Chapter 1: Introduction

1.1. General Introduction

Tone is a crucial linguistic feature that plays a significant role in distinguishing (lexical) meaning in many of the world's languages. All languages of the world make use of *pitch* variations for conveying prosodic information (Duanmu, 2007; Li et al., 2021). Gussenhoven (2004) defines pitch as "the auditory sensation of tonal height." The contrastive pitch patterns are known as *'tonemes,'* a term introduced by Pike (1948). Yip (2002) further explains and differentiates between pitch as a general perceptual property, which can be associated with both speech and non-speech sounds, and tone as a linguistic concept. Tone, as Yip (ibid) explains, is specific to languages, precisely tonal languages, where pitch functions as a phonological category, distinguishing word meanings. The functional use of pitch in a language can be broadly categorized into two main types: *tone* and *intonation*. Tone involves the use of specific pitch patterns to differentiate the meanings of individual words (Pike, 1948; Hyman, 1990; Gussenhoven, 2004), whereas intonation uses pitch variation to convey post-lexical or sentence-level information (Cruttenden, 1997; Gussenhoven 2004; Ladd, 2008). According to Yip (2002), tone is not merely a suprasegmental feature but a core component that can fundamentally alter the meaning of a word. Daumnu (2007) reinforces this by stating that "when pitch is used to distinguish words, it is called tone." Hyman (2011) emphasized the importance of tone, emphasizing that tone systems are as significant as consonants and vowels in shaping lexical meaning.

Based on the inherent quality, Pike (1948) identified and distinguished two types of tones, viz., level tone and gliding/contour tone.

(i) *Level Tone*: In this type, the pitch remains relatively constant during the pronunciation of a syllable, without any perceptible rise or fall.

(ii) *Gliding Tone*: This tonal pattern involves a noticeable change in pitch during its production, which may include a rise, fall, or a combination of both (e.g., rising-falling or falling-rising contours).

According to Pike (1948), glides can be analyzed based on their starting and ending points. The initial point of a glide corresponds to a toneme formed by one of the level pitches, while the final point represents a tone from a different level. Woo (1969) shares the same view, stating

that all contour tones are made from a combination of contrastive level tones. Building on this framework, Pike further classified the tone systems into *Register tone systems* and *Contour tone systems*. Register tone systems are characterized by contrasts between level tones; level tones are the basics of this system. On the other hand, contour tone systems are characterized by gliding pitch movements, such as rising, falling, or more complex patterns, where level tones do not serve as contrastive units.

1.1.1. Functions of Tone

Tones can be lexical as well as grammatical (Hyman, 2006). Tone, according to Yip (2002), "can signal lexical information via lexical tones (Cantonese *yau*H 'worry' vs. *yau*L 'again')." Tones that are used to differentiate lexical words that would otherwise be homophones are called Lexical tones. For example, in Thai (Abramson, 1962), the word [maa] can mean different things depending on its tonal contour:

(i)   maa (mid tone)   "come"

         maa (rising tone)   "horse"

         maa (falling tone)   "dog"

Tone can further "be implicated in grammar, that is, it can have morphological function" (Hyman, 2011). Rolle (2018) argued that tonal contrasts can be exploited to mark several grammatical categories and grammatical relations through various tonological operations. Rolle (2018) argued that in a *tonological operation*, a change (viz., tone addition, deletion, replacement, shifting/displacement, assimilation, dissimilation/polarization, docking, spreading, absorption/simplification, etc.) could be observed in the tonal structure of the input-to-output mapping. A few examples from Maasai [Nilotic; Kenya, Tanzania], as listed in Hyman (2016) are shown below-

(ii)   *nominative*   *accusative*

class I: *èlòkònyá*   *èlókónyá*   'head'

èncòmàtá   *èncómátá*   'horse'

class II: *èndérònì*   *èndèrónì*   'rat'

ènkólòpà   *ènkòlópà*   'centipede'

class III: *òlmérégèsh*   *òlmérègèsh*   'ram'

òlósówùàn	*òlósòwùàn*	'buffalo'
class IV:	*òmótònyî*	*òmótònyî*	'bird'
òsínkìrrî	*òsínkìrrî*	'fish'

1.2. Research Gap and Research Objectives

This dissertation seeks to examine the phonetic and phonological properties of tone in Chokri, a language spoken in Nagaland, northeast India. Chokri is distinguished by its complex phonetic inventory, tonal systems, and phonotactic structures. During our pilot study, it is revealed that Chokri has the possibility of hosting five-way tonal contrasts, apart from controlling certain grammatical function, making it inevitable to examine the tonal richness that is likely to govern the morpho-phonemic and syntactic properties in this language.

Despite its linguistic richness, Chokri, like many other languages of the region, remains an under-studied and low-resourced language. This gap highlights the need for systematic research into its sound system and tonal characteristics, especially given the prominence of tone in distinguishing lexical and grammatical meanings and given the fact that the majority of the (Tibeto-Burman) languages spoken in northeast India, especially in Nagaland, are highly tonal.

This study seeks to address this gap by examining Chokri's phonology, particularly focusing on the tonal system and its interactions with lexical, morphological operations, and grammatical structures. Expanding the understanding of tone, particularly from the under-researched northeast Indian region, would contribute to a broader typological perspective on tonal phenomena. By documenting and analyzing Chokri, this research enriches the global study of tone while supporting efforts to preserve and appreciate the linguistic diversity of a region that is both culturally and linguistically significant.

Bielenberg and Nienu (2001) conducted one of the earliest works on Chokri phonology and laid an important groundwork. While their work provides valuable foundational insights, it is essential to note that their study was conducted on a different dialect and relied on impressionistic judgments rather than instrumental analysis that concentrated on the data generated from only two native speakers. Significantly, their findings were not validated by acoustic evidence, which leaves room for further exploration and scientific rigor in documenting Chokri's phonetic and phonological properties. This study seeks to build upon and refine this earlier observation by employing experimental and acoustic methodologies to provide a more objective and detailed analysis.

Thus, the primary objectives of this study are-

1) To establish the phoneme inventories of Chokri, examine the consonants using spectrographic evidence and examine and analyze the acoustic properties of vowels using a controlled production experiment.

2) To determine the number of lexical tones in Chokri and the way they occur in underived monosyllables, derived and underived disyllables, and derived polysyllables, thereby establishing the tonal contrasts both in terms of quantity and quality.

3) To examine how contrastive tones are perceived in Chokri. Further, the purpose is to investigate the perceptual cues employed by the native speakers.

4) To explore the potential grammatical functions of tones in the language and,

5) To examine the interaction of tone across different linguistic levels, particularly focusing on various morphological operations.

1.3. Literature Review

1.3.1. Development of Tone: Tonogenesis

Tonogenesis, a concept introduced by Matisoff (1970, 1973), refers to the process by which tone develops in a language. Hyslop (2023) defines tonogenesis as the development of tone contrasts in the context where there was no tone previously. Gussenhoven (2004) argues that tone is an areal feature, and thus, a language may acquire or lose tone through various factors, including language contact situations. He further opines that more than genetic affiliation, geographical contiguity could be a better forecaster of tone and suggests that tonogenesis arises when children, developing their phonological system, reinterpret certain surface features of the parental language as tonal distinctions.

According to Hombert et al. (1979), one of the most well-documented forms of Tonogenesis is the loss of voicing distinction on obstruents in prevocalic positions. Yip (2002) reinforces this observation, noting that "the best-known source of tonal contrasts is a voicing contrast in obstruents." When tonal distinctions arise from the loss of voicing contrasts, the pitch of the following vowel tends to differ depending on the (underlying) voicing (property) of the obstruent. Voiced obstruents typically produce a lower pitch on the subsequent vowel (Hombert et al., 1979), while voiceless obstruents usually raise the pitch of the surrounding vowel, leading to the generation of low and high tones, respectively (Yip, 2002). This tonal

differentiation stems from the physiological effects of voicing on the vocal folds. For example, voiced obstruents are associated with slack vocal folds and a lowered larynx, which contribute to a lowering of pitch. In contrast, voiceless obstruents are linked to tenser vocal folds, which raise the pitch on the following vowel (Yip, 2002).

