

Annexure- 2  
Statement of Case

*Mizo Chilli*

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## 1. Background

The state of Mizoram situated in the eastern corner of India has a geographical area of about 21,087 Sq km.<sup>3</sup> It is predominantly a hilly state with varying altitudes, enjoys a splendid blend of climatic conditions with most of the area falling under sub-tropical and some parts under tropical, and temperate zones.

The climatic conditions of Mizoram is divided into four seasons viz. winter season (December to February), summer season (March to May), monsoon season (June to September) and retreating monsoon season (October to November). The climate of the State is humid-tropical, characterized by short winter, long summer with heavy rainfall. The highest temperature is observed during May to July and starts decreasing with the onset of monsoon. This fall in temperature continues with the span of monsoon and becomes more evident with the retreating monsoon. The temperature becomes lowest during December and January. The temperature of Mizoram is moderate throughout the year, in summer, the temperature ranges from 22° C to 32° C, while in winter it ranges from 10° C to 23° C. Mizoram has received an annual average rainfall of 2,563 mm during the last ten years. The amount of rainfall is more or less evenly spread throughout the State excepting that the South and the South-Western parts generally received a slightly higher amount of rainfall. The rainy season normally starts from May and lasts upto October; 85 percent of the total rainfall in the State is received during this season.<sup>7</sup>

High amount of rain fall spread over six to 8 months and high relative humidity upto 90% has made the state conducive for the growth and production of crops under rainfed conditions<sup>6</sup> Due to continuous washing of top soil by monsoon rainwater, the soil is acidic and low in pH ranging from 4.5 to 5.6.<sup>2</sup> The soils are loamy to clay with high organic carbon content. With all these advantages the state has enormous scope for cultivation of a wide range of horticultural crops.<sup>6</sup>

Agro climatic conditions of the state is very conducive for cultivation of various specialized crops like fruits, vegetables, spices, flowers, plantations, medicinal and aromatic plants under its natural, unmodified climate<sup>3</sup> Despite poor management, many crops have got commercial importance in the State and these are yielding some economic benefit to the growers. The fruit crops like mandarin orange, hatkora, banana, passionfruit, grape, some vegetable crops like beans, potato, cole crops, squash etc. spices like ginger, Mizoram Bird's Eye Chillies, turmeric etc. are highly popular and have good economic bearing<sup>6</sup>

Mizoram is a predominantly agricultural state. According to Census 2001, 63.2 percent of the workers, main and marginal put together, are dependent on agriculture and cultivation in Mizoram, as against 61.5 percent for all-India. As per contribution to GSDP services sector is the largest sector in the economy with a share of 63.2 percent of GSDP in 2008-09, followed by industry and agriculture and allied sector, which constitute 21.4 percent and 15.4 percent, respectively<sup>2</sup>

The state is mostly covered by steep hills with an average elevation of about 900 meters.<sup>3</sup> Cultivation is done on hill slopes and net sown area in the state was very low at about 103.835 Sq. km during year 2008-09 which increased to 130.226 Sq km in year 2009 – 10 however it is still just 6.18 % of total area<sup>5</sup>The land which cannot be used for cultivation of cereal crops can be profitably utilised for development of horticulture crops for generating economy to the growers and the state as a whole. Besides, it will offer avenues in creating employment opportunities to rural unemployed population. In fact many of the hill states of the like Himachal Pradesh, Jammu and Kashmir etc. have developed their economy based on horticulture.<sup>6</sup>Cultivable area for horticulture activities is estimated to be about 6.31 lakh hectares comprising gentle to moderate slopes<sup>3</sup> but till year 2010-11 only about 1.099 lakh hectares (only 17%) out of it has been covered under permanent cultivation in a cluster manner<sup>10</sup>

About 32% of the states cultivation is done on Jhum land and the permanent holdings don't account for more than 68% of the total area under cultivation. Jhuming cultivation or shifting cultivation is an age old practice in Mizoram carried out by a large no of people living in rural areas.<sup>10</sup>

Use of fertilizers and pesticides in agriculture and horticulture is almost non – existing in the state, while the national average consumption of fertiliser is over 95 kg per hectare; it is only around 13 kg per hectare in Mizoram.<sup>7</sup> As such all agriculture out of Mizoram are organic produce and should have high value in national and international market but that premium is not enjoyed till now<sup>3</sup>

### 1.1. Mizo Chilli

Owing to its specific climatic, topographic and cultivation characteristics the state is bestowed with some high quality crops varieties that are peculiar and specifically associated with Mizoram. The Mizo Chilli or Mizoram Bird's Eye Chilli grown in Mizoram is of a superior quality and has a very high demand in national and international market. The scope and potential of expansion of Mizoram Bird's Eye Chilli / Mizo chilli is enormous but there is a need to address the issues of transport, processing and marketing.

A Geographical Indication (GI) registration will help the product get a distinctive identity at national and international platform, which can work as a catalyst for the social and economical uplifting of hitherto neglected resource poor farmer community of the state.

1.2. Land Use Statistics in Mizoram

(Area in thousand Hectares)

Sl. No.	Heading	2006-2007	2007-2008	2008-09	2009-10
I.	Geographical Area	2108.700	2108.700	2108.700	2108.700
II.	Area for land Utilization Statistics (Total 1 to 5)	2108.700	2108.700	2108.700	2108.700
1.	Forest	1593.700	1593.700	1,593.700	1,585.305
2.	Not available for cultivation (a+b)	134.040	134.050	133.000	102.188
a)	Land put to non-agricultural use	125.420	125.430	124.000	93.404
b)	Barren and Uncultivable land	8.620	8.620	9.000	8.784
3.	Other uncultivated land excluding fallow land (a+b+c)	79.230	77.209	67.226	44.158
a)	Permanent pastures and other gazing land	5.235	5.230	5.250	5.250
b)	Land Under miscellaneous tree crops and groves not included in net area sown	68.765	66.749	51.976	32.208
c)	Cultivable waste	5.230	5.230	10.000	6.700
4.	Fallow lands (a+b)	207.543	210.928	210.939	246.823
a)	Fallow lands other than current fallows	166.078	165.981	170.850	180.800
b)	Current fallows	41.465	44.947	40.089	66.023
5.	Net sown area	94.187	92.813	103.835	130.226
6.	Total crop Area	105.575	102.903	106.714	133.226
7	Area sown more than once	5.000	1.437	2.879	3.000
III.	Total Irrigation area	16.360	14.169	11.153	10.361
IV.	Area Irrigated for the year	11.388	9.446	11.022	10.244

Source: Statistical Handbook Mizoram 2010<sup>5</sup>

1.3. *Agro-Climatic Zones of Mizoram And Horticulture Products Grown In The Zone*

