpanch (Head of Village) who is elected representative of village(Census,2011).

E. Phaileng village is located in Darlawn subdivision of Aizawl district and is 20km away Darlawn (tehsildar office) and 103km away from district headquarter Aizawl, the capital of Mizoram. The location code of E.Phaileng is 271209 and is 48 meters above sea level. E.Phaileng is surrounded by Phullen Block toward east and Thingsulthliah Block towards south(Soki.In- Villages in India and Indian Village Directory).

East Phaileng has a post office and is electrified. The village has identified dumping ground and is declared as 'Open Defecation Free'. There is 3 Primary School, 2 Middle School and 1 High School in the village. The distance of nearest Higher Secondary School is 20 km away from East Phaileng(Mizoram Profile & Development Indicators 2017-18). The people of the village mostly depend on agriculture for their livelihood.

WEST PHAILENG:

West Phaileng is a village panchayat located in the Mamit district, which is one of the eleventh district of Mizoram. The latitude 23.700589 and longitude 92.4846640000001 are the geocoordinate of the West Phaileng. West Phaileng is located around 25.5 kilometer away from its district head quarter Mamit. Mamit district is bounded on the north by Hailakandi district of Assam state, on the west by North Tripura district of Tripura state and Bangladesh, on the south by Lunglei district and on the east by Kolasib and Aizawl districts. Mamit district occupies an area of 3025.75 km and has 4 R.D. Blocks, Mamit, Reiek, West Phaileng and Zawlnuam. The Mamit district has 3 legislative assembly constituencies namely Hachhek, Dampa and Mamit(Dept. of Information & Communication Technology, GOM).

Mamit District with its headquarters at Mamit was etched out from the erstwhile Aizawl District under Mizoram Govt. Notification No.A.600Ill2ll95-GAD dated 11.3.98. It started functioning from the 24th April, 1998 which was the date when the new Deputy. Commissioner assumed office. Mamit is the least urbanised Districts of Mizoram with 17.25 % of Total Population i.e out of 86364 only 14,899 person is living in Urban areas. Against the State level Sex Ratio of 976,Mamit district comprises of 927 sex ratio. West Phaileng village is the most populated Village with population of 2,1,309 while Saitlaw with a population of Only 59 persons is the smallest village in the district(NIC,2022).

The Temperature of Mamit district ranges from 9C to 24C and from 24C to 36C during winter and summer respectively. It experiences Monsoon during summer receiving abundant rainfall and is neither too hot nor too cold throughout the year. All Rivers flow in South-North direction, except Khawthlangtuipui. The five main big rivers are Tlawng, Tut, Teirei, Langkaih and Khawthlangtuipui. The economy of the District is basically Agro-based. Jhum type cultivation is the most popular type of cultivation and comprises the main source of agricultural products(NIC,2022).

3.3 TURMERIC

The Lakadong variety of turmeric, which derives its name from the place it was originated in Meghalaya, is cultivated in Mizoram. It is considered to be one of the world's best varieties of turmeric with its curcumin content of about 6.8-7.5%(Shreeranjan,2006). The higher curcumin content of Lakadong turmeric its high significance towards its medicinal importance(Malakar et al.,2021). It is slightly dark in colour compared to any other turmeric varieties found in India(Daimei et al.,2012). Reiek and Champhai villages not only grow turmeric but also process and powder the turmeric and sell it asas 'Reiek Aieng' and 'Zospice' respectively.

3.3.1 Production practices:

In both the village, that is Reiek and Champhai the production practices are as follows:

- Cultivation: The land is prepared for sowing by removing existing bushes and other unwanted vegetation using hoe and gardening knife(*thuthlawh and chemkawm*). This debris is then burnt and the farmers repeatedly ploughs the land to prepare it for planting of seeds. This activity is undertaken in the months February and March. Planting is done in the month of April and May with onset of pre-monsoon showers. It was observed that one seed rhizome whole or split mother rhizome was planted by placedit shallow pits dug for the purpose. It was observed that generally an average of 2000 to 2500 kgs of seed material was planted in one hectare of turmeric cultivation.
- Manuring and fertiliser application: Interestingly, no manure or fertilisers were applied to the soil for cultivating the crop. In fact, the cooperative societies prohibit the use of fertilisers to the soil to maintain the status of organic farming. Moreover, the soil in Reiek and Champhai are fertile and the land is virgin and hence do not require any manure. This enhances the quality of the product of the turmeric produced. As mentioned earlier, opportunity for north-eastern states to prosper by turmeric cultivation and marketing North-eastern states, particularly Mizoram and Sikkim are recognized as abnormally high productivity states in turmeric cultivation

because of their higher yield. Also, they have the advantage of recognition for organic production. Further, the respondents also informed that the crops were not infected by diseases whereby the need for pesticides also did not arise.

- Intercropping: It was also observed that no intercropping was done due to large leafing of the crop.
- Weeding and Irrigation: Weeding is done three times before harvesting. After planting activity, weeding is done within 2 to 3 weeks and after that it is done depending upon intensity of the growth of weeds. No artificial irrigation was required as rain water was sufficient for the cultivation of turmeric in Mizoram.
- Harvesting: Maturity of turmeric and readiness for harvest is indicated by the drying of the aerial parts of plants. Harvesting of lakadong turmeric is done in the month of February and March usually after 10-11 months of planting. At the time of harvesting the land is ploughed and the rhizomes are gathered by hand picking.
- Curing and Boiling: Fresh turmeric rhizomes is cured for obtaining dry turmeric and the fingers are separated from mother rhizomes. Mother rhizomes is kept as seed material which is preserved in a gunny bag in a dry area. The finger rhizomes are washed thoroughly and it is placed in a gunny bag which is cooked in a boiling water for about 10 minutes. Boiling is done to soften and to reduce the raw odour of turmeric. It also reduces the drying time and yields uniformly coloured product.
- Drying and Processing: The cooked rhizomes were thereafter sliced and laid down under the sun for drying for 4-5 days. The cooked rhizomes are placed on the road side on the top of a galvanized sheet or silpaulin. Sometimes, they were also dried on the clean rooftops by farmers. The dried rhizomes were again cleaned and ground by a grinding machine to make into a turmeric powder. The turmeric powder was then packed into a net weight of 100gm.

3.3.2 Product :

A product is a good, service or idea made up of a bundle of tangible and intangible attributes that satisfies consumers and is received in exchange for money or some other unit value. The product is the first element of the marketing mix, which affects the other three elements of the mix because of its nature and attributes(Mathieu,2001). Kotler and Armstrong, 2008 define a product as " anything that can be offered to a market for attention, acquisition, use, or consumption that might satisfy a want or need". A product is characterized by quality, design, features, brand name and sizes(Borden,1984). A product is everything that is put forward on the market to be noticed, obtained and used for utilization which may satisfy the desire or need(Burnett,2003).

According to William J. Stanton(1986), ' A product is a complex of tangible and intangible attributes, including packaging, colour, price, manufacturer's prestige, retailer's prestige and manufacturer's and retailer's services which buyers may accept as offering satisfaction of wants or needs'.

Lakadong can also be termed as heirloom turmeric, world's best turmeric, high quality turmeric and finest turmeric. Lakadong as compared to other variety of turmeric has a different taste, aroma and a high potency. The lakadong rhizomes are similar to other variety in shape and structure, however the roots are thin, long and parallel in diameter throughout their lengths. The spice is naturally and traditionally farmed without chemical or artificial fertilizers and no pesticides.

Multi farming Cooperative Society of Reiek buys the dry turmeric flakes from the farmers, processes it into turmeric powder the grinding machines, packages, labels and sells the turmeric powder under the brand name '*Riek Aieng*, which means means turmeric in Mizo language. TlangsamTumeric Growers Society in Champhai,has branded the turmeric powder of the farmers there as '*Zo spice'*

Lakadong is the type of turmeric which is grown in Reiek and Champhai. After processing into powder, packaging is done. In both the village only one type of package which is 100gm is packed and sold. The name of the product for Reiek is

'Reiek Aieng' and that of Champhai is 'Zospice'. Both the product is organic and the first product branded and packaged in Mizoram in the case of turmeric.

3.3.3 Price:

According to Kotler and Armstrong (2008), "Price is the amount of money charged for a product or service. It is the sum of the values that customers exchange for benefits of having or using the product or service. It is the only element in the marketing mix that produces revenue; all other elements represent costs. Price is also one of the most flexible marketing mix elements. Unlike product features and channel commitments, prices can be changed quickly. At the same time, pricing is the number-one problem facing many marketing executives and many companies do not handle it well."

"If the perceived price of a product is much higher than its perceived value, it will become a deterrent to customers. On the contrary, if the perceived price is too low, buyers will be wary about the quality of the product (Evans,1995).

The price of fresh turmeric at Reiek is ₹15-20 per kg, while the dried turmeric is ₹ 120 per kg. In Champhai the price of fresh turmeric is ₹10-20 per kg and the dried turmeric is ₹ 130 per kg. In both the place the powdered, 100 gram packet is sold at ₹ 30 each. As the product was organic, and has a huge demand, it has the potential to fetch a premium price in national and international markets. This was the price at the time of primary data collection from the farmers cultivating turmeric.

3.3.4 Distribution Place:

William J. Stanton (1986) stated that, "A channel of distribution (sometimes called a trade channel) for a product is the route taken by the title to the goods as they move from the producer to the ultimate customer or industrial users."

"Place refers to how a product is distributed so as to be available to customers at the right place and the right time" (Evans, 1995). According to Pheng Low and Tan(1995), 'In simple sense, place or distribution refers to the activities that

make the product available to the consumers. The distribution channel, in the form of a general assessment, affects customers' attitudes towards brands.'

It was observed that both the cooperative societies in turmeric societies in Reiek and Champhai sell their products to Mosia agencies, located in Aizawl. The Reiek Multi Farming Co-operative Society usually hire a pick –up for transportation of their product to Aizawl. The transportation cost is Rs.2500 and 4 quintals are supplied to the wholesaler once a month. As for Champhai , Tlangsam Turmeric Growers Society do not hire a separate truck as they usually dispatch their products through a Sumo, a private Sumo service from Champhai to Aizawl. The Champhai society dispatches their products as and when demand arises. The Mosia agencies distribute the product to the different retail shop in and outside Aizawl.

3.3.5 Promotion:

In the words of Alderson, Wroe and Green(1964), "Promotion is any marketing effort to inform or persuade actual or potential consumers about the merits of a (given) product or service for the purpose of introducing a consumer either to continue or to start purchasing the firms product or service at same(given) price." Promotion is an important part of business and is one of the essential element of the total marketing process(Fam and Merrilees,1998).

According to Lovelock and Wright(2002),"Marketing communication mix(Promotion mix) consists of the blend of advertising, personal selling, sales promotion, public realtions and marketing tools. A communication program plays three vital roles such as provide information, persuade target customers, and encourage them to take actions.

Lovelock and Gummesson(2004) stated that, "The promotional activities can influence consumers' perception, their emotions, their experience as well as their purchasing pattern. Individual sales people, TV, radio, internet, magazine, press, billboards and all types of conventional and nonconventional media can be used for promotional activities."

In Reiek and Champhai the society members participated in State and National Level Exhibition for promoting their product. Advertisement is also done in local channel and local newspaper. In the year 2016, both the society exhibit their turmeric powder in BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation(NSIC) Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016.

3.4 GINGER

Ginger is cultivated in most of the villages in Mizoram. Reiek, Pehlawn, Khanpui and East Phaileng are the villages where the researcher interviewed the farmers cultivating ginger.

3.4.1 Production practices:

In the four villages, that is Reiek, Pehlawn, Khanpui and East Phaileng the production practices are as follows:

- Cultivation: Cultivation practices for ginger is almost the same in different parts of Mizoram, the land is prepared by burning the debris which is present in the land and repeated ploughing is done. Seeds are planted in the month of April and May with onset of pre-monsoon showers. Before planting the soil is dug with the help of hoe and gardening knife(*thuthlawh and chemkawm*) and ginger rhizomes seed usually one seed is placed in the dug area.
- Weeding and Irrigation: Weeding is done three times before harvesting. The first weeding is done after one month of planting and the next is done as and when the need arises, depending upon the weed formation. Irrigation is not done as rain water is enough for ginger crop in almost all the area of Mizoram.
- Mixed cropping: Ginger is grown as an intercrop with maize, gourd, bitter tomato, brinjal, chillies, ladies finger, yum etc.
- Harvesting: Harvesting of ginger for vegetable purpose starts after 180 days based on the demand. The matured rhizomes are harvested in the month of February and March usually after 10-11 months of planting. Maturity of

ginger can be known when the leaves turn yellow and start drying. Depending on the market rate harvesting is also done in some parts of Mizoram. Ginger rhizomes is harvested manually with help of doe(*tuhthlawh*) and it is cleaned by rubbing off the soil and roots attached to the rhizomes.

3.4.2 Product:

In the words of Theodore Levitt (1975), 'Products are almost always combinations of the tangible and intangible. To the buyer, a product is a complex cluster of value satisfactions. The generic component by itself is not a product, it is merely the minimum that is necessary at the outset to give the producer a chance to play the game. It is the playing that gets the results. A customer attaches value to a product in proportion to its perceived ability to help solve his problems or meet his needs. All else is derivative. The product is the total package of benefits the customer receives when he buys it. The customer never just buys the generic products, he buys something that transcends and what that something is, helps determine from whom he'll buy, what he'll pay.'

Ferrell and Hartline(2005) stated that ' the product is the core of the marketing mix strategy. This is because without product there is no need for pricing, promotion, and distribution'. According to Mathieu(2001), 'the product makes up the first element of the marketing mix and affects the other three elements of the mix due to its nature and attributes. The product can vary in terms of its attributes and features based on the dissimilarity of the target markets in terms of the variance of the needs and wants that make up the market components and the marketing environment.'

Thingpui, Thinglaidum and Thiangria are the different varieties which is cultivated in Reiek, Pehlawn, Khanpui and East Phaileng.Thingpui is a thick attractive-sized with a fibre content of 8.6 percent and is the largest-sized variety grown in Mizoram. Thingpui rhizomes is light yellow in colour and it has a low pungency. Thinglaidum is slightly smaller than Nadia and is a popular variety in Mizoram. When cut the rhizome has a distinct purple ring in the middle and the fibre

content is 9.8 percent. Thingria is very thin, longish with a fibre content of 8.1 percent. In the year 2021 Thingpui and Thinglaidum variety received G.I tag under the initiative of Horticulture Department,Govt, of Mizoram.

3.4.3 Price:

Price is the amount of money to be paid in return for goods and services. Pricing is the task of converting the value of the product or services or idea into qualitative terms before it is offered to consumers. It is the process of framing objectives, determining the factors governing the price, developing price policies and strategies setting prices, implementing them and controlling them.

According to Sunyoto and Susanti(2015) argue that 'Pricing activities play an important role in the marketing mix process, because the pricing is directly related to the revenue received by the company. The pricing decision is also so important in determining how much a service is valued by the consumer and also in the image building process, pricing also gives a certain perception of quality'.

In the words of Kamakura and Russell(1993);Migrom and Roberts(1986) and Woodside et al.,(1977), 'Consumers believe that price is an incredible important index and also an indicator of quality or profit. Brands with higher prices are understood as better quality, while those with lower prices damage their quality'.

The price of Ginger in the four villages that is Champhai, Reiek, Pehlawn, Khanpui and East Phaileng and also in different areas of Mizoram is determined by the demand of the buyers. It is sad to know the cultivators or farmers cannot fixed the price of ginger as they keep fluctuating and controlled by the buyers. In most part of Mizoram, the farmers harvested their produce only when there is a good price in the market. The fresh ginger is sold for ₹ 15-20 in the local market and to the buyers from other state. This was the price at the time of primary data collection from the farmers cultivating ginger.

3.4.4 Distribution Place:

Distribution or place is an important factor of the marketing mix as it involves the product from the manufacturer to the ultimate consumer. According to Kotler and Armstrong(2012), 'The distribution channels comprise all those activities that contribute to the delivery of the product or service to the customer. These channels help the organization to promote, sell, and distribute its goods to final buyers, such as resellers, physical distribution firms, marketing services agencies and financial intermediaries.

Pheng Low and Tan(1995) stated that 'Place or distribution refers to the activities that make the product available to consumers. The distribution channel, in the form of a general assessment, affects customers' attitude towards brands.'

In the four villages where the researcher interviewed the farmers, their product is sold locally and sometimes there are buyers from outside the state mostly from Karimgang district in Assam. These buyers come in their own vehicles to buy the ginger, because of this the price could not be controlled by the farmers.

3.4.5 Promotion:

The business scenario of 21st century witnessed the rising level of competition. The manufactures must think of a way to meet the rising competition and this where promotion comes in. The importance of promotion is that it builds awareness about the product which is there in the market and for targeting the right customers.

According to Sidhanta and Chakrabarty(2010),'Promotion is one of the most powerful elements in the marketing mix. It means to communicate and persuade the target market-by identifying the needs of the target segment- to buy the company's products. The promotion concept includes all marketing activities used to inform, persuade, and remind the target market about a firm and its products or services, in such a way as to build a favourable image in the mind of the customer.'

Latif and Abideen(2011) stated that 'Advertising is the most powerful element of the promotion mix, due to its involvement in developing the image of the product in the market, or positioning the product in the mind of the customer.'

In the words of Meredith, Nelson and Neck(1991), 'as small business grows, it must its expand its markets, special sales promotions can provide the exposure that the product or service needs to increase sales in new markets. Also advertising can attract potential customers to the business.'

Promotion is not done for ginger by the four villages namely Reiek, Pehlawn,Khanpui and East Phaileng. The farmers clean the harvested ginger and packed them in a gunny bag for selling in the local market and for the interested buyers from Assam.

3.5 BIRD'S EYE CHILLI

Mizoram is famous for bird's eye chilli and it is grown almost in all parts of Mizoram. The researcher interviewed the farmers growing bird's eye chilli from these three villages, Champhai, Reiek and West Phaileng.

3.5.1 Production Practices:

The production practices of the villages, Champhai, Reiek and West Phaileng are as follows:

- Cultivation- Cultivation practices for bird's eye chilli in the three villages that is Champhai, Reiek and West Phaileng is almost the same as in different parts of Mizoram. The land is prepared by burning the debris which is present in the land, cleaning the land and repeated ploughing. Seeds are planted by spreading in the month of April and May with onset of pre-monsoon showers.
- Weeding and Irrigation: Weeding is done three times before harvesting. The first weeding is done after one month of planting and the next is done as and when the need arises, depending upon the weed formation.

Irrigation is not done as rain water is enough for bird's eye chilli crop in almost all the area of Mizoram.

- Mixed cropping: Bird's eye chilli is grown as an intercrop with maize, gourd, bitter tomato, brinjal, chillies, ladies finger, yum etc.
- Harvesting- When the fruits of the plant is matured that is when it is red in colour, harvesting is done usually in the month of December and January. Sometimes when the fruit is not matured it is also harvested.
- Drying – Solar panel is used for drying the fruit of bird's eye chilli. Almost in all parts of Mizoram drying of bird's eye chilli is done under the sun as most of the farmers do not have solar panel.

3.5.2 Product:

A product is a good, service or idea consisting of a bundle of tangible and intangible attributes that satisfies consumers and is received in exchange for money or some other unit value. Product is characterized by quality, design, features, brand name and sizes(Borden,1984). Product is the first element of the marketing mix, which is the goods and services available for target customers and it also contain attributes like services, quality and guarantees(Jain,2009).

Burnett(2003) stated that product is everything that can be offered on the market to be noticed, obtained and used for consumption which may satisfy the desire or need. According to Cutler et al.,(2000), 'a product is anything that is marketed to draw attention, ownership, use or consumption and meets a requirement or demand.'

According to Kotler, Adam, Brown and Armstrong(2003), 'anything that can be offered to a market for attention, acquisition , use or consumption that might satisfy a want or need. It includes physical objects, services, persons, places, organizations or ideas'.

Mizoram is famous for the habitation of wonderful diversity of bird's eye chilli, with respect to fruit shape,size, colour, pungency, plant type, physiological characteristics, reactions to diseases and pests, adaptability and distribution(Ozgur et

al.,2011. The bird's eye chilli of Mizoram has Geographical Indications which was pursued by Horticulture Department, Govt. of Mizoram. Fresh and dried bird's eye chilli is sold in the market. In West Phaileng village the fresh chilli is made into pickle, packed as 200gm.

3.5.3 Price:

Price of a product or service plays an important role in its marketability. Price is an important component of the marketing mix as it is the only element in that fetches revenue. Mihai(2013) stated that 'Price includes all the resources (financial costs, time and social costs) that a customer has to pay in order to obtain the product.'

Kotler and Armstong(2012) stated that 'Price is the various costs that customers incur for the benefits of a product (service) and includes financial costs and other non-financial costs.' Zeithami(1998) is of the view that 'Monetary cost is of the factors that influence consumers' perception of a product value. Price can be stated as the actual or total rated value of a product which is up for exchange.'

The price of fresh bird's eye chilli in the three village is as follows, in Reiek it is ₹ 150 per kg, in Champhai it is ₹130-150 per kg and in West Phaileng it is ₹120-150 per kg. While the dried chilli is mostly sold in the three villages at ₹400-450 per kg. It is interesting to note that the farmers of West Phaileng village do not have any problem in selling their product as they exported their product outside the state. In the year 2019, they send their product to Delhi and Kolkata in collaboration with Mizofed, but could not continue it because of the many issues like price, refrigerated packing and time limit. This was the price at the time of primary data collection from the farmers cultivating bird's eye chilli.

3.5.4 Distribution Place:

Goi(2009), defines the place as 'The mechanism through which goods and services are moved from the provider or manufacturer to the consumer.' Place includes distribution channels, warehousing facilities, mode of transportation,

location, assortment, convergence, logistics and inventory control management(Singh,2012).

According to Kotler and Armstrong(2012),'The distribution comprise all those activities that contribute to the delivery of the product or service to the customer. These channels help the organization to promote, sell and distribute its good to final buyers, such as resellers, physical distribution firms, marketing services agencies and financial intermediaries.' Szopa and Pekala(2012) stated that 'There are many advantages assopciated with distribution channels such as moving the goods from the place of production to the demand areas, providing information for the customers about the products and services, and promoting products and services.'

In both the village, that is Reiek and Champhai the bird's eye chilli which is cultivated by the farmers is sold at the local market only. While in the case of West Phaileng village, it is exported to Tripura the nearby state of Mizoram. The buyers from Tripura state are mostly from Kanchanpur village in Dasda which is about 153 kms from West Phaileng through NH 108. The buyers come to West Phaileng to purchase and sometimes the farmers hire a pickup for exporting the bird's eye chilli. The pickup is usually hired for Rs.13,000 and around 10 quintals are carried by the pickup.

3.5.5 Promotion:

In the words of Lovelock and Wright(2002), 'Marketing communication mix(promotion) consists of the blend of advertising, personal selling, sales promotion, public relations and direct marketing tools, A communication program plays three vital roles such as provide information, persuade target customers, and encourage them to take action.'

Kotler(2003) stated,' The essence of promotion is a form of marketing communication, which is a marketing activity to disseminate information, influence, persuade and remind target markets about the organization and its products to be willing to accept, buy and be loyal to the products offered by the organization.' Kotler,(2003) also discovers that Promotions have become a critical factor in the

product marketing mix which consists of the specific blend of advertising, personal selling, sales promotion, public relations and direct marketing tools that the company uses to pursue its advertising and marketing objectives.

Promotion is not done by Reiek and Champhai village, while in West phaileng promotion is done by Bird Eye chilli Grower Society. Bird Eye Chilli Grower Society was established in the year 2016 and was registered under firms and society in 2017. This society is under Farmer Producer Organization (FPO) and also under Mission Organic Mizoram(MOM).As per MOVCD-NER guidelines, on 18th February, 2016, State Level Executive Committee (SLEC) was formed. As a result of the SLEC meeting, the State Lead Agency Mission Organic Mizoram (MOM) was formed on 29th February, 2016. The full form of MOVCD-NER is Mission Organic Value Chain Development for North Eastern Region which is under National Mission for Sustainable Agriculture (NMSA) and it is a scheme of Government of India for promoting organic farming(Mission Organic Farming,2022).

Bird Eye chilli Grower Society received Organic Certificate from Ecocert India Pvt. Ltd., Gurgaon, Haryana which is an Organic Certifying Agency in the year 2020. There are more than 1000 members in the society and they are all farmers producing birds eye chilli. The society has taken part in state and national level exhibition and have done advertisement in television and newspapers.

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CHAPTER 4

BUYER'S ATTITUDES, PREFERENCE AND PERCEPTION TOWARDS TURMERIC, GINGER AND BIRD'S EYE CHILLI

This chapter attempts to understand the attitudes of enterprises towards turmeric, ginger and bird's eye chilli.

Based on review of literature significant attributes of the above mentioned spices were listed out by the researcher in the present study. These spices were displayed in the BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation(NSIC) Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016 by the farmers sponsored by Horticulture Department, Govt of Mizoram. On the basis of the preferences of the enterprises who showed interest in the spices, scores were computed based on Fishbein formula.

4.1 BUYERS ATTITUDES

Buyers attitudes are complex and difficult to assess. Marketing researchers have used several multiattribute attitude models to understand and interpret buyer attitudes. Researchers have used varied model to understand attitudes of customers. Multi attribute models have gained popularity among researchers in Marketing. Multiattribute attitude models assume that a consumer's attitude toward an attitude object (A_o) depends on the beliefs he or she has about several of its attributes.When a multiattribute model is used it can be assumed to identify these specific beliefs and combine them to derive a measure of the consumer's overall attitude.

Basic multiattribute models contain three specific elements:

a*)Attributes*are characteristic of the A_o. A researcher tries to identify the attributes that most consumers use when they evaluate the A_o.

b*)Beliefs*are cognitions about the specific A_o. A belief measures assesses the extent to which the consumer perceives that a brand possesses a particular attribute.

c*)Importance weights* reflect the relative priority of an attribute to the consumer.

Fishbien model is among the most influential multiattribute models developed and named after its primary developer. Martin Fishbien. The model measures three components of an attitude:

a)*Salient beliefs* people have about an A$_o$ (i.e., those beliefs about the object a person considers during evaluation).

b)*Object-attribute linkage,* or the probability that a particularobject has an important attribute.

c)*Evaluation* of each of the important attribute.

When these three elements are combined, consumer's overall attitude toward an object is computed. The basic formula is:

$$Ajk = \Sigma\beta\ ijkIjk$$

Where

i = attribute

j = brand

k = consumer

I = the importance weight given attribute *I* by consumer *k*

B = consumer *k*'s belief regarding the extent to which brand *j* possesses attribute *i*

A = a particular consumer's (*k*'s) attitude score for brand *j*

The overall attitude score (A) is obtained by multiplying a consumer's rating of each attribute for all the brands which a person considered by the importance rating for that attribute.

The researcher has used this formula to assess the attitudes of customers (Respondents) who visited the stall of the state of Mizoram in BIOFACH India 2016 with INDIA ORGANIC held at NSIC Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016.

The attitude scores for three spices turmeric, ginger and bird's eye chilli were computed to understand the attitudes of traders towards these spices and device marketing strategies to reach out to national and global markets.

4.2 TURMERIC:

Turmeric '*Lakadong*' was a spice displayed in BIOFACH India 2016 with INDIA ORGANIC held at NSIC Exhibition Grounds, Okhla New Delhi during 10th – 12th November 2016 . Turmeric is aptly known as the queen of Indian spices. Turmeric derives its name from the Latin word "*terra merita*", meaning meritorious earth, which refers to the colour of ground turmeric, resembling a mineral pigment. The botanical name of turmeric is Curcuma domestica Val. Syn..Curcuma longa L,belonging to the family Zingiberaceae (Williamson,2002). Turmeric falls under the order Zingiberales of monocots and is an important genus in the family. The family is composed of 47 genera and 1400 species of perennial tropical herbs, found usually in the ground flora of lowland forests(Nair,2017). Out of the 100 turmeric species, 41 is believed to occur in India, of which at least 10 are endemic to the Indian subcontinent. In the region of Western Ghats and Himalayas in India, the ecology of the turmeric species varies so much that their habitat ranges from the sea level (sandy coastal habitat) to high altitude, such as more than 2000msl(mean sea level).Species diversity is maximum in south and north east India and the Andaman and Nicobar islands(Velayudhan et al.,1999).It is also called "Indian saffron" because of its deep yellow orange colour (Tiwari and Agarwal,2004).

Among the Curcuma species, Curcuma longa L, is the most widely recognised and cultivated plant, grown in a warm climate in many regions of the world(Wu,2015). Turmeric is an erect perennial herb, grown as an annual and also as a biennial in certain cases. The height of the plant is usually of around 120cm, significant variations can been seen in plant height among varieties as well as in plants grown under different agro-climatic conditions(Rao et al.,2006). The taxonomic identity of turmeric is very complicate because of its extremely short period of flowering and herbarium preparation due to the flashiness of tubers, rhizomes and inflorescence(Jadhao and Bhuktar,2018).Rhizomes are the most commonly used plant part composed of a wide variety of compounds(Lakshmi et al.,2011).

Turmeric contains different curcuminoids, although curcumin was found to be the most active one, first isolated in 1815 (Vogel and Pelletier,1815), and the purified crystalline compound described in 1870 (Daube,1870). Since ancient times turmeric has been used for various purposes. It has been used to flavor and color for the preparation of both the vegetarian and non-vegetarian food(Norman,1991;Govindarajan,1980). It can be said that turmeric is one of the main ingredients of curry powder. In the Western part of the world, it is used in sauces, mustard blends and pickles. Turmeric tea is popular in certain areas of Japan, especially in Okinawa and it has also been traditionally identified as an agent of beauty and health(Remadevi et al.,2007). Turmeric has now become so popular that it is used in beverages, cosmetics, food preparations and numerous health-care items(Gupta et al.,2013). Turmeric has a long history of use as spice and food additive, widely used to ameliorate foodstuffs' palatably and storage stability through its specific yellow color, taste and antioxidant potential(Surojanametakul et al.,2010). The assessment of the turmeric rhizomes' organoleptic features disclosed that they are yellowish in color, have an aromatic odor and a slightly bitter taste (Duraisankar and Ravindran,2015).

Turmeric has immense demonstrated benefits ranging from medicinal application. The diseases targeted by curcumin include neurological, liver, metabolic, Autoimmune, cardiovascular, inflammatory, cancer(Prasad et al.,2014).The medicinal utility of turmeric are varied.