Evidence for this process has been extensively documented across different languages. For instance, in Kammu, one of the Mon-Khmer languages, the Northern dialect experienced the loss of its voiced set, leading to the development of two contrasting tones: low and high. Words with previously voiced onsets now exhibit low tones, while words with voiceless onsets show high tones (Svantesson, 1983; Dell, 1985, as cited in Yip, 2002). Kingston (2011) also noted that in two western dialects of Kammu, lower tones appear after voiced stops and sonorants, and higher tones appear when a syllable begins with voiceless stops and sonorants. Haudricourt (1972) also documented that in certain Chinese dialects, the voicing of the preceding consonant results in a low tone on the following vowel, while the high tone corresponds to the voicelessness of the consonant. Building on this idea, Ferlus (2004) proposed that the tonal contrasts in Vietnamese reflect a historical tense versus lax distinction that may have resulted from the continuous interactions with the Chinese linguistic structures.

There are also diverse speculations, particularly on the effect of final consonants leading to tonal contrasts. Matisoff (1973), Ohala (1978), and Abramson (2004) proposed alternative views regarding the tonal effects of final consonants. They speculated that a final glottal stop [?] could result in a higher pitch on the preceding vowel, while a final [h] would produce a low tone. While Mazuadon (1977) and Thurgood (2002) are of the view that a complete glottal stop can raise the pitch, a less abrupt stop could lower the pitch of the adjacent vowel. This phenomenon can also be linked to phonation or voice quality. Gussenhoven (2004) argued that a glottalized voice typically results in a high tone due to the tenseness of the vocal folds during tight phonation. It may also lead to a lowering effect, as could be observed in a creaky voice, a form of glottalization with irregular phonation, which is naturally associated with lower vibration rates, resulting in a lower tone. According to Gussenhoven (2004), phonation types such as breathy voice and glottalized voice can also lead to tonal contrasts. In Punjabi, for example, the loss of (underlying) breathy voiced consonants is realized with a low tone in the following vowel (Hombert et al., 1979; Bhatia, 1975; Vijayakrishnan, 2009). However, the loss of underlying aspiration across voiced and voiceless segments resulted in a high tone in Sylheti (Gope, 2016, 2018, 2021; Mahanta and Gope, 2018). Gope (2016, 2021) argued that the loss of underlying aspiration in the obstruents may have compensated with a perturbed f0 on the

adjacent vowel, which subsequently may be readjusted as a high tone by the native Sylheti speakers due to *hypo-correction*.

1.3.2. Tonal Languages of the World

Pike (1948) offers a foundational definition of a tone language, describing it as "a language having lexically significant, contrastive, but relative pitch on each syllable," emphasizing that pitch is inherently a property of the syllable. Welmers (1959) presents a differing perspective, stating that tone is better understood as a property of morphemes. He defines tone languages as one "in which both pitch phonemes and segmental phonemes enter into the composition of at least some morphemes." Similarly, Hyman (2006) supports the view that tone is associated with morphemes rather than syllables, defining tone languages as those "in which an indication of pitch is integral to the lexical realization of at least some morphemes."

Studies distinguish between two types of tone languages: languages with just level tones and languages that also have contour tones. The languages with only level pitch are termed *register tone languages*, while languages with contour tones are termed *contour tone languages* (Pike, 1948). Similarly, Maddieson (2011) distinguishes between simple and complex tone languages. Simple tone languages typically have only basic two-way contrasts, usually between high and low pitch levels, while complex tone languages include all other systems.

The number of level tone contrasts in languages can vary, with systems featuring three, four, or even five tones; however, becoming increasingly rare as the number increases (Maddieson, 1978). Three-level tone systems are relatively common worldwide, while four-level tone systems are much less frequent. Languages such as the Kru languages, Mambila, Cantonese, and Jiangyang are examples of languages that exhibit four level tones. Reports of languages with five-level tone systems are exceedingly rare, and there is ongoing debate about whether these languages truly possess five distinct underlying level tones or if some tones are derived through tonal interactions or other processes (Yip, 2002). As such, Duanmu (2007) challenges the validity of such claims, describing reports of five contrastive level tones as "sketchy" and arguing that a four-level tone system is typically sufficient to account for tonal distinctions. Additionally, previous studies have observed that tonal languages typically do not exhibit more than four level tones, along with two falling and two rising tones (Bao, 1990, 1999; Maddieson, 1978; Yip, 1980).

Languages with extensive tonal systems often feature a combination of both register tones (level tones) and contour tones. This is seen in languages like Cantonese (Zhang, 2010) and Thai (Luksaneeyanawin, 1983), where these tonal types coexist within the same language.

Tone, as Yip stated, is not confined to a specific geographic area, though it is most commonly found in Africa, East and Southeast Asia, and Central America. Unlike the misconception that tone is exotic and rare, it is rather extremely common in certain regions. For example, in northeast India, the majority of the Tibeto-Burman languages spoken in the states of Nagaland, Manipur, Mizoram, Assam, Tripura, and Arunachal Pradesh are primarily tonal. It is worth mentioning that the present dissertation also aims to examine one of the languages spoken in Nagaland, India.

1.3.2.1. Asain Tonal Languages

Tone is often regarded as a defining characteristic of Southeast Asia (Henderson, 1965; Matisoff, 2001; Enfield, 2011). Tonal studies in prominent languages like Mandarin Chinese (Chao, 1968 spoken; Chen, 1999, 2000; Shen and Lin, 1991), Cantonese (Bauer and Benedict, 1997; Tse, 1978, 2005; Lee, Vong and Law, 1996), Taiwanese (Chiung, 2009), Thai (Khaokham, 2020), and Vietnamese (Thompson, 1765; Chiung, 2019) have provided critical insights into the tonal system of the Asian languages. According to (Matisoff, 2001), the widespread development of tone is perhaps one of the most striking phonological features of the Southeast Asian Languages. He further states that tones have spread across all language families in the area and have become more complex here than in any other part of the world.

The Asian tone system has a rich tonal inventory compared to other languages worldwide (Yip, 2002). It frequently exhibits tone systems with three or four level tones (Duanmu, 2007). For example, Lahu has a rich tonal inventory with seven tones (Matisoff, 2001), Mandarin Chinese has four tones (Chao, 1968 spoken), Vietnamese features six tones (Thompson, 1965).

Another defining feature of the Asian tone system is the presence of complex contour tones. In languages such as Mandarin and Cantonese, contour tones are treated as unitary units rather than as a sequence of level tones (Cheng, 1973; Pike, 1948; Wang, 1967; Barrie, 2007; Duanmu, 1994). And the contour tones can occur word-medially and word-finally, unlike other tonal languages, which restrict the contour tones to the word-final position (Barrie, 2007; Duanmu, 1994; Yip, 1989).

Tone sandhi, a process in which tones change based on their phonetic environment, is considered unique to the Asian tone system. Tone sandhi is particularly prominent in languages

such as Mandarin Chinese (Chao, 1968; Chen, 2000), Taiwanese Hokkien (Chen, 2000), and Shanghainese (Duanmu, 1994), where tonal modifications follow systematic and predictable patterns. Additionally, Asian languages are notable for incorporating phonation types, such as breathy and creaky voice, into their tone systems. Examples of languages that exhibit this phenomenon include Vietnamese (Maspero, 1912; Nguyễn and Edmondson, 1997), Burmese (Watkins, 2001; Gruber, 2011), Nùng (Nicolson, 2000) and Green Hmong (Andruski and Ratliff 2000). Yip (2002), emphasizing the importance of Asian tonal languages in the study of phonological theory, insightfully remarks that no textbook on tone would be complete without a survey of the main characteristics of these systems.

1.3.2.2. African Tonal Languages

The majority of African tonal languages have significantly contributed to the development of theoretical literature on tone. The African tonal languages vary in terms of tonal complexities and functions. Most African languages are characterized by level tone systems, as seen in Yoruba (Pulleyblank, 1986), Igbo (Goldsmith, 1976), and Ewe (Ansre, 1961). However, unlike most African languages that primarily exhibit level tones, Dinka (a Nilotic language spoken in South Sudan) exhibits contour tones, setting it apart from the predominantly level-tone systems of Bantu and West African languages (Andersen, 1987; Remijsen and Ladd, 2008). Additionally, tone in Dinka is closely integrated with vowel length and voice quality, forming a three-way distinction in some cases: short, mid, and long. Furthermore, tone in Dinka is not merely a lexical feature but also plays a crucial grammatical role. Morphological distinctions, such as tense, aspect, and number, are often marked solely through tonal alternations rather than by affixes or changes in word order (Remijsen and Ladd, 2008). The interaction between tone and morphology in Dinka highlights the unique complexity of its tonal system compared to many other African languages.