Agro-climatic zone	Area	Crop
Temperate zone	Blue mountain, Halkhan, Tuipang, Nauzuarzo and Tiang	<p><b>Fruits:</b> Apple, pear peaches, plums, cherries, pistachio, almond, apricot, walnut, chestnut and kiwifruit.</p> <p><b>Vegetables:</b> Cabbage, cauliflower, knoll-khol, broccoli, radish, turnip, beetroot, carrot, garlic, onion, spinach, cucumber, tomato, brinjal, okra, French bean, aspergus, bean, capsicum and peas.</p>
Sub-tropical zone	As whole except lower valleys, adjoining area of Cachar and lower parts of Chhimtuipui	<p><b>Fruits:</b> Mango, guava, citrus, litchi, low chilling peaches, pears, plums, almond, aonla, etc.</p> <p><b>Vegetables:</b> Brinjal, tomato, okra, beans, peas, all cucurbits, carrot, radish, turnip, cole crops, leafy vegetables, onion, garlic, chillies and capsicum. etc.</p> <p><b>Tuber crops:</b> Potato, sweet potato, colocasia, yams, alocasia.</p> <p><b>Ornamentals:</b> Rose, gladiolus, orchids, carnation, chrysanthemum, marigold, petunia, large number of other ornamental and foliage plants.</p>
Tropical zone	Northern and western part, Chhimtuipui district	<p><b>Fruits:</b> Mango, citrus, banana, pineapple, papaya, grape, sapota.</p> <p><b>Vegetables:</b> Brinjal, tomato, okra, beans, gourds, amaranthus, etc.</p> <p><b>Tuber crops:</b> Cassava, sweet potato, amorphophallus, dioscorea, yams, coleus, colocasia, etc.</p> <p><b>Plantation crops:</b> Coconut, arecanut, cashew, oilpalm, rubber, coco</p> <p><b>Spices:</b> Turmeric, ginger large cardamom, pepper, etc.</p> <p><b>Ornamentals:</b> Rose, chrysanthemum, jasmine, marigold, zenna, balsum, orchids, etc.</p>

SOURCE: A.K. Dubey, K. Dhinesh Babu and D.S. Yadav, "Status And Prospects of Horticulture in NEH Region", ENVIS Bulletin: Himalayan Ecology & Development, Volume10, Number 2, 2002.<sup>2</sup>

## 2. Applicant organization

North Eastern Regional Agricultural Marketing Corporation Ltd (NERAMAC) has been assigned the responsibility of registration and supervision of GI by North East Council, Ministry of Development of North Eastern Region (DoNER) in consultation with Directorate of Horticulture, Government of Mizoram.

North Eastern Regional Agricultural Marketing Corporation Ltd (NERAMAC) was incorporated at 31st March 1982 to support farmers/producers of north east getting remunerative prices for their produce and thereby bridge the gap between the farmers and the market and also to enhance the agricultural, procurement, processing and marketing infrastructure of the North eastern Region of India.

The Authorised Capital of the Corporation is Rs.10.00 Cr and the Paid-up Capital is Rupees Rs 7.62 Cr. Presently it is under the administrative control of the Ministry of Development of North Eastern Region (DoNER), Government of India, New Delhi, with its registered office at 9 Rajbari Path, Ganeshguri, Guwahati.

### 2.1. The Objectives of NERAMAC

- To undertake development and marketing of horticultural products within and outside the north eastern region and the supply of inputs, tools, equipment etc. required for the development of horticulture and agro-based industries whether own or run by the Government, statutory body, company, firm, co-operative or individual.
- To undertake, establish, acquire, purchase, sell and manage the projects for the development of horticultural products such as establishment of nurseries and commercial orchards, seed stations etc. and function as agent for the distribution of seeds, plants, processed food and other such products connected with the development of horticultural products.
- To manage, promote, aid and expedite the export of raw and finished horticultural produce and equipment and also to import raw and finished horticultural produce and equipment in furtherance of the company's business

NERAMAC is offering helping hand in sourcing and procuring cash crops of the producers by intervening in the market and provide them remunerative prices. It also helps processing units by providing raw materials and arranging packaging materials. NERAMAC has a few retail outlets within the North East region which directly sell various processed and value added products

produced locally in the region. GI registration is a historical initiative to preserve and promote the bio diversity of region and one more step to help the farmers of geographical location to secure better remuneration.

In line with the set organizational objective, NERAMAC established a branch office at **Mizoram** located at **C. Lalbuanga Building, Dawrpul South, House No.218, Aizawl, Mizoram - 796 001** and has been working for the betterment of local farming community. NERAMAC has been involved in creating farmer – buyer linkages for Mizo Chilli through its local office and a dedicated workforce.

Following is the constitution and list of directors of NERAMAC

Name of Individual	Designations at NERAMAC and other govt. organizations
Shri Arvind Madhav Singh, IFS	Joint Secretary, Ministry of Development of North Eastern Region & Chairman, NERAMAC Ltd.
Shri Vinod H Kalbande	Managing Director, NERAMAC Ltd.
Prof. Charu Lata Mahanta	Professor Department of Food Processing Technology, Tezpur University & Director NERAMAC Ltd.
Shri Rohtash Singh	Director, Ministry of Development of North Eastern Region & Director NERAMAC Ltd.
Dr. Bidyut Chandra Deka	Joint Director, ICAR, Jharnapani (Nagaland) & Director NERAMAC Ltd.
Shri Rajen Lohia	Businessman, Dibrugarh (Assam) & Director NERAMAC Ltd.
Shri R. P. Gurug	CEO, Ecotourism & Conservation Society of Sikkim Gangtok (Sikkim) & Director NERAMAC Ltd.
Shri Hage Kojeen	Commissioner (Agriculture ) Government of Arunachal Pradesh & Director NERAMAC Ltd.
Shri I. Meitei	Advisor (Horticulture), North Eastern Council & Director NERAMAC Ltd.
Shri Samuel Rosanglura	Director (Horticulture), Dept. of Agriculture, Govt. of Mizoram & Director NERAMAC Ltd.



### NERAMAC at a glance

<p><b>Incorporation:</b> 31st March 1982</p> <p><b>Promoter:</b> North Eastern Council, Govt. of India, Shillong-793 001</p>	<p><b>Administrative Ministry:</b></p> <p>Ministry of Development of North Eastern Region (DoNER),</p> <p>Govt. Of India, Vigyan Bhavan Annexe</p> <p>Maulana Azad Road, New Delhi – 110 011</p>
<p><b>Registered/Head Office:</b></p> <p>9 Rajbari Path, Ganeshguri</p> <p>G S Road, Guwahati – 781 005</p> <p>Phone: (0361) 2341427/28</p> <p>Fax: (0361) 2341428</p> <p>Email: <a href="mailto:neramac@gmail.com">neramac@gmail.com</a>; <a href="mailto:info@neramac.com">info@neramac.com</a></p>	<p><b>Zonal Offices:</b></p> <ul style="list-style-type: none"><li>• Arunachal Pradesh</li><li>• Assam</li><li>• Manipur</li><li>• Meghalaya</li><li>• Mizoram</li><li>• Nagaland</li></ul>

### 3. Specification of Goods

Mizo Chilli also referred as *Hmarchte* or *Vaimarcha* or Mizoram Bird's eye chilli belongs to species *Capsicum frutescens* and widely grown in the state of Mizoram.

Mizo Chilli variety is characterized by:-

- Bushy type of plant growing to 4 feet
- Smooth oval leaves up to 2.5 inches
- Fruit is small sized pods and very high pungency
- Color of mature fruit is bloody red
- Fruit size is not more the 4.5 cm
- Capsicin content is very high up to about 1.1%<sup>11</sup>

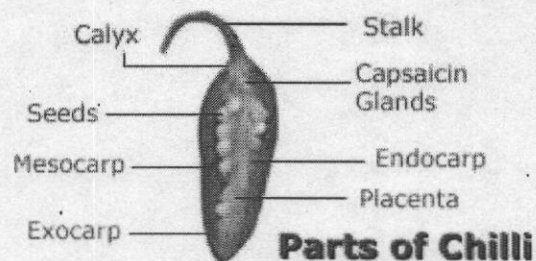
It is grown for its pungency, spicy taste besides the appealing colour it adds to the food. This Chilli is small but packs quite a lot of heat. It measures around 100,000 Scoville units. The hot flavour of chillies is due to the presence of a group of seven closely related compounds called capsaicinoids, but capsaicin (8-methyl-*N*-vanillyl- 6-nonenamide) and dihydrocapsaicin are responsible for approx. 90% of the pungency.<sup>8</sup>

### 4. Description of Goods

**Family:** Solanaceae

**Genus:** *Capsicum*

**Botanical Name:** *Capsicum frutescens*



Chilli is the dried ripe fruit of the genus *Capsicum*. It is a sub shrub widely cultivated all over the world for its pungent fruit that is used as spices. Chilli is an indispensable spice and a basic ingredient in everyday cuisine all over the world. The chilli powder is made by crushing the dried chilli having chilli flakes and chilli pods

There are three major species of chilli *Capsicum annum*, *Capsicum frutescens*, and *Capsicum chinense*. Most of the chilli varieties grown in India belongs to *Capsicum annum* species, whereas the Mizo Chilli belongs to species *Capsicum frutescens*

Mizo Chilli is one of the most popular and widely grown vegetable and spice crops in Mizoram. It is one of the important cash crops supporting the livelihood and improving the economic life of

farmers/ tribes because it is mostly marketed in dried form and therefore, it is non-bulky and has long shelf life which makes it easy to transport.

