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CULTURAL SIGNIFICANCE AND ECONOMIC POTENTIAL OF NAGA KING CHILLI (*CAPSICUM CHINENSE* J.) IN NORTHEAST INDIA: A REVIEW

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ABSTRACT

Northeast India, renowned for its diverse landscape and unique biodiversity, is home to a wide array of *Capsicum* species, among which the Naga King Chilli (*Capsicum chinense* J.) stands out for its extreme pungency, economic potential and deep-rooted cultural significance. Given its importance in the region, recent research on this crop has focused on various aspects, including its evolutionary history, breeding advancements from traditional methods to molecular breeding, health benefits, economic opportunities and challenges impeding its full potential. Though this crop has been associated with the people in this region through various culture, yet their significance in agrobiodiversity conservation remains largely unknown. The present review is an attempt to consolidate into account the various research work carried out so far in the crop with primary attention towards genetic distinctiveness, economic potential, crop improvement and the relevance of culture in preserving the diversity of this crop. Overall, the Naga King Chilli represents not only a profitable horticultural crop that support local livelihoods but also serves as a symbol of the rich cultural heritage and economic aspirations of Northeast India. It also represents an important genetic resource within the *Capsicum* species, contributing to the region's diverse gene pool and offering potential for future breeding and conservation efforts.

Key words **:** Agrobiodiversity, Cultural significance, Crop improvement, Economic opportunities, Northeast India, Naga King Chilli (*Capsicum chinense* J.).

Introduction

Northeast India, comprising eight states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura), is known for its rich biodiversity and diverse agro-climatic conditions. This region lies in the Indo-Burma hotspot, characterized by a high level of floral endemism, including significant genetic resources for chilli (*Capsicum* spp.) diversity (Myers *et al*., 2008; Swamy, 2023). The fertile environment, combined with local farming practices, makes this region a boon for cultivation of local indigenous chilli varieties. The *Capsicum* genus, a member of the Solanaceae family, is one of the most important crops globally, valued both as a vegetable and a spice. Chilli (*Capsicum* spp.) thrives in the warm, humid climates across all eight states of this region. Historically, chilli was introduced to India by the Portuguese in South India during the 16th century, followed by the Arabian traders in North India (Shah, 2023). However, the substantial genetic variability of chillies, particularly the Naga King Chilli, found in Nagaland has led to the hypothesis that this region may be a centre of origin for the crop (Bhagowati and Changkija, 2009). Given the extensive genetic variability of king chillies in the region, along with their distinct genetic composition and adaptation to local environmental conditions, it is believed that this region serves as a genetic reservoir for several landraces and genotypes of king chillies (Bhutia *et al*., 2019; Fig. 1). This chilli is predominantly grown in Nagaland, Assam and Manipur and to a lesser extent in Mizoram, Arunachal Pradesh and Meghalaya (Meetei

et al., 2016). It is known by different vernacular names, such as '*Naga Mircha*' or '*Naga King Chilli*' in Nagaland, '*Bhut Jolokia*' in Assam, '*U-Morok*' in Manipur (Purkayastha *et al.,* 2014). Therefore, for clarity in this review, we refer to all these chillies collectively as *'Naga King Chilli'*. Several *Capsicum* species, including *C. annuum* L. var. *avicular*, *C. annuum* L. var. *grossum*, *C. annuum* L. var. *longum*, *C. chinense*, *C. eximium*, *C. frutescens*, *C. minimum* and *C. pubescens*, have been documented in this region (Tara *et al*., 2020). Among these, the Naga King Chilli stands out for its extreme pungency, measured at 1,001,304 Scoville Heat Units (SHU), once making it the world's hottest chilli (Bosland and Baral, 2007). Several states celebrate festivals dedicated to the Naga King Chilli, promoting its cultivation, boost the local economy and enhance agro-tourism. Recognizing its cultural and commercial importance, the Nagaland government secured a Geographical Indication (GI) tag for the Naga King Chilli (Tara *et al*., 2020). The strong local preference for spicy and pungent dishes has made the Naga King Chilli a vital part of the regional economy. While its exceptionally high capsaicinoids content over regular chilli varieties (Ananthan *et al*., 2014; Islam *et al*., 2015) enhances its value in ethnomedicine, the food industry and pharmaceuticals, boosting its export potential and commanding premium market prices (Meghvansi *et al*., 2010; Baruah *et al*., 2023).

