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ETHNOGRAPHIC STUDY OF ECO-COSMOLOGY OF HO COMMUNITY OF JHARKHAND

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ABSTRACT

Eco-cosmology, as a field of knowledge, reflects upon human perception, relationships, and adaptability to the immediate planetary environment. People in every society have their own conceptual cognitive categories and associated indigenous knowledge about ecology and cosmology. The purpose of this paper is to discuss eco-cosmological knowledge of the Ho people of West Singhbhum districts of Jharkhand, India. The present paper ethnographically elaborates the origin myth relating to land, plants, animals, and human beings and beliefs about celestial bodies like the sun, moon, and stars and geo-climatic events like earthquakes, thunder, storms, rain, seasonal variations, day and night, etc. Further, the younger generation's exposure to local knowledge in the present context is explored to assess the continuity and change in traditional eco-cosmology. Therefore, the paper fills the existing void in field of eco-cosmological knowledge pertaining to the Ho of Jharkhand.

Keywords: Eco Cosmology, Ho, Indigenous Knowledge, Metrology

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1. INTRODUCTION

The concept of cosmology is generally understood as a science of the universe. It is a branch of astronomy that studies the universe as a whole. Under cosmology, themes like planetary systems, solar systems, galaxies, moons, stars, etc. are generally studied. However, from the anthropological point of view, the term cosmology is used to refer to the set of knowledge, beliefs, interpretations, and practices of a society relating to the concept of the world, life, and humanity and its role within the universe. Cosmology also explains humanity's past, present, and future as part of its knowledge of cosmic genesis and deals with human origins, finality, destiny, and other forms of existence. These cosmologies are not just systems of knowing but ideational and operational systems; knowing more about the universe may encourage people to live sustainably balanced lives. Forest

dwellers like Ho of West Singhbhum in Jharkhand are more aware of cosmological belief and knowledge and its implications in life practices, owing to their "ecological ethnicities" (Parajauli 1996). For them, cosmological and ecological wisdoms are often connected.

Thus, the term eco-cosmology is used here to connote key knowledge of ecologically situated cosmologies of Ho people. The word eco-cosmology is composed of two different words, i.e., eco, which means dwelling or environment, and cosmology, which is the science of the universe's origin and evolution. From the indigenous point of view, eco-cosmology is perceived and practiced through various images, symbols, stories, etc. Explaining the eco-cosmic vision of Indigenous people requires understanding the relationship between life, land, air, and water and recognizing the sense in which the human-earth relationship exists. In recent decades, humans have learned that human activities are destroying life on earth at an unprecedented pace, which conveys a sense of urgency to protect and preserve. Understandings of local eco-cosmological perspectives strive to outline community resilience towards global ecological crises like climate change, mass extinction of our companion species, and contamination of land, air, and water.

Therefore, the present study has been conducted keeping eco-cosmology at the center of inquiry, in which origin myths, knowledge about celestial bodies like the sun, moon, and stars, and geoclimatic events like earthquakes, thunder, storms, rain, seasonal variations, weather forecasts, day and night, have been described. These sets of knowledge are significant in everyday survival and adaptation. Eco-cosmological knowledge is presented here not just as a matter of data or facts but as a repository of wisdom, which dovetails everyday negotiations with immediate environmental changes. During the present phase of human existence being termed the Anthropocene and age of extinction, ecological cosmology should not just be examined from a western epistemological framework but also be dealt with in relation to local traditions, cultural practices, and ethical plateaus.

2. METHODOLOGY

This study is based on ethnographic modes of knowing and writing and presents a descriptive account of primary data on the eco-cosmology of the Ho people of West Singhbhum, Jharkhand. The purpose of this ethnographic paper is to comprehend and document the Ho community's eco-cosmology, as well as identify its meaning and significance for people in present time. What is the mechanism through which the Ho sustains a profound eco-cosmological belief system? How do the Ho anticipate their environmental changes and cosmological events and adjust accordingly? How do the youngsters comprehend eco-cosmological traditions amidst their exposure to western scientific visions of the same? With these objectives in mind, the present study was conducted.

1) Study area

The fieldwork was conducted at Barandiya village, located in Sadar Chaibasa Block of West Singhbhum district. The village is part of Simbia Gram Panchyat and comes under the jurisdiction of the Mufasil police station. This village consists of sub-villages like Latar Sai, Dunma Sai, Chitra Sai, and Banana Gutu having Ho as the majority population. Presently, there are a total of 150 houses, in which 178 families are dwelling, in this community, with a total population of 739 people, of whom 349 are female and 390 are male. The other castes, like Gop, are limited to five households only.