Some significant benefits are mentioned below:

a) AntiinflammatoryActivity

The Curcuma genus has a long history of medicinal applications(Akarchariya et al.,2017;Dosoky and Setzer,2018).Turmeric can act as an anti-inflammatory agent by modulating the expression of inflammatory molecules. Turmeric has historic background which begins in Far Eastern medicine and dates back 5,000 (Ayurveda) and 2,000 (Atharveda) years ago, respectively(Vogel and Pelletier,1815). Turmeric showed its activity by decreasing the aggregation of inflammatory cells surrounding the hepatic bile ducts which

correlated with a reduce in serum alanine transaminase level (Boonjaraspinyo et al.,2009). It exhibits high anti-inflammatory properties as it encloses numerous natural cyclooxygenase inhibitors. Turmeric extracts, turmeric oil and curcuminoids is used for the treatment of arthritis due to their high anti-inflammatory properties (Arora et al.,1971). Turmeric has the capacity to reduce histamine levels while it boost the production of cortisone by the adrenal glands (Deodhar et al.,1980).

b*)Antioxidant properties*

Turmeric and its component exhibits great antioxidant activity as compared to vitamins E and C (Chattopadhyay et al.,2004). The aqueous extract of fresh rhizomes displayed higher antioxidant properties as compared to the extracts from dry rhizomes, the dry turmeric powder had the least antioxidant properties (Vankar,2008).

c)*Antidiabetic activity*

Turmeric has been consumed recently in many herbal preparations to reduce the risk of diabetes. When turmeric was induced in diabetic rats, it significantly lowers the level of glucose-6-phosphatase, escalates the action of liver(Prasad et al.,2014)

d*)Anticancer activity*

Turmeric has been most widely investigated for its anticancer activity(Gupta et al.,2013). Curcumin which is present in turmeric has a strong anticarcinogenic activities. Curcumin hampers cell-cycle advancement, which is useful in inhibiting the growth of cancerous cell in rats aortic muscle cells(Chen and Huang 1998). It is also because of the curcuminoids present in turmeric which show tremendous free radical scavenging property(Luthra et al.,2001).

e)*Antiaging activity*

The potential of turmeric as an antiaging agent against long-term , low-dose ultraviolet B irradiation in melanin-possessing hairless mice was studied. Inhibition in matrix metalloproteinase (MMP)-2 expression by turmeric was proposed to

contribute to the prevention of ultraviolet B(UVB)-induced skin aging in mice(Yu et al.,2002).

f)*Wound healing*

Turmeric as an element of a polyherbal preparation has been shown to boost the cellular proliferation and collagen synthesis at wound sites in normal rats(Gupta et al.,2008).

g)*Antimicrobial activity*

Turmeric has exhibited to hinder the growth of numerous microorganism which includes bacteria, viruses, and fungi and has displayed to act as a preservative by retarding microbial growth(Pezeshk et al.,2011). The essential oil of turmeric rhizomes display toxicity to seven fungi involved in deterioration of stored agricultural commodities(Nair,2013).

(h) *Other Uses*

The ground rhizomes, after drying and curing is a good turmeric powder and is the main constituent of curry powders and food colorant(Arajuo and Leon,2001). It is popularly consumed as a flavouring, preservative and colouring agent in South Asia, India and China(Palanikumar and Panneerselvam,2009). It is approved food additive in the United states. Turmeric is widely used as a substitute to the costly saffron spice(Hanif et al,1997). Turmeric is also used in cosmetic preparations(Nybe et al.,2007). It is being recently reported that turmeric can even potentially contribute against the life- threatening viral disease COVID-19 by inhibiting the main protease enzyme(Rajagopal et al.,2020).

According to Tiwari and Agarwal,2004 some of the uses of turmeric can be summarised as follows.

(i) In almost all the Asiatic countries it is used as food adjunct in many vegetables, meat and fish preparations.

(ii) It is used to flavour and to colour butter, cheese, margarine, pickles, mustard and other foodstuffs.

(iii) It is used to colour, liquor, fruit drinks, cakes and jellies.

(iv) It has been widely used for dyeing wool, silk and cotton to impart a yellow shade in an acid bath.

(v) Turmeric dye is also used as colouring material in pharmacy, confectionaries, rice milling, food industry, paint and varnish industry.

4:2:1: Attitudes of Enterprises towards Attributes of Turmeric

As mentioned earlier based on the review of literature five significant attributes of turmeric viz curcumin, aroma, price organic and packaging were listed out by the researcher in the present study. The lakadong turmeric from Mizoram were displayed in the BIOFACH India 2016 with INDIA ORGANIC held at NSIC Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016.116 enterprises showed interest in this product at the exhibition. The 116 respondents were asked to give their preferences of the attributes of the turmeric displayed in the Mizo Stall. On the basis of their preference, attitudes scores were computed by using fishbein formula as mentioned above.

A snapshot of the attributes and attitude score computed on the basis of the preferences of the respondents is presented in table no. 4.2.1.

Table 4.2.1: Attitudes Scores of Different Enterprises Towards Turmeric

Attributes	Export & Import No of Enterprises =33 nos	Food Manu-facturing No of Enterprises = 43 nos	Retail Business No of Enterprises= 18 nos	Service Company No of Enterprises 9 nos	Specialised Organic No of Enterprises 13 nos	Total	Percentage of Attitudes Sores
Curcumin	1039 (25)	1445 (26)	632 (26)	230 (20)	389 (24)	3735	24
Aroma	776 (19)	1041 (19)	425 (18)	185 (16)	335(21)	2762	19
Price	811 (20)	1007 (18)	473 (20)	275 (24)	321(20)	2887	20
Organic	1181 (28)	1667 (29)	665 (28)	366 (31)	460(28)	4339	29
Packaging	336 (8)	447 (8)	182 (8)	104 (9)	123 (7)	1192	8
Total	4143 (100)	5607(100)	2377	1160(100)	1628 (100)	14,915	100

Source: Primary Data

Parenthesis shows percentage of Attitude Score

A glimpse at table 4.2.1 shows that the attribute organic has scored the highest score 29 percent. Further it can be observed that the highest organic is followed by curcumin with a score of 24 percent , the third highest is price with a score of 20 percent followed by aroma with a score of 19 percent and the least packaging, with a score of 8 percent. Organic attribute has been given over riding importance as an attribute of lakadong turmeric cultivated in Mizoram. Organic farming is gaining significant in recent times world over. Curcumin as an attribute has gain popularity because of its medicinal properties. Price as an attribute is also important as it is one of the deciding factor for the consumers to purchase the product. Aroma in turmeric is due to the presence of aromatic volatile oil and because of this it has importance almost in all the Indian dishes. Packaging guards food from environment contamination. The relevance of development of organic farming has become a crucial element of the Common Agricultural Policy(CAP) and various European Member States are keen to promote and do well in organic agriculture by increasing the land for organic farming(Lapple& Van Rensburg,2011). Based on the global survey on organic farming carried out in 2007/2008 by the Research Institute of Organic Agriculture (FiBL), the International Federation of Organic Agriculture Movements (IFOAM) and Foundation Ecology and Agriculture(SOEL), organic agriculture is now practised in more than 130 countries with a total area of 30.4 million hectares in 0.7 million number of organic farms. This composed of about 0.65 percent of total agricultural land of the world(Ramesh et al.,2010).

The researcher have further analyse the attitudes scores of five(5) Enterprises towards each attribute specifically.

4.2.2 Curcumin as an attribute:

Table 4.2.2: Attitudes of Enterprises towards the Attribute -'CURCUMIN' in Turmeric

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =33 nos	Food Manu-facturing (%) No of Enterprises = 43 nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	21(7)	21(9)	11(2)	44(4)	23(3)	25
11 - 20	6(2)	2(1)	11(2)	0(0)	15(2)	7
21 - 30	18(6)	14(6)	22(4)	11(1)	8(1)	18
31 - 40	18(6)	26(11)	11(2)	11(1)	23(3)	23
41 - 50	37(12)	37(16)	45(8)	34(3)	31(4)	43
TOTAL	100	100	100	100	100	116

Source: Primary Data

Parenthesis shows number of Enterprises

A glimpse at table 4.2.2 shows that out of the respondents of the five enterprises, the respondents of the four enterprises namely Export and Import, Food Manufacturing, Retail Business and Specialised Organic have given the highest score for the attributes Curcumin and only one enterprise that is Service Company has given the second highest score. It can be seen that from the 116 respondents all the five enterprises have given importance to the attributes of 'Curcumin' among the five attributes of Turmeric. The Curcuma genus has a long history of medicinal applications (Akarchariya et al.,2017; Dosoky and Setzer,2018), being composed of approximately 120 species. Among the Curcuma species, Curcuma longa L. is the most widely recognized and cultivated and grown in watm climate in many regions of the world(Wu,2015). Tumeric is the dried rhizome or bulbous root of Curcuma longa L, which belongs to the Zingiberaceaefamily(Gupta et al.,2013). Tumeric plant is moderately tall,perennial with underground rhizomes and the rhizomes are mostly ovate, pyriform, oblong and often short-branched. The bioactive element of Curcuma

longa or tumeric is curcumin. Curcumin or curcuminoids gives the characteristic color of tumeric. Curcumin was first identified by Vogal in 1842(Nisaretal.,2015).Tumericcontainsprotein(6.3%),fat(5.1%),minerals(3.5%),carbohydrates(69.4%), and moisture(13.1%)(Prasad et al.,2014).

Turmeric comprises volatile as well as nonvolatile compounds. Volatile compounds are turmerone, zingiberene, curlonearturmerone(Nisar et al.,2015). The nonvolatile components of turmeric includes Curcuminoids and it contributed to the characteristic color of turmeric. This Curcuminoids mainly comprise of Curcumin I (Curcumin), Curcumin II (Demethoxycurcumin) and Curcumin III (Bisdemethoxycurcumin) (Parthasarathy et al.2008),and they all are found to be natural antioxidants (Ruby et al.1995). Curcuminoids was determined by Srinivasan in 1953, by the analysis of tumeric through chromatography (Patil et al,.2009;Prasad et al,.2014;Deogade and Ghate,2015).Among the Curcuminoids, Curcumin is an important element responsible for the biological activity of turmeric. Among the three mixture of curcuminoids curcumin is the most common which constitutes 71.5 per cent, demethoxycurcumin constitutes 91.4 per cent and bisdemethoxycurcumin constitute 9.1 per cent(Gupta et al.,2013).

According to Nisar et al, (2015),Curcumin is an odorless powder which is an orange-yellow crystalline substance that is not soluble in water and is presumed to be the most powerful bioactive portion of turmeric. The melting point of Curcumin is 184 degreecelcius and is easily soluble in acetone, ketone, chloroform and ethanol. In 1815 Curcumin was first isolated and in 1973 the actual chemical configuration was determined by Whiting and Roughley. Among all Curcuminoids, Curcumin I is considered to have minimum stability while Curcumin III is the most stable. Curcumin is not soluble in water at acidic and neutral pH, it is soluble in acetone, methanol, and ethanol (Goel et al,.2008;Jurenka,2009). As curcumin is sensitive to light, biological samples containing curcumin are to be protected from sunlight (Prasad et al.,2014). The structure of curcumin as diferuloylmethane and its synthesis was confirmed by Lampe et al.,(1910) and also by Majeed et al,.(1995). The main yellow –coloredsubstance in the tumeric rhizome is curcumin. Heller(1914) identified three minor constituents in addition to the three forms of

curcuminoids which are considered as geometrical isomers of curcumin with a diketone structure(Prabhakaran Nair, K.P,2013).

Abhishek and Dhan (2008) reported that curcumin possessed higher superoxide anion scavenging activity compared to demethoxycurcumin or bisdemethoxycurcumin. Curcumin acts as a prooxidant in the presence of transition metal ions, such as copper and iron, and is a potent bioprotectant with a wide range of therapeutic applications(Prabhakaran Nair, K.P,2013). More than 300 other bioactive compounds have been isolated from tumeric, including some essential oils, curcumin has shown the greatest bioactivity(Devassy et al.,2015).

Curcumin is an orange-yellow dye insoluble in water and authorized by the European Union as a food additive(Goel et al.,2008). It is mostly used in dairy products, beverages, cereals, mustard, food concentrates, pickles, sausages, confectionary, ice cream, and meat, fish, eggs and bakery products(Lakshmi,2014;Solymosi et al.,2015). Curcumin is a cheap alternative to saffron, even though it cannot substitute the saffron taste, despite being named "Indian Saffron " in Europe(Scartezzini and Speroni,2000). Curcumin when used as an additive is stable during thermal treatment and in dry foods(Stankovic,2004).The diseases targeted by curcumin include neurological, liver, metabolic, Autoimmune, cardiovascular, inflammatory, cancer(Prasad et al.,2014).

Some of the significant biological activities and disease targets of curcumin are mentioned below:

A.*Biological activities of curcumin:*

Anticancer effects:

Curcumin displays chemotherapeutic and chemopreventive effects in diverse cancers(Prasad et al.,2014).Curcumin is found to be effective in many phases of cancer development, to suppress transformation, begining,development invasion of tumor, angiogenesis, and metastasis(Kocaadam& Sanilier,2017).It is effective for decreasing or preventing various cancer types including multiple myeloma and colon, pancreas,breast,prostates and lung cancers(Anand et al.,2015;Devassy et

al.,2015) and also increases the effectiveness of radiotherapy and may open a quicker path to treatment(Akpolat et al.,2010).Curcumin acts as a potent anticarcinogenic compound and induction of apoptosis plays an important role in its anticarcinogenic effect(Chattopadhyay et al.,2004). Curcumin possesses dose dependent chemo-preventive and physiological effects in several tumor bioassay systems and has potency to diminish the poliferation of tumorcells(Nisar et al.,2015).The incidence of low bowel cancer among the Indians has been attributed to the use of tumeric in Indian cookery(Mohandas and Desai,1999).

Anti-inflammatory effects:

Curcumin is determined to be an anti-inflammatory and this property is due to hydroxyl and methoxy groups(Rahman and Biswas,2009).Curcumn shows its effectiveness by inhibiting inflammatory cell proliferation, metastasis, and angiogenis by various molecular targets(Shehzad et al.,2013). According to Shehzad et al.,(2013) Inflamatory bowel disease(IBD) is an immune impairment including Crohn disease and ulcerative colitis, commonly characterized with digestion system chronical inflammation.Curcumin helps in prevention and treatment of IBD(Holt et al.,2005;Ali et al.,2012).

Antioxidant effects:

Curcumin displays strong antioxidant effect through free-radical-scavenging activity (Deogade and Ghate,2015). Curcumin is a powerful antioxidant and it is supposed to be the most soothing and bioactive part of the turmeric(Nisar et al.,2015). The antioxidant mechanism f curcumin is associated to its different conjugated structure, which includes two methoxylated phenols and an enol form of β-diketone(Chattopadhyay et al.,2004).

B. Disease targets of curcumin

Wide-ranging research over the past thirty years has shown that curcumin has therapeutic potential against a considerable number of diseases such as cancer, lung diseases, neurological disease, liver diseases, metabolic diseases, autoimmune

diseases, cardiovascular diseases, and various other inflammatory diseases(Aggarwal and Harikumar,2009;kannappan et al.,2011).

Cardioprotective properties:

Curcumin reduces the severity of pathological changes and thus protects from damage caused by myocardial infarction(Nirmala and Puvanakrishnan,1996). Curcumin hampers the oxiodation of low-density lipoproteins and curbs platelet aggregation(Prasad et al.,2014).

Antidiabetic properties:

Diabetes mellitus arises mainly due to shortage of pancreatic hormone i.einsulin(Nisar et al.,2015). Various inflammatory cytokines, transcription factors, and enzymes have a significant role in the outset and advancement of diabetes(Choudhary et al.,2011; Shehzad et al.,2013). Ghorbaniet al.,(2014) identified that curcumin has properties such as reducing hepatic glucose production, sudueing inflammatory response stemming from hyperglycemia.

There are many other uses of curcumin namely Antiarthritic properties, Protection against multiple sclerosis, Protection against Alzheimer disease, Protection against cystic fibrosis(Prasad et al.,2014).

Curcumin has been verified as a “generally recognized as safe” compound by FDA and it is declared not to have any toxic effect(Kocaadam& Sanlier,2017).

4.2.3 Aroma as an attribute:

Table 4.2.3: Attitudes of Enterprises towards the Attribute- ‘ AROMA’ in Turmeric

Scores/Attitude	Enterprises					
	Export & Import (%) No of Enterprises =33 nos	Food Manu-facturing (%) No of Enterprises= 43 nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	3(1)	2(1)	0(0)	0(0)	0(0)	2
11 - 20	43(14)	45(19)	56(10)	56(5)	38(5)	53
21 - 30	30(10)	23(10)	17(3)	22(2)	24(3)	28
31 - 40	24(8)	23(10)	22(4)	22(2)	38(5)	29
41 - 50	0(0)	7(3)	5(1)	0(0)	0(0)	4
TOTAL	100	100	100	100	100	116

Source: Primary Data

Parenthesis shows number of Enterprises

Table 4.2.3 shows that the majority of the respondents of the five enterprises are in the range of 11-20 to this attribute. The lowest score of 0-10 have been given by the respondents of two enterprises that is Export and Import three percent and Food Manufacturing two percent. In the case of the highest score of 41 – 50 the respondents of the two enterprises namely Food Manufacturing and Retail Business have given seven percent and five percent respectively. This indicates that the attributes of 'Aroma' is relatively lesser important for the respondents of the five enterprises. It is observed that the level of importance for this attribute can be seen from the score of 11 – 40.

Tumeric constitutes volatile as well as nonvolatile compounds, it is an oleoresin which is comprises of a light volatile oil fraction and a heavy yellow-brown fraction(Nisar et al, 2015). The volatile turmeric oil is extracted from dried rhizomes, containing about 5-6% oil and leaves about 1.5%(Prabhakaran Nair, K.P,2013).It is normally extracted by steam distillation and processing and the techniques of extraction play a crucial role in maximising oil yield, pigments and their constituents(Chempakam and Parthasarathy,2008).The Aroma of turmeric is due to the presence of the aromatic volatile oil like tumerone(25%), curdione(11.58%) and ar-tumerone(8.5%) (Nisar et al, 2015). The hexane extract of turmeric had a turmeric like odor, whereas the steam distillate of turmeric had a pungent, non turmeric- like odor(Hasegawa et al,2015).

Rupeet al.,(1934) determine two main ketonic sesquiterpenes responsible for the aroma of turmeric namely, ar-turmerone and turmerone, which is in the ratio of 60:40.Leela et al.,(2002) made a comparative study on the components of the oil from leaves, flowers, rhizomes and roots of turmeric. They concluded that rhizomes and roots possessed more similarity as compared to leaves and flowers which imply the presence of biogenetically linked characters. The volatile oils of flowers and leaves constitutes mostly monoterpenes, while roots and rhizomes contains mostly sesquiterpenes. The essential oil is the one that provides the turmeric rhizomes a particular spicy and aromatic flavour(Saiz,2014;Meng et al.,2018).

Tumeric volatile oil possesses several medicinal and pharmacological properties such as antifungal, insect repellent, anti-bacterial, anti-platelet and anti-

mutagenic(Verma &Kumar,2015).It also possess anti-inflammatory, antioxidant, anti-arthritic and antinociceptive properties(Funk et al.,2010). Food and Drug Administration (FDA) approved turmeric oil as food additive mentioned as safe drug(Sasaki et al.,2002). Some major pharmacological activities of turmeric oil are Antimutagenic activity, Neuroprotective activity, Anti-hyperlipidaemic activity, Anti atherosclerotic activity, Disease modifying activity, Anti-arthritic activity, Anti-ischemic activity, Hepatoprotective activity, Antifibrosis activity, Antidermatophytic activity, Antibacterial activity, antifungal activity, Antiaflatoxigenic activity, Antioxidant activity, Antiapoptic activity, Anti hyperglycaemic activity, Antiplatelet activity, Antidepressant and Immunostimulant activity(Verma &Kumar,2015).

4.2.4 Price as an attribute:

Table 4.2.4: Attitudes of Enterprises towards the Attribute – ' PRICE 'of Turmeric

Scores/Attitude	Enterprises					
	Export & Import (%) No of Enterprises =33 nos	Food Manu-facturing (%) No of Enterprises =43 nos	Retail Business (%) No of Enterprises =18 nos	Service Company (%) No of Enterprises =9 nos	Specialised Organic (%) No of Enterprises=13 nos	Total No of Enterprises
0 - 10	9(3)	9(4)	17(3)	0(0)	8(1)	11
11 - 20	37(12)	30(13)	17(3)	11(1)	8(1)	30
21 - 30	21(7)	38(16)	38(7)	45(4)	68(9)	43
31 - 40	27(9)	21(9)	11(2)	22(2)	8(1)	23
41 - 50	6(2)	2(1)	17(3)	22(2)	8(1)	9
TOTAL	100	100	100	100	100	116

Source: Primary Data

Parenthesis shows number of Enterprises

It can be seen from table 4.2.4 that the majority of the respondents of the five enterprises have given a score of 11 -40 to this attribute. The range for this attribute leans in the score of 11 – 40 and this indicates that the respondents of the five enterprises have given lesser importance to the attribute price. American Marketing Association(AMA) has defined marketing management as the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to create exchange that satisfy individual or organisational objectives(Janakiraman,1998). Marketing mix components should be modified holistically in meeting changing needs of customers without definite emphasis on one or two element. Marketing mix is a set of levers which a firm can manipulate to achieve its objectives such as profitability, market share, customer satisfaction and survival(Pour et al.,2013).

Price decisions are important in determining the benefits that can be given to the customer and play a significant role for product quality in determining the

profitability of the business(Octari et al.,2018). According to Sunyoto and Susanti(2015) argue that “pricing activities play an important role in the marketing mix process, because pricing is directly related to the revenue received by the company. The pricing decision is also important in determining how much a service is valued by the consumer and also in the image building process,pricing also gives a certain perception of quality”.Price is the amount of money charged for a product or service, or the sum of the values that consumers- exchange for the benefits of having or using the product or service(Kotler and Armstrong,2005).Price is the only variable in the marketing mix that must be set in relation to the other three Ps (Low and Tan, 1995).

Price being one of the elements of the marketing mix that companies use to accomplish their marketing objectives(Manafzadeh et al.,2012). It is a sensitive and flexible element of the marketing mix because it can be modified quickly in response to changes in the market(Bennett,2010; Pride & Ferrell,2014).

The price of fresh Mizo turmeric was Rs.8 per kg while turmeric powder was Rs. 130 per kg at the time of being exhibited in Biofach India. Presently, the price of fresh Mizo turmeric is Rs.20 while turmeric powder is Rs.250 per kg. The export price of fresh turmeric currently is Rs.60-62 per kg and while turmeric powder is Rs.400 per kg.

4.2.5 Organic as an attribute:

Table 4.2.5: Attitudes of Enterprises towards the Attribute – ' ORGANIC ' of Turmeric

Scores/Attitude	Enterprises					
	Export & Import (%) No of Enterprises =33 nos	Food Manu-facturing (%) No of Enterprises = 43 nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	3(1)	5(2)	5(1)	0(0)	0(0)	4
11 - 20	18(6)	5(2)	0(0)	12(1)	23(3)	12
21 - 30	9(3)	16(7)	22(4)	0(0)	8(1)	15
31 - 40	30(10)	30(13)	44(8)	44(4)	31(4)	39
41 - 50	40(13)	44(19)	28(5)	44(4)	38(5)	46
TOTAL	100	100	100	100	100	116

Source: Primary Data

Parenthesis shows number of Enterprises

This attribute has emerged as the most important attribute of turmeric displayed in the Exhibition. Organic farming is gaining importance globally in recent times. Organic as an attribute for the respondents of the five enterprises plays an important role as table 4.2.5 shows that majority of the respondents have given the score of 31- 50. The respondents of the three enterprises namely Export and Import (three percent), Food Manufacturing(five percent) and Retail Business (five percent) have given the score of 0-10. The main aim of organic farming is to create a sustainable form of farming system. According to FAO definition, " Organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity , biological cycles and soil biological activity and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm input(Santhoshkumar,2017). In the words of A.N Sarkar, 2015, Organic farming is a specialized form of farming which involves selected application of organic

fertilizers, manures, crop residues, green manuring crops, earthworm casts(vermiculture),etc to enrich soil with adequate nutrients, and provide good soil structure and soil health The main aim of organic farming is to create a sustainable form of farming system. In a simple form, organic farming is the practice of growing crops without the use of synthetic pesticides, herbicides and fertilizers(Mitra and devi,2016).

Organic farming involves recycling of waste and residue to the original soil, restoring the nutrients from the soil which was depleted during the crop growth, strengthening the growth of microorganism in order to maintain right proportion of nutrients in the soil, preserving soil health by balancing the soil moisture and soil aeration and assuring soil fertility(Chand and Wani,2016). Organic farming can be treated as the explanation to the problems related with conventional agriculture such as biodiversity loss, nitrate pollution, animal welfare concerns, surplus production or food safety. Organic farming is gaining steady momentum across the world. According to Chand and Wani(2016)the different components of organic farming are as follows:

Crop and Soil Management- Green manuring and inter-cropping mostly during the year is one of the main goals of this type of farming.

On-farm Waste Recycling- Composting of all organic wastes due to the increase price of chemical fertilizers gain importance in this type of farming.

Non-chemical Weed Management –Weed management is one of the important aspect of organic agriculture. In order to have weed management, the elements to consider are crop rotation, green manuring, maure management, tillage and mulching.

Domestic and Industrial Waste Recycling-Sewage and sludge use for crop production form an essential fundamental of organic farming.

Energy use-The comparison of total energy input/ha with total energy output favours biological farming systems as N-fertilizer and pesticides are not used by the farmers.

Food Quality- The consumers and the scientists are very concerned with the quality of food which is maintained in organic farming.

Ecological Agriculture- Due to the thriving interest for environmental degradation, dwindling natural resources and increase demand of food supply, farm scientist and policy makers are earnestly trying to find alternative to chemical agriculture.

Integrated Intensive Farming System(IIFS)- It covers intensive use of farm resources.

Value of Organic Farming-The value of organic farming can be estimated by assigning the market value of the potentially available plant nutrients.

4.2.6 Pakaging as an attribute:

Table 4.2.6:Attitudes of Enterprises towards the Attribute -'PACKAGING'of Turmeric

Scores/Attitude	Enterprises					
	Export & Import (%) No of Enterprises =33 nos	Food Manu-facturing (%) No of Enterprises = 43 nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	70(23)	68(29)	72(13)	56(5)	69(9)	79
11 - 20	21(7)	21(9)	16(3)	22(2)	31(4)	25
21 - 30	9(3)	9(4)	2(1)	22(2)	0(0)	10
31 - 40	0(0)	2(1)	2(1)	0(0)	0(0)	2
41 - 50	0(0)	0(0)	0(0)	0(0)	0(0)	0
TOTAL	100	100	100	100	100	116

Source: Primary Data

Parenthesis shows number of Enterprises

Table 4.2.6 packaging as an attribute for the respondents of the five enterprises is not important as sixty percent of the respondents are in the score of 0-10.The highest score of 41-50 is not given by any of the respondents of the five enterprises. The main roles of food packaging are to prevent food products from outside pressure and damage, to contain the food, and to furnish consumers with

ingredient and nutritional information(Coles,2003). Packaging is the activities of designing and producing the container or wrapper for a product(Kotler and Armstrong,2003). With the Invention of canning by Nicholas Appert in the 19th century, modern food packaging is believed to have started during this time. Samuel C. Prescott and William I. Underwood worked to create the fundamental principles of bacteriology as applied to canning processes after the inauguration of food microbiology by Louis Pasteur and colleagues in the 19th century(Wilson,2007).

The advancement of polypropylene, polyester and ethylene vinyl alcohol polymers led to the use of plastic and flexible packaging instead of metal, glass and paperboard packaging(Lord,2008). 20th century innovations consist of active packaging(oxygen controllers, antimicrobials, respiration mediators, and odor/aroma controllers) and intelligent or smart packaging. Active packaging allows packages to interact with food and the environment and plays effective role in food preservation(Brody et al.,2001;Rubio et al.,2004). Intelligent or smart packaging is planned to guide and impart about food quality(Brody et al.,2001;Kerry et al.,2006).

The main drivers for 21st century innovations towards packaging is for consumer and food service needs and requirement for global and quick transport of food(Brody et al.,2008). The prime function of packaging is protection and conservation from foreign contamination(Robertson,2006). In modern trade, packaging crucial component which guarantee in preserving the quality of food products. Packaging also plays the main role by safeguarding packed products against external conditions, protecting the quality and health safety of food products, facilitating easy transportation, storage, and dispensing of products(JoannaWyrwa and Anetta Barska,2017).

Food packaging is used to guard food from environmental contamination and other influences(such as odors, shocks, dust, temperature, physical damage,light microorganism and humidity) and it is a key to assuring the quality and safety of food, while also enhancing shelf-life and reducing food losses and wastage(Carocho, Morales & Ferreira,2015;Narayanan et al.,2017;Santos et al.,2017;Robertson,2012). According to Dainelliet al.,(2008), changes in customer interest, industrial

production trends, retailing practises and consumer lifestyles are the major forces driving the growth of novel and innovative packaging techniques thatprovide and monitor food safety and quality, lengthen shelf-life and minimize the environmental responsibility of food packaging. Packaging of products also provides as useful means of marketing for the customers as product comes in different shapes and sizes and as a user interface , serves the customers with both ease of use and convenience(Schaefer and Cheung,2018). Pakaging is done for the Mizo turmeric and also labeling. The label also shows that it is organic in nature and described several things about the product.

Conclusion:

As of conclusion it can be observed that organic (29%) emerged as the most significant attribute followed by curcumin (24%) , followed by price (20%), followed by aroma (19%) and packaging(8%). Hence it can be concluded that ' organic' should be projected the most important attribute for 'formulating marketing strategies for lakadong' turmeric grown in Mizoram.

4:3 GINGER :

Ginger '*Thingpui, Thinglaidum and Thingria* ' was a spice displayed in the BIOFACH India 2016 with INDIA ORGANIC, held at National Small Industries Corporation Exhibition Grounds. Ginger belongs to the family *Zingiberaceae* and the botanical name Zingiber officinale was given by an English botanist William Roscoe (1753 – 1831) in the year 1807(Kaushal et al.,2017). Ginger, Zingiber officale Rose., is a monocotyledonous plant, belonging to the family *Zingiberaceae* in order of zingiberales and sub-family Zingiberoideae. Ginger plant is aromatic, with unbranched aerial stems, distichous leaves, open sheaths and hypogeal germination which is found mostly in the tropical area all over the world with the centre of distribution in Indo-Malaysia (Arya,2001).The name of ginger derives from a Sanskrit word denoting "horn shape"in reference to the protusions on the rhizomes(Ghosh et al.,2011).Ginger is a plant, its rhizome is used as a spice, food , flavouring agent and medicine(Sharma,2017). It is a herbaceous perennial plant

grown as an annual crop with narrow, bright green, grass-like leaves, and yellowish green flowers(Liu et al.,2014).