While *C. annuum* has received significant research attention, other *Capsicum* species, such as the Naga King Chilli (*C. chinense* J.), remains relatively limited (Reddy *et al*., 2014). Previous reviews have primarily explored ethno-medicinal uses (Meetei *et al.,* 2016) or agronomic aspects (Malakar *et al.,* 2019), leaving gaps in a comprehensive synthesis of recent research. To address this, the present review consolidates on recent advancements on Naga King Chilli research, with a particular emphasis on crop improvement, economic opportunities and its role in cultural and agrobiodiversity conservation. A thorough examination was carried out using scholarly databases such as Google Scholar, PubMed, ResearchGate, ScienceDirect and Springer in order to accomplish this. Relevant research articles, review papers, news reports and government reports were analysed to provide a well-documented review.

Genetic distinctiveness of Naga King Chilli

The unique potential of Naga King Chilli was first recognized in the Tezpur district of Assam in 2000 (Bhagowati and Changkija, 2009). Initially, it was misidentified as *Capsicum frutescens* L. (Mathur *et al.,* 2000). However, the exceptionally high pungency of Naga King Chilli, which surpassed typical *C. frutescens* levels, prompted further investigations. Bosland and Baral (2007) clarified its classification, suggesting that Naga King Chilli is likely a natural hybrid between *C. chinense* and *C. frutescens*. Notably, their findings indicated that Naga King Chilli is genetically closer to *C. chinense.* Further investigations into the genetic distinctiveness of Naga King Chilli were conducted by Purkyastha *et al.* (2012a) using the ribosomal RNA gene-internal transcribed spacer (ITS) region. Their study identified a distinct 13-base deletion across all studied samples of Naga King Chilli, distinguishing it from all other members of the *Capsicum* genus. This finding was corroborated by Kehie *et al*. (2016) through similar ITS analyses. Consequently, Purkayastha *et al.* (2012b) proposed that these accessions could be classified as a new species, *Capsicum assamicum.* Verma *et al.* (2013), however, revisited earlier studies and suggested that *C. assamicum* may have originated from natural hybridization between *C. chinense* and *C. frutescens*, proposing that *C. assamicum* be considered a synonym of *C. chinense* due to overlapping traits. This conclusion was further reinforced by Verma *et al*. (2024), who demonstrated that bird's eye chilli (*C. frutescens*) and Naga King Chilli (*C. chinense*) are more closely related to each other than to *C. annuum*. Although these advancements have significantly contributed in revealing the genetic uniqueness of '*Naga King Chilli*', the conflicting taxonomic interpretations highlight the need for more comprehensive studies using larger sample size from diverse geographical regions to resolve this taxonomic ambiguity.

Nutritional composition and health benefits

Chillies are globally valued for their culinary and industrial applications, with extracts widely utilized in the food, feed, pharmaceutical, and cosmeceutical industries. Bioactive compounds such as capsanthin and capsorubin contribute to the fruit's vibrant colour, while capsaicinoids impart its characteristic pungency. Fresh chillies are exceptionally rich in vitamin C, often surpassing citrus fruits, whereas dried chillies are abundant in vitamin A, β-carotene and antioxidants (Shetty *et al*., 2013). The Naga King Chilli stands out for its distinct biochemical and its high capsaicinoids content (0.55 g/100 g), exceeds that of many commercially cultivated *Capsicum* species (0.05–0.24 g/100 g), enhancing its functional properties (Ananthan *et al*., 2014). Similarly, capsaicinoids levels in this chilli have been reported at 41.79 mg g^{-1} significantly higher than the 4.62 mg g^{-1} found in non-Naga King

