Topic: Naga King Cilli Cultivation in Nagaland; its Prospect and Challenges; A Descriptive Study

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Abstract
The Naga King chilli has the record of being the hottest chillies in the Guinness Book of World Record. The Nagaland Government in 1999 had passed the Nagaland Geographical Indication of Goods Act to provide some safety net to Naga farmers in the cultivation of the King chilli. Nagaland is predominantly an agrarian economy with more than 60 per cent of the population depending on agriculture and allied activities for their livelihood. The growth in the primary sector is estimated at 5.92 per cent in 2018-19 as against the growth of 2.91 per cent achieved in 2017-18. Specifically in Nagaland it is grown in districts of Kohima, Mon and Peren. The total productions of area of the major spices in Nagaland are 6578 hectares out of which the total production of major spices is about 21763 M.T (according to statistical handbook of 2017). In which the area for producing Naga king chilly is 1385 hectares and the production is about 7739 M.T.

Key Words: Use of King Chilli, cultivation
Naga king chilli has been known its name for its hottest chilli in the world. King chilli is also known as the indigenous food of the Naga society. The biggest festival in Nagaland which is the Hornbill Festival has the eating competition of king chilli where lots of tourist come from different country. The reputation of King Chilli has been growing immensely since past few decades of years and has many opportunities for the young entrepreneurs to trade it with other States and countries. In this way the farmers will have the opportunity to cultivate more, and it will be a good source of income and help sustain their livelihood.

Chilli is considered as one of the commercial spice crops. It is the most widely used universal spice named as wonder spice. It is originated from Mexico. Worldwide around 3.8 million tonnes hectares are used to produce 33 million tonnes of chilli according to 2010 statistical. India is the world's largest consumer, producer, and exporter of chilli.

The chilli is referred to differently in different regions. Naga’s king chilli is also one of the hottest chillies which are grown in Nagaland; it is specially cultivated in the Peren district located near Dimapur, the commercial hub of Nagaland. In Nagaland it is widely known as ‘raja mircha’ or ‘raja mirchi’. It is an indigenous food for the Naga people.

II. REVIEW OF LITERATURE

SreekantanThampi P.S (1999) studied that 5.60 percent to 8.40 percent prefer to cultivate chillies because of lesser cultivation expenses and profitability. The respondents have low mean score towards market finance for chillies followed by the fluctuations of prices storage of facilities and incidental charges.

V.K Khrishnan Nair in his article (1995) wrote that the consumption of chilly in India is the highest and there is maximum export. It made a record of about 25 percent export of the total world production in 2006-07 and about 30 percent production are of pungent variety. Again, chilli powder is another well-known export item. Indian chillies are brought by several other countries.

Raktim R.B and Sapuchangkija in their study (2009) “Genetic variability and traditional practices in Naga king chilli Landraces of Nagaland” have studied about the botanical facts of Naga’s king chilli which says that chillies were first grown by the Native Americans regions between 5200 to 3400 BC. And studied about the method of observation of king chilli which says about the traditional practices, its use and processing practices.

Ph. Chandramani S and Mrs. Madhumitra S.B in their study “package and practices of king chilli” have studied about the soil and climate of the crop cultivation, land preparation, nursery bed preparation. They have found out that the seeds generally germinate in 7-10 days and seed transplanting is done in the first week of
April to second week of May. It has also found out that proper shade management leads to faster yield.

Veerapur H.H (2002) studied “that India is the largest producer of chillies in the world with an annual output of about 8.5 lakh tonnes followed by china, Pakistan and Mexico. Also, that exportable surplus of chillies from India is about 5 percent of the production than china. The average cultivation is 8.8422 lakh hectares.

Basavaraj c. Rajur (2007) analysed the cost and returns of chilli to estimate the marketing cost and margins, marketing efficiency and to identify the different channels existing in chilli marketing. The study was undertaken to analyse the pattern of market arrivals, prices and the extend of market integration and also to study the growth pattern in exports, trade competitiveness and direction of chilli export from India.