Ginger is believed to be a native of South Eastern Asia (Purseglove et al.,1981). Ginger was known to and greatly acclaimed by the ancient Greeks and Romans who acquired this spice from Arabian traders via the red sea. In the ninth century, ginger was introduced in France and Germany and in the tenth century in England(Arya,2001). In the fifth century A.D, ginger plants were grown in pots and were transported abroad , especially between China and Southeast Asia by a long sea voyages as to serve as fresh food and in preventing scurvy(Rosegarten,1969). Ginger is considered to be the first oriental spice to be extensively introduced outside its origin. In the thirteenth century the Arabs took the ginger plant from India to East Africa and in the sixteenth century, the Portuguese brought to West Africa and other parts of the tropics(Purseglove et al.,1981).

The ginger stems are erect, oblique, round with a smooth leaves and can grow upto 2 or 3 feet in height. Depending on variety, the ginger rhizomes can be yellow, white or red in color and is covered with a brownish skin that may either be thick or thin(Gupta and Sharma,2014). Ginger is a biennial while the stem is annual and is propagated through rhizomes(Arya,2001). The ginger plant is erect, with a number of fibrous roots, aerial shoots(pseudostem) with leaves and underground stem (rhizhome) and the roots of ginger is of two types that is fibrous and fleshy. The roots which are fibrous are thin accompanied by root hairs and their main function is absorption of plant nutrients and water from soil. From the lower nodes of mother rhizome and primary fingers, numerous fleshy roots are produced as the ginger plants grow further. The fleshy roots are thicker, milky white in color with a few hair and no lateral roots and their main functions is of anchorage and conducting vessels for water and nutrient absorption (Nair,2013).

Ginger, is a monocotyledon, with a slender, perennial herb-like habit, but is mostly grown as an annual. It is 30-100cm tall, with a robust branched rhizome borne horizontally near the surface of the soil, bearing leafy shoots close together. The fleshy rhizome is hard, thick and is usually pale yellow within(Farooqi et

al.,2005). The anatomy of ginger can be classified as the first order rhizome which is directly from the seed produces the first above- ground shoot and this had 90-95 per cent of total roots. From the bud of the first order rhizome arose the second order rhizome and the third order rhizome originated from the second order. The third order rhizome produced a reproductive or a vegetative structure and from this rhizome a fourth order rhizome is developed. The fifth and sixth order rhizomes originated from buds formerly developed on the fourth order rhizome(Santos and Silva,1997). The inner structure of the rhizome has an inner zone and an outer zone, separated by intermediate layers(Remashree et al.,1997).

Ginger plant is an impressive pungent spice with an enormous history of cultivation. In India and China ginger has been used as a traditional medicines to attend to a number of disorders over 5000 years (Shoaib et al.,2016). Ginger popularly known as '*Adrak*' which is extensively used in Pakistani and Indian cuisines over 2500 years (Bartley and Jacobs, 2000). It has been grown in South-East Asia for many years and has become popular as a result of its therapeutic effects in most of the European and African countries. Its popularity as a traditional medicinal systems is because of its rich phytochemistry and diseases preventive properties (Shukla and singh,2007).

According to Anderson,1991 , ginger has three distinct phases of growth and development were pointed out. Phase-I, which takes 35 to 45 days from the time of planting to shoot appearance. Phase-II, takes 150 days and consisted of development from shoot appearance to flowering, at the same time rhizome growth is comparably slow. Phase-III, consist of the period from flowering to the harvesting of ginger in the month of June to July, which lasted around 90 days. Throughout this phase the ginger rhizomes grew quickly. The economic part of the ginger plant is the underground rhizome which has many branches resembling in shape of an irregular hand with fingers having circular scars all along their length with small scales adhering to them. The flowers of ginger plant are borne on a spike, produced on a peduncle different from the aerial leafy stems. The spike is condensed, oblong and cylindrical with numerous scarious bracts, each carrying a single flower(Tiwari and Agarwal,2004).

The chemical composition of ginger contains, 80.9 percent moisture, 2.3 percent protein, 0.9 percent fat, 1.2 percent minerals, 2.4 percent fibre and 12.3 percent carbohydrates. Iron, calcium and phosphorous are the minerals found in ginger and the vitamins in ginger consists of thiamine, ribloflavin, niacin and vitamin C. The chemical content of ginger varies according to the type, variety, agronomic conditions, curing methods, drying and storage conditions(Zadeh and Moradi-kor,2013)(Gugnani and Ezenwanze,1985).

Ginger requires a warm and humid climate and it thrives well from sea level to an altitude of 1500 m in the Himalayas, optimum elevation being between 300 and 900m(Pruthy,1993). Ginger needs a tropical or subtropical climate and a shade loving plant. The requirement of base temperature is 13 C with an upper limit 32 C(day) and 27C (night), the optimum being 19-28 C. The optimum soil temperature of 25-26 C is preferable for germination of rhizomes and 27 C for growth and development (Evenson et al.,1978). A well- distributed(8-10months) rainfall(1500-3000mm) during growing season and dry spells during land preparation as well as before harvesting is required for good growth and yield of the crop. As it strives well under partial shade, it can be grown as an intercrop(Tiwari and Agarwal,2004).

Ginger plant can grow on a wide variety of soil but good garden soil is ideal for its growth, which is rich in humus, light, loose friable, well drained and of at least 30 cm depth. Red laterite, clay loam and heavy lateritic loam containing not more than 30 per cent sand or 20 per cent clay and free from gravel is favored, as they give greater yields. Highest yield can be obtain on medium loam with good supply of humus and wet swampy ground or soil logged with water should be avoided. Ginger crop is sensitive to water logging, frost and salinity and tolerant to wind and drought. The hilly slopes are not advisable for growing ginger as it may leads to soil erosion during heavy rainfall. Virgin soils specially after deforestation are ideal for ginger crop and soil hardiness should be less than 15.7 mm(Tiwari and Agarwal,2004).

According to Farooqi et al(2005), Parthasarathy et al(2008) and Tiwari and Agarwal(2004) cultivation, planting . cropping and harvesting of ginger requires the following steps:

- Propagation: It is a general practice to propagate ginger by rhizomes and for this propagation, carefully preserved, healthy and disease-free seed rhizomes are used.
- Land preparation: The preparation of land differ with soil type, slope and irrigation. The land should be ploughed many times to bring the soil into a fine tilth and the land is also prepared for early summer showers.
- Planting: In north India, planting of ginger is done with the onset of monsoon and in the south it is grown mainly as monsoon crop from April-May to December, while in the eastern part of India, planting is done in March. Planting at the right time withstands heavy rains and crop grows rapidly. Studies have shown that planting during the month of April results in better growth and development of rhizomes and fewer incidences of diseases.
- Manures and fertilizers: Ginger is a nutrient exhaustive crop and utilization of organic and manures are highly needed.
- Irrigation: As ginger crop needs a lot of water for its crop, in areas of low rainfall, irrigation is a must.
- Weeding and mulching: Depending on the density of weed growth, weeding is done as weeds are a serious problem in ginger cultivation.
- Rotation and inter-cropping: Crop rotation is important for balancing the nutrient status of soil and also to avoid soft rot disease in ginger. As ginger is a partial shade loving crop it can be grown with other crop.
- Harvesting: The stage of harvesting depends upon the purpose for which crop is grown, price trend in the market, variety and agro-climatic conditions. Ginger is a 7-8 month’s duration crop and green ginger is harvested in 5-6 months. Ginger is harvested usually when the leaves turn yellow and start withering.

Ginger is a famous spice which is used almost all around the world, especially in most of the Asian countries(Demin and Yingying,2010). The uses of ginger are varied, some of the significant uses are mentioned below:

(a) *Medicinal use* : Ginger rhizome is a widespread herbal medicine mostly used for the treatment of gastrointestinal diseases, including dyspepsia, nausea and diarrhea (Borrelli et al.,). Ginger as an element of traditional health products, it is useful as appetite enhancer, anticold and anti-inflammatory properties(Ryu and Kim,2004). From the Ayurvedic medical system, it can be seen that ginger is valued for its numerous medical and spicy properties and is handy in gastritis, dyspepsia and flatulence. According to Tiwari and Agarwal,2004 some of the medicinal properties of ginger are:

- Ginger is an appetizer, laxative, stomachic, alexiteric, aphrodisiac, and carminative and helpful in the diseases of heart and throat, indigestion, asthma, bronchitis, dyspepsia inflammations and also gives relief in piles, rheumatism, headache, lumbago.
- Ginger soothes cold and cough, it is good for diarrhea and helps during constipation.
- Ginger helps in the deterrence of nausea, dizziness and vomiting.
- Ginger reduces blood pressure and helps to avoid internal blood clot and it is also useful in maintaining cholesterol level.

The effects and immune boosting action of ginger can be summarized as follows:

(i) *Anti-Inflammatory Effects* : In ginger there is a strong anti-inflammatory compounds called gingerols(Kiuchi et al.,1992).

(ii) *Effects on cardiovascular system* : Ginger vitalizes heart muscles and helps in blood circulation throughout the body. It also useful in decreasing blood pressure and cardiac workload(Ghosh et al.,2011).

(iii) *Cancer preventive effects* : Ginger is found to be anti-carcinogenic(Koshimizu et al.,1988). Gingerol which is found in ginger hinders the advancement of human colorectal cancer cells(Bode,2003).

(iv) *Antioxidant activity* : Antioxidant property of ginger is an important activity which is useful for inhibiting against numerous diseases. Antioxidant property of ginger is due to the presence of flavones, isoflavones, flavonoids, anthocyanin, coumarin, lignans, catechins and isocatechins(Stoilova et al.,2007).

(v) *Antimicrobial activity* : Traditionally ginger is known to have a wide range of antimicrobial activity against both gram positive and gram negative bacteria and fungi(Gupta,2005).

(b) *Other uses*: Apart from medicinal properties , there are many uses which is mentioned below.

- The extracts of ginger have a properties which increase preservation of chilled and frozen surimi fish(Mariah et al.,2002).
- Shogaols which is present in ginger is supposed to be a good antifouling agents(Etoh et al.,2002).
- Ginger is used mainly as an ingredient in numerous spice blends and in food processing and beverage industries(Tiwari and Agarwal,2004).
- Ginger is one of the main component of curry powder and popularly used in making ginger bread, biscuits, cakes, puddings etc and for soft drinks like cordials, ginger-cocktails etc. Ginger is also a good natural preservative and meat tenderizer(Tiwari and Agarwal,2004).
- Ginger in fresh or dry form is used in all the vegetable and other preparations to increase its tastes(Arya,2001).
- Ginger as a spice is used widely in preparation of different types of condiments and in cooking vegetables. Spice and ground ginger is important component of curry powder , mincemeat spice and other flavouring and seasoning mixtures(Arya,2001).
- Ginger ale, ginger beer and ginger wine are widely used soft drinks and one of the most important value-added products to emerge is “Ginger Tea” brought out by the Tata group(Nair et al.,2013).

4.3.1: Attitudes of Enterprises towards Attributes of Ginger

In the present study five important attributes of ginger viz appearance, price, aroma, organic and pungency were listed out by the researcher. '*Thingpui, Thinglaidum and Thingria* was the variety of ginger from Mizoram were displayed in the BIOFACH India 2016 with INDIA ORGANIC held at NSIC Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016. Out of the many enterprises who visited this exhibition, 113 enterprises showed interest in this product and they were asked to give their preferences of the attributes of the ginger displayed in the Mizo Stall. On the basis of their preference, attitudes scores were computed by using fishbein formula. Table 4.3.1 shows the attributes and attitude score computed on the basis of the preferences of the respondents.

Table 4.3.1: Attitudtes Scores of Different Enterprises Towards Ginger

Attributes	Export & Import No of Enterprises =30nos	Food Manu-facturing No of Enterprises =43 nos	Retail Business No of Enterprises =18 nos	Service Company No of Enterprises =9 nos	Specialised Organic No of Enterprises =13 nos	Total	Percentage of Attitudes Sores
Appearance	463 (13)	580 (10)	316 (14)	82 (7)	247 (15)	1688	12
Price	508 (14)	873 (16)	490 (21)	231 (19)	321 (20)	2423	17
Aroma	691 (18)	1151(21)	400 (17)	184 (16)	297 (19)	2723	18.95
Organic	1245(33)	1891(33)	728 (31)	422 (36)	471 (30)	4757	33
Pungency	789 (21)	1089(20)	390 (17)	255 (22)	258 (16)	2781	19.05
Total	3696(100)	5584(100)	2324 (100)	1174(100)	1594(100)	14,372	100

Source: Primary Data

Parenthesis shows percentage of Attitude Score

From the table 4.3.1 it can be seen that the attribute organic has scored the highest with a score of 33 percent. The highest organic is followed by pungency with a score of 19.05 percent , the third highest is aroma with a score of 18.95 percent followed by price with a score of 17 percent and the least appearance, with a score of 12 percent .It is interesting to note that there is a slight difference of 0.10 percent of attitude score of attributes pungency and aroma. Organic farming has become very popular and is gaining momentum around the world. There are great concerns for organic farming among not only scientists, officials, entrepreneurs and but also the public as the consumers of organic food and fiber(Rehber et al.,2018). Price is also an important attributes as to some extend it is one of the buying factor. Pungency and aroma is a significant attributes of ginger, the pungency of ginger is due to the presence of zingerone, shogaol and gingerol(Greenberg and winnick,1940). While the aroma of ginger is due to the volatile oil that is present in 1-3%(Lamb,1994). Ginger plant is erect, with many fibrous roots, aerial shoots(pseudostem) with leaves, and underground stem(rhizome)(Nair,2013).

The researcher have further analyse the attitudes scores of five(5) Enterprises towards each attribute specifically.

4.3.2 Appearance as an attribute:

Table 4.3.2: Attitudes of Enterprises towards the Attribute – ' APPEARANCE '

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =30nos	Food Manu-facturing (%) No of Enterprises =43nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	60 (18)	63 (27)	50 (9)	78 (7)	46 (6)	67
11 - 20	13 (4)	12 (5)	22 (4)	11 (1)	8 (1)	15
21 - 30	13 (4)	19 (8)	6 (1)	11 (1)	23 (3)	17
31 - 40	7 (2)	2 (1)	17 (3)	0 (0)	8 (2)	8
41 - 50	7 (2)	4 (2)	6 (1)	0 (0)	8 (1)	6
TOTAL	100	100	100	100	100	113

Source: Primary Data

Parenthesis shows number of Enterprises

The table shows that the attribute Appearance is not important for the respondents of the five enterprises as they have all given more than 45 percent for the score of 0- 10. The generic name Zingiber is derived from Zingiberi which in turn originated from the Sanskrit word Shringvera. Shringvera denotes a horn shaped in reference to the protusions on the rhizomes (Suthar etal.,2003) (Ghosh et al.,2011). Ginger is a monocotyledon, a herbaceous crop, perennial in nature but cultivated as an annual(Farooqi et al.,2005). Ginger plant has fibrous roots, aerial shoots(pseudostem) with leaves and underground stem i.e rhizome(Nybe et al,.2007). According to Singh and Selvan,2003 there are four varieties of Ginger grown in Mizoram namely Nadia, Thingpui, Thinglaidum and Thingria. Nadia is an attractive-sized variety with a fibre content of 9.5 percent. Thingpui is a thick attractive-sized with a fibre content of 8.6 percent and is the largest-sized variety grown in Mizoram. Thingpui rhizomes is light yellow in colour and has it has a low pungency. Thinglaidum is slightly smaller than Nadia and is a popular variety in Mizoram. When cut the rhizome has a distinct purple ring in the middle and the fibre content is 9.8 percent. Thingria is very thin ,longish with a fibre content of 8.1 percent.

Ginger is a perennial herbaceous monocotyledon in nature mainly grown as an annual for its underground rhizomes(Tiwari and Agarwal,2004). Ginger is a biennial but the stem is annual. It is propagated through rhizomes, which put forth erect stem (Pseudostem) 30-100 cm in height with robust branched rhizomes borne horizontally near the surface of the soil, bearing leafy shoots close together. The stem is erect consisted of well developed long smooth sheaths of the leaves, sheathing the pseudo-stem and arranged alternately. While the fresh daughter rhizomes developed, the old mother rhizomes shrink and die-off slowly. The daughter rhizomes become the future propagating material(Arya,2001).

The stem of ginger botanically known as rhizomes which is the edible portion of the plant. It is soft and tender when immature, gradually becomes hard at maturity. The rhizomes is usually pale yellow from inside and has circular scars all along their length with small scales adhering to them. The roots of ginger arises from the nodes of the scales present on the rhizomes on the top layer of the soil. The fleshy rhizome is hard and thick and is covered with small distichous scales with an encircling

insertion and with fine fibrous roots. The leaves of ginger are normally light green in color but in some varieties dark green in color and on maturity the green leaves turn yellow. The ginger plant flowers are small, yellowish in color, speckled each with a purple speckled lip and borne on a spike terminating a separate leaf on the stem(Arya,2001). Flowering starts in October and continues till December with a peak in November(Tiwari and Agarwal,2004).

4.3.3 Price as an attribute:

Table 4.3.3: Attitudes of Enterprises towards the Attribute – 'PRICE'

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =30 nos	Food Manu-facturing (%) No of Enterprises = 43 nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	23 (7)	19(8)	6 (1)	0 (0)	23 (3)	19
11 - 20	47 (14)	35 (15)	22 (4)	22(2)	8 (1)	36
21 - 30	20 (6)	28 (12)	39 (7)	56 (5)	23 (3)	33
31 - 40	10 (3)	16 (7)	22 (4)	11 (1)	38(5)	20
41 - 50	0 (0)	2 (1)	11 (2)	11 (1)	8 (1)	5
TOTAL	100	100	100	100	100	113

Source: Primary Data

Parenthesis shows number of Enterprises

Table 4.3.3 shows that the greater number of the respondents of the five enterprises have given the score of 11-40 to this attribute. This shows that the respondents of the five enterprises have given lesser importance to this attributes. In the development of marketing science, the marketing mix also played a significant role as a main principle in commercial philosophy(Wu and Li,2018). Marketing mix includes commodity, delivery, marketing, and pricing methods for the growth and handling of exchanges and the accomplishment of target markets(Isoraite,2016).

Price is the amount of money charged for a product or service and is one of the most flexible marketing mix elements (Kotler and Armstrong.,2008). Pricing as compared to the other elements of marketing mix is one of the most important and the only element which generates a turnover for the organisation (Goi,2011).Even though Price is the most flexible element of marketing mix but, it is the number one problem faced by many marketing executives and there are some factor's to be considered when setting prices by companies. Customer perceptions of the products value is one of the most important factor to be considered while setting prices for the product (Kotler and Armstrong.,2008).

Price should correspond with the customer's evaluation of the product(Kumar and Sharma,1998). Price is considered to be one of the most crucial components in the marketing mix. Many scientists regard price as one of the industry's most significant item as it increases benefit as well as market share(Isoraite,2016). The price of a products or services are one of the main deciding factor for consumers in deciding the product they will purchase and use. Price can be perceived as determining the quality of a product incase consumers have to make purchasing decisions at the time of inadequate information. Price indicators that are used comprise of price levels, price discounts, affordability, and prices that are in line with purchasing power(Sahir and Rosmawati,2020).

The price of fresh ginger was Rs.20 per kg at the time of being exhibited in Biofach India. Presently, the price of fresh Mizo ginger is Rs.40-50 per kg. The export price of fresh ginger currently is Rs.55-60 per kg.

4.3.4 Aroma as an attribute:

Table 4.3.4: Attitudes of Enterprises towards the Attribute – ' AROMA '

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =30 nos	Food Manu-facturing (%) No of Enterprises = 43 nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	10 (3)	9(4)	11 (2)	11 (1)	00 (0)	10
11 - 20	17 (5)	21 (9)	33 (6)	45 (4)	54 (7)	31
21 - 30	50 (15)	30(13)	39 (7)	22 (2)	23 (3)	40
31 - 40	23 (7)	35 (15)	11 (2)	22 (2)	23 (3)	29
41 - 50	0 (0)	5 (2)	6 (1)	0 (0)	0 (0)	3
TOTAL	100	100	100	100	100	113

Source: Primary Data

Parenthesis shows number of Enterprises

From the table 4.3.4, it can be seen that most of the respondents of the five enterprises are in the range of 10-40 to this attribute. The lowest score of 0 – 10 has been given by one enterprise namely specialized organic. The highest score of 41-50 are given by only two enterprises, food manufacturing and retail business that too a score of five and six percent respectively. The aroma and flavour of ginger is determined by the constituents of the steam-volatile oil(Arya,2001). The ginger rhizomes consists of two classes of constituents, the essential oils and the oleoresins(Balladin et.al.,1998). The essential oil is made up of monoterpenes and sesquiterpenes, which add to the distinctive flavour of ginger(Balachandran,2005). According to Govindarajan,1982 the sensational perception of ginger appears from two definite groups of chemical namely volatile oils or essential oils and non-volatile pungent compounds. The volatile oil in ginger constituents mostly of sesquiterpene hydrocarbons, predominantly zingeberene (35%), curcumene(18%) and farnesene(10%) and these contribute to the distinct aroma and taste of ginger.

The composition of fresh ginger rhizome is of fat(1.0%), minerals(1.2%), protein(2.3%), fiber(2.4%), carbohydrate(12.3%) and water(80.7%). Ginger rhizome also contain minerals namely, sodium, potassium, calcium, magnesium iron, and phosphorous(Jolad et al.,2004). According to Sultan et al,.2005,the volatile oil are also called essential oils of ginger and these oils can be extracted by different techniques. The concentration of volatile or essential oils in ginger rhizomes ranges 1-3 percent And the aroma and flavour are also dependent on these compounds. During drying or thermal processing of ginger, the volatile aromatic compounds are lost which leads the difference in the aroma and flavour of dry ginger and fresh ginger.The volatile compounds which is present in ginger rhizomes have a very low boiling point and can freely evaporate from it even at room temperature(Evans,2002).

The oil cells in ginger are found in leaf, shoot apex, root apex which are spherical and contain stored volatile oil(Tiwari and Agarwal,.2004). The volatile oil is a pale yellow liquid with a warm, spicy, sweet aromatic odour(Farooqi et al.,2005). The volatile oil physic-chemical characteristic varies depending on age, variety or period of storage and method of extraction of the ginger rhizomes. The essential oil is aromatic and non-pungent in taste and flavour (Arya,2001). The volatile oil of ginger is a mixture of 24 constituents which consists of monoterpenes (phellandrene, carphene, ceneolc, citral and borneol) and sequiterpenes (zingiberine and hisabolene)(Young et al.,2002).

It is interesting to note that ginger products such as essential oils and oleoresin are commercialized for utilizing in food and pharmaceutical processing(Dani et al.,2011)(Kanade and Bhatkhande,2016). Ginger is a popular food additive in numerous foods and beverages and valued because of the volatile components particularly the aromatic compounds which display a spicy, pungent and pleasant smell(Purnomo et al.,2010). Flavour is normaly the result of the outcome of many volatile and nonvolatile components possessing diverse chemical and physicochemical properties which is present within the complex matrices. The nonvolatile compounds contribute mainly to the taste, while the volatile compounds have an impact both taste and aroma(Longo and Sanroman,2006).

4.3.5 Organic as an attribute:

Table 4.3.5: Attitudes of Enterprises towards the Attribute – 'Organic'

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =30 nos	Food Manu-facturing (%) No of Enterprises =43nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	3(1)	0 (0)	0 (0)	0 (0)	8(1)	2
11 - 20	10 (3)	9 (4)	6 (1)	0 (0)	15 (2)	10
21 - 30	3 (1)	5 (2)	17 (3)	0 (0)	15 (2)	8
31 - 40	17 (5)	12 (5)	22 (4)	22(2)	8 (1)	17
41 - 50	67(20)	74 (32)	55(10)	78(7)	54 (7)	76
TOTAL	100	100	100	100	100	113

Source: Primary Data

Parenthesis shows number of Enterprises

It can be seen clearly from table 4.2.4 that the respondents of the five enterprises has given the highest score of 41 – 50. The lowest score of 0-10 is given by only two enterprises namely Export & Import and Specialized organic with a percentage of 3 and 8 respectively. The term organic organic originated from Greek *organikos* relating to an organ or instrument(Olioso,2008). Lady Eve Balfour pointed out some basic criteria of organic farming in her statement in the first International Federation of Organic Agriculture Movements (IFOAM) Conference in 1977(Rehber et al.,2018).

Mannon (1995) mentioned organic farming as holistic view of agriculture that tries to reflect the profound interrelationship that exists between farm biota, its production and the overall environment. Lampkin(1994) stated the definition of organic farming as "to create integrated, humane, environmentally and economically sustainable production systems, which maximize reliance on farm-derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop, livestock and human

nutrition, protection from pests and disease, and an appropriate return to the human and other resources."

Organic farming can also be stated as a form of agriculture that depends on crop rotation, green manure, compost, biological pest control and mechanical cultivation to preserve soil productivity and control pests, without or in lesser amount the use of synthetic fertilizers and synthetic pesticides, plant growth regulators, livestock feed additives, and genetically modified organisms(Chand and Wani,2016). According to Amarnath and Sridhar(2012) organic agriculture is a distinctive management system which encourages and increases health of agro eco-system, as well as biodiversity, biological cycles and soil biological activity and this is accomplished by using on-farm agronomic, biological and mechanical methods by excluding synthetic off farm inputs.

Over the last three decades, organic farming has attracted attention and it is perceived as a solution to the problems faced by agricultural sectors of industrialized countries (Olhan et al.,2005). . Organic agriculture is a holistic management system, which enhances agro-ecosystem health, utilizing both traditional and scientific knowledge. Organic agriculture systems rely on ecosystem management rather than external agricultural inputs (IFOAM, 2006). According to the USDA study team, " Organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc) and to the maximum extent feasible rely upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection(kumar et al.,2017).

During the 1940's, organic farming was first developed by Hans Muller, Maria Biegler and Hans Peter Rusch in Switzerland and the same time in the United Kingdom by Lady Eve Balfour and Sir Albert Howard. Since the early 1990's, the organic farming has earned policy support for its potential to contribute to environmental protection, rural development and animal welfare(EC,2004; Haring et al., 2004; Nieberg et al .,2007). Organic farming is also associated to the production of quality food and to provide transparency and fair competition on the market, many

policies have been implemented(Darnhofer et al.,2010).It can be seen from research on agronomic aspects of organic farming that crop yields tend to be lesser in organic farming(Mader et al.,2002; Kaut et al.,2008). Organic farming is less susceptible to drought(Lotter,2003). At the same time organic farming methods contribute to boost soil organic matter and thus increase soil fertility(Langmeier et al.,2002; Mader et al.,2002).

India is bestowed with lot of capability to produce a number of varieties of organic products due to its suitable agro-climatic factors in several parts of the country and the inherited tradition of organic farming is an added advantage(APEDA,2010). Over the last one decade, the Indian farmers have given much attention to organic farming systems as they are perceived to offer some solutions to the problems currently besetting the agricultural sector. Organic farming can be regarded as the solution to give benefits in terms of environmental protection, conservation of nonrenewable resources and improved food quality. At the same time it can be seen that some Indian farmers are hesitant to covert from conventional to organic farming because of the perceived high costs and risks involved(Amarnath and Sridhar,2012).

Organic farming is based on principles and values and has set out to be an alternative to conventional agriculture and food chains(Luttikholt,2007; Besson,2008).The four principles to inspire action is developed by the International Federation of Organic Agriculture Movement (IFOAM) after a concerted and participatory process(IFOAM,2005). They are:

- the principle of health: “Organic agriculture should sustain and increase the health of soil, plant, animal and human as one indivual”.
- the principle of ecology: “Organic agriculture should be based on living ecological systems and cycles, work with them and help sustain them.”
- the principle of fairness: “Organic agriculture should build on relationships that ensure fairness with regard to the common environment and life oppurtunities” and

- the principle of care:"Organic agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment"(Darnhofer et al.,2009).

The organic standards lean to focus on values and practices that are easy to codify and audit through the inspection and certification process(Lockie et al.,2006; Padel,2007).

4.3.6 Pungency as an attribute:

Table 4.3.6: Attitudes of Enterprises towards the Attribute – ' PUNGENCY '

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =30 nos	Food Manu-facturing (%) No of Enterprises = 43 nos	Retail Business (%) No of Enterprises = 18 nos	Service Company (%) No of Enterprises 9 nos	Specialised Organic (%) No of Enterprises 13 nos	Total No of Enterprises
0 - 10	10 (3)	9 (4)	33 (6)	0 (0)	30 (4)	17
11 - 20	20 (6)	30 (13)	22 (4)	22(2)	24 (3)	28
21 - 30	27(8)	23(10)	17 (3)	12 (1)	30 (4)	26
31 - 40	40(12)	33(14)	17 (3)	44(4)	8 (1)	34
41 - 50	3(1)	5(2)	11(2)	12(1)	8 (1)	7
TOTAL	100	100	100	100	100	113

Source: Primary Data

Parenthesis shows number of Enterprises

The respondents of the five enterprises towards attribute Pungency concentrate on the score of 0 – 30 in this table 5. The respondents has also given the score of 31-50. Pungency or pungent taste of ginger can be attributed to the presence of principal constituent 'oleoresin' which is a viscous dark brown liquid containing the active ingredient-gingerol. Oleoresin is commercially known as 'gingerin' and is a combination of both volatile and non-volatile oils (Singh Arya,2001). The pungency in fresh ginger is due to the series of homologous phenolic ketones of which 6-gingerol is the major one (Wohlmuth et al.,2005). While 6-gingerol is the

most bioactive compound in fresh ginger, 6-shogoal represents the main bioactive principle in dried ginger. The pungent compound 6-shogoal was identified and first described by Nomura in 1918 where shogoal was isolated by mild distillation of ginger rhizomes without contamination with gingerol(Nomura,1918).

In fresh ginger rhizomes the total content of gingerol is higher as compare to the dried ginger, because gingerols become dehydrated and produced shogoals (Young et al.,2002) When gingerol are stored at 4degree C it is stable in ethanolic solution over a period of five months. It is interesting to note that shogoals were not identified in the extracts prepared from fresh rhizomes at ambient temperature, which confirms that shogoals are not a native constituents of fresh ginger(Parthasarathy et al.,2008). Gingerols are very sensitive to heat and when it is subjected to high temperature they are converted into homologous series of degraded compounds that is shogoals that hold strong antioxidant activity(Kelly et al.,2002)

The name “pungent principles” given to gingerols are the active component of fresh ginger and responsible for the taste of ginger. Gingerol is found as pungent yellow oil and can also form a low melting crystalline solid. Ginger consists of 1.0-3.0% volatile oils and a number of pungent compounds(Chrubasik et al.,2005). The pungent taste of ginger is due to non- volatile phenylpropanoid- derived compounds, gingerols and shogaols(Malu et al.,2009). The bioactive compounds of ginger rhizomes are gingerols, shogoals, zingerone, paradol, gingerenone, galanal, gingerdiols, gingerdiones. The most abundant gingerol found in ginger is 6-gingerol(Wang et al.,2011) while other gingerols with different chain lengths are also found in small quantities(Ali et al.,2008).