African languages are known for their complex tonal phenomena such as tone spreading, floating tone, downstep, and polar tones (Hyman, 2007; Yip, 2002). Yip (2002) opined that tone mobility is one of the most striking properties of African Tone languages. Tone mobility is a phenomenon where a tonal feature extends across multiple syllables or words. For example, this feature of tone mobility is often observed in several Bantu languages, where tonal patterns create harmony over larger phonological domains. In addition to tone spreading, downstep is another significant tonal phenomenon in African languages. Downstep is a process where a high tone following another high tone is lowered, even without the presence of a low tone to

trigger the lowering of pitch. This feature is prominently observed in Ewe (Ansre, 1961), Akan (Clements, 1983), Hausa (Leben, 1971), and Igbo (Clark, 1978).

Additionally, many African languages exhibit tonal polarity, where tones on affixes are the inverse of adjacent tones. Examples include Afro-Asiatic languages like Hausa (Newman, 1995), Margi (Hoffmann, 1963; Pulleyblank, 1983), and Ngizim (Schuh, 1971); Niger-Congo languages like Dagbani (Olawsky, 1996), Dagaare (Anttila and Bodomo, 2000), Kɔnni (Cahill, 2004), Lama (Kenstowicz et al., 1988), Mòoré (Kenstowicz et al., 1988) Yoruba (Akinlabi and Liberman, 2000) etc. Despite the complex tonal systems present in African languages, their tonal inventories tend to be smaller and less complex than those observed in many Asian languages (Yip, 2002).

1.3.2.3. Tonal Languages of India

Among the language families of the Indian subcontinent, Dravidian languages are generally non-tonal, whereas certain Indo-Aryan languages exhibit tonal properties. While tonal systems are relatively rare in the family, they appear prominently in a few languages. Punjabi, one of the most prominent examples, has three lexical tones (Vijayakrishnan, 2003; Bhatia, 1975; Hombert et al. 1979). Mal-Paharia, a lesser-known Eastern Indo-Aryan language, utilizes a two-tone system (Abbi, 2001). Dogri, spoken in Jammu and adjoining areas, uses three distinct tones: high, mid, and low (Bhaskararao, 1998). Sylheti, spoken in parts of Assam and Bangladesh, is reported to have two contrastive tones (Gope, 2016, 2018, 2021). These examples illustrate that while tone is not widespread in Indo-Aryan languages, it plays an essential role in the reported few languages.

In contrast, the Northeast region of India, predominantly home to Tibeto-Burman languages, showcases a remarkable density of tonal languages. While some exceptions like Mising and Garo are reported to be non-tonal, and Deori is described as being on the verge of losing its tonal distinction (Mahanta et al., 2014), the majority of Tibeto-Burman languages in this region employ tone as a central phonological feature. Burling (2003) offered a comprehensive overview of tone in a few Tibeto-Burman (TB) languages and emphasized the need for detailed phonetic and phonological studies in underrepresented regions, particularly in northeast India. TB languages in this region are often tonal, with pitch variations contributing to lexical and grammatical distinctions. For instance, Kuki-Thaadow exhibits three tones (Hyman, 2007), Mizo has a system of four tones (Fanai, 1992; Lalhminghlui, 2023), Paite, specifically the Lamzang variety, features five tones (Singh, 1985), while the Dazpal variety uses three

(Thaumkhanmang et al., 2018), Sahriem and Ranglong both reported to have four tones (Haokip, 2019), Hrangkhawl is reported to have three tones (Haokip, 2019), Ao is reported to have a three lexical tones (Coupe, 2003), Sumi has a three-tone system (Teo, 2014) and Manipuri (Meiteilon) is reported to have a two-tone system (Chelliah, 1997). Tenyidie (Angami) displays a four-tone system. Early studies reported five tones in Tenyidie (Burling, 1960; Giridhar, 1980; N. Ravindran, 1974; Kuolie, 2006). However, later acoustic analysis identified four distinct tones (Dutta et al., 2012). Meyase (2021, 2022, 2024) argued that the fifth tone is a bi-tonal structure comprising a high tone combined with a floating mid tone. Although the mid tone is not phonetically realized, it actively participates in morphophonemic alternations, distinguishing it as a separate phonological tone. Additionally, Lalhminghlui et al. (2019) examined the interaction of vowels and tone in Angami, adding to our understanding of tones in Angami.

1.3.2.3.1. Existing Research on Chokri

Studies on Chokri tones, however, remain limited. One of the earliest works on Chokri (Phek dialect) by Bielenberg and Nienu (2001) identified 4 tones in this language. Recent acoustic studies on Chokri, as spoken in Thipüzu village in the Phek district, have documented the presence of 5 contrastive tones, viz., extra high, high, mid, low, and mid rising, in its phoneme inventory (Tetseo and Gope, 2021; Gope et al., 2024). The language assigns a significant functional load to tonal phonemes, as every syllable is associated with a specific tonal specification, designating them as Tone Bearing Units (TBUs) (Tetseo and Gope, 2021; Gope et al., 2024; Gogoi, Tetseo, and Gope, 2023).

Gogoi et al. (2023, 2024) investigated the downtrend phenomena in Chokri and explored the intonational patterns across different sentence types and tonal downtrends, contributing to a deeper understanding of Chokri's prosodic structure. The study by Tetseo and Gope (2021) and Gope et al. (2024) employed machine learning models to classify the five tones in Chokri tones, achieving significant accuracy and highlighting the potential for computational methods in linguistic analysis. In another innovative study, Gogoi and Gope (2024) used synchronized audio-visual data and machine learning algorithms to analyze tonal nuances in question forms, providing valuable insights into the interaction between tonal systems and different types of question sentences.

1.4. Primary Methodology Adopted in this Study

This study employs a mixed-methods approach, integrating both qualitative and quantitative methodologies to investigate the phonological features of Chokri. A comprehensive literature review is conducted to examine similar linguistic phenomena and to provide a detailed description of the phonological system of Chokri. Subsequently, a series of controlled production experiments are designed to analyze the language's phonetic and phonological properties systematically. These experiments involve the production of speech data by native speakers in various linguistic contexts.

Chokri native speakers from the Thipuzu village in the Phek district of Nagaland participated in several production experiments, and the data was collected through multiple field visits. The data design varies according to the objectives of each chapter, but generally, the datasets for the experiments consist of scripted utterances.

1.5. Language Description

Chokri (ISO 639-3: nri) is a Tibeto-Burman language spoken in the state of Nagaland in northeast India. It is one of the three languages spoken by a sub-group of a tribe called Chakhesang. Chakhesang was erstwhile known as '*Eastern Angami*' under the British administration. The tribe got its official recognition as a separate tribe on 10th January 1946 (Chakhesang Peoples Organisation, 2021). The nomenclature "*Chakhesang*" was formed as an acronym from the names of the three language communities, viz., Chokri (Chakrü), Khezha and Sangtam. However, Sangtam is no longer part of the Chakhesang tribe, though the nomenclature remains the same. Today, although a minority, the Razeba area, which consists of 4 villages (Zhavame, Tsupfume, Razeba, and Zelome) forming the Poumai community, now stands in place of 'Sang.' Chakhesang thus embodies three different language communities: two major groups, Chokri and Khezha, and one minor group, Poumai.