III. OBJECTIVES

The following are the objectives.

1. To study the production trend of Naga King chilli in the state
2. To study the challenges and prospect of Naga King Chilli cultivation.
3. To suggest policy implications and conclusion.

Research Methodology

The study is descriptive based on observation and secondary sources.

Result and Discussion

The Naga’s belong to the Mongolian-race. There are more than forty Naga tribes living in Nagaland, Manipur, Assam, Arunanchal Pradesh and Myanmar (Burma). Nagaland State is the main homeland of Nagas. The major tribes of Nagaland are Angami, Ao, Chakhesang, Chang, Khiamnuingan, Konyak, Lotha, Phom, Pochury, Rengma, Sangtam, Sumis, Yimchunger, Zeliang, and Rongmai. Apart from the Nagas, there are also other tribes and people living in Nagaland such as Kuki, Kachari, Garo and Gorkhalis who have settled in Nagaland for some generations. Claudius Ptolemy, the Greek scholar in his geographia referred to Nagaland as ‘Nagalogo’ which means ‘the realm of the naked’.

Nagaland became the 16th State of Indian Union territory on 1st December; 1963, also known as the ‘land of festivals. The State of Nagaland has 11 districts inhabited by different tribes; Kohima which is the capital of Nagaland and the main indigenous inhabitants are Angami and Rengmas, Dimapur is the commercial hub of Nagaland and known as ‘the gateway of Nagaland’. Physically, the State of Nagaland is roughly triangular, having an area of 16,579 kms. According to 2011 census, the population of Nagaland was 1,978,502. It is one of the North-Eastern States of India, sharing an international border with adjacent country of Myanmar on its extreme South-East. The State lies between 25°6’N and 27°4’N latitudes and between 93°20’E and 95°15’E longitudes.
Nagaland is predominantly an agrarian economy with more than 60 per cent of the population depending on agriculture and allied activities for their livelihood. The growth in the primary sector is estimated at 5.92 per cent in 2018-19 as against the growth of 2.91 per cent achieved in 2017-18. Nagaland has a varied agroclimatic conditions which allow growing of variety of horticulture crops in the state. Thus, the state enjoys a natural comparative advantage of horticulture with possibilities for growing a basket of diversified fruits, vegetables, flowers, planting of crops, spices, and other horticultural crops. In the year 2018-2019, a total area of 12045.50 hectares was covered under spices cultivation as against 11223 hectares in 2016-17, which reflects an increase of 7.3 per cent.

**Production Trend of Naga King Chilli**

Agricultural production is the extension of cultivated crops to produce products for sustaining or to enhance human life. And Agricultural productivity means that the differences in the relationship between agricultural output and the inputs used for productivity such as land. Therefore, we are to see the trend of Naga King chilli with the help of a table from 2006-2007 economic survey to 2015-2016 of economic survey and a Bar chart.

**TABLE 1**

<table>
<thead>
<tr>
<th>Year</th>
<th>Area</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-2007</td>
<td>5100</td>
<td>18310</td>
</tr>
<tr>
<td>2008-2009</td>
<td>330</td>
<td>1400</td>
</tr>
<tr>
<td>2011-2012</td>
<td>435</td>
<td>1760</td>
</tr>
<tr>
<td>2014-2015</td>
<td>1181</td>
<td>6197</td>
</tr>
<tr>
<td>2015-2016</td>
<td>1385</td>
<td>7739</td>
</tr>
</tbody>
</table>

Source: Statistical Handbook of Nagaland

Source: Statistical Handbook of Nagaland
The above table and figure represent the trends on production of Naga King chilli from the year 2006 to 2016. Which shows the year on the ox-axis and production & area on the OY axis, where area is represented by the blue and production by red. Looking into the year 2006-2007 the production of chilli was very high comparing to the succeeding years it is because under chilli, they have included all the production of chilies not mentioning particular on Naga King Chilli. And from 2008-2009 shows that it was particularly only the production of Naga King Chilli with 1400 M.T and in 2011-2012 it increased by 360 M.T with an increased of area 105 hectares. In 2014-2015, the production of Naga King Chilli had rose by 4437 M.T tremendously also with an area which is increased by 746 hectares. And in 2015-2016, the production of King Chilli had increased by 1542 M.T with an increased in area of 204 hectares. Thus, we can see a growth trend in each year of production of Naga King chilli.