The gingerol shows antioxidant(Masuda et al.,2004) and anti-inflammatory behaviour(lantz et al.,2007). The antioxidant activity of ginger extract is depend on the concentration of 6-gingerol(Goyal and Kadnur,2006). Gingerols which is the main bioactive components of non-volatile pungent compounds of ginger rhizomes and this produces hot sensation in the mouth. Gingerols are a chain of homologs molecules, which are characterized on the bases their unbranched alkyl chains length(Jaleel and Sasikumar,2012). The non-volatile components of ginger are more

appreciated due to their high biological and pharmacological value(Shoaib et al.,2016). It is important to note that, during processing the gingerols are converted into shogoals and exhibit more pungency as compared to the gingerols(Wohlmuth et al.,2005).

Conclusion:

It is observed that organic(33%) appeared as the most significant attribute followed by pungency(19.05%), followed by aroma(18.95%), followed by price(17%) and appearance(12%). It is important to note that the percentage difference of pungency and aroma is only .10%. Therefore, it can be concluded that " organic" should be projected the most important attribute for 'formulating marketing strategies for thinglaidum, thingria and thingpui' ginger grown in Mizoram.

4.4 BIRD'S EYE CHILLI :

Bird's eye chilli was a spice displayed in the BIOFACH India 2016 with INDIA ORGANIC, held at National Small Industries Corporation Exhibition Grounds. The botanical name of bird's eye chilli is *Capsicum frutescens,* belonging to the family solanaceae(Vaishnavi et al.,2018). Capsicum frutescens is one among the five cultivated species of the genus solanaceae and is closely related to capsicum chinense Jacq(Heiser and Smith,1953). There are various varieties and forms of Capsicum, which belongs to the family Solanaceae(Smith et al.,1987 and Bosland,1992). The genus Capsicum consists of about thirty-seven species composing of wild, semi-domesticated and the five well-known domesticated species, namely, *Capsicum annuum* L.,*Capsicum baccatum* L., *Capsicum chinense* Jacq., *Capsicum frutescens* L., and *Capsicum pubescens* Ruiz and Pav with more than 200 varieties(Bosland et al.,2012). Almost all Capsicum species are diploid with 12 chromosome pairs(Moscone et al.,1996).

C.annuum, C. chinense and *C. frutescens* are phylogenecally close sister species and are sometimes mentioned as "*annuum-chinense – frutescens*" complex for their overlapping morphological features(Melendez et al.,2009). The identification of *Capsicum* species is based on flower morphology where anther

colour is the main character in this. *C.baccatum* accessions possess yellow anther while *C. annuum* have purple anthers. The species *C. annuum* , *C. chinense* and *C. frutescens* have flowers with greenish to white coloured petals and yellow seeds(Zonneveld et al.,2015 and Sudre' et al.,2010).

Bell pepper, paprika, chilli and red pepper are the types of spices which belongs to the genus Capsicum. The Capsicums within each category also differ extremely and the species designation is not always clear cut. Paprika is from the mild and sweet varieties of Capsicum, whereas red and chilli peppers are mixture of different varieties or more pungent peppers(Tainter and Grenis,2003).Capsicum fruits in various forms are used in many parts of the world as additives in food for their strong pungency and aroma and for their pharmacological and therapeutic effects as a stimulant and counter irritant(Govindarajan,1986 and Manirakza et al.,1999).

The quality of *Capsicum* fruits is determined by its colour, pungency and flavor attributes, which are imparted by its pigments, especially carotenoids mixture, pungent capsicinoids and volatile compounds profiles, respectively(Rodriguez et al.,2014 and Koeda et al.,2014). The fruit is perceived as a carotenoids –rich non-leafy vegetable. The diverse carotenoids are present in the sacrocarps and can be grouped into yellow, orange and red carotenoids, which impart pale yellow to dark red colours to the fruits(Norazian et al.,2019).

Bird's eye chilli is called by numerous other synonyms like African pepper, chilli pepper, goat's pod, Mexican chilli, red pepper, Tabasco pepper, Zanibar pepper and Cayenne pepper. Bird's eye chilli was originated in South America and was introduced in India during 16^{th} century and has been grown as a neglected crop in a small small area all over the world(Baruah and Barua,2004). The genus Capsicum consists of twenty-five distinct species(Baral and Bosland,2002), from these five species are domesticated(Pickersgill,1977).

It is believed that Chillies have originated in the northern Amazon basin and by natural geographic spread are indigenous throughout Central America, South America, the west Indies and the most southerly states of the U.S.A. Chilli was

introduced to the rest of the world By Christopher Columbus who discovered America in 1493(Madala and Nutakki,2020). It is also believed that the monks of the Royal Monastry of Santa Maria de Gaudalupe, in Estremadura, Spain were the first European to come across the taste of hot pepper introduced the chilli to their kitchen. The seeds of the chilli which were first cultivated in the monasteries were spread throughout Spain and Europe by traveler monks(Knneth et al.,2000). In 1600 the Portuguese and Spanish traders through trade routes from South America introduced the chilli pepper in Africa and in India(Rai et al., 2004). Chilli was spread in Asian countries by the Portuguese and Arab traders. At present chilli have an important place in South Asian and South East Asian cuisine. Chilli which is name as wonder spice is regarded as one of the most important commercial spice crop is popularly used universal spice(Wilson et al.,1991).

Capsicum species are native to the Central and Southern America, while Brazil is the centre for most wild peppers while Peru and Bolivia are the primary centre of cultivated *Capsicum* diversity(Zonneveld et al.,2015). The five well known domesticated Capsicum species concentrated areas in different parts of the world are as follows(Bosland et al.,2012):

- *Capsicum annum* is mainly centred in Mexico, it is also grown mainly worldwide.
- *Capsicum chinense* , it is the most widespread species in tropical America
- *Capsicum frutescens* is popular in Asia and Africa.
- *Capsicum boccatum* and *Capsicum pubescens* mostly grown within South America and the Andean region.

Before the introduction of chilli pepper in India by the Portuguese and Spanish traders two types of pepper existed namely, Black Pepper called round pepper and Pippali called the long pepper(Sanatombi et al.,2010). In 1498 the Portuguese explorer Vasco-da-Gama brought with him the pungent spice, chilli to India for the first time. Chilli became popular and found its way in ayurveda and according to aryuveda, chilli has many medicinal properties as a stimulating good digestion and as a endrophins and also as a pain killer(Madala and Nutakki,2020).

India is the world's largest producer, consumer and exporter of chilli peppers. Guntur in Andhra Pradesh produces 38% of all the chillies produces in India and the state of Andhra Pradesh as a whole contributes 75% of India's chilli exports(Mathur et al.,2000).

Chilli was first introduced in India by the Portuguese at the end of the 15th century and gained popularity in the 17th century(Indira et al.,2007). The main cultivated species are Capsicum annum, Capsicum frutescene and Capsicum chinense. Naga King Chilli which belongs to Capsicum chinense is regarded as the world's hottest chilli with a 8,55,000 scovilleunits(Shetalu,2010). In India bird's eye chilli is cultivated as homestead crop and consumed extensively across mainland regions of South Karnataka, Kerala, Tamil Nadu and North-Eastern India, especially in the states of Mizoram and Manipur. Among the north- eastern states of India, Mizoram is famous for the habitation of wonderful diversity of bird's eye chilli, with respect to fruit shape,size, colour, pungency, plant type, physiological characteristics, reactions to diseases and pests, adaptability and distribution(Ozgur et al.,2011) .According to Dutta el al.,2015, the north-eastern hill region of India is one of the hot-spots of biodiversity in the Indian gene centre and is also noted for its richness in ethnic diversity and traditional culture.

Chillies are herbaceous or semi-woody annual and the chilli plants are erect, profusely branched with a leaves that are variable in size and simple. The flowers of chilli are usually borne single,are terminal and are bisexual and their colour varies from white to blue. The fruits of chilli are borne singly at nodes, variable in size, shape, colour, and degree of pungency. The colour of the unripe fruit of chilli is green or purplish,ripening to red or orange, yellow, brown, cream or purplish and the seed is pale yellow. Chillies can be grown in both tropical and subtropical areas. For growth a warm humid climate is most suitable while warm and dry climate increases fruit maturity. Chillies can grow in different types of soils on condition that they are deep, well drained, well aerated and fertile.(Farooqi et al.,2005). Bird's eye chilli is a wild form of chilli and usually used to denote any small sized pointed chilli of high pungency due to its resemblance to an avian pupil(Chatterjee et al.,2012). In 1912, Wilbur Scoville developed a scale to measure

the heat levels of chilli peppers. According to the scale one part per million of heat is equivalent to 1.5 Scoville units(Bellringer,2001).

Capsaicin is the substance that produces all of the heat sensation and this capsaicin is made by a specialized gland cells found in the cross- walls or the ribs of the pepper and is composed of several different alkaloids which vary in amounts depending on the species(Rowland et al.,1983). The sensation of heat and pain in the mouth are the result of the stimulation of local heat receptors in the skin and mucous membrane s by capsaicin(Borges,2001). Capsaicin is a trigeminal stimulant that is important in gustatory physiology(Liu and Simon,2000).

According to Chatterjee et al.,(2012) and Farooqi et al.,(2005), cultivation, planting . cropping and harvesting of chilli requires the following steps:

- Propagation: It is propagated through seeds that is by raising seedlings in seed beds.
- Land preparation: The land should be ploughed 3-4 times in order to get a fine tilth. Shade should be provided atleast for one week during summer season.
- Planting: Planting is done usually in the later month of March with a proper spacing. Chilli is mostly intercropped with banana, tapioca and other crops.
- Manures and fertilizers: Chilli grows well when ferlisers are applied in irrigated and rain-fed areas.
- Irrigation: Irrigation is needed for the better growth and development and especially where there is less rainfall.
- Weeding: Unrestricted weed growth throughout the crop life cycle resulted in 81-90% reduction in potential fruit yield. Therefore, weeding is very important for chilli.
- Harvesting: Harvesting is done during April-June and October-December and usually harvested at the red, ripe stage.
- Storage and processing: Dried chillies can be stored for a longer period compared to green chillies. The primary processing of chilli essentially consists of drying and de-spiking.

There are various uses of chilli, it is use as spice, condiment, culinary supplement, medicine, vegetable and ornamental plant. Chilli can be said to be an essential spice because of its pungency, taste, appealing colour and flavor. In the international spice trade it is the second largest commodity which comes next to black pepper. In India chilli is the principal component in everyday cuisine and is also used in the preparation of pickles, chutneys, sauces etc. The fruit is a rich source of vitamin A,E,C and P(Hosmani,1993). The pungency in chilli is because of the presence of a crystalline, acrid, volatile alkaloid, capsaicin which is present in placenta and pericarp of the fruit. Capsaicin has high diverse prophylactic and therapeutic uses in allopathic and Ayurvedic medicine(Sumathy and Mathew,1984). Oleoresin which is found in chilli has a various uses in food processing and beverage industries and has a high export potential(Sreenivas et al.,2019).

According to Madala and Nutakki,2020 and Hassan et al.,2019, some of the health benefits of Chilli are mentioned below:

- Improves digestive health and metabolism: As chilli is rich in antioxidants and other compounds that can soothe and improves digestion. Chilli can also increase metabolism.
- Reduces risk of cancer: Chilli acts as a potential natural remedy for fighting cancer, as it has a high antioxidant and anti-inflammatory properties.
- Skin Photoprotective : Carotenoids have gain particular attention as protective agents in skin-photosensitivity-related disorders.
- Antidiabetic Potential : The inhibitory action on the hydrolyzing enzyme lengthens carbohydrate digestion time, resulting in a declined glucose absorption rate in the small intestine and a consequent decrease in post-prandial hyperglycaemia.
- Fights fungal infections, colds, and the flu: The characteristic red colour of chili peppers is an indication that it is rich in beta-carotene or pro-vitamin A.
- Supports cardiovascular health: As chilli contain riboflavin and niacin which is responsible for maintaining healthy cholesterol levels and in turn, lower the risk for heart disease.

Other uses of Chilli: There are various uses of chilli, it is use as spice, condiment, culinary supplement, medicine, vegetable and ornamental plant. Chilli can be said to be an essential spice because of its pungency, taste, appealing colour and flavor. In the international spice trade it is the second largest commodity which comes next to black pepper. In India chilli is the principal component in everyday cuisine and is also used in the preparation of pickles, chutneys, sauces etc(Hosmani,1993).

Chilli is used all over the world as spice because of its pungency and distinct flavour. It is a main ingredient in curry powder for culinary preparations. Chilli is used in pickle preparations and as avegetables(Farooqi et al.,2005). It is also used as condiment and as a ornamental plant. Chilli is an indispensable spice, due to its pungency, taste, appealing colour and flavour. The fruit of chilli is a rich source of vitamin A, E, C and P(Hosmani,1993). Capsaicin which is present in chilli has various prophylactic and therapeutic uses in Allopathic and Aryurvedic medicine(Sumathy and Mathew,1994). Oleoresin which is there in chilli has various uses in food processing and beverage industries. The natural colour extracts of chilli have became useful in place of artificial colours in the food items(Sreenivas et al.,2019). Birds eye chillies are processed to extract the oleoresin for sale to the food and pharmaceutical industries due to its high pungency, colour and medicinal properties(Chatterjee et al.,2012).

4.4.1: Attitudes Scores of Enterprises Towards Birds Eye Chilli

Based on the review of literature five significant attributes of birds eye chilli viz distinct appearance, price, organic, pungency and geographical indications were listed out by the researcher in the present study. Birds eye chilli was among the three spices which were displayed in the BIOFACH India 2016 with INDIA ORGANIC held at NSIC Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016. From the number of enterprises who visited the exhibition, 100 enterprises showed interest in this product. The 100 respondents were asked to give their preferences of the attributes of the birds eye chilli displayed in the Mizo Stall.

Table 4.4.1 shows the attributes and attitude score computed on the basis of the preferences of the respondents.

Table 4.4.1: Attitudes Scores of Enterprises Towards Birds Eye Chilli

Attributes	Export & Import No of Enterprises 33 nos	Food Manu-facturing No of Enterprises 34 nos	Retail Business No of Enterprises 13nos	Service Company No of Enterprises 8 nos	Specialised Organic No of Enterprises 12 nos	Total	Percentage of Attitudes Sores
Distinct Appearance	591 (15)	537 (12)	289 (17)	84 (8)	204 (14)	1705	14
Price	729 (18)	825 (19)	321 (19)	227 (22)	297 (20)	2399	19
Organic	1272 (31)	1489(34)	465 (28)	372 (36)	502 (33)	4100	32
Pungency	1000(25)	1163(26)	441 (26)	278 (27)	314(21)	3196	25
Geographical Indications	467 (11)	394(9)	161 (10)	74 (7)	186(12)	1282	10
Total	4059(100)	4408(100)	1677(100)	1035(100)	1503(100)	12682	100

Source: Primary Data

Parenthesis shows percentage of Attitude Score

A glimpse at table 4.4.1 shows that the attribute organic has scored the highest with a score of 32 percent. Further it can be observed that the highest organic is followed by pungency with a score of 25 percent , the third highest is price with a score of 19 percent followed by distinct appearance with a score of 14 percent and the least geographical indications, with a score of 10 percent.

All around the world organic farming has become a trend for the farmers. 'Organic agriculture is a holistic production management system thart avoids use of synthetic fertilizers, pesticides and generally modified organisms, minimizes pollution of airs, soil and water and optimizes the health and productivity of interdependent communities of plants, animals andpeople'(Chand and wani,2016). Pungency in chilli is because of the chemical compounds known as capsaicinoids(Prasati and Ponnuswami,2008). Capsaicinoids are not destroyed in the mouth as the body masks their presence. It is interesting to note that no other plant part produces capsaicinoids as it is produced in glands on the placenta of the fruit (Bosland,1993). Price includes all the resources(financial costs, time and social costs) that a customer has to pay in order to obtain the product(Mihai,2013). Price is the amount that a customer has to pay in return for a product and services(Jain,2009).

Bird's eye chilli (*Capsicum frutescens* L) is given a number of synonym's name like African pepper, chili pepper, goat's pod, Mexican chili, red pepper, Tabasco pepper, Zanibar pepper and Cayenne pepper whose small, very pungent fruits separate easily from calyx and are dispersed by bird's. Bird's eye chilli has whitish green flower and their upward directed pedicel and the fruits are in upright position till maturity which appears above the foliage(Chatterjee et al.,2012). Geographical Indications(GI) has given a chance to producers to determine quality standards and protect their food products' reputation, while showing their geographical origin(Xiomara et al.,2016). Thomas(2013) observed that marketing, distribution, branding and promotion are important tools of the Indian Geographical Indication products to acknowledge profitable prospective in the international market(Divya and Anoop,2018).

The researcher have further analyse the attitudes scores of five(5) Enterprises towards each attribute specifically.

4.4.2: Distinct Appearance as an attribute:

Table 4.4.2: Attitudes of Enterprises towards the Attribute -'DISTINCT APPEARANCE'

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =33nos	Food Manu-facturing (%) No of Enterprises = 34 nos	Retail Business (%) No of Enterprises = 13 nos	Service Company (%) No of Enterprises 8 nos	Specialised Organic (%) No of Enterprises 12 nos	Total No of Enterprises
0 - 10	33 (11)	41 (14)	8 (1)	50 (4)	59 (7)	37
11 - 20	40 (13)	32 (11)	46 (6)	50 (4)	8 (1)	35
21 - 30	9 (3)	15(5)	30 (4)	0 (0)	17 (2)	14
31 - 40	12 (4)	9 (3)	8(1)	0 (0)	8 (1)	9
41 - 50	6 (2)	3 (1)	8 (1)	0 (0)	8 (1)	5
TOTAL	100	100	100	100	100	100

Source: Primary Data

Parenthesis shows number of Enterprises

Table 4.4.2 shows that the score of the attribute distinct appearance is not given due importance by the five enterprises as majority of the score lies in the range of 0 – 20. It can be seen that the respondents of the five enterprises has given minimum score in the range of 31 – 50. Bird eye chilli is a slow-growing short-term perennial or perennial sub-shrub. The flowers of bird eye chilli are in clusters of 2 or more, waxy greenish white and are usually erect. The fruits of bird eye chilli are elongate, upright, small and narrow and the colour is green to cream and yellow when immature, orange to red when mature and are extremely pungent. Bird eye chilli is considered as a spice or condiment for seasoning and stimulating appepite as well as used in local medicine(Srinivas and Thomas,2018).

It is interesting to note that the fruit colour of bird's eye chilli is controlled by carotenoids. The red colour of the fruit is due to carotenoids, capsanthin and capsorubin, while the yellow orange colour is from beta carotene and violaxanthin. Capsanthin which is the major carotenoid in ripe fruits, contributed upto sixty percent(60%) of the total carotenoids(Bosland,1993). Bird's eye chilli contained ascorbic acid(vitamin C) in large amount, tocopherol(vitamin E) and also moisture, protein, fat, minerals, fibres and CHO in minute quantity(Bloom et al.,2002). Bird's eye chilli is small in size but is very pungent which can be is easily separated from calyx and are dispersed by birds. The fruit of bird eye chilli is eaten as raw or in processed form as powder.

Bird eye chilli is a slow- growing short term perennial or perennial sub-shrub and its flowers are in clusters of 2 or more which are usually erect and greenish white in colour. The fruits are upright, usually small and narrow, when immature it is green to cream and yellow and orange to red when mature(Srinivas and Thomas,2018). The fruit of the *Capsicum* species is acknowledge as a carotenoids –rich vegetable and these carotenoids develop and accumulate rapidly as the fruit ripens. At the initial stage the fruit is green in colour, which is full of chloroplast containing approximately 68% chlorophylls, whereas carotenoids at 32% is the lowest level(Deli et al.,2001).

4.4.3 Price as an attribute:

Table 4.4.3: Attitudes of Enterprises towards the Attribute – ' PRICE '

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =33 nos	Food Manu-facturing (%) No of Enterprises = 34nos	Retail Business (%) No of Enterprises = 13 nos	Service Company (%) No of Enterprises 8 nos	Specialised Organic (%) No of Enterprises 12 nos	Total No of Enterprises
0 - 10	33 (11)	6(2)	15 (2)	0 (0)	17 (2)	17
11 - 20	40 (13)	21 (7)	23 (3)	13 (1)	17 (2)	26
21 - 30	9 (3)	55(19)	31 (4)	61 (5)	33 (4)	35
31 - 40	12 (4)	15 (5)	23 (3)	13 (1)	25 (3)	16
41 - 50	6 (2)	3 (1)	8 (1)	13 (1)	8 (1)	6
TOTAL	100	100	100	100	100	100

Source: Primary Data

Parenthesis shows number of Enterprises

It can be seen from table 4.4.3 that number of enterprises is highest in the range of 21 – 30 and in the range of 41 – 50 it is the lowest with only 6 in numbers. The table also shows that the attribute price is not given due importance by the correspondents among the five attributes. Price includes all the resources(financial costs, time, and social costs) that a customer has to pay in order to obtain the product(Mihai,2013). If the perceived price of a product is much higher than its perceived value, the customers will turned away from the product. On the other hand, if the perceived price is too less, buyers will have a doubt regarding the quality of the product(Evans,1995).

Price is the value of a product and it is the value that customers received when they use the product. It is the amount of money paid by the customer for buying a product. In the four components of marketing mix only price generate revenue and the others represent costs(Jain,2009). Pricing is the second most important element in the marketing mix and acts as a weapon to counteract competitors as well as ensures survival of the firm(Mahmood and Khan,2014). Peter

and Donnelly(2007) found in their study that price is one of the factor in which buyers focus more as compared to other attributes while making buying decision.

Kotler(2003) defines price as a cost of producing, delivering and promoting the product to be exchanged by the organization. Zeithami(1988) is one of the view that monetary cost is one of the factors that influence consumer's perception of a products value. Price is the different type of costs that consumers pay for the benefits of a product or service and comprises of financial costs and other non-financial costs(Kotler and Armstrong,2012). Brands with higher prices are termed better quality, while those with lower prices damage their quality(Kamakura and Russell,1993;Milgrom and Roberts,1986; Woodside et al.,1977).

Price is the second element in the marketing mix concept, namely product, price, place and promotion. It depends on the purchasing power of the consumer/buyer and considered to be the important element in the purchasing decision(Singh,2012).

The price of fresh birds eye chilli was Rs 200per kg while the dry chilli was Rs,500 per kg at the time of being exhibited in Biofach India. Presently, the price of fresh birds eye chilli is Rs 500 while the dried chilli is Rs. 800. The export price of fresh birds eye chilli currently is Rs 800-1000 per kg and while dried birds eye chilli is Rs 1200 – 1500 per kg.

4.4.4: Organic as an attribute:

Table 4.4.4: Attitudes of Enterprises towards the Attribute – 'Organic'

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =33 nos	Food Manu-facturing (%) No of Enterprises = 34 nos	Retail Business (%) No of Enterprises = 13 nos	Service Company (%) No of Enterprises 8 nos	Specialised Organic (%) No of Enterprises 12 nos	Total No of Enterprises
0 - 10	0 (0)	6 (2)	8(1)	0 (0)	0 (0)	3
11 - 20	6 (2)	0 (0)	8 (1)	0 (0)	0 (0)	3
21 - 30	21 (7)	3 (1)	15 (2)	0 (0)	25 (3)	13
31 - 40	27 (9)	21(7)	38(5)	25(2)	8 (1)	24
41 - 50	46(15)	70 (24)	31(4)	75(6)	67 (8)	57
TOTAL	100	100	100	100	100	100

Source: Primary Data

Parenthesis shows number of Enterprises

A glimpse at table 4.4.4 shows that score of Organic as an attribute for the respondents of the five enterprises lies mainly in range of 21 – 50. A score of six per cent and eight per cent is given by two enterprises Food Manufacturing and Retail Business respectively in the range of 0 - 10 . In the range of 11- 20, Export & Import has given six per cent, while Retail Business has given eight per cent. This attribute has appeared to be the most important attributes among the five attributes of bird's eye chilli which was displayed in the exhibition. Out of the hundred correspondents who has visited the Mizo stall, fifty seven(57) has opted for the highest range that is 41 - 50.

International Federation of Organic Agriculture Movements(IFOAM) defines organic farming as, " A production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic farming combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all

involved"(Aulakh and Ravisankar,2017). In organic farming, the first scientific approach can be traced back to the Vedas of the "Later Vedic period i.e. 1000 BC – 600 BC(Randhawa,1986 and Pereira,1993).

A British botanist, Albert Howard is often referred to as the father of modern organic farming. Organic farming depends on crop rotation, green manures, organic manures, biofertilizers, composts and biological pest management for crop production excluding or strictly limiting the use of synthetic fertilizers, chemical pesticides, plant growth regulators and livestock feed additives. Organic farming can be said to be a combination of traditional and modern agriculture(Aulakh and Ravisankar,2017). Organic agriculture systems lean to have greater and more various crop rotations, considerable plant-based weed suppression through cover crops, more biologically-based pest regulation and better nutrient cycling relative to conventional chemical systems(Reganold and Watchter,2016). Greater microbial abundance, activity(Lori et al.,2017) and diversity(Lupatini et al.,2017) have been reported in organic systems.

There is tremendous development in organic agriculture and today around 170 countries produced organic food commercially. There is 43.1 million hectares of organic agricultural land in India including in conversion areas and with 2 million producers. The world's organic producers are in Asia(36%), followed by Africa(29%) and Europe(17%)(Yadav et al.,2021).

Organic farming is mainly based in combining agro-ecological approaches with productivity and due to the restricted use of pesticides, herbicides, synthetic soluble fertilizers and veterinary medicines, organic farmers depend more on preventive and system-oriented practices. Organic farming improves soil fertility as legumes and compost are added and also by the recycling of local nutrients and organic matter(Niggli,2015).

Multi-functionality:Organic agriculture produces both commodity and non-commodity outputs and addresses ethical concerns such as animal welfare and the livelihoods of farmers(Niggli,2015). The most remarkable environmental advantages of organic agriculture can be summarized as follows:

- *(Bio)diversity on organic farms*-Diversity is the key factor for the stability of agro-ecosystems and therefore, a regularly stable supply of food(Altieri and Nicholls,2006). Comparative biodiversity assessments on organic and conventional farms reveal a 30% higher species diversity and a 505 greater abundance of flora and fauna in organic fields(Bengtsson et al.,2005; Hole et al.,*2005*; Fuller et al.,2005).
- *Lower negative environmental impacts*- Due to the ban of chemical fertilizers on organic farms, 35-65% less nitrogen leaches from arable fields into soil zones where it could degrade the ground and drinking water quality(Stolze et al.,2000; Drinkwater et al.,1998).
- *Stable soils; less prone to erosion*- Organically managed soils exhibit a high organic matter content, high biomass, immense enzyme activities of micro-organisms, improved water infiltration and retention capacities and low susceptibility to water and wind erosion(Mader et al.,2002;Edwards,2007;Fliebach et al.,2007 ; Marriot and Wander,2006).
- *Carbon sequestration*- The most effective technique used by organic farmers for building soil fertility are fertilization by animal manure, composted harvest residues and leguminous plants as main and intermediate crops(Gattinger et al.,2005).

4.4.5 Pungency as an attribute:

Table 4.4.5: Attitudes of Enterprises towards the Attribute – ' PUNGENCY '

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =33 nos	Food Manu-facturing (%) No of Enterprises = 34 nos	Retail Business (%) No of Enterprises = 13 nos	Service Company (%) No of Enterprises 8 nos	Specialised Organic (%) No of Enterprises 12 nos	Total No of Enterprises
0 - 10	9 (3)	0 (0)	0 (0)	0 (0)	0 (0)	3
11 - 20	6 (2)	9 (3)	23 (3)	0 (0)	33 (4)	12
21 - 30	33(11)	21 (7)	23 (3)	25 (2)	25 (3)	26
31 - 40	40(13)	52 (18)	23 (3)	62 (5)	42 (5)	44
41 - 50	12 (4)	18(6)	31 (4)	13(1)	0 (0)	15
TOTAL	100	100	100	100	100	100

Source: Primary Data

Parenthesis shows number of Enterprises

A glance at table 4.4.5 shows that the score of pungency as an attribute for the respondents of the five enterprises lies heavily in the range of 11 – 40. A score of 0 -10 is given by only one enterprise that is Export and Import. Pungency is defined as a "sharp, piercing, stinging, biting or penetrating quality" or "power to excite or stimulate"(Bosland,1995). Chilli is one of the most popular cultivated spices globally valued for their sensory attributes of colour, aroma and pungency. The pungency in chilli is due to the presence of closely related to the alkaloids called capsaicinoids which is found only in the genus Capsicum. The nature of the pungency has further been established as a mixture of seven homologous branched-chain alkyl vanillyamides(Hoffman et al.,1983)(Claver et al.,2006). Capsaicin and dihydrocapsaicin are the two important capsaicinoids accounting for 77-98% pungency in chillies(Barberoa et al.,2014).

The pungency in bird's eye chilli is due to the presence of capsaicin and di-hydro capsaicin(DHC) and they constitute about one-third(69%) of the total capsaicin. Non di-hydro capsaicin(NDC), homo-capsaicin and homo-di-hydro

capsaicin are minor capsaicinoid, which also contribute to the pungency of bird's eye chilli. The capsaicin content of bird's eye chilli ranges from 0.26 to 1.21% w/w or 1,00,000 – 1,50,000 scoville heat units(SHU)(Bosland,1993). Capsaicin is formed by specialized gland cells which is found in the cross-walls or ribs of the pepper and is made up of various different alkaloids which differ in amounts depending on the species(Rowland et al.,1983).

In capsicum frutescens that is bird eye chilli the total content of capsaicin and dihydrocapsaicin ranges from 0.4 to 1.0 per cent with the ratio around 2:1(Prasath and Ponnuswami,2008). Capsaicin is synthesized and accumulated by capsicum species in capsaicinoid which secreted organs localized in the placenta and the intercellular septum of fruits(Ohta,1962). Accumulation of capsaicin happens for a fairly short period during the latter stages of fruit growth(Iwai et al.,1979). On the placenta of the fruit of chilli plant, the capsaicinoids are produced in glands. The seeds of the chilli plant are the cause of pungency, just that they sometimes absorb capsaicin due to its closeness to the placenta. No other parts of the plant produces capsaicinoids(Bosland,1995).

Capsaicin is sparingly soluble in water but highly soluble in fats, oils and alcohol. The other compounds of the capsaicinoid groups are nordihydrocapsaicin, homocapsaicin, homodihydrocapsaicin and norcapsaicin(Rico Avila,1983;Murakami et al.,2001; Singh etal.,2001 and Reilly et al.,2001). The pungency level of chilli is measured by the Scoville organoleptic test which is the first laboratory test reported. One 'Scoville Heat Unit'(SHU) corresponds to about fifteen parts per million (ppm) of the capsaicin(Scoville,1912; Govindarajan et al.,1977).