Chillies (Islam *et al.,* 2015). Capsaicin has been extensively studied for its potential health benefits, including pain relief, metabolism regulation and cardiovascular health. Regular consumption in small amounts has been linked to improved respiratory function in asthma patients, muscle recovery after strenuous exercise and relief from toothache and joint pain (Bhagowati and Changkija, 2009). Beyond its dietary applications, Naga King Chilli holds significant industrial relevance, with its oleoresin serving as a key component in self-defence sprays, tear gas and chili grenades (Bora *et al*., 2020).

Market demand and commercial value

The recognition of Naga King Chilli has significantly boosted its production across Northeast India (Meetei *et al*., 2016). The crop is consumed in various forms—fresh, dried, powdered, or pickled (Ao and Konwar, 2021). Local consumers favour its intense pungency, driving economic opportunities within the region. The pungent principal compound, capsaicin, holds significant export potential (Roy, 2016). The rising global interest in spicy food and its associated health benefits has further increased its market potential. For instant, famed KFC's Flaming Crunch Chicken has incorporated Naga King Chilli into its distinctive new spicy recipe to attract spicy and pungent food lovers (www.kaziranganational parkassam.in). The economic significance of Naga King Chilli was highlighted by former Hon'ble President of India, Shri Ram Nath Kovind, during his speech at Nagaland's Statehood Day on December 1st, 2017. He emphasized the need to increase production and develop value-added products for global markets (Anon., 2017). Government initiatives such as the 'One District One Product ' (ODOP) scheme, launched by the Ministry of Food Processing Industries (GOI) in 2018, have further bolstered its commercial growth. Notably, Naga King Chilli was selected as the ODOP for Peren (Nagaland), Jorhat (Assam) and Kamjong (Manipur) districts (www.mofpi.gov.in). The export market has expanded, exemplified by a shipment of fresh Naga King Chilli to London in 2021 (Anon., 2021) and a 600 kg organic dry chilli consignment exported to the USA in 2022 by the Manipur Organic Mission Agency (MOMA) (Anon., 2022).

The cultivation of Naga King Chilli offers substantial economic opportunities for farmers in Northeast India. Studies indicate that yields can range from 10 tons ha^{-1} under traditional farming methods to 18-20 tons ha^{-1} using improved production technologies (Samsangheile and Kanaujia, 2014). Seasonal price fluctuations affect profitability (Malangmeih and Rahaman, 2016), but the crop has consistently shown higher returns than regular chillies (Konyak *et al*., 2022). Its benefit-cost ratio ranges from 2.80 to 4.33 (Samsangheile and Kanaujia, 2014), making it a lucrative option for farmers. Low-cost polyhouses enable earlier harvests and premium pricing than open cultivation (Devi *et al*., 2022). While large-scale commercial cultivation is expanding, small-scale kitchen gardens offer a sustainable alternative. Studies show that growing Naga King Chilli plants in kitchen gardens can yield abundant harvests of fruits up to 60-100 fruits per plant (Samsangheile and Kanaujia, 2014) reducing reliance on local markets. This approach highlights the importance of localized, small-scale initiatives in fostering self-sufficiency and sustainability, challenging the notion that large-scale production always leads to economic growth. Furthermore, this chilli's environmentally-favourable attributes and health-promoting benefits present a compelling rationale for continued research and advancement in sustainable farming practices and product diversification.

Crop Improvement

The growing domestic and international demands has led to an expansion in cultivation of Naga King Chilli, although challenges persist, including susceptibility to biotic and abiotic stresses, limited pest and disease management practices and inadequate access to advance agricultural technologies **(**Talukdar *et al*., 2012; Jamir and Jha, 2024). This section outlines key advancements in traditional and modern breeding approaches that have significantly contributed to the genetic improvement of Naga King Chilli.