Chakhesang

Chokri   **Khezha**   Sangtam
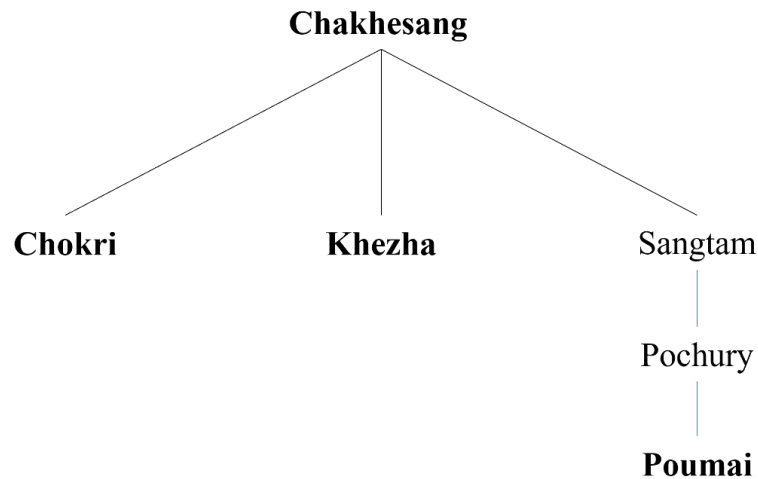
Pochury

Poumai

Figure 1.1: The sub-groups of the Chakhesang tribe

The term *Chokri*, thus, serves both as an ethnolinguistic identifier for the language and its speech community. Specifically, *Chokrimi* refers to the speech communities, while *Chokrijü* denotes the language. Chokri community predominantly inhabits the Phek district, bounded by the Angami in the West, Sema in the North, Khezha in the South, and Pochury in the East. A significant Chokri population also lives in Dimapur, the state's commercial hub, and Kohima, its capital. According to the 2011 Census of India, there are approximately 111,062 Chokri speakers. Chokri is classified as a '*vulnerable*' language by UNESCO (UNESCO, 2010).

At present, while there is some mutual intelligibility between Chokri and the Southern Angami variety due to the geographical proximity and language contact, the standard Angami language (Tenyidie) is not as easily understood by Chokri speakers or vice-versa. The ability of many Chokri speakers to understand and speak Tenyidie is largely attributed to its inclusion in educational institutions as part of the Mother Tongue curriculum. Another significant factor is the widespread use of the Tenyidie bible and hymnal book in Chakhesang churches. However, it has been observed that Chokri speakers who have not been exposed to Tenyidie through formal education or religious contexts often find it incomprehensible.

At present, Chokri is recognized as one of the 18 official languages of Nagaland by the State Government. On August 8, 2019, the government approved the inclusion of Chokri, along with 17 other Naga languages, as a school subject up to the elementary level. Although Chokri lacks a standardized form to date, it is taught in schools from Classes I to VIII using a composite approach that incorporates various Chokri village dialects.

Acknowledging the significance and necessity of a Chokri Bible, the Gospel Literature, Translation Committee, in collaboration with the community, translated and published the Bible in 2019. This effort plays a crucial role in both safeguarding and promoting the language, as these texts are among the limited literary resources widely used and accessed by all members of the community. Further initiatives are in progress, especially the developmemt of school textbooks, which will greatly expand the availability of Chokri literature. Published literature is predominantly in Tenyidie (Angami), while works in Chokri are primarily based on the specific variety spoken by individual authors.

Since, Chokri does not have a formally recognized **standard variety**, and written works often reflect the dialectal background of the author. Against this backdrop, this study focuses on the Thipüzu variety of Chokri, a dialect spoken in a village approximately 56 km from the state capital, Kohima, and 92 km from the Phek district headquarters. For clarity and consistency, this study will use the term **Chokri** throughout the thesis to refer specifically to the Thipüzu variety unless a distinction between dialects is necessary for discussion.
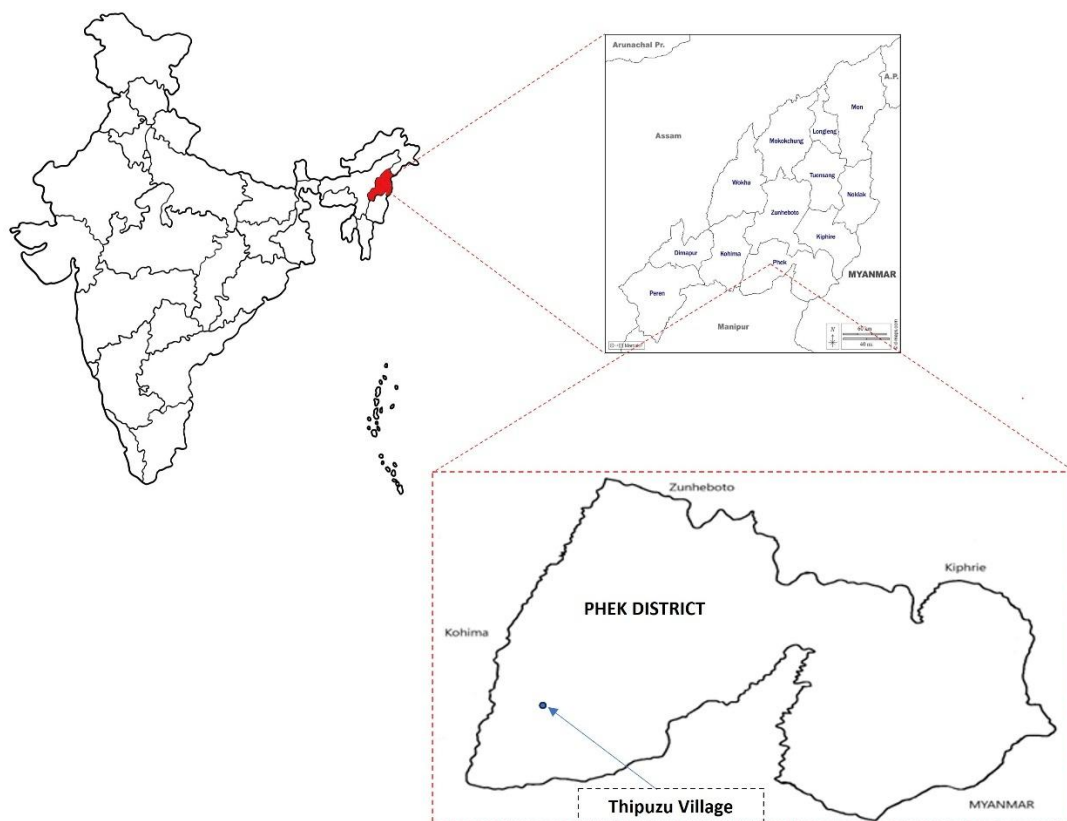

Figure 1.2: Districts of Nagaland in India, with the expanded inset showing the Phek district, the place where we collected our data from.

1.5.1. Generic Classification of the Language

Previously referred to as *eastern Angami*, the name Chokri is likely to come into effect following the formal establishment of the tribe in 1945. This shift is evident in historical classifications of Naga languages. For instance, Grierson (1903) categorized Naga languages into Western, Central, and Eastern groups, assigning Angami and Khezha (a major subgroup of the Chakhesang tribe) to the Western group, while Chokri was notably absent from specific documentation.