It is used for spicy cousin, pickle, chatnies and hot sauces to be served with noodles and has a very high demand in neighboring states and countries like China, Thailand, Vietnam and Bangladesh and therefore the major share of the produce is exported outside the state.

Mizo Chilli cultivation is scattered all over the state of Mizoram. There are eight districts of Mizoram, where three different varieties/qualities of Mizo Chilli are being cultivated. All these varieties are considered to be same with minor difference in quality.

The table below illustrates the differentiation between the three grades

Variety	Length (cm)	Thickness (cm)	Pungency	Colour of mature chilli
Grade A	2.0 to 3.5	0.75	Highest	Red
Grade B	2.5 to 4.0	1.00	Lower than Grade A	Dark Red
Grade C	3.0 to 4.5	1.25	Lower than Grade A	Dark Red

#### 4.1. Grade A –

This is the smallest and most thin variety which is most pungent among all. It is considered to be of the best quality and fetches highest demand in the market. The chilli powder of this variety can be identified because of the slight difference of colour. Its colour is more shiny red in comparison of other two varieties.

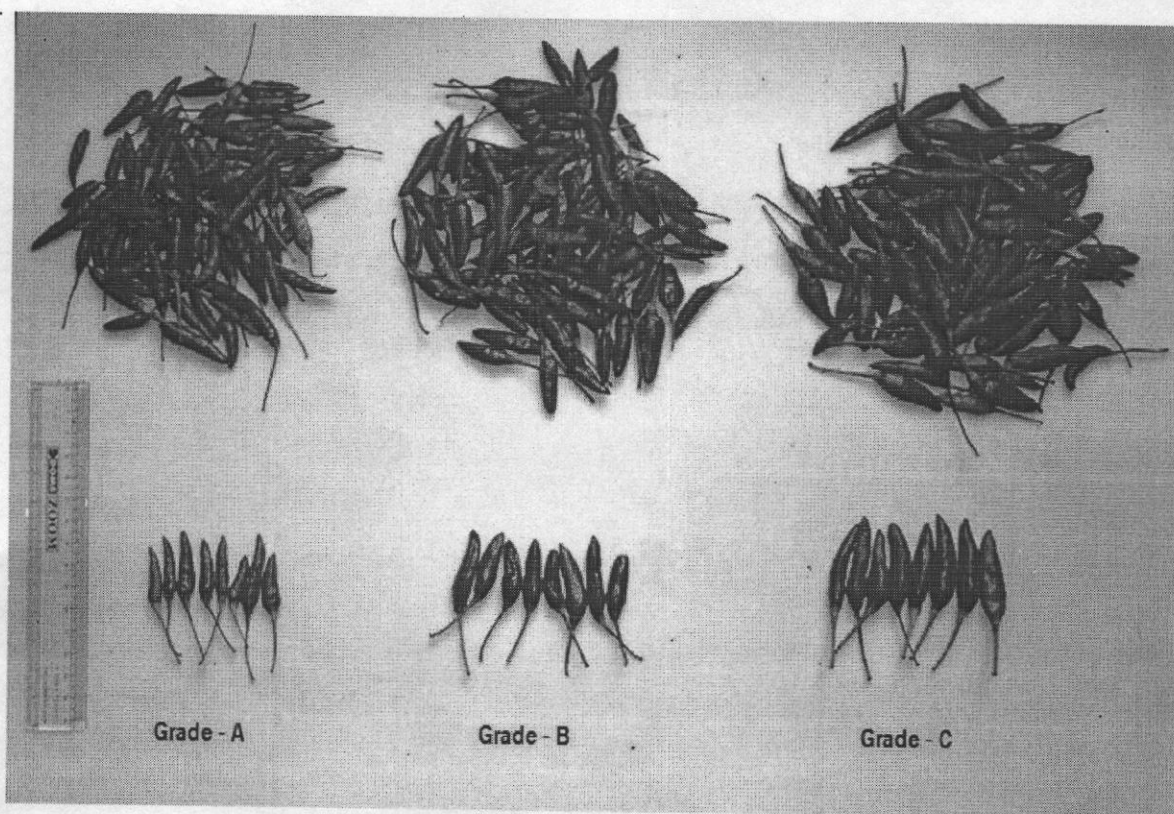
#### 4.2. Grade B –

These types of chilli are slightly thicker than the above ones and marginally longer in size. The colour of dried red chilli changes to dark red and pungency is slightly lower.

#### 4.3. Grade C –

This is almost similar to grade B in other properties but the size is a bit longer than other varieties of this segment. There is usually not much difference in prices of the all three types of Mizo Chillies but the buyer preference is towards Grade A.

#### 4.4. Photograph of the Three Grades of Mizo Chilli Available in Mizoram



#### 5. Origin and Historical References

Mizo Chilli is tiny, green and when matured the color changes to bright red. The pungency varies from the place and environmental condition it receives.<sup>23</sup> Due to the long history of cultivation, out crossing the nature and popularity of the crop large genetic diversity including local landraces have evolved. In hot chilli great range of variability for several attributes (Fruit shape, size, color and bearing habit and semi – perennial and perennial and pungency) occurs throughout the North east region.<sup>24</sup> In Mizoram itself three different varieties of Mizo Chilli are cultivated in different parts.

The recorded history of Mizoram dates back to only about a century when Lushai Hills, were reconstituted into two administrative units under British rule. It was under an Act of Parliament that the name of Lushai Hills district was changed to Mizo district from 20th April 1959 and later this district became a Union Territory from 21st January, 1972, and it was granted full Statehood on February 20, 1987.<sup>20</sup>

The production of chilli in the state can be traced upto the recorded history, B. C. Nuthara, in his book *Mizoram Society and Politics* mentions that when the village land became free from the traditional clutches for the chiefs (in 1946) agriculture cash crops like cotton, ginger and chillies became a new source of wealth.<sup>21</sup>

In 1971, the Lal Kuma committee submitted a report regarding industrial development and listed a number of industries that can be conveniently develop in Mizo hills, one of that was production of chilli.<sup>20</sup>

Jagdish K. Patnaik in his book Mizoram – Dimensions and Perspectives – Society, Economy and Polity, says that officials of Horticulture department, Government of Mizoram, claim that Mizoram is the world's native of a Bird's Eye Chilli variety known locally as hmarchate. Commercial cultivation of this uniquely aromatic chilli, highly demanded outside the state, was initiated and promoted during the Indian National Congress party rule in the state.<sup>22</sup>

The state is considered to be the germplasm bank for Mizo Chilli and when, for the vegetable improvement programme in north east around 80 genotypes of chilli were collected from different parts of north eastern region and evaluated at ICAR Research Complex for NEH Region, Umiam. The genotypes of big and hot chilli, King Chilli or Raja Mircha or Bhut Jholakia, were collected from Nagaland and Manipur, where as the genotype of small and hot chilli, Mizo Chilli, were collected from Mizoram.<sup>3</sup>