Cultivation of Naga King Chilly in Nagaland

Northeast is home to a unique range of spices that are quite different in taste and attributes from the commonplace spices used in the cuisines of mainland India. Thus, the region comes with immense potential for organic spice farming. The land is extremely fertile and simply ideal to grow spices organically. The major crops of Nagaland are cardamom, black pepper, Naga king chilly, turmeric, betel vine and aromatic & medicinal. These major crops can be shown in a table form along with a pie diagram.

### TABLE 2

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>Cardamon</th>
<th>Blackpepper</th>
<th>Turmeric</th>
<th>Naga Chilly</th>
<th>Betelvine</th>
<th>Aromatic &amp; Medicinal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
</tr>
<tr>
<td>Area &amp; Production</td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
</tr>
<tr>
<td>Kohima</td>
<td>609</td>
<td>285</td>
<td>11</td>
<td>4</td>
<td>25</td>
<td>360</td>
</tr>
<tr>
<td>Wokha</td>
<td>465</td>
<td>156</td>
<td>20</td>
<td>5</td>
<td>40</td>
<td>525</td>
</tr>
<tr>
<td>Mockchung</td>
<td>185</td>
<td>100</td>
<td>31</td>
<td>8</td>
<td>20</td>
<td>243</td>
</tr>
<tr>
<td>Zunheboto</td>
<td>680</td>
<td>435</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>252</td>
</tr>
<tr>
<td>Tuenang</td>
<td>272</td>
<td>98</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>390</td>
</tr>
<tr>
<td>Phek</td>
<td>566</td>
<td>222</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>136</td>
</tr>
<tr>
<td>Mon</td>
<td>650</td>
<td>500</td>
<td>15</td>
<td>4</td>
<td>16</td>
<td>140</td>
</tr>
<tr>
<td>Dimapur</td>
<td>0</td>
<td>0</td>
<td>35</td>
<td>6</td>
<td>215</td>
<td>4600</td>
</tr>
<tr>
<td>Kiphire</td>
<td>181</td>
<td>51</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>243</td>
</tr>
<tr>
<td>Longleng</td>
<td>217</td>
<td>60</td>
<td>26</td>
<td>6</td>
<td>24</td>
<td>411</td>
</tr>
<tr>
<td>Peren</td>
<td>126</td>
<td>22</td>
<td>15</td>
<td>4</td>
<td>265</td>
<td>3204</td>
</tr>
<tr>
<td>Nagaland</td>
<td>395</td>
<td>1929</td>
<td>153</td>
<td>37</td>
<td>663</td>
<td>1050</td>
</tr>
</tbody>
</table>

* A= Area, P= Production

Sources: Statistical Handbook of Nagaland 2017
It is inferred from the above table 2 which shows all the major production of spices grown in Nagaland. The highest production is turmeric with 10504 production and 663 area followed by Naga chilly with 7739 production and 1385 area. Also followed by cardamom with 1929 production and 3951 area. The least production is the Black pepper where its production is 37 with 153 areas.

Sources: Statistical Handbook of Nagaland 2017

Figure 1 shows the production of Naga king Chilli in Nagaland. It shows that Peren District production is 20% which is the highest followed by Dimapur District which is 13% in production level. The lowest production is of Longleng District with 3% production level. As Peren District is known for cultivation of Naga King Chilli it has the highest 20% of production as though the area of cultivation is smaller comparing to another District.

The Naga king chilly is widely cultivated in north eastern states of India predominately in Nagaland, Assam, and Manipur. Specifically in Nagaland it is grown in districts of Kohima, Mon and Peren. There are two types of planting seasons practiced viz kharif and Rabi. Kharif cultivation starts during February-March in the hilly states whereas the Rabi crop is grown in the plains.