2) Methods

For the present ethnographic study, a pre-planned timeline was developed to gather information and detailed fieldwork has been conducted during September 2022 to July 2023. The primary respondents are villagers, men and women, young and old, who actively shared their understanding, ideas, and beliefs. The data collected through focus group discussion and individual interviews were mainly used, where the villagers were found to have good practical information about their tradition relating to eco-cosmological knowledge.

3. ECO- COSMOGENESIS AND CREATION MYTH

The Ho possess well-informed knowledge about the genesis of the environment. The origin myths narrated by them depict eco-cosmological ideas about land, forests, trees, animals, and human beings. *Singbonga*, the supreme deity, is credited with the powers of creation for the entire universe. No anthropomorphic attributes are assigned to the deity, but it is considered all too powerful to control the different forces of nature. The cosmogenesis processes described by Ho are as follows:

1) Creation of land

People from Ho community know that thousands of years ago, there was no land, animals, humans, or other creatures on the planet, just water. Their supreme deity (*Singbonga)* wondered, 'What can I do with this water without all around? So, first of all, I have to make land'. For this, I need someone to help me make land by bringing soil from the surface. Keeping this in mind, *Singbonga* made a turtle and released it in the water, which started digging the soil and collecting it in one place. But it was taking him a long time to do this work. Then one day, the tortoise said to *Singbonga* that I am not fully capable of doing this work alone as I have only two hands, and it will take more time to bring this soil up and dig it up. You create something that has more than two hands. Hearing this, *Singbonga* made a crab that had five arms and five legs and sent it into the water. But then, despite having five hands and feet, the crab could not dig the soil. Then *Singbonga* started thinking about how to bring this soil up; therefore, he created two earthworms, one male and one female, and put them in water. Then, after a few days, *Singbonga* got worried since the process of land formation remained incomplete and started wondering if these two earthworms were not doing their job properly. Perhaps earthworms might have died in the water, but both of these earthworms were alive and have survived by eating the soil below the water. And many other earthworms were born because of male and female earthworms. These increasing earthworms continued the process of digging the soil and eating that soil below water. After a few days, the water level gradually decreased, and the ground became visible on the top of the water surface. *Singbonga* realized that these earthworms were not dead but engaged in the process of making land. In this way, all these earthworms together created many hills and mountains.

2) Creation of trees, plants, and animals

After the creation of the land, *Singbonga* realized that the land was not perfectly flat and was worried about what he should do with it. And then the crabs, tortoises, and earthworms told *Singbonga* that, Lord, you can build something with both arms and legs, and with the help of such creatures, the ground can be levelled. *Singbonga* then created two humans: one was a female named *Surmi,* and the other was a male named *Dhurmi*. *Singbonga* engaged both men and women in levelling the land. After some time, *Surmi* and *Dhurmi* urged *Singbonga*, 'We will not be able to do this work

alone; please send someone else to help us', then *Singbonga* sent a tiger, an elephant, a deer, and a bear to the earth to help them. Then all these species worked to level the land. The trees and plants produced on the high ground turned into a forest.

3) Human creation myth

Thereafter*, Singbonga* was very happy to see the earth's greenery and said, 'Oh, how beautiful this earth is, but how to make it more attractive?' *Singbonga* said to Surmi-*Dhurmi*, 'Who on earth will be able to offer you and me?' Then *Surmi-Dhurmi* requested that *Singbonga* make something that could live on earth with arms and legs. *Singbonga* then made a clay idol in human form and made it alive. *Singbonga* named him Luku. Then *Surmi-Dhurmi* said to *Singbonga that* this man does not live with us and wanders like a lunatic. Then *Singbonga* asked him, What can I do? He replied, You created us and all other creatures as male and female; therefore, *Luku* also needs a companion. Then *Singbonga* put *Luku* in deep sleep, took out one of the bones from his body, and gave it the shape of a woman. After waking up, *Luku* asked *Singbonga*, 'Who is this?' *Singbonga* told him, 'She is your companion, *Lukmi'*. *Singbonga noticed* over a period that all the other animals were multiplying, but humans were not. *Singbonga* found that *Luku* and *Lukumi* always kept a husk pole between them at bedtime so they could not become intimate. Then *Singbonga* wondered if this continued, humans would not multiply, and Supreme God walked up to them in the form of an old man and told him about rice beer and its preparation method. *Singbonga* gave them the yeast (*ranu*) required for preparing the rice beer and taught them how to make it. After drinking rice beer that night, they crossed the husk pole and had intercourse. From that day on, they began to live as husband and wife, and they produced progenies, and humans also expanded on the earth.