Similarly when in 1991, Mr. Vanlalnuntlunga Renthlei, conducted a research on 45 species of chilli including Mizo Chilli, he had obtained the germplasm from Mizoram.<sup>4</sup>

Under The Technology Mission for Integrated Development of Horticulture, special budgets and targets are assigned for promotion of Mizo Chilli, specially and exclusively for state of Mizoram, for Area Expansion Programme through the adoption of modern technology.<sup>2</sup>

## **6. Geographical Area of Production**

### **6.1. Production**

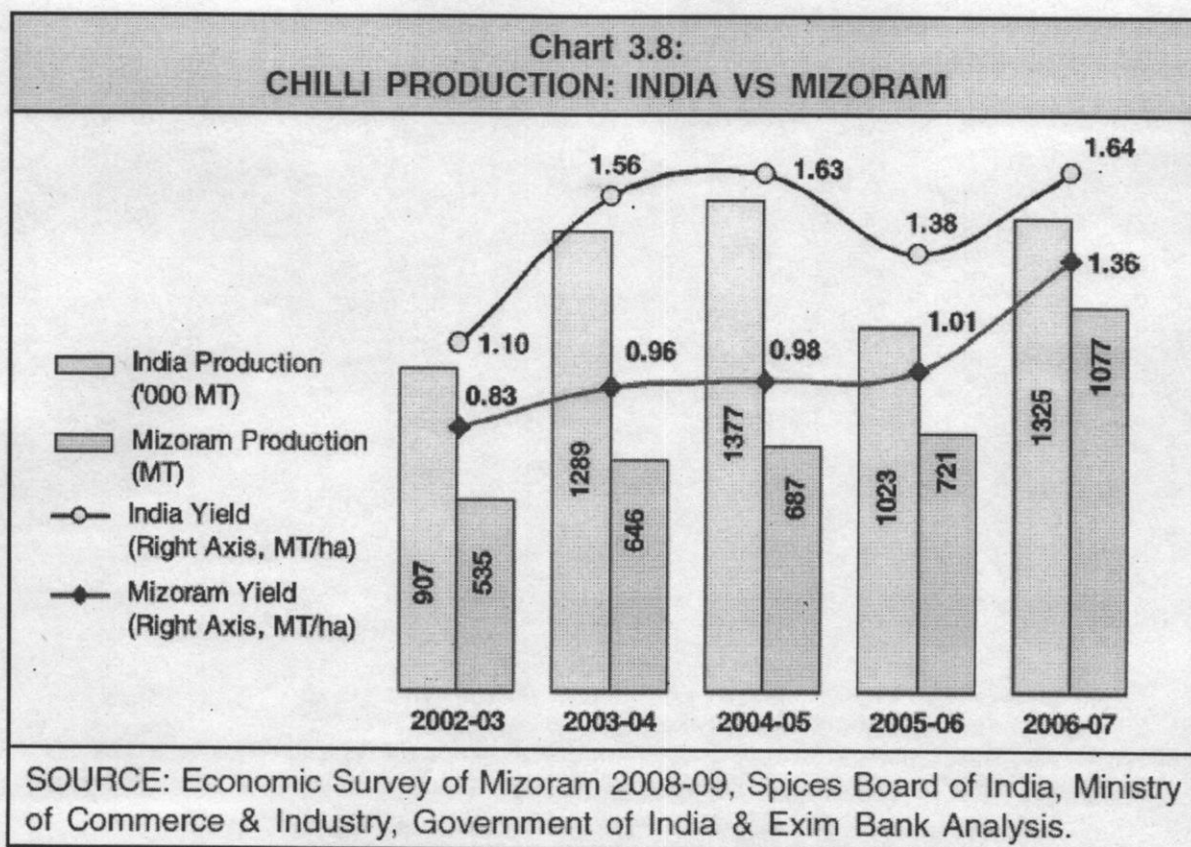
Mizoram is a major producer of Mizo Chilli (*Capsicum frutescens*) where production of other varieties of chilli (*Capsicum annum*) is almost nonexistent. The other varieties of chilli are brought to Mizoram from neighboring states of Manipur and Assam.

Mizoram has enormous potential for large quantity production with proper market linkage and not less than 2000 tons is sold though un-authorized traders every year to Bangladesh and neighboring states.<sup>3</sup>

Because of the constant efforts for Agriculture and Horticulture development in Mizoram and with special focus of government on Mizo Chilli, there has been consistent increase in the level of production. The production of chilli doubled from 535 MT in 2002- 03 to 1077 MT in 2006-07 and

accordingly, the yield has also increased from 0.83 MT/hectare in 2002-03 to 1.36 MT/hectare in 2006-07.<sup>2</sup>

### 6.2. Area, Production and Yield Rate of Spices in Mizoram<sup>2</sup>

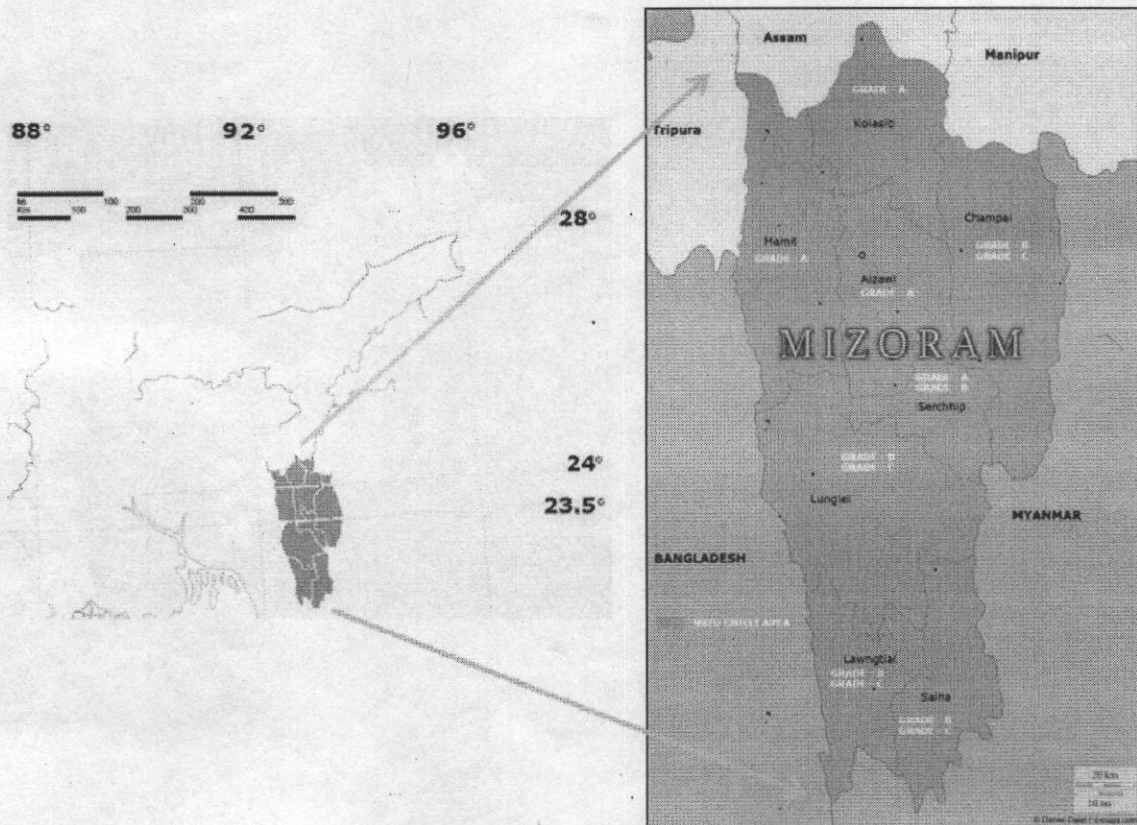


### 6.3. District Wise Distribution of Mizo Chilli in Mizoram<sup>15,19</sup>

S/No	Name of the District	Variety grown in the area
1	Aizawl	Grade A
2	Mamit	Grade A
3	Kolasib	Grade A
4	Champai	Grade B, Grade C
5	Serchhip	Grade A, Grade B
6	Lunglei	Grade B, Grade C
7	Lawntlai	Grade B, Grade C
8	Saiha	Grade B, Grade C

#### 6.4. Grade Wise Distribution Map Of Mizo Chilli<sup>15, 19</sup>

### Mizo Chilli Production Map for Mizoram



The geographical boundaries of the production area of Mizo Chilli lies between 21° 58' North to 24° 35' North Latitude and 92° 15' East to 93° 29' East Longitude.