Chilli is made up of 40 percent pericarp containing an inner sheath known as dissepiments, 56 per cent seeds and 4 per cent stalks. Almost all the pungency is contained in the pericarp, while the chilli seeds contain only traces of pungency with a capsaicin content of 0.005 per cent. The pungency of the pericarp is mostly concentrated in the dissepiments(Narayanan et al.,1979).vb The release of endorpnins at nerve ending gives the body a sense of pleasure. Capsaicinoids are

normally not extinguished in the mouth as the body masks their presence(Bosland,1993).

Capsaicin, which is the cause of pungency in birds eye chilli is believed to reduce risks of organ dysfunction and keep a healthy body and a diet containing capsaicin shows a significant features to enhance and boost the immune system(Mozsik et al.,2014). The biological benefits of capsaicin are related to its interactions with callous neural receptors. The interaction of capsaicin with the nocireceptors encompassing the taste sensors of the mouth gives the hot sensation at the time of consumption of chillies(website,http://www.scopus.com).

4.4.6: Geographical Indications as an attribute

Table 4.4.6: Attitudes of Enterprises towards the Attribute - 'GEOGRAPHICAL INDICATIONS'

Attitude Scores	Enterprises					
	Export & Import (%) No of Enterprises =33nos	Food Manu-facturing (%) No of Enterprises = 34 nos	Retail Business (%) No of Enterprises = 13 nos	Service Company (%) No of Enterprises 8 nos	Specialised Organic (%) No of Enterprises 12 nos	Total No of Enterprises
0 - 10	49 (16)	54 (18)	69 (9)	62 (5)	25 (3)	51
11 - 20	24 (8)	35 (12)	23 (3)	38 (3)	50 (6)	32
21 - 30	21 (7)	8 (3)	0 (0)	0 (0)	17 (2)	12
31 - 40	6 (2)	3 (1)	0(0)	0 (0)	8 (1)	4
41 - 50	0 (0)	0 (0)	8 (1)	0 (0)	0 (0)	1
TOTAL	100	100	100	100	100	100

Source: Primary Data

Parenthesis shows number of Enterprises

Table 4.4.6 shows that the correspondent of the five enterprises have given the score mainly in the range of 0 – 30. Minimum percentage has been given by three enterprises namely, Export & Import, Food Manufacturing and Specialised Organic to the score of 31 – 40. The score of 41 – 50 has been given by one enterprise that is

Retail Business that too only 8 per cent. A product, which is originated from a certain region/country and has a private characteristic of the region/country, is defined as "geographical indications(GI)". A GI, which of the intellectual property rights, is a sign used on goods that have a specific geographical origin and possess qualities, reputation or characteristics that are essentially attributable to that origin(WIPO, 2012)(Dogan and Gokovali,2012). Many studies have revealed that the willingness to purchase GI products with higher prices is greater than other standard products(Combris et al.,1997; Loureiro and McClusky,200; Teuber,2009).

The history of GI for origin products dates to the BCE era(Takahashi,2015). In the middle ages, the seals of the European guilds were regarded to be a symbol of the quality of local foods. The development of international agri-food trade during the 19th century led to the signing of the 1883 Paris Convention for the Protection of Industrial Property, an agreement which influences to the first international GI accord(Mottet et al.,2011;Echols,2008; Calboli et al.,2017; Parasecoli,2017;Bonanno et al.,2019). In the year 1995, following to the international agreements such as the 1891 Madrid Agreement and the 1958 Lisbon Agreement, TRIPS(Agreement on Trade-Related Aspects of Intellectual Property Rights), which protects GI registered under a trademark and / or sui generis laws as intellectual property, came into effect between WTO(World Trade Organisation) member states(WIPO:Geneva, Switzerland,2015).

GI and patrimonization are sometimes concerned with IPs(Indigenous Peoples) as they are inheritors and practitioners of unique and traditional cultures and a way of life closely related to the environment through farming, gathering, hunting, fishery and animal husbandry(Sekiguchi,2012).IPs belong to various ethno-linguistic groups and are distinct from the dominant societies in terms of culture, language, history, values, and sometimes religion.

With a good marketing process, GI registration leads a "price premium" owing to the product differentiation by the high reputation of the product(Dogan and Gokovali,2012). The more price premium can be achieved through the high willingness to pay by consumers(Raynaud et al,2002). A GI- labeled product treated

a public good due to its intrinsic characteristics are the result of a local heritage, a reputation built up over a generations that belongs to no one in particular(Larson,2007).

In India, in keeping with the TRIPS Agreement of the WTO, enacted ' The Geographical Indications of Goods(Registration and Protection) Act,(GI Act) on 15th September,2003 to provide protection to the goods registered under the Act(Dattawadkar and Mohan,2012). According to Calboli(2015) Geographical indication is a name or a sign used on products relating to a specific geographical location or origin.GI are regarded to recognize product quality, highlight brand identity and reputation. It has an important place in the safeguarding of cultural traditions and a GI cannot be allocated or licensed to someone outside that place of not belonging to the group authorized producers(Divya and Anoop,2018).

Conclusion:

It can be concluded from the study that organic (32%) came out as the most important attribute followed by pungency(25%), followed by price(19%), followed by distinct appearance(14%) and geographical indications(10%). Thus it can be concluded that 'organic' should be projected as the most significant attribute for 'formulating marketing strategies for birds eye chilli' cultivated in Mizoram.

Price emerged as an insignificant attribute in the present study.It may be inferred that the price of turmeric, ginger and bird's eye chilli was not that significant for the traders in making the decision of buying of turmeric,ginger and bird's eye chilli. Further 'Organic' emerged as the most significant attribute it may be inferred that the traders are willing to pay premium price for the spices.

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CHAPTER 5

CONCLUSIONS, PROSPECTS, CHALLENGES AND SUGGESTIONS

CONCLUSIONS, PROSPECTS, CHALLENGES AND SUGGESTIONS

The last chapter gives a summary of the study.The conclusions, prospects, challenges and suggestions of the study ii given in the last chapter.

5.1 CONCLUSIONS

5.1.1 Introduction

Chapter 1 presents an overview of agriculture, horticulture, about the selected spices namely turmeric, ginger and bird's eye chilli, the thematic review of literature covering agriculture, about spices, the growth of Indian spices, relevance of spices to the Indian economy, about Mizoram, turmeric, ginger and bird's eye chilli as a spice. It also includes significance and scope of the study, research gap, statement of the problem and the research methodology.

- Agriculture can be term as one of the most important sectors in the global economy and is the main source of food and forage with a notable impact on the environment. Agriculture is the largest users of water resources, about 70% of fresh water is used for agriculture in most part of the world and is an anthropogenic source of green house gases(Wallace,2000;Labedzki and Bak,2017;Neethu et al.,2018;Piwowar and Harasym,2020).
- Horticulture in India has today emerged as one of the most important sectors for diversification in agriculture with a total production of 280 millions tons annually. Presently, India ranked as the second largest producer of fruits and vegetables in the world with annual production 81.285 million tonnes of fruits and 162.19 million tones of vegetables contributing 12.6 percent and 14.0 percent of the total world production of fruits and vegetables respectively.
- The botanical name of turmeric is Curcuma domestica Val. Syn..Curcuma longa L,belonging to the family Zingiberaceae (Williamson,2002). Turmeric falls under the order Zingiberales of monocots and is an important genus in the family. The family is composed of 47 genera and 1400 species of perennial tropical herbs, found usually in the ground flora of lowland forests(

Nair,2017). Out of the 100 turmeric species, 41 is believed to occur in India, of which at least 10 are endemic to the Indian subcontinent. In the region of Western Ghats and Himalayas in India, the ecology of the turmeric species varies so much that their habitat ranges from the sea level (sandy coastal habitat) to high altitude, such as more than 2000msl(mean sea level).Species diversity is maximum in south and north east India and the Andaman and Nicobar islands(Velayudhan et al.,1999).It is also called "Indian saffron" because of its deep yellow orange colour (Tiwari and Agarwal,2004).

- Ginger, Zingiber officale Rose., is a monocotyledonous plant, belonging to the family *Zingiberaceae* in order of zingiberales and sub-family Zingiberoideae. The ginger stems are erect, oblique, round with a smooth leaves and can grow upto 2 or 3 feet in height. Depending on variety, the ginger rhizomes can be yellow, white or red in color and is covered with a brownish skin that may either be thick or thin(Gupta and Sharma,2014). Ginger is a biennial while the stem is annual and is propagated through rhizomes(Arya,2001). The ginger plant is erect, with a number of fibrous roots, aerial shoots(pseudostem) with leaves and underground stem (rhizhome) and the roots of ginger is of two types that is fibrous and fleshy. The roots which are fibrous are thin accompanied by root hairs and their main function is absorption of plant nutrients and water from soil.
- The botanical name of bird's eye chilli is *Capsicum frutescens*, belonging to the family solanaceae(Vaishnavi et al.,2018). Chillies are herbaceous or semi-woody annual and the chilli plants are erect, profusely branched with a leaves that are variable in size and simple. The flowers of chilli are usually borne single,are terminal and are bisexual and their colour varies from white to blue. The fruits of chilli are borne singly at nodes, variable in size, shape, colour, and degree of pungency. The colour of the unripe fruit of chilli is green or purplish,ripening to red or orange, yellow, brown, cream or purplish and the seed is pale yellow. Chillies can be grown in both tropical and subtropical areas. For growth a warm humid climate is most suitable while warm and dry climate increases fruit maturity. Chillies can grow in different types of soils on condition that they are deep, well drained, well aerated and

fertile.(Farooqi et al.,2005). Bird's eye chilli is a wild form of chilli and usually used to denote any small sized pointed chilli of high pungency due to its resemblance to an avian pupil(Chatterjee et al.,2012). In 1912, Wilbur Scoville developed a scale to measure the heat levels of chilli peppers. According to the scale one part per million of heat is equivalent to 1.5 Scoville units(Bellringer,2001).

- Indian spices have a global presence with a considerable share in the world market. Indian spices are valued globally, for their exquisite aroma, texture, taste and medicinal value. The varying climatic conditions in India provide ample scope for the cultivation of a variety of spices. Almost all Indian states produce spices, with the total area under spice cultivation being 3.21 million hectares with the passage of time, the Indian spices has evolved and matured as a technology based, quality-conscious, customer-centric and market-driven industry. India is the world's largest producer, consumer and exporter of spices and the country produces about 75 of the 109 varieties listed by the International Organization for standardization (ISO) and also accounts for half of the global trading in spices. (Spice Board of India,2014).

- India rank first in the world in the production of ginger, with a total production of 64,89,000 tones by producing 45.43% of the total production of the top ten countries during the year 2019. Nigeria ranked second with a total production of 34,14,142 tones having a share of 17.56%, which is nearly half of what India is producing. China ranked third(14.76%), followed by Nepal(7.56%). Fifth and sixth position is obtained by Indonesia(4.43%) and Thailand(4.24%) respectively. Cameroon(2.12%) ranked seventh position, while Bangladesh(2.03%), Japan(1.15%) and Philippines(0.68%) secured eighth, ninth and tenth position respectively.

- India ranked first in the production of Chilli in the world, India could produced 91,58,390 tones during 2015 to 2019 . During the year 2019 India produced 17,43,000 tones with a share of 49.48% which is nearly half of the other nine countries in the top ten. Next to India is Thailand with a production of 17,57,935 tones, having a share of 9.88% which is only around

20% of what India is producing. China(9.25%) ranked third, while Ethiopia(8.88%) could secured fourth position followed by Cote d'Ivoire(4.98%). The sixth, seventh, eighth, ninth, tenth position is obtained by Bangladesh(4.24%), Myammar(3.89%), Ghana(3.58%), Vietnam(2.89%) and Pakistan(2.88%) respectively.

- The highest share of spices production for the year 2011-12 is chilli with a percentage of 23.781, next is dry turmeric with a percentage of 22.291 and third highest is ginger(fresh) with 15.180 percent. For the year 2021-22, the highest is garlic with a share of 30.391 per cent, second is ginger (fresh) with 19.665 per cent and third is chilli with 17.304 per cent.

- It can be seen that as the area of cultivation increases, production also increases from the area and production of turmeric, ginger and bird's eye chilli in Mizoram for the last ten years that is from 2011 to 2020. The area and production of the three spices is more or less the same from the year 2017 to 2020. The highest production can seen for the three years viz 2017-18, 2018-19 and 2020-21 with a production of 10,918 metric tonnes. The production of bird's eye chilli for the year 2011-12 was 9,790 metric tonnes, while in 2020-21 it was 10,918 metric tonnes registering an increase of 10.33 percent.

5.1.2 Indian spices: Role and significance in Indian economy and the economy of Mizoram.

Chapter 2 focuses on the role and significance in Indian economy and the economy of Mizoram. The area, production and exports of major spices of India and production and area of the three spices of Mizoram is focused in this chapter.

- India is usually referred as 'spice bowl of the world' owing to the cultivation of 75 varieties of spices out of 109 shortlisted by International Organization for Standardization(ISO) and it is also for her production of different variety and superior quality spices India has highest number of spice varieties in the world (Ralte and Ekhe,2022;Anantha and Sidana,2019).

- According to Spices Board of India, in the year 2021-22, the country produced about 10.9 Mn MT of spices in 4.4 Mn Ha (adv. estimates) with average productivity of nearly 2.5 MT/Ha. Over the period (2010-11 to 2020-21), the production increased at a CAGR of about 7% from 5.35 Mn MT in 2010-11 to 11.04 Mn MT in 2020-215. The acreage has also increased at a CAGR of nearly 4% from 2.9 Mn Ha in 2010-11 to 4.5 Mn Ha in 2020-2(Spice Board of India, 2023). It is interesting to note that the glory of Indian spices prevails all over the world and that helps India holding a commanding position in the global spice trade. Indian spices can be found in abundance in the highlands, tropical rain forests, marshes, marshy woods, fertile valleys, and beautiful green plains.
- The most produced and exported spices are pepper, cardamom, chilli, ginger, turmeric, coriander, cumin, celery, fennel, fenugreek, garlic, nutmeg & mace, curry powder. Spices oils and oleoresins. From the spices produced in India, chilli, cumin, turmeric, ginger and coriander make up about 76% of the total production(Spice Industry and Export in India,2022). Nearly all the states and union territories in India cultivate at least one of the spice due to the favourable climatic conditions prevailing in all the states and union territories(Rajanbabu et al.,2022). In terms of the value of the world trade, pepper, cardamom, ginger, turmeric, chilli, cinnamon, nutmeg/mace, cloves and vanilla are the most important spices crop from tropical regions and cumin, coriander, sesame seeds, mustard, sage, bay, oregano and mint are the spices crop from the non-tropical regions(FAO,2005). India is the largest exporter of spice and spice products. During the year 2020-21, the country exhibited an upward trend and exported spices worth US $4.18 which was a 34% increase from that of 2019-20. United States of America (USA) imports the highest quantity of spices in the world (Sharangi and Pandit, 2018) with a value of 1,701 thousand USD which contributes 16.35 per cent of world import value whereas India ranks third with a value of 596 thousand USD with a total share of only 5.73 per cent in the import value of the world (Yes Bank and IDH, 2018).

- Spices play an important role in the economy of India as India is one of the largest producer of spices in the world. Spices production in the country grew from 67.64 lakh tonnes in 2014-15 to 106.79 lakh tonnes in 2020-21 with an annual growth rate 7.9%, following an increase in area from 32.24 lakh hectare to 45.28 lakh hectare. Among the major spices, Cumin (14.8%), Garlic (14.7%), Ginger (7.5%), Fennel (6.8%), Coriander (6.2%), fenugreek (5.8%), Red chilli (4.2%) and Turmeric (1.3 %), show significant growth rate in production(Spices Statistics at a glance 2021). The three spices namely Chilli, turmeric and ginger ranked first, second and third among the fifteen spices produced during 2011-12. For the year 2017-18 and 2021-22, the highest production is for garlic and followed by chilli, ginger and turmeric.
- It is observed from that there is decadel growth only in five spices out of the fifteen spices. Garlic, ginger have registered an increase in growth with garlic registering a substantial growth of 15.64% and ginger (4.49%). Coriander(.39%), fenugreek(.30%) and cardamom large(.02%) have also shown an increase. However all the other spices have shown a decline. This may be attributed to due to many reasons like the pandemic Covid-19, low yield, damage to standards, crop loss due to pests and diseases, post-harvest losses fluctuating prices and also less rainfall. The main reason can be regarded as the pandemic Covid-19 which greatly effects not only the economy of India but also the rest of the world.
- During the past years, there has been a steady increase in area production of spices in India. The annual growth rate of area of production of spices in India is estimated to be 3.6%. The total area under spices cultivation is 34.12 lakhs hectare in 2012 and 40.31 lakhs hectare in 2022 that is an increase of 6.19 percent. Madhya Pradesh, Telangana, Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, Orissa and North Eastern States are important states for spices production.
- Among the fifteen popular spices cultivated in India, an increase in the area of production can be seen from the eleven spices viz; coriander, garlic, cumin, turmeric(dry), pepper, fenugreek, ginger(fresh), cardamom(large),

nutmeg, celery and clove. Coriander spice has registered the biggest increase with a large margin of 2,69,550 hectares followed by garlic with an increase of 2,29,367 hectares.

- It can be seen from that the state Maharashtra ranked number one among top thirteen turmeric producing state in India. The estimated production for Maharashtra during the year 2021-22 is 3,67,985 tonnes which is 28.91% of the total production of the top thirteen states. The state Telangana was number one producer in India for the five years that is from 2017 to 2021, for the year 2022 the state ranked second with a production of 3,30,257 tonnes with a share of 25.95%. The third position goes to the state Karnataka with a share of 10.29% followed by Tamil Nadu having a share of 8.20% and the state Mizoram could secured 10^{th} position by producing 29,572 tonnes that is 2.32% of the total production.
- It can be observed that Madhya Pradesh ranked first in the production of ginger with a total estimated production of 5,15,741 tonnes, having a share of 28.29% for the year 2022-23. The second ranked is secured by Karnataka with a share of 16.80%, followed by Assam (9.36%). The state Mizoram could secured the tenth position with a share of 3.33% of the total estimated production.
- It is evident that Andhra Pradesh is the highest producer of chilli for the last five years, followed by Telangana. The third position is secured by Madhya Pradesh and fourth is Karnataka. For the year 2021-22 , it is estimated the state Andhra Pradesh will produced 7,00,000 tons which is38.35% of the total production of the top fourteen states of India while, the state Telangana is estimated to produce 4,33,122 tons that is 23.73% of the total production. The top five states viz; Andhra Pradesh, Telangana, Madhya Pradesh, Karnataka and Orissa shared 92.58% of the total production of the top fourteen states fot the year 2020-21. This shows that the other nine states, Tamil Nadu, Gujarat, Assam, Maharashtra, Punjab, Rajasthan, Uttar Pradesh, West Bengal and Nagaland have a small margin share of only 7.42%.

- It is observed that for the spice turmeric, the state Maharashtra ranked first with a production of 2,78,000 tons having a share of 25% of the total production. Second ranked is Telangana with a share of 22.76%, followed by Karnataka(11.84%) and fourth rank is secured by Tamil Nadu with a share of 9.10%. The state Mizoram could attained ninth rank with a production of 29,820(2.71%).
- It can be seen that for ginger, the highest rank has been accorded to Madhya Pradesh by producing 5,44,526 tons with a share of 25.93%. The state Karnataka could secured the second rank with a share of 23.81%, followed by Orissa(10.83%), then Assam(8.25%). There is a small difference in the fifth and sixth rank which is attained by West Bengal(6.53%) and Maharashtra(6.26%) respectively. The state Mizoram could secured eleventh rank with a share of 2.86% of the total production.
- For chilli, the first rank is obtained by Andhra Pradesh with a large margin of 33.31% share of the total production. The second rank is attained by Telangana with a big share of 29.18%. The state Andhra Pradesh and Telangana could secured a share of 62.49% out of the total production of the top eleven chilli producing states of India. The third rank is Madhya Pradesh (17.01%), followed by Karnataka(8.91%) and the fourth rank is Orissa with a share of only 4.72%.
- The decadel growth/decline in the total share of production of turmeric in India shows that the state Karnataka has an increase in share of production with a large margin of 16.815%, followed by West Bengal(7.332%), next is Mizoram(3.775%) and then Assam(3.203%). The state Andhra Pradesh has a huge margin decrease that is 22.666%, followed by Tamil Nadu(6.391%), Orissa(1.7%) and Gujarat(0.368%).
- It can be seen from the twelve states of India, only in three states there is decadel growth viz: Karnataka(11.109%), West Bengal(7.593%) and Mizoram(0.057%). The other nine states have decline share of production from the year 2011 to 2022.

- The three states from the nine states have decadel growth, they are Madhya Pradesh(15.437%), Karnataka(5.593%) and Gujarat(3.638%). The other six states having decadel decline in share of production are Andhra Pradesh(9.71%), West Bengal6.893%),Orissa(0.531%), Tamil Nadu(0.058%) and Punjab(0.2%).
- In Mizoram, there are eleven districts namely, Mamit, kolasib, Aizawl, Champhai, Serchhip, Lunglei, Lawngtlai, Siaha, Saitual, Khawzawl and Hnahthial. The production of turmeric, ginger and bird's eye chilli in the eleventh districts of Mizoram for the year 2020-21, shows that the highest production for turmeric is Mamit district, for ginger it is Kolasib district and for bird's eye chilli it is Aizawl district.

- The export for the different spices during the year 2016 to 2020 was 58,49,500 tonnes in quantity and Rupees 1,04,55,421 lakhs in values. The three spices namely turmeric, ginger and chilli have a large share in the export of spices from India. As India is the largest producer, consumer and exporter of chilli, the table 13 depicted that during the year 2016 to 2020, 24,10,150 tonnes with a value of Rupees 29,87,842(in lakhs) were exported. In the case of turmeric 6,78,050 tonnes with a value of Rupees 6,65,726(in lakhs) were exported and for ginger 2,51,815 tonnes with a value of Rupees 1,95,484(in lakhs) were also exported.

- For the year 2020-21, chilli secured first position among the spices exported with a share of 38.43%. Cumin ranked second with a share of 19.10%, followed by turmeric(11.69%). The fourth position is obtained by ginger with a share of 8.03%. Comparing the year 2016 and 2020, these spices have registered an increase, chilli(50.28% in volume,66.24% in value), ginger(403% in volume,194.35% in value),turmeric(53.54% in volume,35% in value), cumin(151.26% in volume and 116.64% in value), cardamom(small)(68.83% in volume,162% in value), cardamom(large)(69.87% in volume,10.43% in value),coriander(88.11% in volume,67.70%),celery(22.4% in value,59.8% in value), fenugreek(10.43% in volume,34.82%), other seeds(169.61% in volume, 94.15% in value),other

spices(9.42% in volume,40.21% in value), curry powder and paste(34.91% in volume and 48.79% in value), mint products(22.86% in volume,45.13% in value) and spice oils and oleoresins(35.95% in volume,34.67% in value). The following spices have shown a decrease, pepper(7.38% in volume, 52.37% in value), fennel(22.45 in volume, 59.8% in value), garlic(44.25% in volume, 49.10% in value) and nutmeg and mace(23.57% in volume,19.65% in value).

- It is interesting to know that during 2020-21, the export of spices reached an all-time high both in terms of value and volume by registering a growth of 17% in value and 30% in volume. India produces about 75 of the 109 varieties listed by the International Organization for Standardization(ISO). The most produced and exported spices are pepper, cardamom, chilli, ginger, turmeric, coriander, cumin, celery, fennel, fenugreek, garlic, nugmeg & mace, curry powder, spice oils and oleoresins. Out of these spices, chilli, cumin, turmeric, ginger and coriander make up about 76% of the total production.

- India is one of the world's largest, consumer and exporter of spices, and it exported spices and spice products to 180 destinations worldwide in 2019-20. The top destinations among them were China, U.S.A, Bangladesh, U.A.E, Thailand, Sri Lanka, Malaysia, U.K, Indonesia and Germany. These ten destinations made up of more than 78 per cent of the total export earnings in 2019-20. Spices worth Rs.5,15,323 lakhs were exported to China in 2091-20 whish constituted 33.64% of the overall value exported. During the same year U.S.A imported Rs 3,35,127 lakhs(21.31%), while Bangladesh imported Rs.1,17,703 lakhs(7.83%).Spices worth Rs.1,07,833 and Rs.1,07,813 were exported to U.A.E and Thailand consisting of 7.18% and 7.17%.
- The economy of Mizoram is primarily based on agriculture and shifting cultivation is still the dominant mode of agriculture in the state. According to the 2011 census, around 60 per cent of principal workers are employed in agriculture and allied sectors of the economy(Mizoram Economic Survey, 2021-22). Mizoram has geographical area of 21,087 sq. kms. out of which the Horticulture potential area is 11.56 lakhs Ha. At present, the total area under Horticulture crops is 1.10 lakh Ha. The geo-climatic situation of Mizoram

offers an excellent scope for growing different Horticulture crops including fruits, vegetables, spices, plantation crops, medicinal and aromatic plants of high economic value. Of the many spice crops, ginger, turmeric and birds eye chilli are the major spice crops of Mizoram(Department of Horticulture, Govt. of Mizoram).

- Mizoram falls under the Eastern Himalayan Zone, according to the demarcation of 15 agro-climatic regions in India. Mizoram enjoys a tropical and sub-tropical climate where most of the horticultural crops flourish. Of the total 21 lakh hectare of land in the state, about 4.40 lakh hectare are suitable for horticulture. The climate in the state is suitable for the cultivation of spices like ginger, turmeric, chilli, pepper, cinnamon, large cardamom and citronella. At present ginger, turmeric and chillies are commonly cultivated in Mizoram. According to the Spice Board of India, Mizoram has congenial grounds for commercial cultivation of spices retaining their unique generic properties.

- Spices like ginger, turmeric, black pepper and bird's eye chillies are grown in large areas of land estimated around 2,2470 ha with total production of major spices of 59,620 MT. Among the spices crop cultivated, turmeric being a short gestation crop, is an ideal crop for the poor farmers. Ginger is cultivated in many parts of Mizoram and has been a good source of income for farmers because of its pungency and longevity. The ginger variety thingpui and thinglaidum has received Geographical Indication(GI) tag in 2021. Mizo Chilli that is bird’s eye chilli received Geographical Indication(GI) tag in 2015¸ which is small in size and very pungent(Directorate of Agriculture, Govt. of Mizoram. Total horticulture production in Mizoram was 687.36 thousand metric tonnes as per advance estimates 2021-22. In the financial year 2020, the state produced 344.91 thousand tonnes of fruits under an area of 63.77 thousand hectares. Similarly, 101.49 thousand tonnes of spices were produced in the state under an area of 28.22 thousand hectares in the financial year 2020.(Ministry of Commerce and Industry, Govt. of India).

- Ginger, turmeric and chilli has a share of 99.906 per cent of the total production of spices in Mizoram for the year 2014-15. The spices coriander, black pepper, cinnamon, garlic, celery and others has a share of just 0.094 per cent.
- In Mizoram, there are eleven districts namely, Mamit, kolasib, Aizawl, Champhai, Serchhip, Lunglei, Lawngtlai, Siaha, Saitual, Khawzawl and Hnahthial. The production of turmeric, ginger and bird's eye chilli in the eleventh districts of Mizoram for the year 2020-21 shows that the highest production for turmeric is Mamit district, for ginger it is Kolasib district and for bird's eye chilli it is Aizawl district.
- Mizoram ranked 9th amongst the highest producers of turmeric in the country with a total production of 29,570 tonnes and a share of 2.52 percent in the total production of turmeric in India for the year 2021-22, in spite of being a small state.
- Mizoram ranked 11th amongst the highest producers of ginger in the country with a total production of 60,830 tonnes and a share of 2.74 percent in the total production of ginger in India for the year 2021-22, in spite of being a small state.

5.1.3 Marketing practices of growers of turmeric, ginger and bird's eye chilli in Mizoram

Chapter 3 presents marketing practices of growers of turmeric, ginger and bird's eye chilli in Mizoram. The four P's namely, product, price, place and promotion of the farmers cultivating turmeric, ginger and bird's eye chilli practices by them are shown in this chapter.

In both the village, that is Reiek and Champhai the production practices of turmeric are as follows:

- Cultivation: The land is prepared for sowing by removing existing bushes and other unwanted vegetation using hoe and gardening knife(*thuthlawh and chemkawm*). This debris is then burnt and the farmers repeatedly ploughs the

land to prepare it for planting of seeds. This activity is undertaken in the months February and March. Planting is done in the month of April and May with onset of pre-monsoon showers.

- Manuring and fertiliser application: Interestingly, no manure or fertilisers were applied to the soil for cultivating the crop. In fact, the cooperative societies prohibit the use of fertilisers to the soil to maintain the status of organic farming.
- Intercropping: It was also observed that no intercropping was done due to large leafing of the crop
- Weeding and Irrigation: Weeding is done three times before harvesting. After planting activity, weeding is done within 2 to 3 weeks and after that it is done depending upon intensity of the growth of weeds. No artificial irrigation was required as rain water was sufficient for the cultivation of turmeric in Mizoram.
- Harvesting: Harvesting of lakadong turmeric is done in the month of February and March usually after 10-11 months of planting. At the time of harvesting the land is ploughed and the rhizomes are gathered by hand picking.
- Curing and Boiling: Fresh turmeric rhizomes is cured for obtaining dry turmeric and the fingers are separated from mother rhizomes. Mother rhizomes is kept as seed material which is preserved in a gunny bag in a dry area.
- Drying and Processing: The cooked rhizomes were thereafter sliced and laid down under the sun for drying for 4-5 days. The dried rhizomes were again cleaned and ground by a grinding machine to make into a turmeric powder. The turmeric powder was then packed into a net weight of 100gm.
- Multi farming Cooperative Society buys the dry turmeric flakes from the farmers, processes it into turmeric powder the grinding machines, packages, labels and sells the turmeric powder under the brand name '*Riek Aieng*, which means means turmeric in Mizo language. TlangsamTumeric Growers Society

in Champhai,has branded the turmeric powder of the farmers there as '*Zo spice'*

- Lakadong is the type of turmeric which is grown in Reiek and Champhai. After processing into powder, packaging is done. In both the village only one type of package which is 100gm is packed and sold. The name of the product for Reiek is 'Reiek Aieng' and that of Champhai is 'Zospice'. Both the product is organic and the first product branded and packaged in Mizoram in the case of turmeric.
- The price of fresh turmeric at Reiek is ₹15-20 per kg, while the dried turmeric is ₹120 per kg. In Champhai the price of fresh turmeric is ₹10-20 per kg and the dried turmeric is ₹130 per kg. In both the place the powdered, 100 gram packet is sold at ₹ 30 each. This was the price at the time of primary data collection.
- In Reiek and Champhai the society members participated in State and National Level Exhibition for promoting their product. Advertisement is also done in local channel and local newspaper. In the year 2016, both the society exhibit their turmeric powder in BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation(NSIC) Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016.