(a) *Traditional breeding approaches*

Genetic diversity studies are one of the most basic forms of traditional breeding which plays a crucial role in initiating a crop improvement programme. Traditional breeding methods relies on selection, hybridization and evaluation of experimental materials using morphological parameters and under controlled pollination to identify superior varieties. Morphological characterization has been widely used in *Capsicum* species to assess genetic diversity based on phenotypic traits such as plant height, fruit shape, size, colour, capsaicin content and yield components. Studies on Naga King Chilli landraces from Northeast India have revealed significant variation in key agronomic traits, indicating the presence of a diverse genetic pool. Ozukum *et al.* (2016) analysed eight Naga King Chilli landraces from Nagaland, identifying three distinct clusters and reported high heritability for fruit count and plant height. Similarly, Jamir *et al*.

(2022) classified 11 genotypes into five groups based on morphological and biochemical traits, revealing moderate genetic variation. Despite their usefulness, morphological traits are highly influenced by environmental factors, limiting their reliability for precise genetic characterization. To overcome these limitations, researchers have increasingly turned to molecular marker-based approaches for improving Naga King Chilli.

(b) *Molecular breeding and biotechnological approaches*

Molecular markers are crucial for precise genetic characterization and assessing the relatedness of germplasm. Among various molecular markers, simple sequence repeat (SSR) markers, have proven valuable in characterizing genetic diversity due to their precision and reproducibility. Adluri *et al.* (2017) utilized SSR markers to assess genetic distinctiveness among Naga King Chilli germplasm, identifying CAeMS009 as an effective marker to differentiate germplasm originating from Assam, Nagaland and Manipur. Meanwhile, Mena *et al*. (2019) employed sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) seed protein profiling on 16 *C. chinense* genotypes, identifying two distinct clusters, with 'CHFKC-8' and 'CHFKC-14' as the most genetically distant. Baruah *et al.* (2019) conducted an extensive diversity study of 227 high-capsaicin-containing *Capsicum chinense* genotypes collected from four Northeastern Indian states using microsatellite markers. The study revealed substantial genetic variation, with the highest diversity recorded in the Nagaland population. Based on capsaicin content (>1.2%), 120 genotypes were selected for further study. Following up on this, Baruah *et al.* (2023) further evaluated these 120 selected genotypes across three consecutive growing seasons in different environments, focusing on 11 key morphological traits for yield related traits and capsaicin content. The study found that fruit yield per plant exhibited the highest phenotypic and genotypic coefficient of variation, followed by the number of fruits per plant and capsaicin content, indicating their strong potential for selection. Correlation analysis revealed that the number of fruits per plant contributed most directly to fruit yield, while fruit yield per plant strongly influenced capsaicin content. Overall, these findings reported that the observed yield and related traits can be effectively improved through direct selection strategies. Baruah *et al.* (2024) conducted a stability analysis based on their previous reports and they identified eight stable genotypes with high capsaicin content and consistent yield across different environments. This is particularly significant as capsaicin levels tend to decrease when *C. chinense* is cultivated outside Northeast India (Tiwari *et al.*, 2005). With the increasing demand of capsaicin in spice and pharmaceutical industries, these stable genotypes can be recommended for large-scale cultivation and further multi-location trials can be proposed to evaluate their adaptability at the national level. Genetic diversity studies on *Capsicum* species in Northeast India, including Naga King Chilli, have been reviewed by Bhutia *et al.* (2019). The identification of diverse genotypes with high capsaicin content and stable performance across environments provides a strong foundation for breeding programme aimed at yield enhancement and trait-specific improvements. These findings, particularly those by Baruah *et al.* (2019, 2023, 2024), demonstrate that integrating morphological and molecular breeding approaches is an effective strategy for assessing the genetic diversity of Naga King Chilli. This integration can accelerate breeding efforts while ensuring the conservation and utilization of diverse germplasm for sustainable crop improvement.