## 7. Methods of Production

### 7.1. Field Preparation

In Mizoram, Mizo Chilli is cultivated mostly under Jhuming system or Shifting Cultivation System, on hill slopes. In this type of system, large tracts of hills are cleared by burning. Raised beds (Called bum) of about one meter width are made along the slope and again covered with farm wastes dried leaves etc. which are being burnt before sowing of seeds. The burning of field helps in reducing the weed growth, soft rot disease and increase the availability of certain plant nutrients, particularly Potash. This jhum land is abandoned after 3-5 years and new piece of land is cleared in similar fashion.<sup>3</sup>

### 7.2. Sowing

Mizo Chilli is cultivated as an intercrop with paddy to generate some extra revenue. The yield is very low and there is high price fluctuation in the market because of this reason farmers don't not grow it as a single crop.<sup>14, 15, 17</sup>

It is generally cultivated by broadcasting and dibbling method, and Mizo Chilli seeds are spread between paddy crops in the month of April before onset of Monsoon. There is no hybrid used for Mizo Chilli and the seed from previous year crop is kept for next year sowing.<sup>15</sup>

### 7.3. Irrigation

The cultivation is mostly rainfed in nature because of lack of irrigation sources but with the advantage of high rainfall spread over a period of six to eight months farmers are still able to grow paddy and chilli.<sup>7, 15</sup>

### 7.4. Intercultural

The crop requires regular weeding because of fast growth of weed in cleared forest land. Normally 2-3 hand weeding is done for the crop and no herbicides are used.<sup>15</sup>

### 7.5. Zero Fertilizer and Pesticides Application

The soils in the state are loamy to clay with high organic carbon content. They are acidic in nature with pH ranging from 4.5 to 5.6 and it is highly fertile and therefore cultivation is done in purely organic manner and no fertilizer is used in the fields. In addition to this, burning of forest on Jhum land ensures high availability of Potash which helps the crop grow well and provides good color to the final fruit.<sup>1-3, 7, 15</sup>

Growing of Mizo Chilli with paddy also helps in reducing the incidence of Leaf curl disease. White fly, which is a vector for the leaf curl virus can not fly easily between paddy crops and thus the transmission of virus is hampered. This way a natural restraint gets created to control the Leaf curl disease and farmers don't need to use any pesticide for it.<sup>15</sup>

### 7.6. Harvesting

Harvesting season for Mizo Chilli starts from October and ends till December. This Chilli has as lower yield/ ha, in comparison of other big size chilli varieties, which is about 1.36 MT/ha.<sup>7, 15, 19</sup>

## **8. Specialties of Mizo Chilli**

The Mizo Chilli has developed several unique characteristics because of its germplasm, peculiar agro-climatic conditions of the state and the specific cultural practices.



### 8.1. Shape and Size

Mizo Chilli stands apart from other chilli variety because of its smaller size which is about average 2.0 to 4.0 cm in length and about 1.00 cm in diameter. This size also adds some aesthetic value to the food where this chilli is used as a whole.

### 8.2. Color

The high availability of potash on the Jhum lands gives the Mizo Chilli a distinctive red colour. The bloody red color of this chilli is different from any other varieties available in market.<sup>15</sup>

### 8.3. Capsaicin Content and Pungency

According to the Spice board of India, the capsaicin content of Mizoram Bird's Eye Chilli is 0.59 % but as per the research thesis of Mr. Vanlannunthunga, capsaicin content of 0.897% was recorded for green fruit and about 0.909% for fresh red fruit.<sup>4</sup> The capsaicin content as per Central Institute of Horticulture, Medziphema, Nagaland was recorded as high as 1.1%.<sup>11</sup>

This level of capsaicin is very high as compared to other chilli varieties and that is why the pungency of Mizo Chilli is measured to be as high as 100,000 Scoville Units.

### 8.4. Taste and Flavor

Besides the high level of pungency at Scoville this chilli is also preferred to the uniqueness of its taste. The pungency of this chilli is very clear and hot.<sup>14, 15, 17, 19</sup>

### 8.5. Organic Production

Mizo Chilli is the only one of its kind that is grown under completely organic cultivation on Jhum land.<sup>3</sup> As such the use of chemical fertilizers and pesticides is very rare in the state and because most of this chilli is grown on Jhum land which is already very fertile, farmers don't ever use any chemical fertilizers. This characteristic clearly differentiates it from other Bird's Eye Chilli grown elsewhere in the world.

Based on a research of about 45 varieties of capsicum by Mr. Valalnuntlunga in year 1991, following results were observed regarding Mizo Chilli, which separates it from other varieties

### 8.6. Results Observed by Mr. Valalnuntlunga in Year 1991<sup>4</sup>

Characteristic examined	Mizo Chilli	Group range
Color of green fruit	Green	
Color of red fruit	Bloody red	

Days of 50% flowering	62	33.3- 62.0
Length of fruit	1.51 inch	1.51- 11.74 inch
Diameter of fruits	0.56 inch	0.56 – 2.99 inch
Height of plant	37.7 inch	33 – 88 inch
Spread of plant	52.8 inch	44 – 92 inch
Yield of green fruit/plant	69 gm	69 – 1560 gm
Yield of fresh red fruit/plant	47 gm	47 – 515 gm
Ascorbic acid in green fruit (mg/100 gm)	26	16 – 176
Ascorbic acid in fresh red fruit (mg/100 gm)	71	71 – 265
Capsaicin in green fruit (%)	0.897	0.141 – 0.897
Capsaicin in fresh red fruit (%)	0.909	0.189 - 0.909

Source - Mr. Vanlalnunlunga Renthlei<sup>4</sup>

#### 8.7. Comparison of Various Varieties of Chilli Available in India<sup>9</sup>

Name of the Variety	Production area	Color and Pungency	Harvesting Season	Capsaicin %	Asta colour value
Birds Eye Chilli/ Mizo Chilli	Mizoram & some areas of Manipur	Blood red in colour, highly pungent	October to December	0.59%	41.7
Byadagi (Kaddi)	Dharwar Karnataka	Red in colour with less pungency or without pungency	January to May	Negligible	159.9
Ellachipur Sannam-S <sub>4</sub> Type	Amaravathi District of Maharashtra	Reddish in colour and very hot	September to December	0.20%	70.4
Guntur Sannam-S <sub>4</sub> Type	Guntur, Warangal, Khammam Districts of Andhra Pradesh	Skin thick, hot and red	December to May	0.23%	32.11
Hindpur-S <sub>7</sub>	Hindpur in	Red in colour, hot	December to	0.24%	33

	Andhra Pradesh	and highly pungent	March		
<b>Jwala</b>	Kheda, Mehsana & in South Gujarat	Highly pungent, light red in colour, short and the seeds are compact	September to December	0.40%	NA
<b>Kanthari-White</b>	Kerala & some parts of Tamil Nadu	Short and ivory white in colour with high pungency	Available in the markets throughout the year	0.50%	2.96
<b>Kashmir Chilli</b>	Temperate regions such as Himachal Pradesh, Jammu & Kashmir and also in sub-tropical regions of North India during winter season	Long, fleshy, deep red in colour	November to February	0.33%	54.1
<b>Madhya Pradesh G.T.Sannam</b>	Indore, Malkapur Chikli and Elachpur areas of Madhya Pradesh	Red in colour and pungent	January to March	NA	

Source - Spice Board of India

### 9. Relationship with Climatic conditions and Human Skills

The state of Mizoram situated in the eastern corner of India is predominantly a hilly state with varying altitudes, enjoys a splendid blend of climatic conditions with most of the area falling under sub-tropical and some parts under tropical, and temperate zones.

