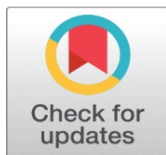


# DECODING SEASONAL VARIATIONS THROUGH ARCHAEOASTRONOMY

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## ABSTRACT

Before calendars, ancient cultures tracked the passage of time and seasons by observing the sun's position and its effect on the environment. This method, known as archaeoastronomy, was essential for agricultural planning, rituals, and understanding seasonal changes.

The Angami Nagas, a major tribe that primarily lives in Kohima District of Nagaland similarly used the position of the sun in relation to the mountain ranges to decode seasonal changes. Many ancient cultures have different ways to comprehend seasons, likewise the ancestors of the Angami Nagas from L-Khel, Kohima Village, in the absence of the existence of calendars; seasons were established by employing various cues from nature. They studied the position of the sun which gave inference of the best time for sowing seed and harvesting of crops. Their knowledge of the seasons also came by observing the trees, plants and flowers.

The paper titled, "Decoding seasonal variations through archaeoastronomy" is aimed to ascertain the credibility of such techniques, and if such practices can still be employed in establishing seasonal variations despite the current alarming rate of climate change.

**Keywords:** Angami, Kohima, Season, Nature, Sun, Position, Agriculture, Sowing, Harvesting

## 1. INTRODUCTION

Kohima village is often considered as the second largest village in Asia. It is located in Kohima, the capital of Nagaland, and serves as a significant cultural and historical center for the Angami Naga tribe. The village is divided into four Khels namely, Lhisemia (L-Khel), Dapfhütsumia (D-Khel), Pfuchatsumia (P-Khel) and Tsütuo nuomia (T-Khel).

Agriculture being the primary source of occupation for Angami Nagas, they practiced terrace farming, and crops such as rice, millets, maize and varieties of vegetables are cultivated. Before calendars, ancient cultures tracked the passage of time and seasons by observing the sun's position and its effect on the environment.

This method, known as archaeoastronomy was essential for agriculture planning, rituals and understanding seasonal changes. The Angami Nagas similarly used the position of the sun in relation to the mountain ranges to decode seasonal changes. Many ancient cultures have different ways to comprehend seasons, likewise the ancestors of the Angami Nagas from L-khel kohima village, in the absence of calendars; seasons were established by employing various cues from nature. They studied the position of the sun which gave inference of the best time for sowing seed and harvesting of crops, their knowledge of the seasons also came by observing the trees, plants and flowers.

## 2. LITERATURE REVIEW

“Angamia Lhou Kevor Dze a kesi”, by Dr. Kiyasetuo Dzüvichü is an attempt to trace the ancestry lineage of the Angami Nagas. The book consists of 12 Chapters wherein the author implies that the Tenyimia Nagas are of the lost Mannasseh Tribe of Israel.

In Chapter – 11 of the book he mentions about the position of the sun in relation to the mountain ranges and how nature itself indicate time for agricultural activities.

### Objectives

- 1) This paper is an attempt made to decode seasonal variations by means of the sun’s position as it shifts across the mountain ranges with time.
- 2) The study aimed at understanding seasonal changes in relation to the position of the sun and its impact on agricultural activities.

## 3. METHODOLOGY

The study is conducted at Lower L-Khel, Kohima village, Nagaland. The research approach is carried out through primary source of interview and secondary source. It follows a practical approach of decoding seasonal variations that has been in practice since time immemorial. It involves observing trees, plants and flowers, and if such observation can still be applied for inferring seasonal changes despite the drastic climate change.

Figure 1

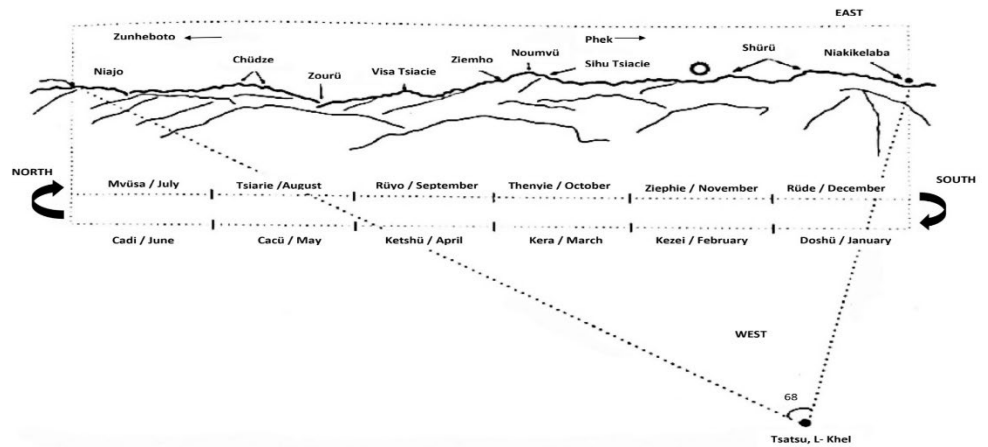


Figure 1

#### 4. FINDINGS

By observing the position of the sun crossing certain mountains in the East, our forefathers (the Angami Nagas of L-Khel) marked some prominent mountain ranges and peaks and labeled them with various names such as Niakikelaba, Noumvü etc.

##### 1) The traverse of the sun from the South to the North.

When the sun reaches *Niakikelaba*, it corresponds to the month of January where tilling of fields can be done. It is ideal to till fields when the sun hovers above *Shürü* and *Noumvü* which is from late January to March. It is easier to till fields at this period, and it is also believed that those fields that were tilled during this period later gives the best soil condition for optimum growth of the seeds into healthy rice plants and bear healthy paddy. The millets sown in March thrive as it receives rainfall from the Pre-Monsoon showers.