In Marrison's 1967 survey of Northeast Indian languages, Chokri was included in the Angami-Zeme group alongside Angami, Sema, Khezha, Mao, and Rengma. More recently, Burling (2003) classified Chokri within the Angami-Pochuri group, which also includes Khezha, Angami, Mao, Pochury, Rengma, and Sema, indicating a close genetic relationship between Chokri and Angami.
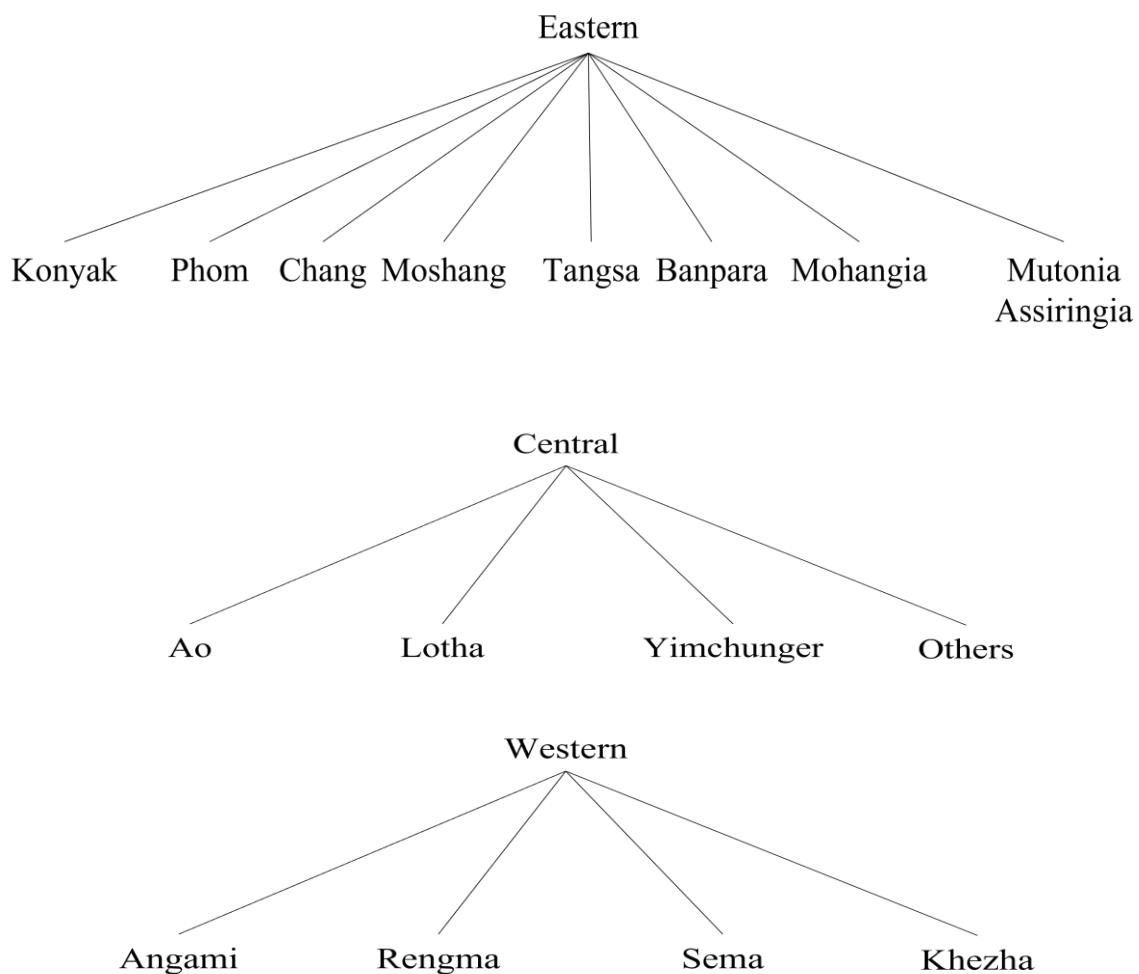

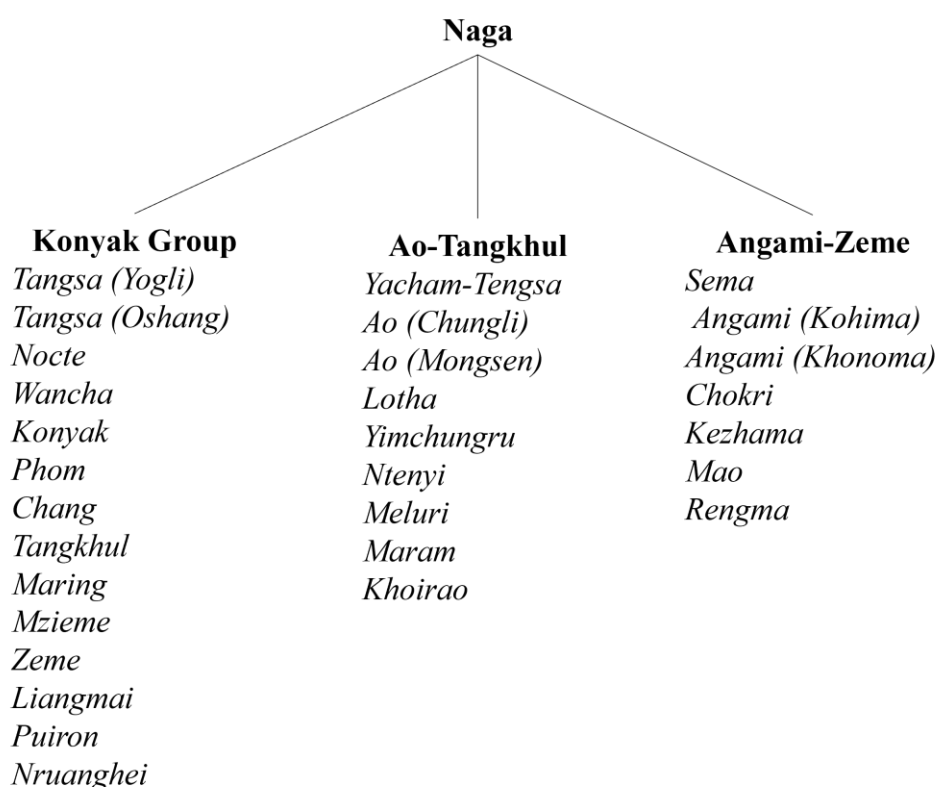Figure 1.3: Grierson's (1903) Classification of Naga Languages

```
                                    Naga

        Konyak Group          Ao-Tangkhul          Angami-Zeme
      Tangsa (Yogli)         Yacham-Tengsa         Sema
      Tangsa (Oshang)        Ao (Chungli)           Angami (Kohima)
      Nocte                  Ao (Mongsen)          Angami (Khonoma)
      Wancha                 Lotha                 Chokri
      Konyak                 Yimchungru            Kezhama
      Phom                   Ntenyi                Mao
      Chang                  Meluri                Rengma
      Tangkhul               Maram
      Maring                 Khoirao
      Mzieme
      Zeme
      Liangmai
      Puiron
      Nruanghei
```

Figure 1.4: Marrison's (1967) Classification of Naga languages

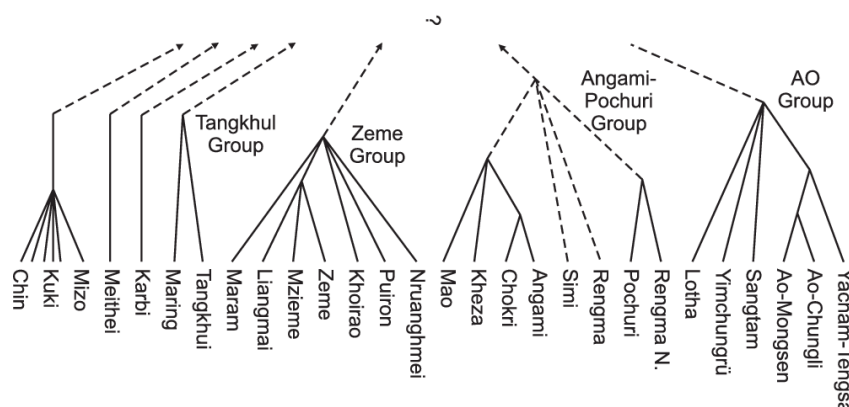
Figure 1.5: Burling (2003: 184) Classification of the Kuki-Chin-Naga languages

1.5.2. Dialects of Chokri

Chokri language can be divided into dialects largely based on geographical locations using various criteria that reflect differences in pronunciation, sounds, and vocabulary as the primary criteria. Trudgill (1992) defines dialect as a variety of a language that differs from others in terms of vocabulary, grammar, and pronunciation and is typically associated with a particular

geographical area or social group. Following this definition, the Chokri language is divided into five dialects based on their geographic distributions in Nagaland:

1. Chokri area dialect (south-western part of Phek district)

2. Phek area dialect (south-eastern part of Phek district)

3. Secheku area dialect/Central Chakhesang (southern part of Phek district)

4. Chozuba area dialect (north-western part of Phek district)

5. Tizü area dialect (north-eastern part of Phek district)

These dialectal divisions align with existing community-recognized groupings, making them a practical and widely accepted classification.

1.6. Structure of this Dissertation

Chapter 1 of this study serves as the foundation for this study, providing an overview of the research focus and research objectives. It provides an overview of existing studies addressing tone, tonogenesis, and tone languages, providing a foundation for understanding Chokri tonal features. A Language Description follows, introducing Chokri as the primary language under investigation. The study also looks into the genetic Classification of the Language, which situates Chokri within the Angami-Pochuri subgroup of the Tibeto-Burman language family. The chapter concludes by dividing Chokri into five main dialects (Chokri, Phek, Secheku, Chozuba, and Tizü).

Chapter 2 provides a detailed analysis of Chokri's phoneme inventory, focusing on its consonant and vowel systems. It classifies the phonemes based on their articulatory and acoustic features and discusses their distribution within the language. This chapter provides a detailed acoustic analysis of Chokri consonants and vowels. Spectrographic evidence is provided for all the unique or uncommon phonological features, such as the distribution of three-way plosives, voiced and voiceless aspirated sonorous sounds, and so on. This chapter also provides the details of a production experiment that was conducted to explore the quality and quantity of the vowels present in this language.