In Nagaland, the farmers practice Jhum cultivation in paddy fields as a sporadic intercrop with summer paddy and in small homestead garden. The crop is said to be semi perennial, but the fruit size is gradually reduced to beyond 3 years of growth. In homestead traditional gardens, the farmers prefer to grow the crop in the shade rather than in sunny places as it yields fruits with enhanced pungency. In Jhum cultivation, direct seeding is practiced in paddy fields during February-March and the peak harvest time is between August-September.

For sowing, the chilly pods are collected after maturation when they are bought red or orange in colour, the seeds are then extracted, and sun dried for at least three days. The germination of seeds takes about 15-20 days and therefore the seeds should be treated with fungicides and insecticides to avoid attack during the fungal or insect attack during the germination period. The crop can be grown under diverse soil
condition but for optimum growth, it requires well drained sandy loam soil, clay loam or laterite soil (Borgohain and Devi 2007). Traditionally chilly is being grown for green fruits during summer months in the upland Jhum paddy fields. Its fruits form an essential ingredient of the Naga Kitchen cuisine. The plant grows at height of 120 cm bearing up to 150 fruits. The flowers are wide of 2-3 nodes, and fruits are blood red or green conical measures about 2 inches in length and a half inch width. Heat value 1,041,427 Scoville Heat Unit.

When Naga king chilly was first discovered, it was reported that it belonged to capsicum Frutescent (Mathur et.al 2000). Later, based on Morphological characters using capsicum descriptors developed by the International Plant Genetic Resources Institute (1995) Bosland and Baral (2007) confined that Naga king chilly is a member of Capsicum Chinense species. They had used Randomly Applied polymorphic DNA makers for species identification and thus concluded that genetic introgression occurred from Capsicum frutesens into Naga King Chilly and placed it in a taxonomic position between Capsicum Chinense and Capsicum Frutescens, clustering more closely with the Capsicum Chinense group.

Challenges

The Naga King Chilli Production and trading can also include in state’s economy. The chilli production has a lot of opportunities to generate employment to the young entrepreneurs, yet it lacked in some part. Some of the shortcomings can be removed by following the measures:

1. The farmers cultivating Naga king chilly were opinion that they could not reach the maximum yield because of the attacks made by pest. They did not know what number of fertilizers and pesticides to be used and the modern technologies. Therefore, the farmers should be well educated.
2. Non availability of credit and storage facilities were also the major constraints. Financial institutions should timely revitalise the existing credit facilities so that the farmers can get timely credit for undertaking the improved cultivation process. Further policy support must be made to make warehouse established.
3. An extensive educational programme may be desired by the State Government to educate the farmers in essential areas of cultivation, preservation, and marketing. The farmers lacked the use of modern technologies. Therefore, this can be remedied if the Government Organisation takes up to investigate this matter for better production.
4. To ease the farmers the infrastructure facilities like road, transportation that are lacking behind, the State Government should investigate this matter seriously.
5. The Government initiative is the very foremost thing for any kind of development.
Prospects

The Naga chilli despite its reputation is actually a very sensitive and vulnerable item. After the harvest it has very little staying power and easily rots. This chilly does not grow well in all areas. Naga’s king chilli is used as an everyday food item by Naga’s. The product is highly prized, and the cost accordingly is also the highest in Naga society. It is used in many forms – fresh, dried, powdered and in pickle forms. It is used in all kinds of food preparations.

Some Naga’s used crush powdered Naga chilli as a pesticide to protect crops from insects/harmful bacteria. In Assam, some environmental NGOs also use this chilly as protection against depredations of elephants. The ripe red chillies contain vitamin A, B and C. The unripe yellow and green chillies also contain vitamin but less comparing to ripe ones. They contain potassium, magnesium, and iron. According to the report chillies help in fighting cancer cells, help in fighting obesity for those with weight problems, helps cells to produce insulin against in type I diabetes patients, has anti-ulcer fighting cancer cells, help in fighting obesity for those with weight problems, helps cells to produce insulin against in type II diabetes patients, it has anti-ulcer protective effect on stomachs etc.