The climatic conditions of Mizoram is divided into four seasons viz. winter season (December to February), summer season (March to May), monsoon season (June to September) and retreating monsoon season (October to November). The climate of the State is humid-tropical, characterized by short winter, long summer with heavy rainfall. The highest temperature is observed during May to July and starts decreasing with the onset of monsoon. This fall in temperature continues with the span of monsoon and becomes more evident with the retreating monsoon. The temperature becomes lowest during December and January. The temperature of Mizoram is moderate throughout the year, in summer, the temperature ranges from 22° C to 32° C, while in winter it ranges from 10° C to 23° C. Mizoram has received an annual average rainfall of 2,563 mm during the

last ten years. The amount of rainfall is more or less evenly spread throughout the State excepting that the South and the South-Western parts generally received a slightly higher amount of rainfall. The rainy season normally starts from May and lasts upto October; 85 percent of the total rainfall in the State is received during this season. This high amount of rain fall spread over six to 8 months and high relative humidity upto 90% helps the growth and production of Mizo Chilli crops under rainfed conditions.

In Mizoram, Mizo Chilli is cultivated mostly under Jhuming system or Shifting Cultivation System, on hill slopes. About 32% of the states cultivation is done on Jhum land and the permanent holdings don't account for more than 68% of the total area under cultivation. In this type of system, large tracts of hills are cleared by burning. Raised beds (Called bum) of about one meter width are made along the slope and again covered with farm wastes dried leaves etc. which are being burnt before sowing of seeds. The burning of field helps in reducing the weed growth, soft rot disease and increase the availability of certain plant nutrients, particularly Potash. This jhum land is abandoned after 3-5 years and new piece of land is cleared in similar fashion.

The use of fertilizers and pesticides in agriculture and horticulture is almost non – existing in the state, while the national average consumption of fertiliser is over 95 kg per hectare; it is only around 13 kg per hectare in Mizoram. The soils in the state are loamy to clay with high organic carbon content. They are acidic in nature with pH ranging from 4.5 to 5.6 and it is highly fertile and therefore cultivation is done in purely organic manner and no fertilizer is used in the fields. In addition to this, burning of forest on Jhum land ensures high availability of Potash which helps the crop grow well and provides good color to the final fruit.

Mizo Chilli is grown as an intercrop with paddy which helps in reducing the incidence of Leaf curl disease. White fly, which is a vector for the leaf curl virus cannot fly easily between paddy crops and thus the transmission of virus is hampered. This way a natural restraint gets created to control the Leaf curl disease and farmers don't need to use any pesticide for it.

#### **10. Marketing Chain System Study**

Although there is a great demand for this particular variety, but due to no proper market tie up programs and linkages, the production and sell is very irregular. <sup>3</sup>

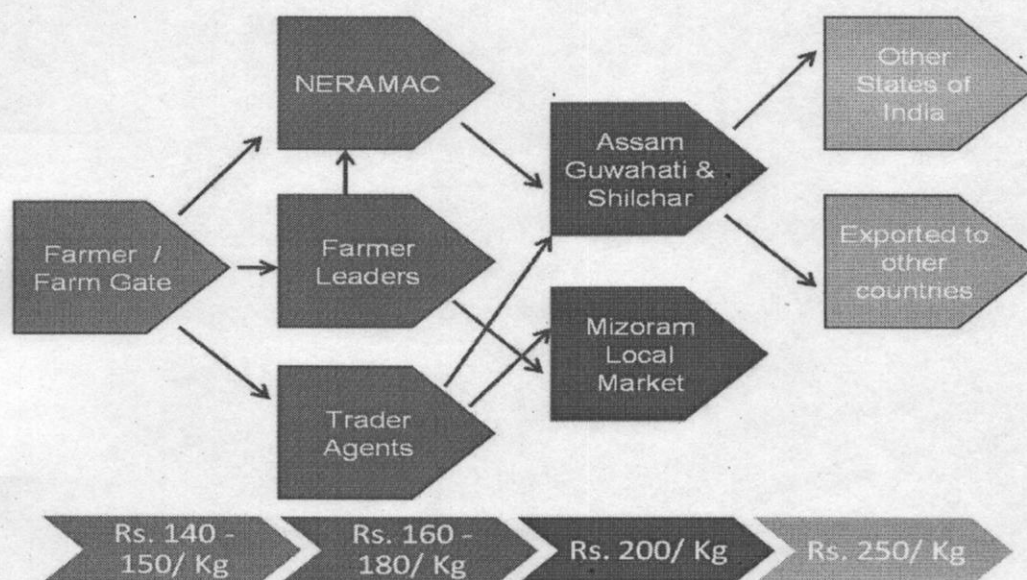
Mizo Chilli is considered as a secondary crop and invariably grown as an intercrop with paddy because of its financial non viability considering lack of adequate marketing support and lower yield. <sup>14, 15, 19</sup>

The yield of Mizo Chilli is very low and farmers don't have a bulk quantity because of this the transportation expenses becomes very high. On the contrary demand for this particular variety is very high which attracts the trader to directly purchase if from the farm gate. Sometimes trader fix the purchase terms even before harvesting is done. This whole system helps farmer save on transportation cost but higher margins are enjoyed by the traders. <sup>15, 17, 19</sup>

These traders sell the produce to the retailers (who further sell it to open market) and big traders (who transport it to other parts of the country). <sup>18, 19</sup> The traders market it in dried form. Hence, it is non-bulky and has long keeping quality making it easy to transport. <sup>6</sup>

In local retail market some quantity of green chilli is not sold but not on Kg basis because of its high price. It is instead sold on volume basis measured by a mug, which is approximately 100 gm in weight. The local market price of Green chilli is about Rs. 100/ Kg and Rs. 200/Kg for Dry red chilli, when it reaches to end consumer. <sup>13, 19</sup>

#### 10.1. Value Chain for Mizo Chilli



#### 11. Future Potential and Scope of GI for Mizo Chilli

### 11.1. Export

India is the highest chilli growing country in the world and also the biggest exporter of chilli. During the last five years spices exports have registered substantial growth, registering an annual average growth rate of 21% in value and 8% in volume. During the year 2010-11, spices export from India has registered an all time high both in terms of quantity and value. In 2010-11 the export of spices from India has been 525,750 tonnes valued Rs.6840.71 crores (US \$ 1502.85 Million) as against 502,750 tonnes valued Rs.5560.50 crores (US \$ 1173.75 Million) in 2009-10, registering an increase of 28% in dollar terms of value and 5% in volume. India commands a formidable position in the World Spice Trade with 48% share in Volume and 44% in Value.<sup>9</sup>

The comparative advantage for Mizoram from the exports perspective lies in high value horticulture and floriculture sector. Within this, the products that have been identified as having good potential for exports from Mizoram includes Mizo Chilli. <sup>2</sup>As per Spice Board of India the export potential of Mizo Chilli for end product capsaicin is 2000 MT which value at Rs. 110 cr.<sup>9</sup>

Mizoram is the state with more than 70 percent of the state's border is international border, with Myanmar in the East and the South and Bangladesh in the West. It is this that the State of Mizoram need to take advantage of, more so in light of the following factors: <sup>2</sup>

- Proximity to China, which has emerged as the largest trading partner for India
- Proximity to Southeast Asian countries which have become important players in India's overall trade and investment relations
- Bordering countries, Myanmar and Bangladesh, which have potential to become important trading partners for Mizoram and NER
- Look East Policy of the Government of India, in order to diversify the geographical spread of India's international trade
- Availability of domestic airport and proximity to Kolkata international airport
- Relatively small population resulting in surplus for Mizo Chilli
- Thrust being given by the State Government to promote high value low volume products

### 11.2. Promotion of Organic Farming

In recent years, global awareness of health and environmental issues in agriculture has been spreading rapidly, especially in the developed countries of European Union, United States and

Japan. As a result, sustainability in production of crops has become the prime concern in agriculture development.