Chapter 3 explores the syllable structure of Chokri, analyzing how phonemes combine to form syllables. It investigates the phonotactic constraints that govern syllable formation, identifying any restrictions on the arrangement of consonants, vowels, and tones within the syllable structure. Additionally, it addresses the concept of word minimality, discussing the minimum

syllabic requirements for words in Chokri. This chapter further explores key phonological processes observed in the language, such as apocope, syncope, assimilation, fortition, lenition, etc.

Chapter 4 establishes the tonal system of Chokri, identifying and categorizing the different tones used in the language. Results from the experimental studies indicate that there are 5 tones in Chokri. We define the tones as extra high, high, mid, low, and mid-rising. This chapter also examines the Tone-Bearing Unit (TBU) in Chokri and investigates how native speakers perceive and process tonal contrasts.

Chapter 5 explores the role of tone in Chokri beyond its lexical function, focusing on its grammatical implications. It identifies and analyses the inflectional and derivational roles of tone within the language, highlighting how tone contributes to various grammatical processes. The chapter also investigates the grammaticalization of tone, examining how tonal features evolve from lexical to grammatical markers over time. Additionally, it explores the interaction between lexical tone and grammatical tone, providing insight into how these two types of tone function within the language system. The finding shows that tones in Chokri can mark aspects and persons, and also derive nominal words from verbal and adjectival roots. The chapter further addresses the challenge of distinguishing grammatical tone from lexical tone and discusses the typology of Chokri grammatical tone.

Chapter 6 investigates the interaction of tone with morphophonological processes in Chokri. It examines the complexities of tone assignment in morphologically derived environments, including prefixation, suffixation, compounding, and reduplications. The findings indicate that affixes possess their inherent tones rather than deriving their tone from the root morpheme to which they attach. Tones in Chokri are stable, as the tonal properties of affixes remain independent and do not influence or alter the tones of the lexical items they attach to, especially in inflectional constructions. However, in certain derivational constructions, we found that the tone of the affixes can alter the tone of the root word.

Chapter 7 summarizes the key findings from each chapter, providing a comprehensive discussion of the results and demonstrating how they align with the objectives outlined in Chapter 1. Additionally, the chapter highlights the prospects for future research.

References

Abbi, A. (2001). *A Manual of Linguistic Fieldwork and Structures of Indian Languages*. Lincom Europa.

Abramson, A. S. (1962). The Vowels and Tones of Standard Thai: Acoustical Measurements and Experiments. *Internationsl Journal of American Linguistics*, 28; 2, part II

Abramson, A. S. (2004). The Plausibility of Phonetic Explanations of Tonogenesis. In G. Fant, H. Fujisaki, J. Cao, and Y. Xu (Eds.), *From traditional phonology to modern speech processing: Festschrift for Professor Wu Zongji's 95th birthday* (pp. 17–29). Foreign Language Teaching and Research Press.

Akinlabi, A., and Mark, L. (2000). The Tonal Phonology of Yoruba Clitics. In Birgit Gerlach and Janet Grijzenhout (eds.) *Clitics in phonology, morphology and syntax*. Amsterdam: Benjamins. 31–62.

Andersen, T. (1987). The Phonemic System of Agar Dinka. *Journal of African Languages and Linguistics,* 9(1), 1-28.

Andruski, J. E., and Ratliff, M. (2000). Phonation Types in Production of Phonological Tone: the Case of Green Mong. *Journal of the International Phonetic Association*, 30(1/2), 37–61. http://www.jstor.org/stable/44526872

Ansre, Gilbert. 1961. *The Tonal Structure of Ewe*. (MA thesis). Hartford: Hartford Seminary Foundation.

Anttila, A., and Adams, B. (2000*)*. Tonal Polarity in Dagaare. In Vicki Carstens and Frederick Parkinson (eds.) *Advances in African linguistics*. Trenton, NJ: Africa World Press. 119–134.

Barrie, M. (2007). Contour Tones and Contrast in Chinese Languages. *Journal of East Asian Linguistics, 16*(4), 337–362.

Bauer, R. S., and Benedict, P. K. (1997). *Modern Cantonese Phonology*. Mouton de Gruyter.

Bhaskararao, P. (1998). Voiced Aspiration and Tonogenesis in Some South-Asian Languages. In S. Kaji (Ed.), *Proceedings of the Symposium on Cross-Linguistic Studies of Tonal Phenomena: Tonogenesis, Typology, and Related Topics* (pp. 337–351). Tokyo: ILCAA.

Bhatia, T. K. (1975). The Evolution of Tones in Punjabi. *Studies in the Linguistic Science,* 5/2 (Fall 1975); 12-24

Bielenberg, B., and Nienu, Z. (2001). Chokri (Phek dialect): Phonetics and phonology. *Linguistics of the Tibeto-Burman Area*, 24(2).

Burling, R. (1960). "Angami Naga Phonemics and Word List." *Indian Linguistics*, 21: 51-60.

Burling, R. (2003). The Tibeto-Burman Languages of Northeastern India. In Graham Thurgood and Randy LaPolla (Eds.), *The Sino-Tibetan Languages* (pp. 169-191). London: Routledge.

Cahill, M. (2004). Tone Polarity in Kɔnni Nouns. *Studies in African Linguistics* 33. 1–33.

Chakhesang People Organisation. (2021). *Commemorating Chakhesang tribe 75th anniversary 1946-2021*- Souvenir.

Chakhesang Students' Union. (2013). *Chakhesangs a window to Phek District*.

Chao, Y. R. (1930). *A System of Tone Letters*. Le Maître Phonétique, 45, 24-27.

Chao, Y. R. (1968). *A Grammar of Spoken Chinese.* University of California Press.

Chelliah, S. L. (1997*). A Grammar of Meithei*. Mouton de Gruyter.

Chen, J.-Y. (1999). The Representation and Processing of Tone in Mandarin Chinese: Evidence from Slips of the Tongue. *Applied Psycholinguistics, 20*(2), 289–301.

Chen, M. Y. (2000). *Tone Sandhi: Patterns Across Chinese Dialects.* Cambridge University Press.

Cheng, C. C. (1973). *A Synchronic Phonology of Mandarin Chinese*. Mouton.

Chiung, W. T. (2019). Contrastive Analysis of Tonal System in Vietnamese, Taiwanese, and Chinese. *Journal of Chinese Linguistics, 47*(1), 1-24

Clark, A. (1978). Tone and Downstep in Igbo. *Journal of African Languages*, 7(1), 1-14.

Clements, G. N. (1983). The Syntax and Semantics of Tone in Akan. *Lingua*, 59(3-4), 271-309.

Clements, G. N. (1984). The Formal Depiction of Phonological Tone: A Case Study of Kikuyu. *Phonology Yearbook*, 1, 125-142.

Clements, G. N., and Goldsmith, J. (1984*). Autosegmental Studies in Bantu Tone*. Foris.

Connell, B. (2000). The Perception of Lexical Tone in Yoruba. *Journal of Phonetics*, 28(1), 29–45.

Coupe, A. R. (1998). The Acoustic and Perceptual Features of Tone in the Tibeto- Burman Language Ao Naga. Vol 2, pp. 57–60 of Mannell, Robert and Robert Ribes, Jordi (eds), *Proceedings of the 5th International Conference on Spoken Language Processing*. Canberra: ASSTA. ISBN 1 876346 17 5.

Coupe, A. R. (2003). *A Phonetic and Phonological Description of Ao: A Tibeto-Burman Language of Nagaland, North-East India.* Pacific Linguistics

Coupe, A. R. (2007). *A Grammar of Mongsen Ao*. Mouton de Gruyter.

Cruttenden, A. (1997). *Intonation* (2nd ed.). Cambridge University Press.

Das, N. K. (1989). *Ethnic Identity, Ethnicity, and Social Stratification in Northeast India*. Inter-India Publications. p. 210. ISBN 9788121002189.

Duanmu, S. (1994). Against Contour Tone Units. *Linguistic Inquiry, 25*(4), 555–608.

Duanmu, S. (2007). *The Phonology of Standard Chinese*. Oxford University Press.