The Naga king chilli possibly the only chilli that contains genes of both capsicum frutescence and capsicum Chinese is said to be a circulatory stimulate and used in treatment of atherosclerosis, shock, haemorrhagic, heart attack etc. It is used to combine well with many herbal medicinal treatments.

According to Bhagowati and Changkija (2009) reported some of the ethnomedicinal uses of Naga King chilli as.

- It can be used as relief for asthma patients by using low quantities.
- It can be treated gastrointestinal abnormalities by consuming regularly in small quantities.
- It can be used to tone body muscles after heavy exercise work.
- It can be used as a hot infusions of Naga King chilli for toothache and muscle pain.
- The tender leave pastes can be applied as thin coat over boils for easy removal of pus from boil.

The origin of the Naga king chilli cannot be explained in a proper way since there are no official documents. However, there are many evidences in the form of stories, songs, names and places related to the use of this important crop among the different Naga tribe.

Agricultural Marketing

Agricultural marketing is mainly the buying and selling of agricultural products. In earlier days when the village economy was self-sufficient the marketing of agricultural products presented no difficulty as the farmer sold his produce to the consumer on a cash or barter basis. Today’s agricultural marketing must undergo a series of exchanges or transfer from one person to another before reaches the consumer. Most of the agricultural products in India are sold by farmers in the private
sector to the moneylender or to the village traders. In India, there are several central Government organisations who are involved in agricultural marketing like Commission of Agricultural Costs and Prices, Food Corporation of India, Cotton Corporation of India, Jute Corporation of India etc.

According to the Nagaland Economic Survey during 2014-15 Agriculture and allied sector achieved a growth of 4.1% and contributed 24.73% to the Gross State Domestic Products. Out of this agriculture pepper alone contributed 19.29% to GSDP.

IV. FINDINGS

1. Nagaland has a varied agroclimatic conditions which can grow many diversified crops; therefore, it can cultivate and produce huge production on Naga King Chili, having a tag of hottest chilli it can trade with the neighbouring countries.

2. According to the trends on the production of Naga King Chilli, it had shown a growth from 2008 of 6339 M.T in 2015-2016, also with an increase in area of 1055 Hectares.

3. The major spices produce in Nagaland are Cardamon, black pepper, turmeric, Naga King chilli, betel vine and aromatic & medicinal. The highest production was of turmeric with 10504 M.T followed by Naga King Chilli with 7739 M.T.

4. Farmers in Nagaland practice Jhum cultivation and do direct seeding during February-March and takes 15-20 days to germinate and harvest in between August-September bearing 150 chillies in 120cm height plant.

5. Naga King chillies has so many uses as a remedy even in our daily lives. It can be help in fighting cancer cells, help in fighting obesity for those with weight problems, helps cells to produce insulin against in type I diabetes patients, has anti-ulcer fighting cancer cells, help in fighting obesity for those with weight problems, helps cells to produce insulin against in type II diabetes patients, it has anti-ulcer protective effect on stomachs etc.

6. Knowing the advantages of Naga King chilli, the farmers must be properly trained with modern technologies, educate to cultivate better, letting them know the usage of fertilizers & pesticides and building warehouses.

7. If we see the growth rate of Naga King Chilli it had a positive growth of 4.5 percent from 2008-2009 to 2015-2016.

V. CONCLUSION

It can be concluded that the cultivation of Naga king chilli is a tremendous source of income for the State’s economy. Naga King Chilly cultivation is an important method of cultivation that is yet to reach its full potential. The production of Naga king chilli can be proved as to be a well source of income for the chilli growing farmers and the it can generate income to the state’s economy, as we have seen that there is so much usage of Naga King Chilli in many ways. So, it is very necessary on the part of the government to investigate the matters and certain initiatives and changes should be
taken to encourage the farmers and expand their production which will be beneficial for both the farmers as well as Government. Also, introduction of modern techniques should be adopted for better production.

VI. REFERENCES