Given the challenges of low seed germination and the recalcitrant nature of Naga King Chilli seeds, scientists have looked into biotechnological technologies as other means of propagation, especially *in vitro* methods. Jamir and Maiti (2019) conducted a study to standardize a protocol for plantlet regeneration in Naga King Chilli as an alternate propagation method. Their study found that Murashige and Skoog (MS) medium supplemented with 6-Benzylaminopurine (BAP) at 0–8 mg L^{-1} and low levels of Indole-3-acetic acid (IAA) at 0.5 mg L^{-1} successfully induced shoot proliferation. Whereas, Indole-3-butyric acid (IBA) at 1 mg L^{-1} effectively promoted root induction. The regenerated plantlets were gradually acclimatized and transplanted in a sterilized, soilless medium under shade, achieving a survival rate of up to 60%. Various *in vitro* techniques for Naga King Chilli were comprehensively reviewed by Meetei *et al*. (2016), highlighting the significance of tissue culture approaches in enhancing germination and propagation. Recent research also focuses on enhancing capsaicinoids biosynthesis through *in vitro* techniques to maximize its potential applications. For example, Kehie *et al.* (2014) demonstrated that nutrient stress, pH stress and precursor feeding significantly enhanced capsaicin production in suspension and immobilized cell cultures, with nitrate stress and vanillin yielding the highest levels of capsaicinoids. Kabita *et al.* (2020) further found that chitosan elicitation increased capsaicin and dihydrocapsaicin content in cell suspension cultures by up to 2.87 mg g^{-1}

and 1.03 mg g^{-1} fresh weight, respectively, compared to controls. These findings suggest potential for alternative approaches to boost capsaicin production.

(c) *Recent advances in genomic studies in Naga King Chilli*

Advancements in genome sequencing have significantly improved genetic research and precision breeding in Capsicum species, offering deeper insights into the molecular mechanisms controlling key traits such as pungency, fruit development and stress resistance. Sarpras *et al.* (2016) conducted a comparative genomic analysis on 136 genotypes across *C. chinense*, *C. frutescens* and *C. annuum*. The study found that *C. chinense* exhibited significantly higher expression levels of most pungency-related genes compared to the other species, suggesting that elevated gene expression contributes to its extreme pungency. Jaiswal *et al.* (2020) developed 623 non-coding RNA-based SSR markers, including 119 microRNA-SSR markers and 504 long non-coding RNA-SSR markers. These markers successfully distinguished between *C. annuum*, *C. frutescens* and *C. chinense*, highlighting their usefulness for breeding applications in *Capsicum*. Similarly, Chhapekar *et al*. (2021) identified 279 conserved and 490 novel miRNAs in *C. chinense*, revealing their roles in carotenoid biosynthesis, fruit ripening and disease resistance. Sanatombi *et al*. (2024) also identified 69 differentially expressed miRNAs between pungent (*C. chinense*) and non-pungent (*C. annuum*) cultivars, revealing their involvement in capsaicinoids biosynthesis and the potential for miRNA-based genetic improvement in chillies. With continuous advancements in genome sequencing, integrating these findings into breeding programs could accelerate the development of Naga King Chilli cultivars with enhanced agronomic and commercial traits.

Cultural and agrobiodiversity significance of Naga King Chilli

The communities in Northeast India have cultivated and preserved diverse crops that integrate cultural traditions with agrobiodiversity. Through traditional farming systems, these communities have ensured food security, sustainable natural resource management and the preservation of their cultural identity passing down all these local practices across generations. The Naga King Chilli exemplifies this interplay between culture and biodiversity, serving as both a culinary and cultural significance and preservation of agrobiodiversity. For generations, indigenous communities in Northeast India have cultivated and preserved diverse crops that integrate cultural traditions with agricultural biodiversity. Through traditional farming systems like jhum (shifting) cultivation, these communities have ensured food security, sustainable natural resource management and the preservation of their cultural identity, passing down local practices across generations. The Naga King Chilli exemplifies this intricate relationship between culture and biodiversity, serving as both a culinary application and a symbol of cultural identity, while also playing a crucial role in agrobiodiversity conservation.