The global organic food market grew by 10.9 percent in 2007 to reach a value of US\$ 43.5 billion and is forecast to reach US\$ 67 billion by 2012. Within this, sales of fruit and vegetables account for 35 percent of the markets value, i.e. US\$ 8 billion. This gives Mizoram a lot of leeway, particularly in the international market, which has not yet been exploited. The fact that a large share of the global organic market comprises fresh horticulture products presents an even more lucrative opportunity for Mizoram.<sup>7</sup>

Mizoram has a potential in organic farming since the extent of chemical consumption in farming is far less than the national average. In fact, the use of fertilizer and pesticides in agriculture and horticulture fields in Mizoram is almost non-existing. While the national average consumption of fertiliser is over 95 kg per hectare, it is only around 13 kg per hectare in Mizoram.<sup>7</sup>

On July 12, 2004, Government of Mizoram has also passed the Mizoram Organic Farming Act, 2004 to promote organic farming in the state. In case of Mizo Chilli, Mizoram has a huge marketable surplus and the production can increase with promotion. The need of the hour is to properly brand it and promote it on national and international platform. GI registration can be the first step towards this direction which can prove out to be a milestone in development of Agriculture in Mizoram.

### 11.3. Processing

As per current marketing value chain analysis most of the Mizo Chilli is being transported from Mizoram to other states in whole dried form and no further processing is being done here. The traders from Assam purchase the chilli from the farmers and grind it into powder for in different processing units.

Such type of processing units for making chilli powder can be promoted in the state to facilitate value addition and better returns.

### 11.4. Backward and Forward Linkages

Production of Mizo Chilli is very scattered around the state and there are no centres available for bulk purchase or sale of it. There is a need to establish backward and forward linkages among local pool of farmers and buyers (processors, traders & exporters) for regular sell and supply of raw materials. Here, the agencies can tie up with group of local farmers to create a regular supply chain for raw material inputs.

NERAMEC is already working in the field of marketing of agri – horti produce working as a facilitator for farmer and trader linkage, Last year about 200 Q of Mizo Chilli was sold through the NIRAMEC centre at Aizawl, Mizoram.<sup>39</sup>

11.5. *SWOT Analysis for Mizoram With Respect to GI Registration of Mizo Chilli*

STRENGTHS	WEAKNESS
<ul style="list-style-type: none"> <li>• Availability of a good quality marketable surplus of Mizo Chilli</li> <li>• Availability of vast area of cropland for increasing of production</li> <li>• History of organic farming by default (through minimal chemical inputs) for cultivation resulting in maintenance of rich soil nutrients.</li> <li>• Availability of domestic airport at Lengpui to reach international markets, via Kolkata International airport, including neighbouring South Asian and ASEAN Countries.</li> <li>• Emphasis on horticulture and floriculture by government to develop sustainable and</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of proper branding and marketing at national and international platform about high quality Mizo Chilli produce of the state</li> <li>• Extensive practice of Jhum cultivation involving slash-burn and clearing of forest, along with increase in the demand for more cultivable land resulting in high degree of land fragmentation and forest degradation.</li> <li>• Inadequate infrastructure, poor accessibility to good quality roads and communication for marketing, lack of infrastructure for post-harvest management, processing and value addition and weak extension support.</li> <li>• Non availability of rail network for bulk transport of products implying that the only alternative mode of transport is by road.</li> </ul>
OPPORTUNITY	THREATS
<ul style="list-style-type: none"> <li>• Opportunity of GI registration and marketing the quality produce to get better share of value chain for the farmers.</li> <li>• The sloping marginal lands could be suitably diversified for increasing the production of Mizo Chilli to meet the farmers' requirement and sustainable environment, avoiding soil degradation and soil erosion.</li> <li>• Increasing international demand for organic products.</li> <li>• "Look East Policy" of the Government of India along with the various Regional Trade Agreement with countries of Southeast Asia</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy rainfall during monsoon season results in landslide in several part of the State, which hampers transportation for marketing. Many times the horticultural crops like off season vegetables grown in the interior areas cannot be marketed and the farmers suffer heavy loss.</li> <li>• Price fluctuations during the glut-season forced farmers to sell their produce at low prices.</li> <li>• The National Insurance Scheme is yet to provide insurance for horticultural crops.</li> </ul>

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21. Mizoram Society and Politics By - B. C. Nuthara
22. Mizoram – Dimensions and Perspectives – Society, Economy and Polity By - Jagadish K. Patnaik

## Annexure

MIZORAM'S REAL GROSS STATE DOMESTIC PRODUCT (GSDP) AT FACTOR COST										
Sector	Growth (In percent)					Share in GSDP (In percent)				
	2004-05	2005-06	2006-07(Q)	2007-08(A)	2008-09(P)	2004-05	2005-06	2006-07(Q)	2007-08(A)	2008-09(P)
<b>A Agriculture &amp; Allied Sector</b>	4.4	2.6	1.9	3.0	2.5	17.0	17.0	16.4	16.0	15.4
1 Agriculture	4.2	2.4	1.6	2.7	2.3	15.0	15.0	14.4	14.1	13.5
2 Forestry	12.4	5.9	2.3	6.8	5.0	1.0	1.0	1.0	1.0	1.0
3 Fishing	-0.1	1.7	4.9	2.1	2.9	1.0	1.0	1.0	1.0	0.9
<b>B Industry Sector</b>	-3.6	17.8	8.1	7.1	11.2	17.1	19.7	20.1	20.4	21.4
1 Mining & Quarrying	-5.0	-33.2	12.9	12.8	13.0	0.3	0.2	0.2	0.2	0.3
2 Manufacturing	-1.0	36.4	7.4	7.5	7.4	1.4	1.9	1.9	1.9	1.9
3 Construction	-7.4	24.3	9.4	8.0	13.7	11.4	13.8	14.3	14.6	15.6
4 Electricity, Gas & Water Supply	7.8	-2.9	3.3	3.3	3.3	4.0	3.8	3.7	3.6	3.5
<b>C Service sector</b>	6.3	-1.7	5.6	5.7	5.9	65.9	63.3	63.4	63.5	63.2
1 Transport, Storage & Communication	24.0	14.9	13.6	14.3	14.6	2.8	3.1	3.3	3.6	3.9
2 Trade, Hotel & Restaurants	1.7	0.9	3.9	2.3	2.4	7.2	7.1	6.9	6.7	6.5
3 Banking & Insurance	10.6	16.6	9.8	9.8	9.9	3.5	4.0	4.1	4.3	4.4
4 Real estate, Ownership of Dwelling & Business Services	9.5	6.9	9.6	9.7	9.8	17.2	17.9	18.6	19.4	20.0
5 Public Administration	4.3	-10.5	3.2	3.3	3.3	22.4	19.6	19.2	18.7	18.2
6 Other Services	4.2	-7.7	1.1	1.4	1.4	13.0	11.7	11.2	10.8	10.3
<b>D Total GSDP</b>	4.2	2.4	5.5	5.5	6.5	100.0	100.0	100.0	100.0	100.0

Q - Quick Estimates. A - Advance Estimates. P - Projected.  
SOURCE: Calculated from Economic Survey of Mizoram 2008-2009, Government of Mizoram, 2009.