4. HO CELESTIAL KNOWLEDGE

Ho people could depict various degrees of celestial understanding and its practical nuances in everyday life. The changes and understanding of these celestial bodies and different weather changes have been observed daily and are described below.

1) Sun (Singi)

For Ho people, the sun is the part of nature and they are devoid of knowledge of any presence of solar system. However, the events of day and night is credited to the presence of sun, which in turn is revered as *Singi bonga*. Villagers strongly agree that no creature in the world can survive without the sun and they consider sun as a source of life. *Singbonga* made *Singi bonga* for creating light in the darkest of the places. Nobody can stop his light and the supreme creator has given sun to shower everything on Ho people and their environment since beginning. People narrate a story regarding the existence of night and day. In the past, there was a quarrel between the sun and the moon. The sun used to say that the light on the earth is due to me, and the moon was claiming the presence of light due to it. In such a situation, sun was hidden in a cave in a fit of anger. As a result, the entire earth entered darkens. And all of the creatures that live in universe become quite concerned. Where will they acquire their meals from now on? While doing so, all of the animals began arguing about who would bring back the sun now. Meanwhile, a cock suggested that I bring the sun out of the cave. The cock started shouting 'kuk ru ku' at exactly midnight. Sun was shocked to hear this voice and wondered, 'What is this voice?' However, he never came out of the cave. After waiting for some time, the cock again raised the sound of 'kuk ru ku'. This time, along with this cock, other cocks were also crowing in unison, and then the sun peeped from cave a little after

listening so much crowing. The cocks saw that the earth had become lighter again, thus cocks continued to shout loudly. Then the sun came off the cave and light prevailed on earth. From that time till now, it is stated that the sun goes to that cave every day, and without the cock crowing, the sun does not rise, which is the way day and night came into being.

2) Moon (Chandu)

The moon is considered a very affectionate creature among Ho. People use the lunar calendar, which is based on the moon's cyclic appearances. The month calculations are done from the first full moon to the second full moon. This is explained in detail in the section on the seasonal cycle. The new moon day (*hende chandu)* and a sighting of the new moon (*neer chandu)* are considered inauspicious events. Sometimes the moon hides in the sky; people call it '*Chandu niri anae*'. The sudden absence of the moon is not a sign of any kind of auspicious or inauspicious thing. Ho do not worship any spirits on this occasion, but there are certain taboos associated with this day. On this day, people do not work at night; no work is allowed in the barn (*kolom*), like preparing bundles of paddy, husking, etc. On the new moon, giving loans like money or any other goods is prohibited because it is believed that the money will also be gone, like the moon. The full moon is known as *punai chandu,* and the moon on that day is called *chandu oliya.* All festivals, auspicious works, and rituals are mostly done during the full moon. Ho priest (*deuri*) suggests auspicious and ominous days based on the moon's direction. If the moon's direction is east-west, it is considered a bad day; if the moon's direction is north or south, it is considered an auspicious day. On an auspicious full moon day, all auspicious activities are preferred. The first feeding of babies (*jim namai tene le*) is organized during the full moon cycle. Our field informant Sonaram Deogam, during group discussion, compared the moon cycle with the agricultural cycle, metaphorically exclaiming that "the way the farming work is more intense in the beginning, and then it gradually decreases, is the way the light of the moon also decreases gradually, and then a new moon happens". Ecology and cosmology are conceptualized together to bring closer the importance of both in a Ho life.

3) Stars (Epil)

In the Ho language, a single star and a group of stars are called *epil*. However, there are certain stars that individuals may view by making a connection to their normal daily routines. One of these is the primary star, known as *Aad Epil. When three stars* are placed to form a triangle, two represent bullocks in front being used to plough the fields, and the third star is a wooden plough linked to them; it is *Aad Epil*. The bull's plough is named *aad,* and therefore the star is named so. *Ango Epil* is always alone in the south direction during the night. By looking at this *Ango Epil,* people can find out the time of night and morning. As the night ends, *Ango Epil* moves from south to east and lasts till morning. When this star is seen towards the east, people understand that it is morning. The constellation *Karkom Epil* is made up of four stars that are in the shape of a quadrilateral. It is said that stars in this group remain at the same distance and direction, like the corners of a cot (*karkom*). Occasionally, three more stars align with this and form a constellation of seven stars, which they refer to as the Seven Sages (*Saptarishi).* Since this is quite similar to the *Saptarishi mandal* of Hindu cosmology, it depicts a continuum of cosmological belief with neighboring people. These seven stars are known by different names similar to the seven days of the week, which are *Sombar*, *Mongdobar*, *Budhubar*, *Gurubar*, *Shukurbar*, *Sunibar*, and *Ruibar*. A prominent star named *Punchal Epil* appears occasionally, generally after a long period of time, and its visibility is considered harmful and may cause poor rain as well as drought and famine. *Bonga Tode Keda* is

the name given to a broken star caused by *Bongas*, but it is not intended to create any unusual or harmful incident.