The Naga King Chilli is prominently featured in key traditional dishes such as *'ironba'* in Manipur and *'tathu'* in Nagaland. Adding this crop as an ingredient in these dishes greatly alleviate the appetite of the indigenous communities which reflect the region's rich culinary heritage. Events like the Hornbill Festival of Nagaland feature a famous chilli-eating competition that attracts global attention allowing both domestic and tourists to participate in this event (www.nagalandpost.com). Crop festivals further highlight its importance, providing a platform for farmers to showcase diverse landraces, sustainable farming methods and value-added products that promote biodiversity conservation and economic opportunities (Fig. 2).

The GI tag recognition of Naga King Chilli not only preserves its distinct genetic identity but also enhances market accessibility, benefiting regional producers while strengthening its cultural and economic significance (Tara *et al*., 2020).

The Naga King Chilli plays an important role in agrobiodiversity, contributing to its diverse *Capsicum* gene pool. Its higher capsaicinoids content compared to other *Capsicum* species makes it a valuable trait for crop improvement aimed high capsaicinoids content. Farmers traditionally adopt jhum cultivation and kitchen gardening to grow various horticultural crops, including Naga King Chilli, which has facilitated the preservation of diverse landraces. These indigenous practices support *in-situ* conservation by allowing natural selection to maintain genetic variation. However, due to the cross-pollinating nature of *Capsicum* species (7–36%), admixture frequently occurs within the gene pool, potentially leading to genotype duplication or the formation of intermediate variants that may affect the crop's population genetics (Pradeepkumar and Peter, 2020; Tara *et al*., 2020) Similar challenges have been reported in other cross-pollinating crops, such as muskmelon, where admixture influences genetic diversity and population structure, posing challenges for varietal improvement

(Tara *et al.,* 2024). Studies on muskmelon have demonstrated that population structure analysis is essential for distinguishing true genetic diversity from admixture, ensuring that breeding programs utilize genetically distinct and superior genotypes. These findings necessitate the utmost need of conducting genetic structure studies on Naga King Chilli to accurately assess genetic variation and prevent unintended introgression in breeding efforts. To safeguard this valuable genetic resource, institutions such as ICAR and SAUs/CAU must develop systematic strategies to identify and protect superior landraces while promoting sustainable cultivation practices.

Challenges impeding Naga King Chilli cultivation

While the Naga King Chilli offers a promising avenue for dietary diversification and improving rural livelihoods, its cultivation is not without challenges. Below, we outline key bottlenecks impeding its full potential.

(a) ***Lack of improved production technologies and superior varieties***

The crop is susceptible to different pests and diseases, necessitating effective sustainable pests and diseases management (Talukdar *et al*., 2012; Konyak *et al.,* 2022). The unavailability of improved varieties having pests/diseases tolerance and agronomic attributes, has left many farmers to continue relying on local landraces of Naga King Chilli, which often shows inconsistent yield performance (Meghvansi *et al.*, 2010). Moreover, limited access to modern cultivation technologies and inadequate extension activities hindered efficiency and productivity (Barman *et al.*, 2016).

(b) ***Market access, infrastructure limitations and economic challenges***

The lack of proper infrastructure, including cold storage facilities, processing units and efficient transportation networks, severely limits market access. High perishability and inadequate post-harvest management contribute to significant losses, making it difficult to meet year-round market demand (Sharma, 2016). Poor road connectivity increases transportation costs and restricts farmers' access to larger markets and limited credit availability prevents farmers from scaling up production (Sharma, 2016) and high labour costs make it difficult to implement good agricultural practices (GAP) (Kehie *et al.,* 2020).