SECTORAL CONTRIBUTION TO REAL GSDP GROWTH					
	<i>(in percent)</i>				
Sector	2004-05	2005-06	2006-07(Q)	2007-08(A)	2008-09(P)
Agriculture & Allied	17.8	18.6	5.8	8.7	6.1
Industry	-16.2	128.1	29.0	25.9	35.6
Service	98.4	-46.8	65.2	65.3	58.3
<b>Total GSDP</b>	100.0	100.0	100.0	100.0	100.0

Q - Quick Estimates. A - Advance Estimates. P - Projected.  
SOURCE: Calculated from Economic Survey of Mizoram 2008-2009, Government of Mizoram, 2009.

## AGRO-CLIMATIC ZONES OF MIZORAM AND HORTICULTURE PRODUCTS GROWN IN THE ZONE

Agro-climatic zone	Area	Crop
Temperate zone	Blue mountain, Halkhan, Tuipang, Nauzuarzo, and Tiang	<p><b>Fruits:</b> Apple, pear peaches, plums, cherries, pistachio, almond, apricot, walnut, chestnut and kiwifruit.</p> <p><b>Vegetables:</b> Cabbage, cauli-flower, knoll-khol, broccoli, radish, turnip, beetroot, carrot, garlic, onion, spinach, cucumber, tomato, brinjal, okra, French bean, aspergus, bean, capsicum and peas.</p>
Sub-tropical zone	As whole except lower valleys, adjoining area of Cachar and lower parts of Chhimtuipui	<p><b>Fruits:</b> Mango, guava, citrus, litchi, low chilling peaches, pears, plums, almond, aonla, etc.</p> <p><b>Vegetables:</b> Brinjal, tomato, okra, beans, peas, all cucurbits, carrot, radish, turnip, cole crops, leafy vegetables, onion, garlic, chillies and capsicum. etc.</p> <p><b>Tuber crops:</b> Potato, sweet potato, colocasia, yams, alocasia.</p> <p><b>Ornamentals:</b> Rose, gladiolus, orchids, carnation, chrysanthemum, marigold, petunia, large number of other ornamental and foliage plants.</p>
Tropical zone	Northern and western part, Chhimtuipui district	<p><b>Fruits:</b> Mango, citrus, banana, pineapple, papaya, grape, sapota.</p> <p><b>Vegetables:</b> Brinjal, tomato, okra, beans, gourds, amaranthus, etc.</p> <p><b>Tuber crops:</b> Cassava, sweet potato, amorphophallus, dioscorea, yams, coleus, colocasia, etc.</p> <p><b>Plantation crops:</b> Coconut, arecanut, cashew, oilpalm, rubber, coco</p> <p><b>Spices:</b> Turmeric, ginger large cardamom, pepper, etc.</p> <p><b>Ornamentals:</b> Rose, chrysanthemum, jasmine, marigold, zenna, balsum, orchids, etc.</p>

SOURCE: A.K. Dubey, K. Dhinesh Babu and D.S. Yadav, "Status And Prospects of Horticulture in NEH Region", ENVIS Bulletin: Himalayan Ecology & Development, Volume10, Number 2, 2002.

**MAJOR ITEM-COUNTRY WISE EXPORT OF SPICES FROM INDIA**

MAJOR ITEM-COUNTRY	2006-07		2007-08		2008-09		2009-10		2010-11(E)	
	QTY (MT)	VALUE (Rs. LAKHS)	QTY (MT)	VALUE (Rs. LAKHS)	QTY (MT)	VALUE (Rs. LAKHS)	QTY (MT)	VALUE (Rs. LAKHS)	QTY (MT)	VALUE (Rs. LAKHS)
CHILLI										
MALAYSIA	43625	25133.18	51782	30520.74	40615	26072.08	45545	32303.70	48248	35641.96
SRI LANKA	21822	11228.58	29505	13501.12	37792	19627.97	34788	19441.63	34072	19728.61
BANGLADESH	28425	15507.67	34679	16120.26	1923	1023.32	28173	15157.92	32742	18207.91
U.S.A	13058	8328.19	19713	12956.91	15793	12881.60	17744	15137.32	17362	13801.24
PAKISTAN	255	55.01	11350	4531.96	22376	10192.04	160	80.52	25712	13491.59
U.A.E	12623	3685.39	15813	5889.14	18813	7006.45	23232	8997.80	20703	8478.70
MEXICO	1895	1426.60	2557	1723.64	1363	899.40	2256	1828.44	8500	7627.51
INDONESIA	6489	3151.06	9305	4146.77	10531	5148.77	10267	5563.64	10242	6035.16
CHINA	889	662.52	1565	981.21	382	315.97	1769	1284.22	6771	4699.28
U.K	2279	1522.19	2872	2010.42	3045	2646.64	3205	3271.42	3612	3744.56
VIETNAM	997	493.81	4326	2738.55	422	231.60	4036	3142.67	3383	2399.94
THAILAND	627	387.10	2914	1544.33	9190	5434.60	7605	5110.05	2601	1850.79
SOUTH AFRICA	1738	925.50	2349	1303.36	2815	1726.44	2469	1788.83	2469	1843.59
SAUDI ARABIA	806	538.16	1514	885.92	1921	1306.87	1664	1283.19	1726	1365.46
SINGAPORE	1286	788.45	1966	1221.10	1857	1277.76	1546	1128.00	1745	1350.55
CANADA	635	450.88	892	634.60	830	695.41	918	784.49	1087	1023.14
EGYPT(A.R.E)	503	306.17	1067	780.51	2823	1830.66	3160	2216.09	1465	938.82
AUSTRALIA	698	557.81	747	631.78	708	677.93	909	942.29	859	887.87
NEPAL	3264	1358.06	4306	1580.36	3225	1228.41	4568	2060.15	2197	860.97
ITALY	652	436.69	742	531.69	1002	991.09	579	572.19	793	847.28
NETHERLANDS	331	245.19	311	254.44	262	243.57	243	248.50	682	677.51
KUWAIT	564	300.79	1031	490.70	693	441.62	429	414.35	827	558.19
RUSSIA	871	386.79	741	405.12	1266	592.76	1178	599.88	1298	538.36
OMAN	221	145.77	345	251.89	387	335.85	654	514.73	623	520.52
FRANCE	279	257.41	366	324.13	457	561.79	429	494.17	421	454.41
BRAZIL	177	107.13	306	180.82	280	177.49	422	293.98	634	454.11
GERMANY	255	172.32	206	162.28	296	286.24	203	221.35	413	444.40
QATAR	325	147.01	580	229.94	876	420.48	598	373.46	598	409.63
BAHARAIN	565	221.03	675	270.42	440	294.47	643	333.58	555	322.61
ITEM TOTAL (Incl. Others)	149022	80855.97	209000	109750.01	188000	108094.92	204000	129172.81	240000	153553.96
<b>GRAND TOTAL</b>	<b>393692</b>	<b>380604.79</b>	<b>444250</b>	<b>443550.06</b>	<b>470520</b>	<b>530025.40</b>	<b>502750</b>	<b>556049.98</b>	<b>525750</b>	<b>684070.66</b>