The position of the sun at *Sihu Tsiacie*<sup>1</sup> signifies that it is not ideal to sow paddy seeds as they do not thrive during this period, which corresponds to mid March. Legend has that Sihu (Mr. Know it all) sowed paddy seeds at this very period but none of plants produced harvest though it germinated. However, once the sun reaches *Noumvü*, sowing of paddy and vegetable seeds commences. The sun hovers above *Ziemho* for three days only. During this time the sun is dimmed, it is usually cloudy.

The most ideal time to sow any kind of seed is when the sun appears above *Visa Tsiacie*<sup>2</sup>. This follows the legend of Visa, a rich man who in order to know the most ideal time or day to sow paddy experimented for years. Finally, his seeds thrived and paddy saplings flourished the best during this time. So the placement of the sun above this area is known as *Visa Tsiacie* (loosely translated to the period when Visa sowed seeds) even to this day.

When the sun reaches *Chüdze*, preparation for 'phiedzü' (watered paddy field) begins which marks the beginning of Monsoon i.e. the month of May. As the sun approaches *Niajo* gradual works at paddy field is initiated, and this corresponds to the month between June and July.

##### 2) Movement of the sun from North to South

Once the sun reaches *Niajo* and goes towards *Chüdze*, millets are harvested and active work at paddy fields commences. The sun after its entry at *Niajo* moves from North to South known as *Niaki kekho-u*. Active paddy work continues till the sun is at *Zourü* that is the month of August.

After the sun surpasses *Zourü*, it is late as the paddy will not grow into healthy rice plants. During this time (late August) Jhum rice starts developing panicle grains. As the sun approach *Visa Tsiacie*, *Ziemho* and *Noumvü*, i.e from September to October, Jhum rice starts ripening and can be harvested. This period experiences cool and dry season which indicates retreating monsoon season.

The position of the sun at *Noumvü* indicates that it is no longer favorable to plant any other crops except vegetables like garlic and mustard. At this time of the year it is ideal to collect wood and bamboo for house construction. However, after December 22 when the sun's position changes from South to North, it is no longer ideal to collect wood and bamboo as they tend to rot and decay rapidly.

##### 3) Understanding cues of nature through trees, plants and flowers

Having knowledge about the time and period of sowing and rice plantation etc. were very important for our ancestors as agriculture was the sole source of

livelihood. Our forefathers associate the trees, plants and flowers, and connect them with agricultural works.

'Hutuo' (*Erythrina Orientalis*) and 'Teguo' (*Bauhinia Variegata*)<sup>3</sup> starts blooming in the month of March and April, in this period all kind of seeds can be sown.

By the time 'mecho' (needle wood) starts blooming, paddy work should commence. If work starts at the end of 'mecho' flowering, it is already too late to start paddy work. Our forefathers predicted the year's weather by observing the flower of needle wood. If the flower falls and lands on face-up position, it signifies that the weather will be harsh, however, if the needlewood flower lands face-down, the year weather will be normal.

'Pfhesei' (Garland Lily or ginger lily) blooms at the end of summer, which should mark the end of paddy works.

- 1) Oral interview with Mr. Thinuozequolie Dzüvichü, Age - 71 years, L-Khel, Kohima Village.
- 2) Oral interview with Mr. Ketsu-u Yhome, Age - 70 years, L-Khel, Kohima Village.

#### **4) Understanding the behavior of animals and birds**

The sound of animals and birds indicate the time to go to the field or return home. It signals the time to work and makes a person understand good and dangerous situations.

If the sound of Hutu (cuckoo bird) is heard, there is heavy downpour of rain. During this time, the position of the sun is at *Noumvü*. That is between March and April and it corresponds to Pre-Monsoon showers.

Hutu bird starts chirping when the sun reaches *Noumvü*, if hutu doesn't chirp even after the sun reaches *Noumvü*, that year, the rain come late. The Hutu bird (cuckoo bird) is a migratory bird, and so for the Northern Angami Naga if cuckoo bird is heard, they should start their field works. But for the Southern Angami Naga, once the cuckoo bird is heard, it is already late for them to work (sowing of seeds)<sup>4</sup>.

When the sun changes its position and reaches *Niakikelaba*<sup>5</sup> in December, owl starts hooting indicating that the years work will commence very soon.

When weather is bad the bird 'thenyie' (Great barbet) sound changes from 'krierülou' to 'kraü' but during good weather, it changes to 'krierülou' again.

### **5. CONCLUSION**

Many ancient artifacts and ancient devices still play an importance role in development of various technologies. The technique used by the Angami Nagas of L-Khel, Kohima village in decoding seasonal variation is just as significant as the Sundials and Obelisks used for determining time. This serves as a reminder of ancient ingenuity and their interrelationship with nature.

Through this study it is established that though climatic changes have taken place, it is still feasible to decode seasonal changes by careful examination of the sun's position. However, the limitation is that the mountain ranges as stated are as viewed from L-Khel Kohima village and the position of the sun in relation to the mountain ranges are not uniform throughout the entire Kohima village. Therefore, future research into this study can be taken up on establishing and correlating the mountain ranges with respect to the Sun's position as seen from the other Khels.

- 3) Oral interview with Mr. Ketsu-u Yhome, Age – 70 years, L-Khel, Kohima Village.
- 4) Oral interview with Mr. Thinuozekuolie Dzüvichü, Age – 71 years, L-Khel, Kohima Village.
- 5) Oral interview with Mr. Ketsu-u Yhome, Age – 70 years, L-Khel, Kohima Village.

### **CONFLICT OF INTERESTS**

None.

### **ACKNOWLEDGMENTS**

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