(c) ***Research and funding gaps***

The expansion and genetic improvement of Naga King Chilli cultivation are constrained by significant research and funding gaps. Despite its economic and agricultural potential, there is a lack of well-structured breeding programme to identify and develop superior landraces suited for commercial cultivation. Research activities carried out by ICAR and Agricultural Universities (SAUs/CAU) in the region have remained largely stagnant, with limited progress beyond initial findings. Inadequate government funding for research and development (R&D) has obstructed efforts to advance the initial fundings to progress further. The absence of dedicated financial support for farmers and researchers also limits commercial scale adoption and innovation in cultivation techniques.

Overcoming these limitations could help farmers achieve higher returns and promote large-scale cultivation. Government agencies should improve extension services, establish focused policies and actively distribute information about government schemes. Improvements in storage infrastructure and the promotion of value-added products are necessary to extend shelf life and enhance profitability. Research institutions working on Naga King Chilli should create organized breeding programme aimed at identifying and recommending high-yielding, stress-resistant landraces suited to different agro-climatic regions. Moreover, investments in processing infrastructure and market linkages can further enhance the commercial viability of the crop.

Conclusion and Future Thrusts

The Naga King Chilli, represents a cultural and agricultural gem of Northeast India, has been cultivated by indigenous communities for centuries. This review has highlighted, its unique genetic makeup, exceptional pungency and diverse applications, acting as a driver of economic and social development in the region. Unlocking its full potential requires addressing challenges related to superior varieties and cultivation practices. Promising genotypes identified for consistent yield and high capsaicin content (Baruah *et al.,* 2023, 2024) should be assessed across diverse environments and seasons through collaborative efforts with ICAR institutes and universities. Such initiatives will significantly enhance research and increase the popularity of Naga King Chilli. Discrepancies in the classification of Naga King Chilli species must be resolved through comprehensive sampling across major and minor growing regions, supported by institutional collaborations. The recent surge in research investigations on this crop is encouraging. This momentum can significantly strengthen future research programme by integrating findings from various studies to develop improved

varieties with enhanced traits, such as higher yield, quality, capsaicin content or stress resistance. Low-cost polyhouse cultivation offers a viable alternative to open-field farming, ensuring higher yields and profitability amid increasing and unpredictable climate change-induced challenges, such as erratic rainfall and drought. Naga King Chilli also serves as a vital link between culture and agrobiodiversity, reflecting the rich traditions of Northeastern India and supporting agricultural diversity through its role in festivals, cuisine and sustainable farming practices. To capture both larger and better markets, including potential export opportunities, farmers can form farmer producer organisations (FPOs) or self-help groups (SHGs). These collective efforts will allow them to pool resources, improve product quality, increase production and enhance their chances of accessing these markets. While large-scale cultivation offers economic benefits, small-scale kitchen gardens provide a sustainable alternative for individuals with limited resources, offering fresh produce and reducing dependency on local markets. This approach enables them to access fresh produce year-round while potentially lowering their expenses and increasing savings. By addressing challenges hindering crop cultivation and fostering collaborative efforts, the Naga King Chilli can continue to be a source of cultural pride, economic prosperity, a pungent culinary delight and a vital component of agrobiodiversity for generations to come.

Fig. 1. Naga King Chilli (*Capsicum chinense* J.) **A.** Image depicting a Naga King Chilli plant with its fruits **B.** Harvested Naga King Chilli Fruits **C.** Fresh Naga King Chilli fruits placed on a kitchen table.

Fig. 2. Naga King Chilli festivals **A.** '*Chaiberatsi ngyi'* (translated to as- 1st Naga King Chilli festival in English), Peren, Nagaland (www.utsav.gov.in) B. Naga King Chilli Festival at Seiyhama Village in Kohima, Nagaland (www.discovereast.in) C. Showcase of the high-quality, naturally grown Naga King Chilli in Kuilong Part II, Tamenglong, Manipur **(**www.ukhrultimes.com)

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