In the five villages, that is Reiek, Champhai, Pehlawn, Khanpui and East Phaileng the production practices of ginger are as follows:

- Cultivation: The land is prepared by burning the debris which is present in the land and repeated ploughing is done. Seeds are planted in the month of April and May with onset of pre-monsoon showers.
- Weeding and Irrigation: Weeding is done three times before harvesting. Irrigation is not done as rain water is enough for ginger crop in almost all the area of Mizoram.
- Mixed cropping: Ginger is grown as an intercrop with maize, gourd, bitter tomato, brinjal, chillies, ladies finger, yum etc.

- Harvesting: Harvesting of ginger for vegetable purpose starts after 180 days based on the demand. The matured rhizomes are harvested in the month of February and March usually after 10-11 months of planting

- Thingpui, Thinglaidum and Thiangria are the different varieties which is cultivated in Reiek, Pehlawn, Khanpui and East Phaileng.

- The price of Ginger in the four villages that is Reiek, Pehlawn, Khanpui and East Phaileng and also in different areas of Mizoram is determined by the demand of the buyers. In most part of Mizoram, the farmers harvested their produce only when there is a good price in the market. The fresh ginger is sold for ₹15-20 in the local market and to the buyers from other state. This was the price at the time of primary data collection.
- Promotion is not done for ginger by the five villages namely Reiek, Champhai, Pehlawn,Khanpui and East Phaileng. The farmers clean the harvested ginger and packed them in a gunny bag for selling in the local market and for the interested buyers from Assam.

The production practices of the villages, Champhai, Reiek and West Phaileng of bird's eye chilli are as follows:

- Cultivation- Cultivation practices for bird's eye chilli in the three villages that is Champhai, Reiek and West Phaileng is almost the same as in different parts of Mizoram. The land is prepared by burning the debris which is present in the land, cleaning the land and repeated ploughing.
- Weeding and Irrigation: Weeding is done three times before harvesting. Irrigation is not done as rain water is enough for bird's eye chilli crop in almost all the area of Mizoram.
- Mixed cropping: Bird's eye chilli is grown as an intercrop with maize, gourd, bitter tomato, brinjal, chillies, ladies finger, yum etc.
- Harvesting- When the fruits of the plant is matured that is when it is red in colour, harvesting is done usually in the month of December and January. Sometimes when the fruit is not matured it is also harvested.

- Drying – Solar panel is used for drying the fruit of bird's eye chilli. Almost in all parts of Mizoram drying of bird's eye chilli is done under the sun as most of the farmers do not have solar panel.

- The bird's eye chilli of Mizoram has Geographical Indications which was pursued by Horticulture Department, Govt. of Mizoram. Fresh and dried bird's eye chilli is sold in the market. In West Phaileng village the fresh chilli is made into pickle, packed as 200gm.
- The price of fresh bird's eye chilli in the three village is as follows, in Reiek it is ₹150 per kg, in Champhai it is ₹130-150 per kg and in West Phaileng it is ₹ 120-150 per kg. While the dried chilli is mostly sold in the three villages at ₹400-450 per kg.
- In both the village, that is Reiek and Champhai the bird's eye chilli which is cultivated by the farmers is sold at the local market only. While in the case of West Phaileng village, it is exported to Tripura the nearby state of Mizoram.
- Promotion is not done by Reiek and Champhai village, while in West phaileng promotion is done by Bird Eye chilli Grower Society. Bird Eye Chilli Grower Society was established in the year 2016 and was registered under firms and society in 2017.
- Bird Eye chilli Grower Society received Organic Certificate from Ecocert India Pvt. Ltd., Gurgaon, Haryana which is an Organic Certifying Agency in the year 2020. The society has taken part in state and national level exhibition and have done advertisement in television and newspaper.

5.1.4 Buyer's attitudes, preference and perception towards Turmeric, Ginger and Bird's Eye Chilli

Chapter 4 attempts to understand the buyers' attitudes, preference and perception of enterprises towards the attributes of turmeric, ginger and bird's eye chilli. The attributes of turmeric includes curcumin, aroma, price, organic and packaging. The attributes of ginger includes appearance, price, aroma, organic and pungency. The attributes of bird's eye chilli includes distinct appearance, price, organic, pungency and geographical indications. The enterprises are export and

import, food manufacturing, retail business, service company and specialized organic.

Based on review of literature significant attributes of the above mentioned spices were listed out by the researcher in the present study. These spices were displayed in the BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation(NSIC) Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016 by the farmers sponsored by Horticulture Department, Govt of Mizoram. On the basis of the preferences of the enterprises who showed interest in the spices, scores were computed based on Fishbein formula.

- For the Attitudes of Enterprises towards Attributes of Turmeric, the attribute organic has scored the highest score 29 percent. Further it can be observed that the highest organic is followed by curcumin with a score of 24 percent , the third highest is price with a score of 20 percent followed by aroma with a score of 19 percent and the least packaging, with a score of 8 percent.
- From the respondents of the five enterprises, the respondents of the four enterprises namely Export and Import, Food Manufacturing, Retail Business and Specialised Organic have given the highest score for the attributes Curcumin and only one enterprise that is Service Company has given the second highest score. It can be seen that from the 116 respondents all the five enterprises have given importance to the attributes of 'Curcumin' among the five attributes of Turmeric.
- For aroma as an attribute, the majority of the respondents of the five enterprises are in the range of 11-20 to this attribute. The lowest score of 0-10 have been given by the respondents of two enterprises that is Export and Import three percent and Food Manufacturing two percent. In the case of the highest score of 41 – 50 the respondents of the two enterprises namely Food Manufacturing and Retail Business have given seven percent and five percent respectively. This indicates that the attributes of 'Aroma' is relatively lesser important for the respondents of the five enterprises. It is observed that the level of importance for this attribute can be seen from the score of 11 – 40.

- For price as an attribute, the majority of the respondents of the five enterprises have given a score of 11 -40 to this attribute. The range for this attribute leans in the score of 11 – 40 and this indicates that the respondents of the five enterprises have given lesser importance to the attribute price.
- For organic as an attribute, this attribute has emerged as the most important attribute of turmeric displayed in the Exhibition. Organic farming is gaining importance globally in recent times. Organic as an attribute for the respondents of the five enterprises plays an important role as it can be seen that majority of the respondents have given the score of 31- 50. The respondents of the three enterprises namely Export and Import (three percent), Food Manufacturing(five percent) and Retail Business (five percent) have given the score of 0-10.
- Packaging as an attribute for the respondents of the five enterprises is not important as sixty percent of the respondents are in the score of 0-10.The highest score of 41-50 is not given by any of the respondents of the five enterprises.
- As of conclusion it can be observed that organic (29%) emerged as the most significant attribute followed by curcumin (24%) , followed by price (20%), followed by aroma (19%) and packaging(8%). Hence it can be concluded that ‘ organic’ should be projected the most important attribute for ‘formulating marketing strategies for lakadong’ turmeric grown in Mizoram.
- For the Attitudes of Enterprises towards Attributes of ginger, It can be seen that the attribute organic has scored the highest with a score of 33 percent. The highest organic is followed by pungency with a score of 19.05 percent , the third highest is aroma with a score of 18.95 percent followed by price with a score of 17 percent and the least appearnce, with a score of 12 percent .It is interesting to note that there is a slight difference of 0.10 percent of attitude score of attributes pungency and aroma.

- The attribute Appearance is not important for the respondents of the five enterprises as they have all given more than 45 percent for the score of 0- 10.

- The greater number of the respondents of the five enterprises towards price as an attribute have given the score of 11-40 to this attribute. This shows that the respondents of the five enterprises have given lesser importance to this attributes.
- For aroma as an attribute, it can be seen that most of the respondents of the five enterprises are in the range of 10-40 to this attribute. The lowest score of 0 – 10 has been given by one enterprise namely specialized organic. The highest score of 41-50 are given by only two enterprises, food manufacturing and retail business that too a score of five and six percent respectively.
- For organic as an attribute, the respondents of the five enterprises has given the highest score of 41 – 50. The lowest score of 0-10 is given by only two enterprises namely Export & Import and Specialized organic with a percentage of 3 and 8 respectively.
- The respondents of the five enterprises towards attribute Pungency concentrate on the score of 0 – 30. The respondents has also given the score of 31-50.
- It is observed that organic(33%) appeared as the most significant attribute followed by pungency(19.05%), followed by aroma(18.95%), followed by price(17%) and appearance(12%). It is important to note that the percentage difference of pungency and aroma is only .10%. Therefore, it can be concluded that " organic" should be projected the most important attribute for 'formulating marketing strategies for thinglaidum, thingria and thingpui' ginger grown in Mizoram.
- Attitudes Scores of Enterprises Towards Birds Eye Chilli shows that the attribute organic has scored the highest with a score of 32 percent. Further it can be observed that the highest organic is followed by pungency with a score of 25 percent , the third highest is price with a score of 19 percent followed by distinct appearance with a score of 14 percent and the least geographical indications, with a score of 10 percent.
- The score of the attribute distinct appearance is not given due importance by the five enterprises as majority of the score lies in the range of 0 – 20. It can

be seen that the respondents of the five enterprises has given minimum score in the range of 31 – 50.

- For price as an attribute, the number of enterprises is highest in the range of 21 – 30 and in the range of 41 – 50 it is the lowest with only 6 in numbers. The attribute price is not given due importance by the correspondents among the five attributes.
- The score of Organic as an attribute for the respondents of the five enterprises lies mainly in range of 21 – 50. A score of six per cent and eight per cent is given by two enterprises Food Manufacturing and Retail Business respectively in the range of 0 - 10 . In the range of 11- 20, Export & Import has given six per cent, while Retail Business has given eight per cent. This attribute has appeared to be the most important attributes among the five attributes of bird's eye chilli which was displayed in the exhibition. Out of the hundred correspondents who has visited the Mizo stall, fifty seven(57) has opted for the highest range that is 41 - 50.
- The score of pungency as an attribute for the respondents of the five enterprises lies heavily in the range of 11 – 40. A score of 0 -10 is given by only one enterprise that is Export and Import.
- For Geographical Indications as an attribute, the correspondent of the five enterprises have given the score mainly in the range of 0 – 30. Minimum percentage has been given by three enterprises namely, Export & Import, Food Manufacturing and Specialised Organic to the score of 31 – 40. The score of 41 – 50 has been given by one enterprise that is Retail Business that too only 8 per cent.
- It can be concluded from the study that organic (32%) came out as the most important attribute followed by pungency(25%), followed by price(19%), followed by distinct appearance(14%) and geographical indications(10%). Thus it can be concluded that 'organic' should be projected as the most significant attribute for 'formulating marketing strategies for birds eye chilli' cultivated in Mizoram.

5.2 PROSPECTS

5.2.1 Production of Spices in India

Spices play an important role in the economy of India as India is one of the largest producer of spices in the world.Spices production in the country grew from 67.64 lakh tonnes in 2014-15 to 106.79 lakh tonnes in 2020-21 with an annual growth rate 7.9%, following an increase in area from 32.24 lakh hectare to 45.28 lakh hectare. Among the major spices, Cumin (14.8%), Garlic (14.7%), Ginger (7.5%), Fennel (6.8%), Coriander (6.2%), fenugreek (5.8%), Red chilli (4.2%) and Turmeric (1.3 %), show significant growth rate in production(Spices Statistics at a glance 2021). The three spices namely Chilli, turmeric and ginger ranked first, second and third among the fifteen spices produced during 2011-12. For the year 2017-18 and 2021-22, the highest produced spice in India was garlic followed by chilli, ginger and turmeric.

The North East Region (NER) of India, comprising of 'Seven Sister' states namely Assam, Arunachal Pradesh,Manipur, Meghalaya, Mizoram, Nagaland, and Tripura along with Sikkim has huge opportunities and resources for production of spices. The geo-climatic condition of Mizoram offers an excellent scope for growing different Horticulture crops including fruits, vegetables, spices, plantation crops, medicinal and aromatic plants of high economic value.Of the many spice crops, ginger, turmeric and birds eye chilli are the major spice crops of Mizoram(Department of Horticulture, Govt. of Mizoram).

Spices like ginger, turmeric, black pepper and bird's eye chillies are grown in large areas of land estimated around 2,2470 ha with total production of major spices of 59,620 MT.In the financial year 2020, the state produced 344.91 thousand tonnes of fruits under an area of 63.77 thousand hectares. Similarly, 101.49 thousand tonnes of spices were produced in the state under an area of 28.22 thousand hectares in the financial year 2020.(Ministry of Commerce and Industry, Govt. of India).

Ginger, turmeric and chilli has a share of 99.906 per cent of the total production of spices in Mizoram. Mizoram has emerged an important producer of

organic turmeric, ginger and bird's eye chilli in India with a significant share in the total production of these spices in spite of being a small state in terms of area and population.

5.2.2 Production of organic spices in Mizoram

Opportunity for north-eastern states to prosper by turmeric cultivation and marketing North-eastern states, particularly Mizoram is recognized as abnormally high productivity states in turmeric, ginger and bird's eye chilli cultivation because of their higher yield. Mizoram also have the advantage of recognition for organic production.

Industry estimates that the size of the global organic spice market is currently valued at close to USD 750 Mnto USD 1 Bn. Currently India (besides China and Vietnam) is the key exporter of organic spices. Industry estimates that the organic spice segment is dominated by commodities like chili, ginger and garlic.(Yes Bank).The demand for organic spices is expected to grow by 5-7% annually, being largely driven by the European market. This demand will be met largely through the South East Asian nations, who have surplus quantum of spices' production and can adhere to the standards of the importing nations.

The Indian organic spice market also holds a huge opportunity. In case of spices, the threat of mixing up ofcarcinogenic products like colors, chemicals, etc. in the spice powders, has driven the consumers towards choosing organic (or natural) spices. The organic spices easily command a premium of around 30%-40% and in some caseseven upto 100% premium at the retail level.

5.2.3 Quality of spices produced in Mizoram

Lakadong variety of turmeric is considered to be one of the world's best varieties of turmeric with its curcumin content of about 6.8-7.5%(Shreeranjan,2006). In case of Turmeric, the Curcumin contentis a key determinant of high quality produce. The turmeric from the North Eastern States and specifically Mizoram has very high curcumin content yes bank. The present study observed that mother

rhizomes were used as seeds which contributed to very high curcumin content and the high quality turmeric.

The researcher observed that the turmeric produced in Mizoram was sought after by enterprises in India and abroad. The most important attribute for buying turmeric was the quality of turmeric.

Thingpui, Thinglaidum and Thiangria were the different varieties cultivated in Reiek, Khanpui and East Phaileng and Champai. Thingpui is the largest sized variety of ginger found in Mizoram with a fibre content of 8.6 per cent. Thingpui rhizome is light yellow in colour with a low pungency. Thinglaidum is another popular variety of ginger grown in Mizoram slightly smaller than the Nadia[1] variety ginger. The rhizome has a distinct purple ring in the middle when broken with a fibre content of 9.8 percent. Thingria very thin and long variety with a fibre content of 8.1 percent(Singh and Selvan).The researcher observed that the ginger produced in Mizoram was sought after by enterprises in India and abroad. The most important attribute for buying turmeric was the quality of turmeric.

Mizoram is famous for the habitation of wonderful diversity of bird's eye chilli, with respect to fruit shape,size, colour, pungency, plant type, physiological characteristics, reactions to diseases and pests, adaptability and distribution(Ozgur et al.,2011). Known as the wonder spice, chili is the most widely used universal spice. Different varieties of chili are cultivated across the globe for varied uses like vegetables, pickles, spices and condiments. In daily life, chilies are integral and the most important ingredient in many different cuisines around the world as these add pungency, taste, flavour and colour to the dishes.

5.2.4 Acquisition of GI

In the year 2021 *Thingpui*and *Thinglaidum* varieties of ginger received G.I tag under the initiative of Horticulture Department,Govt, of Mizoram. Birds eye chilli (*Hmarchate*) also received the GI tag in 2015.

5.3 CHALLENGES AND SUGGESTIONS:

1. Need to market beyond Mizoram:

As observed in the present study, for turmeric powder it is sold largely to Mosia agencies, for ginger the bulk of the produced is sold to middlemen from Silchar, Assam and for bird's eye chilli it is sold to the commissioner or middlemen from Tripura. It is also observed in the present study that all the enterprises namely, Export & Import, Food Manufacturing, Retail Business, Service Company and Specialised Organic were interested in buying turmeric, ginger and bird's eye chilli exhibited in the BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation(NSIC) Exhibition Grounds, Okhla New Delhi during November 2016.

It was further observed that the price of the product exhibited did not adversely affect the buyer's attitude towards turmeric, ginger and bird's eye chilli cultivated in Mizoram. Hence, it can be inferred that there is a huge demand for turmeric, ginger and bird's eye chilli cultivated in Mizoram in National and International markets.

2. No Cold Storage:

Lack of cold storage facilities aggravated the problem faced by the farmers. There is a need for the government agencies to establish cold storage for these spices grown in remote areas in Mizoram. Bird's eye chilli being a perishable product and having a huge demand outside Miozoram, also required cold storage to preserve the freshness of the product.

3. Facilities for Drying and Slicing:

It was observed in the present study that except for Multi farming Cooperative Society of Reiek, Tlangsam Tumeric Growers Society of Champhai and by Bird Eye chilli Grower Society of West Phaileng, none of the farmers had the facilities of drying and slicing. It is important to provide slicers and solar panel

drying facilities for the farmers for processing the raw turmeric, ginger and bird's eye chilli.

4. Value Added Products:

There is a need to install all extraction facilities for all the three spice namely, turmeric, ginger and bird's eye chilli for producing value added products like:

- Turmeric - turmeric oleoresin, turmeric drops, curcumin powder, turmeric milk, turmeric powder.
- Ginger – ginger oleoresin, ginger candies, ginger biscuits, ginger beer, ginger powder, ginger oil, ginger paste.
- Bird's eye chilli- red chilli powder, chilli oleoresin, chilli paste, chilli sauce, chilli oil, chilli pickle.

All these by products are a valuable export items.

5. Godowns:

It was observed during field study that most of the villages lacked Godowns for storage of spices before it is transported. The researcher found that the three spices namely, turmeric, ginger and bird's eye chilli were packed in a gunny left in the open on the roadside.

6. Co-operatives Societies:

It was observed that only the co-operatives societies viz,Multi farming Cooperative Society of Reiek, Tlangsam Tumeric Growers Society of Champhai and by Bird Eye chilli Grower Society of West Phaileng were functioning. All the other farmers are outside the ambit of organized Co-operative Societies or FPO's. There is a need to strengthen the Co-operatives Societies already existing namely, Multi farming Cooperative Society of Reiek, Tlangsam Tumeric Growers Society of Champhai and by Bird Eye chilli Grower Society of West Phaileng and established new Co-operatives Societies and FPO's to increase the bargaining power of the farmers and facilitate production and marketing of turmeric, ginger and bird's eye

chilli cultivated by them. In the long run these Co-operatives Societies can be formed into Consortiums of the respective spices produced by the farmers.There is also a need to promote more co-operative societies among the growers of spices in Mizoram.

7. Transport Facilities:

The villagers lacked transport facilities to transport their produced to district Head Headquarters and Nodal areas of trade namely Aizawl, Bairabi and Vairengte. It was observed that the middlemen came to these centres with their trucks and procure the farmers produced at throw away prices. The farmer were at dis-advantage due to unavailability of transport facilities which adversely affected the bargaining power.

8. Need for participation in National and International Exhibition(Promotion):

It was observed that the farmers rarely got a chance to exhibit their product at National and International Exhibitions. There is a need to give opportunities to farmers of turmeric, ginger and bird's eye chilli to exhibit the products at National and International levels to tap markets beyond Mizoram.

9. Need for Regulation of prices:

It was observed that the farmers have no control over pricing of the products due to lack of awareness of markets and lack of facilities such as transport, storage, machineries, value added products etc. to reach National and International markets. The middlemen exploited the farmers due to these factors by procuring the spices at throw away prices at the point of production. It was distressing to note that many a times the spices were left unharvested especially turmeric and ginger in remote areas due to low procurement prices. Hence, there is a need for Government of Mizoram to fix minimum sale price for spices in Mizoram as a regulating measure.

10. Organic Certification:

It was found that the Co-operative Societies and farmers did not have organic certification. There is an urgent need for APEDA and Government of

Mizoram to take consulted steps to procure organic certification for turmeric, ginger and bird's eye chilli.

11. Training for Farmers:

It was observed that except Multi farming Cooperative Society of Reiek, Tlangsam Tumeric Growers Society of Champhai and by Bird Eye chilli Grower Society of West Phaileng, most of the other farmers had not participated in any training programmes for capacity building in upgradation of their skills. There is a need to conduct tailored made training programmes for the farmers to upgrade their skills.

12. Need for facilating International Trade :

Mizoram is strategically located having borders with Myanmar, Bangladesh and Tripura. Bangladesh is a significant importer of ginger spice. Most of the trade that presently takes place is informal between Myanmar, Bangladesh , Tripura and Mizoram. There is a need to formalize the trade in spices and open trade routes between Mizoram and these neighbouring countries. This will enhance the profitability of the farmers of Mizoram.

13. Need for facilitate direct selling to traders:

There is a need to tap the potential by enabling bulk sales from farmers organization to these companies namely, Export & Import, Food Manufacturing, Retail Business, Service Company and Specialised Organic directly without any middlemen.There is an urgent need to regulate the sales of spices to the middlemen who are apparently exploiting the farmers by procuring the produced at low price.Since the farmers are uneducated and unaware of markets for their spices they sell it at throw away prices to this middlemen from Silchar, Assam for ginger and Tripura for bird's eye chilli.

14. Branding of Mizo Spices:

Highlighting the attributes such as organic for the three spices, curcumin content of turmeric, pungency of the three spices, aroma for turmeric and ginger, distinctiveness of bird's eye chilli and GI tags for ginger and bird's eye chilli.

15. Pakaging:

Appropriate packing technology should be introduced for the three spices, training should be imparted to the Farmers Producer Organisation(FPO) by Indian Institute of Packaging(IIP).

16. Advertising for Spices at the National and International Level along with Tourism:

The state government should developed strategies for advertising the unique features of Mizo spices along with tourism. The Anthurium festival of Reiek which is organized every year should be replicated for spices in the main clusters which is cultivate turmeric, ginger and bird's eye chilli. Wide coverage of such festivals should be made in mass media channel to attract tourists and customers at the regional, national and international levels.

17. Festivals for Turmeric, Ginger and Bird's eye chilli:

Festivals for turmeric, ginger and bird's eye chilli should be organized at the time of harvest to attract tourists and customers around the globe.

18. Distribution for Sample Sachet:

As a promotional campaign, sachet of turmeric, ginger and bird's eye chilli should be distributed to the delegates who participate in events such as G20 and other national and international events. This can be a means of advertising Mizo spices outside Mizoram.

19. Mission Organic:

Mission organic should be implemented extensively for turmeric, ginger and bird's eye chilli as observed in the present study. None of the farmers interviewed use fertilizers or pesticides in the cultivation of turmeric, ginger and bird's eye chilli. This attributes should be highlighted to increase sales and fetch premium price for Mizo turmeric, ginger and bird's eye chilli.

20. Educating Farmers about Organic Products:

It was observed that the farmers were uneducated and were using conventional methods of farming. The farmers should be educated to maintain the same status of organically producing turmeric, ginger and bird's eye chilli and that they do not lured in using fertilizers for increasing yield.

21. There is a need to explore markets beyond Mizoram and Assam:

Developing strategies for marketing of spice beyond Mizoram. Spiceshas a huge potential markets in India and abroad. Organic was the most significant attribute according to the attitudes of the different enterprises namely, Export and Import, Food Manufacturing, Retail Business, Service Company and Specialised Organic.Hence, there is a need to project this attribute 'Organic' as a marketing strategy for marketing these spices beyond Mizoram.

22. Scope for Entrepreneur Development in spice :

Spices offer a huge apportunity for business and Entreprenuership.These is a huge scope for Entreprenuership development in different facets of marketing of spices in Mizoram.

Scope for Futher Research

1. Studies can be conducted on other spices grown in Mizoram.
2. Comparision study can be done with these three spices grown in Mizoram with other spices grown in North East India.

Annexure – Questionnaire for Traders

TURMERIC

QUESTIONNAIRE FOR TRADE VISITORS

(Please tick on the appropriate boxes)

A. Organisation's profile:

Name of organisation: _____

Address (Registered head office): _____

Mobile No:_____

Email:_____

Date of commencing business: _____

Nature of business:

Manufacturing : □

Wholesaler : □

Retailer : □

Type of trade activity:

Export and Import : □ : Food manufacturing : □

Retail Business :□ Service companies : □ Specialised organic :□

Service companies : □ Others : □

B.Trade visitors perception on Mizo Turmeric:

1.Please give ranks for all the attributes given below that would be considered by you while buying Mizo Turmeric:

(Please give rank from 1-5, 1 being the most important)

Attributes	Colour/circumin	Aroma	Price	Organic	Packaging
Ranks					

2.Please give points on Mizo Turmeric based on the attributes that would be considered by you while buying it.

(Please give points out of 10 for each attribute of Mizo Turmeric)

Sl.No.	Attributes	Mizo Turmeric
1	Colour/circumin	
2	Aroma	
3	Price	
4	Organic	
5	Packaging	

GINGER

QUESTIONNAIRE FOR TRADE VISITORS

(Please tick on the appropriate boxes)

A. Organisation's profile:

Name of organisation: _____

Address (Registered head office): _____

Mobile No:_____

Email:_____

Date of commencing business: _____

Nature of business:

Manufacturing : □

Wholesaler : □

Retailer : □

Type of trade activity:

Export and Import : □ : Food manufacturing : □

Retail Business :□ Service companies : □ Specialised organic :□

Service companies : □ Others : □

B. Trade visitors on Mizo Ginger :

1. Please give ranks for all the attributes given below on the basis of the importance of that attribute which will be considered by you while buying Ginger.

(Please give rank from 1 – 5, 1 being the most important)

Attributes	Appearance	Price	Aroma	Organic	Pungency
Ranks					

2.Please give points on Mizo Ginger based on the attributes that would be considered by you while buying it.

(Please give points out of 10 for each attribute of Mizo Ginger)

Sl.No.	**Attributes**	**Mizo Ginger**
1	Appearance	
2	Price	
3	Aroma	
4	Organic	
5	Pungency	

BIRD'S EYE CHILLI

QUESTIONNAIRE FOR TRADE VISITORS

(Please tick on the appropriate boxes)

A. Organisation's profile:

Name of organisation: _____

Address (Registered head office): _____

Mobile No:_____

Email:_____

Date of commencing business: _____

Nature of business:

Manufacturing : □

Wholesaler : □

Retailer : □

Type of trade activity:

Export and Import : □ : Food manufacturing : □

Retail Business :□ Service companies : □ Specialised organic :□

Service companies : □ Others : □

B. Trade visitors perception on Bird's Eye Chilli :

1.Please give ranks for all the attributes given bellow that would be considered by you while buying Bird's Eye Chilli.

(Please give rank from 1-5, 1 being the most important)

Attributes	Distinct appearance	Price	Organic	pungency	G-I
Ranks					

2.Please give points on Bird's Eye Chilli based on the attributes that would be considered by you while buying it.

(Please give points out of 10 for each attribute of Bird's Eye Chilli)

Sl.No.	Attributes	Bird's Eye Chilli
1	Distinct appearance	
2	Price	
3	Organic	
4	pungency	
5	G-I	

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https://pmfme.mofpi.gov.in/pmfme/newsletters/enewsaugust9/markettrends1.html accessed on 1st March 2023.

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PAPER PUBLICATIONS:

1.Buyers Attitudes towards "Hmarchate'(Bird's Eye Chilli) grown in Mizoram, *Journal of Emerging Technologies and Innovative Research*, 10 (8), 223 in August, 2023.

2. Production and Marketing practices of growers of bird's eye chilli in Mizoram, *International Advanced Research journal in Science, Engineering and Technology*, 10 (7), in August, 2023.

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1.Presented a paper titled "Marketing Practices of Turmeric growers in Mizoram" at the 'National Level Workshop on AgriBusiness Potential of Mizoram' organised by Department of Commerce, Mizoram University, Aizawl in collaboration with Indian Society of Agricultural Marketing , Hyderabad on 17th -18th October, 2019 at Aizawl, Mizoram.

2. Presented a paper titled “Buyers Attitudes towards “Hmarchate’(Bird’s Eye Chilli) grown in Mizoram” at the ‘National Seminar on G20 and Economic Development’ organized by Department of Commerce, Pachhunga University College, Aizawl, Mizoram on 1st –2nd May, 2023.

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DEGREE : DOCTOR OF PHILOSOPHY

DEPARTMENT : COMMERCE

TITLE OF THE THESIS : MARKETING AND MARKETS BEYOND MIZORAM: A STUDY ON SELECT SPICES PRODUCED IN THE STATE

DATE OF ADMISSION : 7th August 2015

APPROVAL OF RESEARCH PROPOSAL:

1. DRC : 15th September, 2016

2. BOS : 22nd September, 2016

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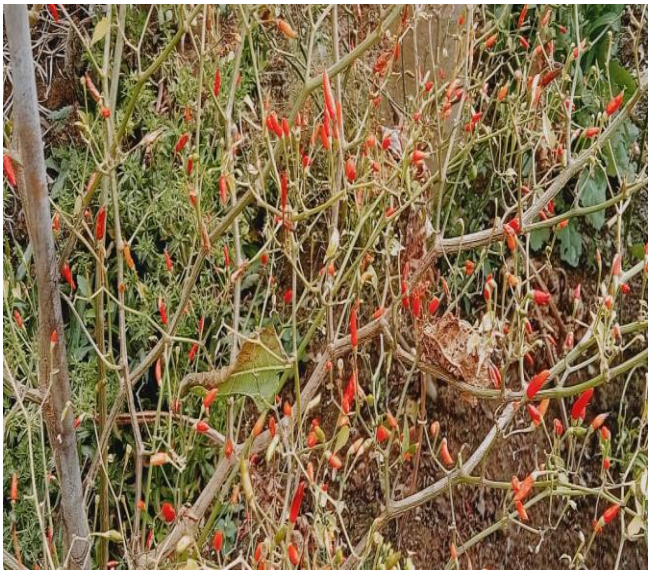
EXTENSION (IF ANY): Extension Period: 30.10.2021 – 30.10.2023 consequent upon Resolution No. AC:40:4(3), vide No. 16-2/MZU(Acad)/20/432-434, Dated 31.08.2021.