Dutta, I., M. K. Ezung, S. Mahanta and S. M. Meyase. (2012). Lexical Tones of Tenyidie. Paper presented at the Workshop on Tone and Intonation, IIT Guwahati. Guwahati, Assam, India, January 26-27

Eberhard, D. M., Simons, G. F., and Fennig, C. D. (eds.). 2025. *Ethnologue: Languages of the World*. Twenty-eighth edition. Dallas, Texas: SIL International. Online version: http://www.ethnologue.com.

Enfield, Nicholas J. (2011). Linguistic Diversity in Mainland Southeast Asia. In Nicholas J. Enfield (ed.), *Dynamics of Human Diversity*, pp. 63-79. Canberra: Pacific Linguistics.

Ezung M. K. (2014) Case and Tone Systems in Tenyidie. *Interdisciplinary Journal of Linguistics.* Volume |7] 2014, Pp.51-58

Fanai, L. (1992). *Some Aspects of the Lexical Phonology of Mizo and English: An Autosegmental Approach. (*PhD dissertation), The Central Institute of English and Foreign Languages.

Ferlus, M. (2004). The Origin of Tones in Viet-Muong. *In Proceedings of the 11th Annual Conference of the Southeast Asian Linguistics Society* (pp. 297–313). Tempe, AZ, USA.

Firth, J. R. (1958). *Papers in Linguistics 1934–1951*. Oxford University Press.

Firth, J.R., and Rogers, B.B. (1937). The Structure of the Chinese Monosyllable in a Hunanese Dialect (Changsha). *Bulletin of the School of Oriental and African Studies, 8*, 1055 - 1074.

Giridhar, P. P. (1980). *Angami Grammar.* Mysore: Central Institute of Indian Languages.

Gogoi, T., Tetseo, S., and Gope, A. (2023). The Phonetics of Downtrends in Chokri. Radek Skarnitzl and Jan Volín (Eds.), *Proceedings of the 20th International Congress of Phonetic Sciences*. Guarant International, Prague, pp. 1628-1632, ISBN 978-80-908 114-2-3

Gogoi, T., Tetseo, S., and Gope, A. (2024). A Mathematical and Statistical Approach to Explore the Downtrend Properties in Chokri. *Forum for Linguistic Studies*, 6(5), 664–677. https://doi.org/10.30564/fls.v6i5.6981

Goldsmith, J. A. (1976). *Autosegmental Phonology* (Doctoral dissertation). Massachusetts Institute of Technology.

Gope, A. (2016). *The Phonetics and Phonology of Sylheti Tonogenesis* (Doctoral dissertation). Indian Institute of Technology, Guwahati.

Gope, A. (2018). The Phoneme Inventory of Sylheti: Acoustic Evidence. *Journal of Advanced Linguistic Studies (JALS). 7*(1-2), 7- 37, ISSN 2231-4075.

Gope, A. (2021). The Phonetics of Tone and Voice Quality Interactions in Sylheti. *Languages.* 6(4), 154, ISSN: 2226-471X. (Scopus-indexed). https://doi.org/10.3390/languages6040154.

Gope, A., Pal, A., Tetseo, S., Gogoi, T., Joanna, J., and Borah, D. (2024). Multi-class Identification of Tonal Contrasts in Chokri Using Supervised Machine Learning Algorithms. *Humanities and Social Sciences Communications*, https://www.nature.com/articles/s41599-024-03113-2

Grierson, G. A. (Ed.). (1903). *Linguistic Survey of India* (Vol. 1). Calcutta: Office of the Superintendent of Government Printing.

Gruber, James. (2011). *An Articulatory, Acoustic, and Auditory Study of Burmese Tone* (Doctoral dissertation). Georgetown University.

Gussenhoven, C. (2004). *The phonology of Tone and Intonation*. Cambridge University Press.

Haokip, P. (2019). Kuki-Chin Phonology of Barak Valley. *Indian Linguistics*, 80((3-4)):85-114.

Haudricourt, A. (1972). Two-way and Three-way Splitting of Tonal Systems in Some Far Eastern languages (C. Court, Trans.). In J. G. Harris and R. B. Noss (Eds*.), Tai Phonetics and Phonology* (pp. 58–86). Central Institute of English Language, Mahidol University.

Henderson, Eugénie J. A. (1965). The Topography of Certain Phonetic and Morphological Characteristics of South East Asian languages. *Lingua* 15:400 434.

Hoffmann, C. (1963). *A Grammar of the Margi Language.* London: Oxford University Press.

Hombert, J.-M., Ohala, J. J., and Ewan, W. G. (1979). Phonetic Explanations for the Development of Tones. *Language*, *55*(1), 37–58. https://doi.org/10.2307/412518

Howie, J. M. (1976). *Acoustical Studies of Mandarin Vowels and Tones*. Cambridge University Press.

Hyman, L.M. (2011). Tone, is it different?. *The handbook of Phonological Theory.* Blackwell Publishing.

Hyman, L. M. (2006). Word-Prosodic Typology. *Phonology.* 23(2), 225–257.

Hyman, L. M. (2007). Kuki-Thaadow: An African Tone System in Southeast Asia. *UC Berkeley Phonology Lab Annual Reports.* 3. 10.5070/P77G41N67R.

Hyman, L. M. and Ngunga, A. (1997). Two Kinds of Moraic Nasal in Ciyao. *Studies in African Linguistics* 26. 131–163.

Hyman, L. M., and Haokip, P. (2017). Kuki-Thaadow: An African Tone System in Southeast Asia. *Journal of the Southeast Asian Linguistics Society,* 10(1), 91–120. https://doi.org/10.5281/zenodo.1127753

Hyslop, G. (2023): Toward a Typology of Tonogenesis: Revising the model*, Australian Journal of Linguistics,* DOI: 10.1080/07268602.2022.2157675

Kenstowicz, M., Nikiema, E. and Ourso, M. (1988). Tonal Polarity in Two Gur Languages. *Studies in the Linguistic Sciences* 18.77–103.

Khaokham, C. (2020). A Comparative Analysis of the Tones Between Northern Thai Dialect Tai Yuan Language and Mandarin Chinese. *Chinese Journal of Social Science and Management, 4*(2), 85-97.

Kingston, J. (2011). Tonogenesis. In M. van Oostendorp, C. J. Ewen, E. Hume, and K. Rice (Eds.), *The Blackwell Companion to Phonology (pp. 2304–2333).* Blackwell.

Kisserberth, C. (1984). Digo Tonology. In Clements, George N. and Goldsmith, J. (eds.), *Autosegmental Studies in Bantu Tone*, 105-182.

Krämer, M., and Zec, D. (2020). Nasal Consonants, Sonority, and Syllable Phonotactics: The Dual Nasal Hypothesis. *Phonology*, *37*(1), 27–63. doi:10.1017/S0952675720000032

Kuolie, D. (2006). Structural Description of Tenyidie: A Tibeto-Burman Language of Nagaland. Kohima*: Ura Academy Publication Division.*

Ladd, R. D. (2008). *Intonational Phonology (2nd ed.).* Cambridge University Press.

Ladefoged, P., and Johnson, K. (2014). *A Course in Phonetics (7th ed.).* Cengage Learning.

Lalhminghlui, W., Terhiija. V., and Sarmah, P. (2019). Vowel-Tone Interaction in Two Tibeto-Burman Languages. 3970-3974. 10.21437/*Interspeech*.2019-2808.

Leben, W. R. (1971). The Interaction Between Tonal and Syntactic Structures in Hausa. *Linguistic Inquiry,* 2(1), 47-73.

Lee, K. W. S., Vong, R., and Law, S. P. (1996). Tone Perception in Cantonese and Mandarin: A Cross-Linguistic Comparison. *Bilingualism: Language and Cognition, 6*(2), 137-151.

Li, Y., Tang, C., Lu, J., Wu, J., and Chang, E. F. (2021). Human Cortical Encoding of Pitch in Tonal and Non-tonal Languages. *Nature communications*, *12*(1), 1161. https://doi.org/10.1038/s41467-021-21430-x

Lisker, L., and Abramson, A. S. (1964). A Cross-Language Study of Voicing in Initial Stops: Acoustical Measurements. *Word.* 20. 384-422. 10.1080/00437956.1964.11659830.

Luksaneeyanawin, S. (1983). *Intonation in Thai* (Doctoral dissertation*).* University of Edinburgh.