Head

Department of Commerce

AREA OF CULTIVATION

TURMERIC



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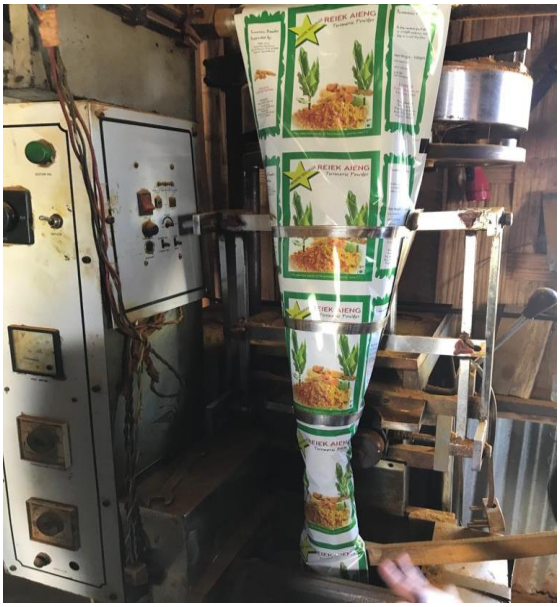

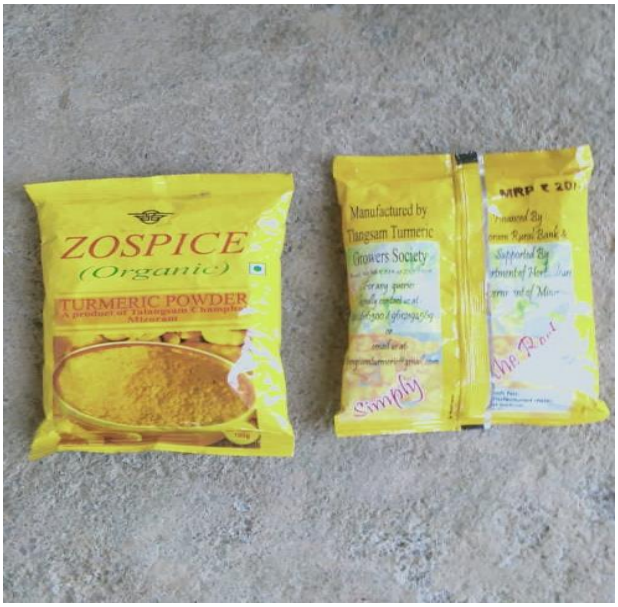

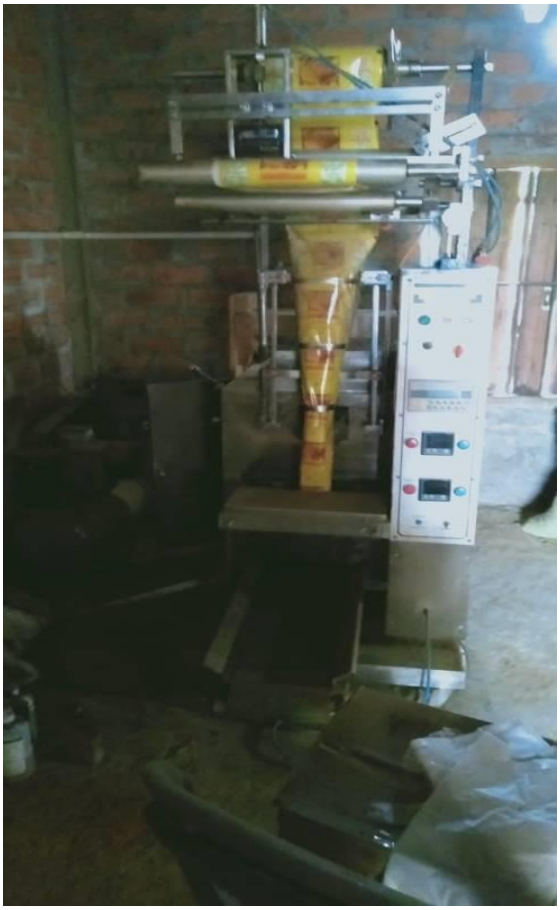

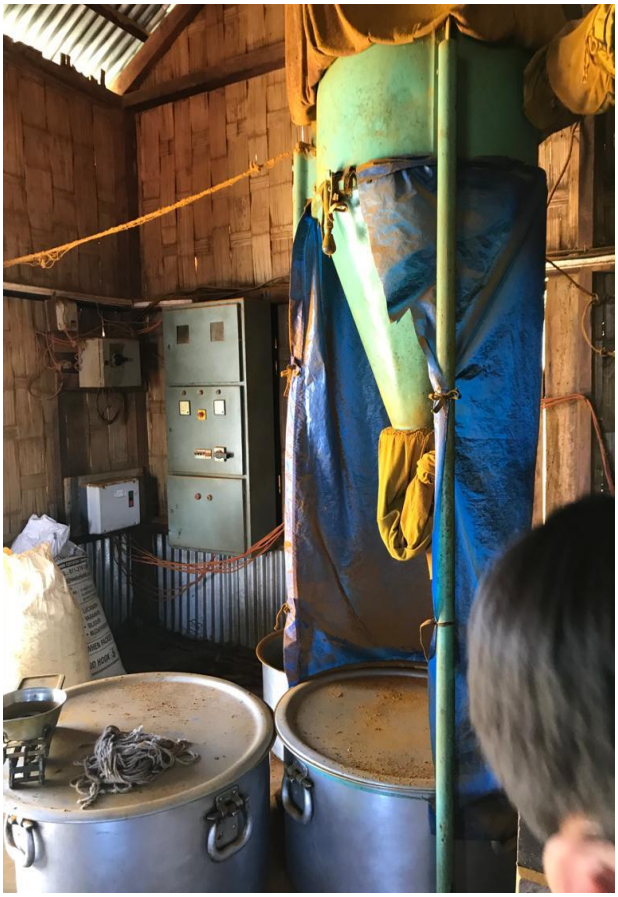

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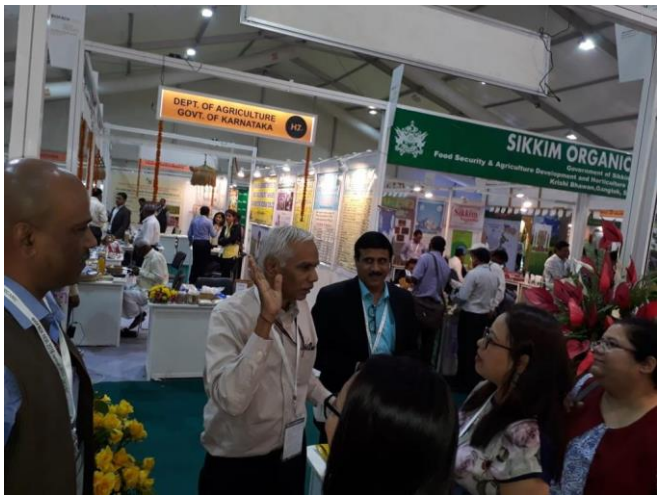

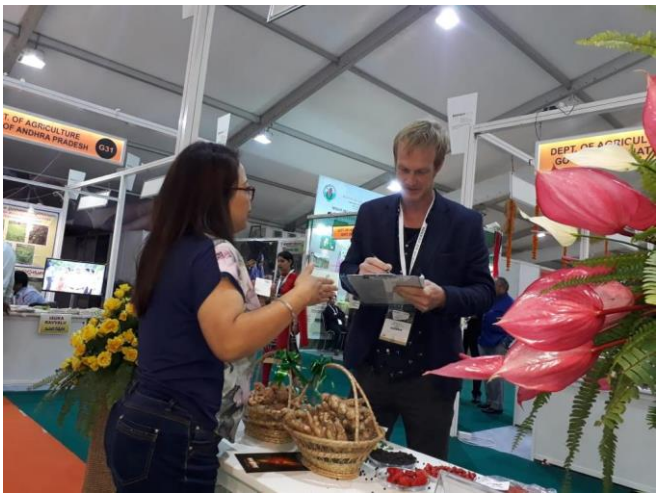

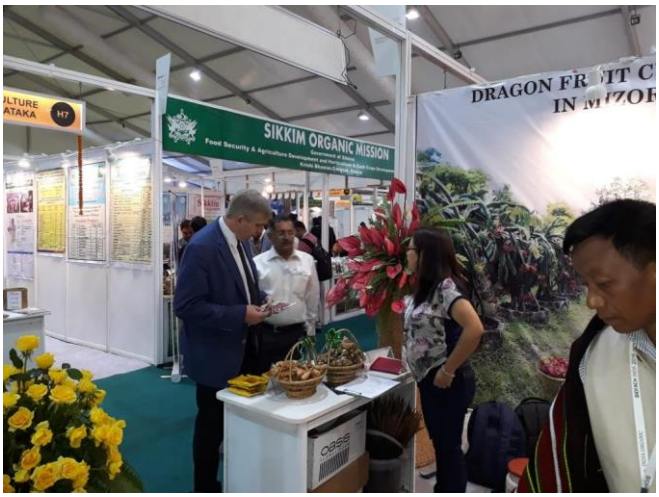

ABSTRACT

MARKETING AND MARKETS BEYOND MIZORAM: A STUDY ON SELECT SPICES PRODUCED IN THE STATE

AN ABSTRACT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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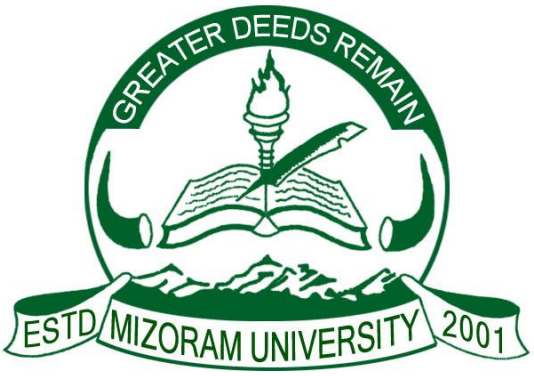

DEPARTMENT OF COMMERCE

SCHOOL OF ECONOMICS, MANAGEMENT AND INFORMATION SCIENCES

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MARKETING AND MARKETS BEYOND MIZORAM: A STUDY ON SELECT SPICES PRODUCED IN THE STATE

BY

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INTRODUCTION

Agriculture can be term as one of the most important sectors in the global economy and is the main source of food and forage with a notable impact on the environment. Agriculture is the largest users of water resources, about 70% of fresh water is used for agriculture in most part of the world and is an anthropogenic source of greenhouse gases (Wallace,2000;Labedzki and Bak,2017;Neethu et al.,2018;Piwowar and Harasym,2020).

Horticulture is the branch of agriculture that deals with the art, science, technology and business of growing plants. It includes the cultivation of medicinal plants, fruits,vegetables,nuts,seeds,herbs,sprouts,mushrooms,algae,flowers,sea weeds and non-food crops such as grass and ornamental trees and plants. Horticulture occupies a very important place in India and horticultural crops play a unique role in India's economy. India, with diverse soil and climate comprising several agro-ecological regions provide ample opportunity to grow a variety of horticulture crops. These crops contributed a significant part of total agricultural produce in the country comprising of fruits, vegetables, root and tuber crops, flowers, ornamental plants, medicinal and aromatic plants, spices, condiments, plantation crops and mushroom. Cultivation of these crops is labour intensive thus, generating a lot of employment opportunities for the rural population.(Datta,2013).

India is a major producer, consumer and exporter of spices in the world. 75 different varieties out of 109 different spiceS listed by ISO are grown in India because of varied agro-climatic conditions and soil types. India produces more than 100 Lakh MT of spices, of which, about 15.78 Lakh MT (15 per cent) is exported to more than 180 countries (Ministry of Commerce and Industry, Government of India, Spice Board India 2023).

The present study includes three main spices viz. turmeric, ginger and bird's eye chilli.

Turmeric:

The botanical name of turmeric is Curcuma domestica Val. Syn..Curcuma longa L. belonging to the family Zingiberaceae (Williamson,V 2002). Turmeric falls under the order Zingiberales of monocots and is an important genus in the family. The family is composed of 47 genera and 1400 species of perennial tropical herbs, found usually in the ground flora of lowland forests (Nair,2017).

Ginger:

Ginger, Zingiber officale Rose is a monocotyledonous plant, belonging to the family *Zingiberaceae* in order of zingiberales and sub-family Zingiberoideae. Ginger plant is aromatic, with unbranched aerial stems, distichous leaves, open sheaths and hypogeal germination which is found mostly in the tropical area all over the world with the centre of distribution in Indo-Malaysia (Arya,2001).The name of ginger derives from a Sanskrit word denoting "horn shape" in reference to the protusions on the rhizomes (Ghosh et al.,2011).

Bird's eye chilli:

The botanical name of bird's eye chilli is *Capsicum frutescens*, belonging to the family solanaceae (Vaishnavi et al.,2018). Capsicum frutescens is one among the five cultivated species of the genus solanaceae and is closely related to capsicum chinense Jacq (Heiser and Smith,1953). There are various varieties and forms of Capsicum, which belongs to the family Solanaceae (Smith et al.,1987 and Bosland,1992).

Mizoram (the land of the Mizos) is nestled in the steep hill folds, which is one of the fabled 'seven sisters' of north-east India namely, Assam, Arunachal Pradesh, Manipur, Mizoram, Nagaland, Meghalaya and Tripura. Mizoram is a mountainous region, it lies between 21° 31'N (285 Kms from north to south) and spans across 92°16'E longitude (115 kms east to west), covering an area of 21,087 square kilometres(Pachuau,1994). Mizoram is a land of rolling hills, valleys, rivers and lakes and the average height of the mountains is 1000 meters (3,300ft). The state is covered with 76% forest, 8% fallow land, 3% which is barren and uncultivable and

the rest constitutes cultivable area. As Mizoram is a landlocked state, whose southern part shares 722 kilometers long international borders with Myanmar and Bangladesh, and northern part share domestic borders with Manipur, Assam and Tripura (Economic suervey, GOM,2013). The international boundaries of Myanmar is in the east and south, Bangladesh in the west and the national boundaries of Manipur in the northeast, Assam in the north and Tripura in the northwest (Sati,2022).

The Mizos have been agriculturists dated back to the beginning of the 18th century. Shifting cultivation which is commonly known as Jhum cultivation in the north eastern region of India, is an integral part of the socio cultural life of the Mizos. Jhuming locally known as '*Tlangramloneih*' is the main occupation of the Mizos and has a close link to their culture and tradition. Horticulture Department was bifurcated from Agriculture Department temporarily in the year 1993 and became a full fledged Department on 2.9.1997. Despite its young existence, the contribution and achievement of the Department towards horticulture development in the state of Mizoram has been tremendous. From the geographical area 21,087 sq. kms., the horticulture potential area is 11.56 lakhs Ha. At present, the total area under Horticulture crops is 1.10 lakh Ha. The geo-climatic situation of Mizoram offers an excellent scope for growing different horticulture crops including fruits, vegetables, spices, plantation crops, medicinal and aromatic plants of high economic value (Department of Horticulture, Govt. of Mizoram).

CHAPTER PLAN

The present study has been structured in the form of five chapters:

- Chapter 1: Introduction.
- Chapter 2: Indian spices: Role and significance in Indian economy and the economy of Mizoram.
- Chapter 3: Marketing practices of growers of bird's eye chilli, ginger and turmeric in Mizoram.
- Chapter 4: Buyers' attitudes, preference and perception towards select spices.
- Chapter 5: Conclusions, Prospects, Challenges and Suggestions.
- Bibliography

CHAPTER 1: INTRODUCTION

1.1 Introduction:

Agriculture is the backbone of Indian economy, it not only provides food requirements to such a huge population of India but also provides opportunities for employment generation, saving, contribution to industrial goods market and earning foreign exchange (Rehman et al.,2012, Yadav,2016).

1:2 Horticulture:

Horticulture occupies a very important place in India and horticultural crops play a unique role in India's economy. India, with diverse soil and climate comprising several agro-ecological regions provide ample opportunity to grow a variety of horticulture crops. These crops contributed a significant part of total agricultural produce in the country comprising of fruits, vegetables, root and tuber crops, flowers, ornamental plants, medicinal and aromatic plants, spices, condiments, plantation crops and mushroom. Cultivation of these crops is labour intensive thus, generating a lot of employment opportunities for the rural population (Datta,2013).

1.3 Turmeric

Turmeric is an erect perennial herb, grown as an annual and also as a biennial in certain cases. The height of the plant is usually of around 120cm, significant variations can been seen in plant height among varieties as well as in plants grown under different agro-climatic conditions (Rao et al.,2006).

1.4 Ginger

Ginger is a biennial while the stem is annual and is propagated through rhizomes (Arya,2001). The ginger plant is erect, with a number of fibrous roots, aerial shoots (pseudostem) with leaves and underground stem (rhizhome) and the roots of ginger is of two types that is fibrous and fleshy. The roots which are fibrous are thin accompanied by root hairs and their main function is absorption of plant nutrients and water from soil.

1.5 Bird's eye chilli

Chillies are herbaceous or semi-woody annual and the chilli plants are erect, profusely branched with a leaves that are variable in size and simple. The flowers of chilli are usually borne single are terminal and are bisexual and their colour varies from white to blue. The fruits of chilli are borne singly at nodes, variable in size, shape, colour, and degree of pungency.

1.6 Mizoram: A Profile

Mizoram (the land of the Mizos) is nestled in the steep hill folds, which is one of the fabled 'seven sisters' of north-east India namely, Assam, Arunachal Pradesh, Manipur, Mizoram, Nagaland, Meghalaya and Tripura.

1.7 Production of Spices in India:

Indian spices have a global presence with a considerable share in the world market. Indian spices are valued globally, for their exquisite aroma, texture, taste and medicinal value. The varying climatic conditions in India provide ample scope for the cultivation of a variety of spices. India is the world's largest producer, consumer and exporter of spices and the country produces about 75 of the 109 varieties listed by the International Organization for standardization (ISO) and also accounts for half of the global trading in spices. (Spice Board of India,2014).

1.8 Production of Spices in Mizoram:

PRODUCTION OF TURMERIC, GINGER AND BIRD'S EYE CHILLI IN MIZORAM FOR THE YEARS 2011-2021

		TURMERIC		GINGER		BIRD"S EYE CHILLI	
Sl. No	Year	Area (Ha)	Production (MT)	Area (Ha)	Production (MT)	Area (Ha)	Production (MT)
1	2011-12	5,580	29,240	7,010	34,460	8,900	9,790
2	2012-13	6,050	22,990	7,280	28,390	9,025	8,210
3	2013-14	6,250	24,700	7,480	29,920	9,040	9,100
4	2014-15	6,350	25,130	7,650	31,200	9,140	9,330
5	2015-16	5,950	24,730	7,340	30,790	9,140	9,330
6	2016-17	7,480	28,890	8,550	62,740	11,170	10,730
7	2017-18	7,738	29,823	8,553	62,743	11,195	10,918
8	2018-19	7,738	29,823	8,553	60,131	11,196	10,918
9	2019-20	7,738	29,823	8,553	60,131	11,196	10,198
10	2020-21	7,738	29,823	8,553	60,131	11,196	10,918

Source: Mizoram Statistical Abstract (2021), Directorate of Economics & Statistics, Govt. of Mizoram.

The highest production can seen for the three years viz 2017-18, 2018-19 and 2020-21 with a production of 10,918 metric tonnes. The production of bird's eye chilli for the year 2011-12 was 9,790 metric tonnes, while in 2020-21 it was 10,918 metric tonnes registering an increase of 10.33 percent.

1.9 BUYERS' ATTITUDES:

In a consumer behavior context, an attitude is a learned predisposition to behave in a consistently favourable or unfavourable way with respect to a given object. (Leon & Leslie, 2007)An attitude is lasting because it tends to endure over time. Consumers have attitudes toward a wide range of attitude objects, from very product-specific behaviors to more general, consumption related behaviors.

Psychologist Daniel Kalz developed the functional theory of attitudes to explain how attitudes facilitate social behavior. According to this pragmatic approach, attitudes exist because they serve some function for the person. Consumers who expect that they will need to deal with similar situations at a future time will be more likely to start to form an attitude in anticipation. Two people can each have an attitude toward some object for very different reasons. As a result, it is helpful for a marketer to know why an attitude is held before he or she tries to change it.

The following are different attitude functions:

(a)Utilitarian function: The utilitarian function relates to the basic principles of reward and punishment. Attitudes is developed towards products simply because they provide pleasure or pain. Advertisement that stress straight forward product benefits appeal to the utilitarian function.

(b)Value-expressive function: Attitudes that perform a value-expressive function relate to the consumer's central values or self-concept. A person forms a product attitude in this case because of what the product says about him or her as a person. Value-expressive attitudes also are highly relevant to the psychographic analysis which consider how consumers cultivate a cluster of activities, interests and opinions to express a particular social identity.

(c)Ego-defensive function: Attitudes we form to protect ourselves either from external threats or internal feelings perform an ego-defensive function.

(d)Knowledge function: A knowledge function applies when a person is in an ambiguous situation or he/she confronts a new product (Solomon,2014)

1.10 Attitude model:

Attitude model specify the different elements that might work together to attitude toward an attitude object (Ao) depends on the beliefs he or she has about several of its attributes. When a multiattribute model is used assumptions is made to identify these specific beliefs and combine them to derive a measure of the

consumer's overall attitude. Basic multiattribute models contains three specific elements:

(a) Attributes arecharacteristics of the Ao. A researcher tries to identify the attributes that most consumers used when they evaluate the Ao.

(b) Beliefs are cognitions about the specific Ao. A belief measure assesses the extent to which the consumer perceives that a brand possesses a particular attribute.

(c) Importance weights reflect the relative priority of an attribute to the consumer. Although people might consider an Ao on a number of attributes, some attributes are likely to be more important than others (Solomon, 2014).

1.11 SIGNIFICANCE OF THE STUDY

Agriculture is the mainstay of the Indian economy. Horticulture plays on important role in the agricultural production in India with a total production of 280 million tons a year. Spices have a significant share in the export earnings of the country `14,899.68crores during 2014-15. In the back drop it is important to understand the marketing practices of turmeric, ginger and bird's eye chilli having a share of 56.92 percent in the production of spices and contributing `4,592.78crores to the export earnings in the year (Spice of Board, 2014-15).

In view of the large share in the production of these spices in the national level (56.92 percent) and an overwhelming share (99.91 percent) share in the production of spices in Mizoram, the researcher was prompted to understand the marketing practices adopted by the grower of these spices in Mizoram and to identify the potential market for these spices outside Mizoram.

1.12 SCOPE OF THE STUDY

In view of the share of these spices in the share of production at the national level (56.92 percent) and in the production of spices in Mizoram (99.91 percent), the researcher was prompted to focus on these spices in the present study. Although garlic has significant share in the production of spices at the national level (21.36 percent), due to its meagre share (.018 percent) in the production of spices in

Mizoram, it is excluded from the purview of the present study. In the present study buyer includes trade visitors who visited the BIOFACH exhibition. The trade visitors included Export & Import, Food Manufacturing, Retail Business, Service Company and Specialized Organic.

1.13 REVIEW OF LITERATURE

The researcher conducted a thematic review of literature on the following, agriculture, about Spices, growth of Indian Spices, relevance of spices to Indian economy, about Mizoram, Reiek District, turmeric as a spice, curcumin – turmeric, aroma of turmeric, price – turmeric, organic – turmeric, packaging – turmeric, ginger as a spice**, a**ppearance, price- ginger, organic – ginger, pungency – ginger, bird's eye chilli as a spice**,** distinct appearance – Bec, Price – Bec, organic- Bec, pungency – Bec, GI – Bec. The researcher also reviewed reports of Spice Board of India, ICAR-Indian Institute of Spices Research, APEDA- Agricultural and Processed Food Products, IBEF-India Brand Equity Foundation, ICAR-Indian council of Agricultural Research, IISR- Indian Institute of Spices Research, Spices Statistics at a Glance 2021, Business Case for Spices Production & Processing-YES BANK and MOFPI-Ministry of Food Processing Industries.

1.14 RESEARCH GAP:

There is no substantial evidence of research conducted on marketing practices and buyers attitude of the three spices namely, turmeric, ginger and bird's eye chilli in the state of Mizoram. Hnamte et al (2012) and Vanrammawia and Thanga (2013) pointed out to the infrastructural constraints and pricing practices of spices grown in Mizoram. There appears to be no substantial evidence of work done on the marketing practices of bird's eye chilli and turmeric and probing the market potential of bird's eye chilli, ginger and turmeric at the national/international level on the basis of an appraisal of the perceptions/ attitudes of buyers (traders) beyond the realm of local markets in Mizoram. The present study is an attempt to explore the markets for these spices beyond Mizoram.

1.15 STATEMENT OF THE PROBLEM:

Evidently, these spices namely turmeric, ginger and turmeric birds eye chilli have a substantial share in the production of spices in India (56.92 percent). Moreover they also contribute substantially to exports (`36451.732 millions in 2013-14 and `459278 millions in 2014-15) Mizoram produces 59,588 metrictonnes of bird's eye chilli,ginger and turmeric. These spices are cultivated in traditional methods of farming therefore, making them a highly valued organic spice. With Agriculture being the mainstay of the Mizo economy, there is need to formulate strategies to enhance the markets for spices grown in Mizoram. The spices grown in the North East have a huge potential in the domestic and world market (Hnamte,2012). A key aspect in expanding markets is the perceptions and attitudes of customers towards the spices grown in the state. The present study proposes to focus on the marketing aspects of the spices grown in Mizoram. The study proposes to identify the features of the products, the pricing practices of the farmers, the distribution channels and promotional methods. It appears that the market for these spices grown in Mizoram are presently restricted to the local market. Furthermore, an attempt is made to understand the market for these spices outside Mizoram.

1.16 OBJECTIVES :

The main purpose of the proposed study is to identify and analyse the marketing practices adopted by the farmers of the select spices namely, bird's eye chilli, ginger and turmeric in Mizoram with a view to explore the market for these spices beyond Mizoram. The objectives of the proposed study are as follows:

1. To study the role and growth of select spices in the Indian economy and the economy of Mizoram.

2. To identify the marketing practices of spice growers-unique features of the product, the pricing practices of the farmers, the distribution channels and promotional methods.

3. To study the buying attitudes, preference and perception of buyers/trade visitors with respects to the select spices.

4. To analyse the challenges of marketing of select spices and offer suggestions to the growers of spices in Mizoram and other stakeholders and facilitating agencies.

1.17 RESEARCH METHODOLOGY:

The study focuses on the analysis of the marketing practices of spices namely turmeric, ginger and bird's eye chilli, of the horticulture products in Mizoram Sources of Data: The researcher relied on secondary data as well as primary data as detailed below:

1. The secondary data is collected by consulting relevant reports, journal, magazines, books, newspapers and websites.

2. Primary data:

a) Buying attitudes, preferences and perceptions is assessed from customers of select spices of Mizoram at the national level. The researchers administered a structured questionnaire at the point of purchase in the Mizo spices stalls in BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation (NSIC) Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016 which was displayed by the farmers, sponsored by Horticulture Department, Govt of Mizoram. Thereafter, farmers from Mizoram have not participated in this exhibition.

(b) The researchers have examined the production practices and identified the 4Ps of marketing viz; product, price, place and promotion of turmeric, ginger and bird's eye chilli agripreneurs in the main growing centres of Mizoram.

The researcher conducted interviews and FGDs with 50 farmers of Multi-farmingCooperative, producing turmeric in Reiek village, in Mamit district and 50 farmers from Tlangsam Tumeric Growers Society in Champhai, Champhai district, the main centres of organised farming practices in turmeric production in Mizoram. The researchers conducted interviews and FGDs with 50 farmers in Khanpui village, East Phaileng village and Pehlawn village in Aizawl district; 25 farmers in Reiek village in Mamit district and 25 farmers in Champhai. Champhai district which are the main ginger growing centres in Mizoram. The researcher also conducted

interviews and FGDs with 50 farmers of Bird Eye chilli Grower Society producing bird's eye chilli in West Phaileng village, in Mamit district, 25 farmers in Reiek village in Mamit district and 25 farmers in Champhai, Champhai district which are the main bird's eye chilli growing centres in Mizoram. These farmers were represented in the BIOFACH India 2016. The data was collected through interviews and FGDs in 2018 and 2019.

Purposive sampling technique was adopted to collect primary data from traders. Purposive sampling implies collecting information from members of the population who are available at the point of purchase in the Mizo spice stalls in exhibitions organised in New Delhi. Sample consisted of all traders who showed interest in buying these spices.

Questionnaires was designed to assess the customer attitudes towards Mizo spices products, on turmeric, ginger and bird's eye chilli based on their attributes and benefits. The product attributes include each spice attributes namely, curcumin, aroma, price, organic and packaging for turmeric, appearance, price, aroma, organic and pungency for ginger, distinct appearance, price, organic, pungency and geographical indications for bird's eye chilli. The 116 respondents were asked to give their preferences of the attributes of the turmeric displayed in the Mizo Stall. Out of the many enterprises who visited this exhibition, 113 enterprises showed interest in this product and they were asked to give their preferences of the attributes of the ginger displayed in the Mizo Stall. From the number of enterprises who visited the exhibition, 100 enterprises showed interest in birds eye chilli displayed in the Mizo Stall and were asked to give their preferences of the attributes.

For this purpose, the multi-attribute model developed by Fishbein(1985) is applied. The model measures three components of attitudes :

(a) Salient beliefs people have about an object Ao,

(b) Object-attribute linkages, or the probability that a particular object has an importantattribute and

(c) Evaluation of each of the important attributes.

Attributes such as curcumin, aroma, price, organic and pakaging for turmeric, appearance, price, aroma, organic and pungency for ginger and distinct appearance, price, organic, pungency and GI bird's eye chilli.

The basic formula is:

$A_{ijk} = \sum B_{ijk} I_{ik}$ Where:

i=attribute

j=product

k=consumer

I=the importance weight given attribute i by consumer k.

B=consumer k's belief regarding the extent to which product j possesses attribute i.

A=a particular consumer's (k's) attitude score for product j.

The overall attitude score for each of the selected spices was computed after weighing each by its relative importance on the basis of the formula.

2. The secondary data will be collected by consulting relevant reports, journal, magazines, books, newspapers and websites. Such data will be collected from various reports.

CHAPTER 2: INDIAN SPICES: ROLE AND SIGNIFICANCE IN INDIAN ECONOMY AND

THE ECONOMY OF MIZORAM

This chapter presents the role and significance in Indian economy and the economy of Mizoram.