Mahanta, S., and Gope, A. (2018). Tonal Polarity in Sylheti in the Context of Noun Faithfulness. *Language Sciences.* 69, 80- 97, ISSN 03880001. https://doi.org/10.1016/j.langsci.2018.06.010

Marrison, G. E. (1967). *The Classification of the Tibeto-Burman Languages of Nagaland of Northeast India.* Unpublished PhD dissertation. School of Oriental and African Studies, University of London.

Matisoff, J. A. (1970). Glottal Dissimilation and the Lahu High-Rising Tone: A Tonogenetic Case-Study. *Journal of the American Oriental Society*, 90(1): 13-44.

Matisoff, J. A. (1973*). Tonogenesis in Southeast Asia. In Larry Hyman (Ed.), *Consonant types and tone (Southern California Occasional Papers in Linguistics 1)* (pp. 71-95). Los Angeles: University of Southern California.

Matisoff, James A, Genetic versus Contact Relationship: Prosodic Diffusibility in South-East Asian Languages, in Alexandra Y Aikhenvald, and R M W Dixon (eds), *Areal Diffusion and Genetic Inheritance: Problems in Comparative Linguistics* (Oxford, 2001; online edn, Oxford Academic, 31 Oct. 2023), https://doi.org/10.1093/oso/9780198299813.003.0011

Mazaudon, M. (1977). Tibeto-Burman Tonogenetics. *Linguistics of the Tibeto-Burman Area,* 3(2), 1-123. https://dx.doi.org/10.32655/LTBA.3.2.01

Meyase, S. M. (2014*). Four Versus Five: The Number of Tones in Tenyidie. *Proceedings of the 4th International Symposium on Tonal Aspects of Languages (TAL-2014),* pp. 19–22.

Meyase, S. M. (2015). The Fifth Tone of Tenyidie, in Linda Konnerth, Stephen Morey, Priyankoo Sarmah, and Amos Teo (eds.) *Northeast Indian Linguistics 7 (NEIL 7)*, Canberra: Asia-Pacific Linguistics. https://openresearch-repository.anu.edu.au/handle/1885/95392

Meyase, S. M. (2018). Tenyidie: Another African Tone System in Southeast Asia?, *in TAL2018 [Sixth International Symposium on Tonal Aspects of Languages]*, Berlin 2018. ISCA Archive. https://doi.org/10.21437/TAL.2018-34

Meyase, S. M. (2021). Polarity in a Four-level Tone Language: Tone Features in Tenyidie, in *Phonology*, vol. 38.1. Cambridge University Press, Cambridge, UK. https://doi.org/10.1017/S0952675721000063

Myers, S. (1998). Surface Underspecification of Tone in Chichewa. *Phonology*, *15*(3), 367–391. http://www.jstor.org/stable/4420135

Newman, P. (1995). Hausa Tonology: Complexities in an Easy Tone Language. In John A. Goldsmith (ed.) *The Handbook of Phonological Theory.* Cambridge, MA and Oxford: Blackwell. 762–781.

Nguyễn V. L., and Jerold, E. (1997). Tones and Voice Quality in Modern Northern Vietnamese: Instrumental Case Studies. *Mon-Khmer Studies*: *A Journal of Southeast Languages*, 1-18.

Nicolson, B. (2000). The Nung An Language of Vietnam: Stepchild or Aberrant Son? *In The Fifth International Symposium on Languages and Linguistics,* pp. 266-295. Vietnam National University, Ho Chi Minh City University of Social Sciences and Humanities.

Odden, D. (1995). Tone: African languages. In J. Goldsmith (Ed.), *The Handbook of Phonological Theory.* Blackwell.

Ohala, J. J. (1978). Production of Tone. In V.A. Fromkin (Ed.), *Tone: A linguistic* survey (pp. 5-40). New York: Academic Press

Ohala, J. J. (1983). Cross-Language Use of Pitch: An Ethological View. *Phonetica,* 40: 1-18

Olawsky, K. J. (1996). *An Introduction to Dagbani Phonology.* Düsseldorf: Arbeiten des SFB.

Pike, K. L. (1948). *Tone Languages: A Technique for Determining the Number and Type of Pitch Contrasts in a Language, With Studies in Tonemic Substitution and Fusion.* University of Michigan Press.

Pulleyblank, D. (1983). Extratonality and Polarity. WCCFL 2. 204–216.

Pulleyblank, D. (1986). *Tone in Lexical Phonology.* Reidel Publishing Company.

Ravindran, N. (1974). *Angami Phonetic Reader.* CIIL Phonetic Reader Series 10. Mysore: Central Institute of Indian Languages.

Remijsen, B. and Ladd, D. (2008). The Tone System of the Luanyjang Dialect of Dinka. *Journal of African Languages and Linguistics*, *29*(2), 173-213. https://doi.org/10.1515/JALL.2008.009

Rolle, N. (2018). *Grammatical Tone: Typology and Theory* (PhD dissertation). University of California, Berkeley

Shen, X. S., and Lin, M. (1991). A Perceptual Study of Mandarin Tones 2 and 3. *Language and Speech, 34*(2), 145–156

Singh, N. S. (1985). *A Descriptive Grammar of Paite*. (PhD dissertation), Manipur University.

Temsunungsang, T. (2009*). Aspects of the Prosodic Phonology of Ao: An Inter-Dialectal Study* (Ph.D. Dissertation), The English and Foreign Languages University, Hyderabad. Accessed via STEDT database <http://stedt.berkeley.edu/search/> on 2025-01-24.

Teo, A. (2014). *A Phonological and Phonetic Description of Sumi, A Tibeto-Burman Language of Nagaland.* Canberra: Asia-Pacific Linguistics

Tetseo, S., and Gope, A. (2021). Tonal Contrast and Grammatical Tone in Chokri. [Paper presentation]. 43rd International Conference of Linguistic Society of India, CIIL-Mysore.

Thompson, L. C. (1965*). A Vietnamese Grammar*. University of Washington Press.

Thuamkhanmang, G., Lalhminghlui, w., and Sarmah, P. (2018). A Preliminary Acoustic Study of Tones in Dazpal Dialect of Paite. Paper presented at the 10th International Conference of the Northeast Indian Linguistics Society.

Thurgood, G. (2002). Vietnamese and Tonogenesis: Revising the Model and the Analysis. *Diachronica*, 19(2): 333-363.

Trudgill, P.W. (1992). *Introducing Language and Society.* Penguins book Ltd.

Tse, H. (2005). *The Phonetics of VOT and Tone Interaction in Cantonese*. (PhD dissertation), University of Chicago.

Tse, J. K.-P. (1978). Tone Acquisition in Cantonese: A longitudinal Case Study. *Journal of Child Language, 5*(2), 191–204

Tsukada, K. (2019). Are Asian Language Speakers Similar or Different? The Perception of Mandarin Lexical Tones by Naïve Listeners from Tonal Language Backgrounds: A Preliminary Comparison of Thai and Vietnamese Listeners. *Australian Journal of Linguistics, 39*(3), 329-346.

UNESCO. (2011*). Number of Endangered Languages by Country.* United Nations Educational, Scientific and Cultural Organisation Institute for Statistics, Paris, France. Retrieved from atlas/index.php?hl=enandpage=atlasmap

Vijayakrishnan, K. G. (2003). Stress and Tone in Punjabi. *Language in India,* 3(11). Retrieved from http://www.languageinindia.com/nov2003/vijayakrishnanpunjabi.pdf

Wang, W. (1967). Phonological Features of Tone. *International Journal of American Linguistics, 33*, 93 - 105.

Watkins, Justin. (2001). Burmese. *Journal of the International Phonetic Association* 31:291-295.

Welmers, W. (1973). *African Language Structures*. University of California Press.

Welmers, W. E. (1959). Tonemics, Morphotonemics, and Tonal Morphemes. *General Linguistics*, 4, 1–19.

Woo, N. (1972). *Prosody and Phonology*. United States: Indiana University Linguistics Club.

Xu, Y. (1997). Contextual Tonal Variations in Mandarin. *Journal of Phonetics*, 25(1), 61–83.

Yip, M. (1989). Contour tones. *Phonology, 6*(1), 149–174.

Yip, M. (2002). *Tone*. Cambridge University Press.

Zhang, J. (2010). Issues in the Analysis of Chinese Tone. *Language and Linguistic Compass*, 4, 1137–1153.