2.1 Role and significance of Spices in Indian economy

According to Spices Board of India, in the year 2021-22, the country produced about 10.9 Mn MT of spices in 4.4 Mn Ha (adv. estimates) with average productivity of nearly 2.5 MT/Ha. Over the period (2010-11 to 2020-21), the production increased at a CAGR of about 7% from 5.35 Mn MT in 2010-11 to 11.04 Mn MT in 2020-215. The acreage has also increased at a CAGR of nearly 4% from 2.9 Mn Ha in 2010-11 to 4.5 Mn Ha in 2020-2(Spice Board of India, 2023). From the spices produced in India, chilli, cumin, turmeric, ginger and coriander make up about 76% of the total production(Spice Industry and Export in India,2022). India is the largest exporter of spice and spice products. During the year 2020-21, the country exhibited an upward trend and exported spices worth US $4.18 which was a 34% increase from that of 2019-20. United States of America (USA) imports the highest quantity of spices in the world (Sharangi and Pandit, 2018) with a value of 1,701 thousand USD which contributes 16.35 per cent of world import value whereas India ranks third with a value of 596 thousand USD with a total share of only 5.73 per cent in the import value of the world (Yes Bank and IDH, 2018).

Spices play an important role in the economy of India as India is one of the largest producer of spices in the world. Spices production in the country grew from 67.64 lakh tonnes in 2014-15 to 106.79 lakh tonnes in 2020-21 with an annual growth rate 7.9%, following an increase in area from 32.24 lakh hectare to 45.28 lakh hectare. Among the major spices, Cumin (14.8%), Garlic (14.7%), Ginger (7.5%), Fennel (6.8%), Coriander (6.2%), fenugreek (5.8%), Red chilli (4.2%) and Turmeric (1.3 %), show significant growth rate in production(Spices Statistics at a glance 2021).

2.2 Role and significance of Spices in economy of Mizoram

. At present, the total area under Horticulture crops is 1.10 lakh Ha. The geo-climatic situation of Mizoram offers an excellent scope for growing different Horticulture crops including fruits, vegetables, spices, plantation crops, medicinal and aromatic plants of high economic value. Of the many spice crops, ginger, turmeric and birds eye chilli are the major spice crops of Mizoram (Department of Horticulture, Govt. of Mizoram). Mizoram accounts for about 13.2% of the total fruits produced in the Northeast. Spices contribute about 13% to the horticulture basket with the key contributors being Ginger, Turmeric and Chili (YES BANK Ltd., IDH India, 2018).

2.2.1 Production of Spices in Mizoram:

Spices like ginger, turmeric, black pepper and bird's eye chillies are grown in large areas of land estimated around 2,2470 ha with total production of major spices of 59,620 MT. Among the spices crop cultivated, turmeric being a short gestation crop, is an ideal crop for the poor farmers. Ginger is cultivated in many parts of Mizoram and has been a good source of income for farmers because of its pungency and longevity. The ginger variety thingpui and thinglaidum has received Geographical Indication(GI) tag in 2021. Mizo Chilli that is bird’s eye chilli received Geographical Indication(GI) tag in 2015¸ which is small in size and very pungent(Directorate of Agriculture, Govt. of Mizoram. Total horticulture production in Mizoram was 687.36 thousand metric tonnes as per advance estimates 2021-22. In the financial year 2020, the state produced 344.91 thousand tonnes of fruits under an area of 63.77 thousand hectares. Similarly, 101.49 thousand tonnes of spices were produced in the state under an area of 28.22 thousand hectares in the financial year 2020 (Ministry of Commerce and Industry, Govt. of India).

CHAPTER 3: MARKETING PRACTICES OF GROWERS OF TURMERIC, GINGER AND BIRD'S EYE CHILLI IN MIZORAM

This chapter presents marketing practices of growers of turmeric, ginger and bird's eye chilli in Mizoram. The four P's namely, product, price, place and promotion of the farmers cultivating turmeric, ginger and bird's eye chilli practices by them are shown in this chapter.

3.1 Introduction: The researcher conducted interviews and FGDs with 50 farmers of Multi-farming Cooperative, producing turmeric in Reiek village, in Mamit district and 50 farmers from Tlangsam Tumeric Growers Society in Champhai, Champhai district, the main centres of organised farming practices in turmeric production in Mizoram. The researchers conducted interviews and FGDs with 50 farmers in Pehlawn village, Khanpui village, East Phaileng village in Aizawl district; 25 farmers in Reiek village in Mamit district and 25 farmers in Champhai village, Champhai district which are the main ginger growing centres in Mizoram. The researcher also conducted interviews with 50 farmers of Bird Eye chilli Grower Society, producing bird's eye chilli in West Phaileng village, in mamit district, 25 farmers in Champhai in Champhai district and 25 farmers in Reiek village district which are the main bird's eye chilli growing centres in Mizoram

3.2 An overview of villages growing turmeric, ginger and bird's eye chilli

The researcher visited the following prominent areas of cultivation. These villages were selected as they had organization of farmers. The researcher visited these villages and interviewed farmers in all who were engaged in cultivation of turmeric, ginger and bird's eye chilli.

3.3 Turmeric

The Lakadong variety of turmeric, which derives its name from the place it was originated in Meghalaya, is cultivated in Mizoram. Reiek and Champhai villages not only grow turmeric but also process and powder the turmeric and sell it asas 'Reiek Aieng' and 'Zospice' respectively.

3.3.1 Production practices

In both the village, that is Reiek and Champhai the production practices are as follows:

- Cultivation: The land is prepared for sowing by removing existing bushes and other unwanted vegetation using hoe and gardening knife (*thuthlawh and chemkawm*). This debris is then burnt and the farmers repeatedly ploughs the land to prepare it for planting of seeds.
- Manuring and fertiliser application: Interestingly, no manure or fertilisers were applied to the soil for cultivating the crop.
- Intercropping: It was also observed that no intercropping was done due to large leafing of the crop.
- Weeding and Irrigation: Weeding is done three times before harvesting. After planting activity, weeding is done within 2 to 3 weeks and after that it is done depending upon intensity of the growth of weeds. No artificial irrigation was required as rain water was sufficient for the cultivation of turmeric in Mizoram.
- Harvesting: Harvesting of lakadong turmeric is done in the month of February and March usually after 10-11 months of planting.
- Curing and Boiling: Fresh turmeric rhizomes is cured for obtaining dry turmeric and the fingers are separated from mother rhizomes. Boiling is done to soften and to reduce the raw odour of turmeric.
- Drying and Processing: The cooked rhizomes were thereafter sliced and laid down under the sun for drying for 4-5 days. The dried rhizomes were again cleaned and ground by a grinding machine to make into a turmeric powder. The turmeric powder was then packed into a net weight of 100gm.

3.3.2 Product

Multi farming Cooperative Society of Reiek buys the dry turmeric flakes from the farmers, processes it into turmeric powder the grinding machines, packages, labels and sells the turmeric powder under the brand name '*Riek Aieng*, which means means turmeric in Mizo language. TlangsamTumeric Growers Society in Champhai,has branded the turmeric powder of the farmers there as *'Zo spice'.*

3.3.3 Price

The price of fresh turmeric at Reiek is ₹15-20 per kg, while the dried turmeric is ₹120 per kg. In Champhai the price of fresh turmeric is ₹10-20 per kg and the dried turmeric is ₹130 per kg. In both the place the powdered, 100 gram packet is sold at ₹30 each. As the product was organic, and has a huge demand, it has the potential to fetch a premium price in national and international markets.

3.3.4 Distribution Place

It was observed that both the cooperative societies in turmeric societies in Reiek and Champhai sell their products to Mosia agencies, located in Aizawl.

3.3.5 Promotion

In Reiek and Champhai the society members participated in State and National Level Exhibition for promoting their product. Advertisement is also done in local channel and local newspaper. In the year 2016, both the society exhibit their turmeric powder in BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation(NSIC) Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016.

3.4 Ginger

Ginger is cultivated in most of the villages in Mizoram. Reiek, Pehlawn, Khanpui and East Phaileng are the villages where the researcher interviewed the farmers cultivating ginger.

3.4.1 Production practices

In the four villages, that is Reiek, Pehlawn, Khanpui and East Phaileng the production practices are as follows:

- Cultivation: Cultivation practices for ginger is almost the same in different parts of Mizoram, the land is prepared by burning the debris which is present in the land and repeated ploughing is done. Seeds are planted in the month of April and May with onset of pre-monsoon showers.
- Weeding and Irrigation: Weeding is done three times before harvesting. Irrigation is not done as rain water is enough for ginger crop in almost all the area of Mizoram.
- Mixed cropping: Ginger is grown as an intercrop with maize, gourd, bitter tomato, brinjal, chillies, ladies finger, yum etc.
- Harvesting: Harvesting of ginger for vegetable purpose starts after 180 days based on the demand. The matured rhizomes are harvested in the month of February and March usually after 10-11 months of planting.

3.4.2 Product

Thingpui, Thinglaidum and Thiangria are the different varieties which is cultivated in Reiek, Pehlawn, Khanpui and East Phaileng. In the year 2021 Thingpui and Thinglaidum variety received G.I tag under the initiative of Horticulture Department Govt. of Mizoram.

3.4.3 Price

The price of Ginger in the five villages that is Champhai, Reiek, Pehlawn, Khanpui and East Phaileng and also in different areas of Mizoram is determined by the demand of the buyers. The fresh ginger is sold for ₹15-20 in the local market and to the buyers from other state.

3.4.4 Distribution Place

In the five villages where the researcher interviewed the farmers, their product is sold locally and sometimes there are buyers from outside the state mostly from Karimgang district in Assam. These buyers come in their own vehicles to buy the ginger because of this the price could not be controlled by the farmers.

3.4.5 Promotion

Promotion is not done for ginger by the five villages namely Champhai, Reiek, Pehlawn,Khanpui and East Phaileng. The farmers clean the harvested ginger and packed them in a gunny bag for selling in the local market and for the interested buyers from Assam.

3.5 Bird's Eye Chilli

Mizoram is famous for bird's eye chilli and it is grown almost in all parts of Mizoram. The researcher interviewed the farmers growing bird's eye chilli from these three villages, Champhai, Reiek and West Phaileng.

3.5.1 Production Practices:

The production practices of the villages, Champhai, Reiek and West Phaileng are as follows:

- Cultivation- The land is prepared by burning the debris which is present in the land, cleaning the land and repeated ploughing. Seeds are planted by spreading in the month of April and May with onset of pre-monsoon showers.
- Weeding and Irrigation: The first weeding is done after one month of planting and the next is done as and when the need arises, depending upon the weed formation. Irrigation is not done as rain water is enough for bird's eye chilli crop in almost all the area of Mizoram.
- Mixed cropping: Bird's eye chilli is grown as an intercrop with maize, gourd, bitter tomato, brinjal, ladies finger, yum etc.

- Harvesting- When the fruits of the plant is matured that is when it is red in colour, harvesting is done usually in the month of December and January. Sometimes when the fruit is not matured it is also harvested.
- Drying – Solar panel is used for drying the fruit of bird's eye chilli. Almost in all parts of Mizoram drying of bird's eye chilli is done under the sun as most of the farmers do not have solar panel.

3.5.2 Product

The bird's eye chilli of Mizoram has Geographical Indications which was pursued by Horticulture Department, Govt. of Mizoram. Fresh and dried bird's eye chilli is sold in the market. In West Phaileng village the fresh chilli is made into pickle, packed as 200gm.

3.5.3 Price

The price of fresh bird's eye chilli in the three village is as follows, in Reiek it is ₹150 per kg, in Champhai it is ₹130-150 per kg and in West Phaileng it is ₹120-150 per kg. While the dried chilli is mostly sold in the three villages at ₹400-450 per kg.

3.5.4 Distribution Place

In both the village, that is Reiek and Champhai the bird's eye chilli which is cultivated by the farmers is sold at the local market only. While in the case of West Phaileng village, it is exported to Tripura the nearby state of Mizoram. The buyers from Tripura state are mostly from Kanchanpur village in Dasda which is about 153 kms from West Phaileng through NH 108. The buyers come to West Phaileng to purchase and sometimes the farmers hire a pickup for exporting the bird's eye chilli. The pickup is usually hired for Rs.13,000 and around 10 quintals are carried by the pickup.

3.5.5 Promotion

Promotion is not done by Reiek and Champhai village, while in West phaileng promotion is done by Bird Eye chilli Grower Society. Bird Eye chilli Grower Society received Organic Certificate from Ecocert India Pvt. Ltd., Gurgaon, Haryana which is an Organic Certifying Agency in the year 2020.

CHAPTER 4: BUYERS' ATTITUDES, PREFERENCE AND PERCEPTION TOWARDS SELECT SPICES

This chapter attempts to understand the buyers'attitudes, preference and perception of enterprises towards turmeric, ginger and bird's eye chilli. Some of the major findings of the study under this chapter are shown below:

Overall Attitude scores (%) of the spice-TURMERIC and Attitudes Scores of Enterprises towards Five Attributes- Curcumin, aroma, price, organic and packaging.

- From the attitudes scores of different enterprises towards turmeric, the attribute organic has scored the highest score 29 percent. Further it can be observed that the highest organic is followed by curcumin with a score of 24 percent , the third highest is price with a score of 20 percent followed by aroma with a score of 19 percent and the least packaging, with a score of 8 percent. Organic attribute has been given over riding importance as an attribute of lakadong turmeric cultivated in Mizoram.
- The score of the attitudes of enterprises towards the attribute - 'CURCUMIN' in turmeric shows that out of the respondents of the five enterprises, the respondents of the four enterprises namely Export and Import, Food Manufacturing, Retail Business and Specialised Organic have given the highest score for the attributes Curcumin and only one enterprise that is Service Company has given the second highest score. It can be seen that from the 116 respondents all the five enterprises have given importance to the attributes of 'Curcumin' among the five attributes of Turmeric.
- The score of attitudes of enterprises towards the attribute - ' AROMA' in turmeric shows that the majority of the respondents of the five enterprises are in the range of 11-20 to this attribute. The lowest score of 0-10 have been given by the respondents of two enterprises that is Export and Import three percent and Food Manufacturing two percent. In the case of the highest score of 41 – 50 the respondents of the two enterprises namely Food Manufacturing and Retail Business have given seven percent and five percent respectively.

- From the attitudes of enterprises towards the attribute – ‘ PRICE ’of turmeric it can be seen that the majority of the respondents of the five enterprises have given a score of 11 -40 to this attribute. The range for this attribute leans in the score of 11 – 40 and this indicates that the respondents of the five enterprises have given lesser importance to the attribute price.
- It can be seen from the attitudes score of enterprises towards the attribute – ‘ ORGANIC ’ of turmeric shows that majority of the respondents have given the score of 31- 50. The respondents of the three enterprises namely Export and Import (three percent), Food Manufacturing(five percent) and Retail Business (five percent) have given the score of 0-10. This attribute has emerged as the most important attribute of turmeric displayed in the Exhibition.
- The attitudes score of enterprises towards the attribute -‘PACKAGING’ of turmeric shows that packaging as an attribute for the respondents of the five enterprises is not important as sixty percent of the respondents are in the score of 0-10.The highest score of 41-50 is not given by any of the respondents of the five enterprises.

  Overall Attitude scores (%) of the spice-GINGER and Attitudes Scores of Enterprises towards its Five Attributes-appearance, price, aroma organic and pungency
- Attitudes scores of different enterprises towards ginger appears that the attribute organic has scored the highest with a score of 33 percent. The highest organic is followed by pungency with a score of 19.05 percent. the third highest is aroma with a score of 18.95 percent followed by price with a score of 17 percent and the least appearance, with a score of 12 percent .It is interesting to note that there is a slight difference of 0.10 percent of attitude score of attributes pungency and aroma.
- It can be seen from the attitudes score of enterprises towards the attribute – ‘ APPEARANCE ’- ginger shows that the attribute appearance is not important for the respondents of the five enterprises as they have all given more than 45 percent for the score of 0- 10.

- From the attitudes score of Enterprises towards the Attribute – 'PRICE'- ginger, the greater number of the respondents of the five enterprises have given the score of 11-40 to this attribute. This shows that the respondents of the five enterprises have given lesser importance to this attributes.
- Attitudes score of enterprises towards the attribute – 'AROMA' in ginger appears that most of the respondents of the five enterprises are in the range of 10-40 to this attribute. The lowest score of 0 – 10 has been given by one enterprise namely specialized organic. The highest score of 41-50 are given by only two enterprises, food manufacturing and retail business that too a score of five and six percent respectively.
- It can be seen from the attitudes score of enterprises towards the attribute – 'Organic' of ginger that the respondents of the five enterprises has given the highest score of 41 – 50. The lowest score of 0-10 is given by only two enterprises namely Export & Import and Specialized organic with a percentage of 3 and 8 respectively.
- Attitudes score of Enterprises towards the Attribute – 'PUNGENCY' in ginger shows that the respondents of the five enterprises towards attribute Pungency concentrate on the score of 0 – 30 in this table 5. The respondents has also given the score of 31-50.

Attitude scores (%) of the spice-Bird's eye chilli and Attitudes Scores of Enterprises towards its Five Attributes- distinct appearance, price, organic pungency and geographical indications

- Attitudes scores of enterprises towards birds eye chilli shows that the attribute organic has scored the highest with a score of 32 percent. Further it can be observed that the highest organic is followed by pungency with a score of 25 percent , the third highest is price with a score of 19 percent followed by distinct appearance with a score of 14 percent and the least geographical indications, with a score of 10 percent.
- It can seen from the attitudes scores of enterprises towards the attribute - 'DISTINCT APPEARANCE' of bird's eye chilli, that the score of the attribute distinct appearance is not given due importance by the five

enterprises as majority of the score lies in the range of 0 – 20. It can be seen that the respondents of the five enterprises has given minimum score in the range of 31 – 50.

- The attitudes score of Enterprises towards the Attribute – 'PRICE' of bird's eye chilli shows that number of enterprises is highest in the range of 21 – 30 and in the range of 41 – 50 it is the lowest with only 6 in numbers. It can also be seen that the attribute price is not given due importance by the correspondents among the five attributes.
- The score of attitudes of enterprises towards the attribute – 'Organic' for bird's eye chilli shows that the score of Organic as an attribute for the respondents of the five enterprises lies mainly in range of 21 – 50. A score of six per cent and eight per cent is given by two enterprises Food Manufacturing and Retail Business respectively in the range of 0 - 10 . In the range of 11- 20, Export & Import has given six per cent, while Retail Business has given eight per cent. This attribute has appeared to be the most important attributes among the five attributes of bird's eye chilli which was displayed in the exhibition.
- From the attitudes score of enterprises towards the attribute – 'PUNGENCY ' of bird's eye chilli, it can be seen that the score of pungency as an attribute for the respondents of the five enterprises lies heavily in the range of 11 – 40. A score of 0 -10 is given by only one enterprise that is Export and Import.
- It can be seen that the correspondent of the five enterprises towards the attribute – 'Geographical Indications' for bird's eye chilli have given the score mainly in the range of 0 – 30. Minimum percentage has been given by three enterprises namely, Export & Import, Food Manufacturing and Specialised Organic to the score of 31 – 40. The score of 41 – 50 has been given by one enterprise that is Retail Business that too only 8 per cent.

CHAPTER 5: CONCLUSIONS, PROSPECTS, CHALLENGES AND SUGGESTIONS

This chapter contains the conclusion, prospects, challenges and suggestions based on the findings of the research.

5.1 Conclusion

5.1.1 Introduction

Chapter 1 presents an overview of agriculture, horticulture, about the selected spices namely turmeric, ginger and bird's eye chilli, the thematic review of literature covering agriculture, about spices, the growth of Indian spices, relevance of spices to the Indian economy, about Mizoram, turmeric, ginger and bird's eye chilli as a spice. It also includes significance and scope of the study, research gap, statement of the problem and the research methodology.

5.1.2 Indian spices: Role and significance in Indian economy and the economy of Mizoram.

Chapter 2 focuses on the role and significance in Indian economy and the economy of Mizoram. The area, production and exports of major spices of India and production and area of the three spices of Mizoram is focused in this chapter.

5.1.3 Marketing practices of growers of turmeric, ginger and bird's eye chilli in Mizoram

Chapter 3 presents marketing practices of growers of turmeric, ginger and bird's eye chilli in Mizoram. The four P's namely, product, price, place and promotion of the farmers cultivating turmeric, ginger and bird's eye chilli practices by them are shown in this chapter.

5.1.4 Buyer's attitudes, preference and perception towards Turmeric, Ginger and Bird's Eye Chilli

Chapter 4 attempts to understand the buyers' attitudes, preference and perception of enterprises towards the attributes of turmeric, ginger and bird's eye

chilli. The attributes of turmeric includes curcumin, aroma, price, organic and packaging. The attributes of ginger includes appearance, price, aroma, organic and pungency. The attributes of bird's eye chilli includes distinct appearance, price, organic, pungency and geographical indications. The enterprises are export and import, food manufacturing, retail business, service company and specialized organic.

5.2 Prospects

5.2.1 Production of Spices in India

Spices play an important role in the economy of India as India is one of the largest producer of spices in the world.Spices production in the country grew from 67.64 lakh tonnes in 2014-15 to 106.79 lakh tonnes in 2020-21 with an annual growth rate 7.9%, following an increase in area from 32.24 lakh hectare to 45.28 lakh hectare.

5.2.2 Surplus production of spices in Mizoram

Turmeric

Mizoram ranked 10th amongst the highest producers of turmeric in India with a total production of 29.57 tonnes and a share of 2.52 percent in the total production of turmeric in Indiain spite of being a small state.

Ginger

Ginger is one of the important cash crops grown in Jhum lands in Mizoram. The agro climatic conditions of Mizoram suit the ginger cultivation Mizoram produces around 32,000 MT of Ginger annually, which accounts for about 3% of the country's production. The crop contributes around 46% to the total spices production of the state.

Bird's Eye Chilli

Mizoram produces around 9000 MT of chili annually, most of which is Mizo chili. The crop contributes around 14% to the total spices production of the state. The

key clusters producing chili include Aizawl, Mamit, Champhai and Lunglei districts of the state. The local variety of chili grown in Mizoram called the “Mizo Chili” is a very small sized fruit with high SHU (more than 200,000 SHU) (Yes Bank,2018).

5.2.3 Production of organic spices in Mizoram

The demand for organic spices is expected to grow by 5-7% annually, being largely driven by the European market. This demand will be met largely through the South East Asian nations, who have surplus quantum of spices’ production and can adhere to the standards of the importing nations.

The Indian organic spice market also holds a huge opportunity. In case of spices, the threat of mixing up of carcinogenic products like colors, chemicals, etc. in the spice powders, has driven the consumers towards choosing organic (or natural) spices. The organic spices easily command a premium of around 30%-40% and in some cases even up to 100% premium at the retail level.

5.2.4 Quality of spices produced in Mizoram

Lakadong variety of turmeric is considered to be one of the world’s best varieties of turmeric with its curcumin content of about 6.8-7.5%(Shreeranjan,2006). In case of Turmeric, the Curcumin contentis a key determinant of high quality produce. The present study observed that mother rhizomes were used as seeds which contributed to very high curcumin content and the high quality turmeric.

Thingpui is the largest sized variety of ginger found in Mizoram with a fibre content of 8.6 per cent. Thingpui rhizome is light yellow in colour with a low pungency. Thinglaidum is another popular variety of ginger grown in Mizoram slightly smaller than the Nadia[1] variety ginger. The rhizome has a distinct purple ring in the middle when broken with a fibre content of 9.8 percent. Thingria very thin and long variety with a fibre content of 8.1 percent (Singh and Selvan).

Mizoram is famous for the habitation of wonderful diversity of bird’s eye chilli, with respect to fruit shape, size, colour, pungency, plant type, physiological

characteristics, reactions to diseases and pests, adaptability and distribution(Ozgur et al.,2011).

5.2.5 Acquisition of GI

In the year 2021 *Thingpui*and *Thinglaidum* varieties of ginger received G.I tag under the initiative of Horticulture Department Govt. of Mizoram. Birds eye chilli (*Hmarchate*) also received the GI tag in 2015.

5.3 Challenges and suggestions

1. Need to market beyond Mizoram :

   As observed in the present study, the markets for turmeric, ginger and bird's eye chilli are restricted largely to Mizoram. It is also observed in the present study that all the enterprises namely, Export & Import, Food Manufacturing, Retail Business, Service Company and Specialised Organic were interested in buying turmeric, ginger and bird's eye chilli exhibited in the BIOFACH India 2016 with INDIA ORGANIC held at National Small Industries Corporation(NSIC) Exhibition Grounds, Okhla New Delhi during 10^{th} – 12^{th} November 2016.

2. No Cold Storage:

   Lack of cold storage facilities aggravated the problem faced by the farmers. There is a need for the government agencies to establish cold storage for these spices grown in remote areas in Mizoram.

3. Facilities for Drying and Slicing:

   It was observed in the present study that except for Multi farming Cooperative Society in Reiek, none of the farmers had the facilities of drying and slicing. It is important to provide slicers and solar panel drying facilities for the farmers for processing the raw turmeric, ginger and bird's eye chilli.

4. Value Added Products:

   There is a need to install all extraction facilities for all the three spice namely, turmeric, ginger and bird's eye chilli for producing value added products like:

- Turmeric - turmeric oleoresin, turmeric drops, curcumin powder, turmeric milk, turmeric powder.
- Ginger – ginger oleoresin, ginger candies, ginger biscuits, ginger beer, ginger powder, ginger oil, ginger paste.
- Bird's eye chilli- red chilli powder, chilli oleoresin, chilli paste, chilli sauce, chilli oil, chilli pickle.

All these by products are a valuable export items.

5. Godowns:

It was observed during field study that most of the villages lacked Godowns for storage of spices before it is transported. The researcher found that the three spices namely, turmeric, ginger and bird's eye chilli were packed in a gunny left in the open on the roadside.

6. Co-operatives Societies:

There is a need to strengthen the Co-operatives Societies already existing namely, Multi farming Cooperative Society of Reiek, Tlangsam Tumeric Growers Society of Champhai and by Bird Eye chilli Grower Society of West Phaileng and established new Co-operatives Societies and FPO's to increase the bargaining power of the farmers and facilitate production and marketing of turmeric, ginger and bird's eye chilli cultivated by them.

7. Transport Facilities:

The villagers lacked transport facilities to transport their produced to district Head Headquarters and Nodal areas of trade namely Aizawl, Bairabi and Vairengte.

8. Need for Participation in National and International Exhibition(Promotion):

It was observed that the farmers rarely got a chance to exhibit their product at National and International Exhibitions. There is a need to give opportunities to farmers of turmeric, ginger and bird's eye chilli to exhibit the products at National and International levels to tap markets beyond Mizoram.

9. Need for Regulation of prices:

It was observed that the farmers have no control over pricing of the products due to lack of awareness of markets and lack of facilities such as transport, storage, machineries, value added products etc. to reach National and International markets. The middlemen exploited the farmers due to these factors by procuring the spices at throw away prices at the point of production Hence, there is a need for Government of Mizoram to fix minimum sale price for spices in Mizoram as a regulating measure.

10. Organic Certification:

It was found that the Co-operative Societies and farmers did not have organic certification. There is an urgent need for APEDA and Government of Mizoram to take consulted steps to procure organic certification for turmeric, ginger and bird's eye chilli.

11. Training for Farmers:

It was observed that except for Multi farming Cooperative Society of Reiek, Tlangsam Tumeric Growers Society of Champhai and by Bird Eye chilli Grower Society of West Phaileng.Reiek, most of the other farmers had not participated in any training programmes for capacity building in upgradation of their skills. There is a need to conduct tailored made training programmes for the farmers to upgrade their skills.

12. Need for facilitating International Trade:

Mizoram is strategically located having borders with Myanmar, Bangladesh and Tripura. Bangladesh is a significant importer of ginger spice. Most of the trade that presently takes place is informal between Myanmar, Bangladesh , Tripura and Mizoram. There is a need to formalize the trade in spices and open trade routes between Mizoram and these neighbouring countries. This will enhance the profitability of the farmers of Mizoram.

13. Need to facilitate direct selling to Traders:

(a) There is a need to tap the potential by enabling bulk sales from farmers organization to these companies namely, Export & Import, Food Manufacturing, Retail Business, Service Company and Specialised Organic directly without any middlemen.

(b) There is an urgent need to regulate the sales of spices to the middlemen who are apparently exploiting the farmers by procuring the produced at low price.

(c) Since the farmers are uneducated and unaware of markets for their spices they sell it at throw away prices to this middlemen from Silchar, Assam for ginger and Tripura for bird's eye chilli.

14. Branding of Mizo Spices:

Highlighting the attributes such as organic for the three spices, curcumin content of turmeric, pungency of the three spices, aroma for turmeric and ginger, distinctiveness of bird's eye chilli and GI tags for ginger and bird's eye chilli.

15. Pakaging:

Appropriate packing technology should be introduced for the three spices, training should be imparted to the Farmers Producer Organisation(FPO) by Indian Institute of Packaging(IIP).

16. Advertising for Spices at the National and International Level along with Tourism:

The state government should developed strategies for advertising the unique features of Mizo spices along with tourism. The Anthurium festival of Reiek which is organized every year should be replicated for spices in the main clusters which is cultivate turmeric, ginger and bird's eye chilli.

17. Festivals for Turmeric, Ginger and Bird's eye chilli:

Festivals for turmeric, ginger and bird's eye chilli should be organized at the time of harvest to attract tourists and customers around the globe.

18. Distribution for Sample Sachet:

As a promotional campaign, sachet of turmeric, ginger and bird's eye chilli should be distributed to the delegates who participate in events such as G20 and other national and international events. This can be a means of advertising Mizo spices outside Mizoram.

19. Mission Organic:

Mission organic should be implemented extensively for turmeric, ginger and bird's eye chilli as observed in the present study. None of the

farmers interviewed use fertilizers or pesticides in the cultivation of turmeric, ginger and bird's eye chilli. This attributes should be highlighted to increase sales and fetch premium price for Mizo turmeric, ginger and bird's eye chilli.

20. Educating Farmers about Organic Products:

    It was observed that the farmers were uneducated and were using conventional methods of farming. The farmers should be educated to maintain the same status of organically producing turmeric, ginger and bird's eye chilli and that they do not lured in using fertilizers for increasing yield.

21. There is a need to explore markets beyond Mizoram and Assam:

    Developing strategies for marketing of spice beyond Mizoram. Spiceshas a huge potential markets in India and abroad. Organic was the most significant attribute according to the attitudes of the different enterprises namely, Export and Import, Food Manufacturing, Retail Business, Service Company and Specialised Organic.Hence, there is a need to project this attribute 'Organic' as a marketing strategy for marketing these spices beyond Mizoram.

22. Scope for Entrepreneur Development in spice :

Spices offer a huge apportunity for business and Entreprenuership.These is a huge scope for Entreprenuership development in different facets of marketing of spices in Mizoram.

Scope for Futher Research

1. Studies can be conducted on other spices grown in Mizoram.
2. Comparision study can be done with these three spices grown in Mizoram with other spices grown in North East India.