4) Eclipse (Sabakai)

A solar eclipse (*singi sabakai*) is believed to occur due to the union of the moon and sun. People ceremoniously cut a few branches from the trees near their homes during a solar eclipse, believing that the tree would thus produce more fruit. Apart from this, people believe in ghosts (*siri*) and think that the ghost gradually consumes the moon and the sun; hence, the sun and the moon become invisible. If pregnant women observe the solar and lunar eclipses (*siri sabakai*), then it is believed that the baby will be born with a cleft lip because the shape of the baby's lips is like the moon. They fast during the eclipse because, according to belief, if they consume anything at that time, the *siri* will devour them like the moon and the sun.

5) Earthquakes (Ote Docol)

The reason for earthquakes or land tremors is linked to *Sinbonga*. He has raised the whole earth on one hand when he could not endure, then shifted it to the other hand. At this time, the entire earth trembles, but it does not harm anyone. No informant ever argued that *Singboga* is to blame for earthquakes and any similar natural disasters. It is rare for Ho to ever experience an earthquake, and no one could narrate any recent experiences of earthquakes in the village. Therefore, there are no religious rituals to mitigate events like earthquakes.

6) Fire (Sengale)

Fire (*sengale*) is believed to be auspicious, as is *Bonga's* gift for converting raw food into cooked food. Now they use matchboxes for igniting fire for various purposes; however, traditionally, they used to light fire through local methods. During hunting expeditions, animals used to run from one place to another, and in the process of running, small stones colliding with each other generated sparks. In this way, the forest's dry leaves used to catch fire, and their forefather acquired this knowledge about fire by observing natural fire in forests and developing local practices for generating fire. They make a hole in bamboo (*maad*) wood and then put semal's (*heldu daru*) cotton on that hole and cover it with silkworm's cocoon (*lugam*), then the hole is rubbed with a stone. Doing so would ignite fire in cotton, which is used for lighting hearths. Another method is to take two wide pieces of wood first and put some dry leaves in one of them by making a hole. The leaf catches fire after some time while the wood pieces are rubbed together.

7) Thunder (Tere Tana)

Thunder (*tere tana*) is believed to be due to Tere Bonga, who throws fire from the sky during the rainy season. Some people believe that the thunder is caused by clouds. When thunder falls on any tree, people do not use the tree's wood in house construction. If this inauspicious tree is used in the house construction, then there is a high possibility of lightning on the house as well. The wood of any tree struck by lightning is not even utilized for firewood. If someone uses such wood in the kitchen (*adin*), they will die of thunder; there will always be a fire risk for that person. People use this wood in the hearth outside the home when there is no firewood available. A woman during her pregnancy is not allowed to go outside of her home because that child is more prone to lightning. While working in the agriculture field, they keep cow dung beside them; by doing this, lightning does not fall around them. It is believed that in the past, if lightning fell on a tree, people indulged in the custom of digging the soil and pouring water near the tree immediately. It is believed that people may get an iron rod (*sabbal*) while doing so.

8) Hailstorm (Aaril)

The hailstorm (*aril*) occurs when the white cloud (*pand rimil*) and the black cloud (*hende rimil*) meet each other, and there is a strong wind at that time. Some also believe that *Singbonga* does this to spoil the new leaves. People sprinkle salt in their courtyards to reduce the storm. It is claimed that by doing so, this large snow melts and the hailstorm reduces in a while. This sprinkling of salt in the courtyard is often done by the youngest daughter of the home, although other members of the house can do it in her absence. It works quickly when this process is done by the youngest girl in the home.

9) Windstorm (Horol Sing)

Among Ho villagers, the occurrence of fast wind blowing in circular fashion is believed to be a ghost. People hold their breath for a second to protect themselves from such a ghost, and they also hang a broom in the courtyard of their house so that it goes away. The forest is believed to be the source of origin for such stormy winds. Usually, a windstorm may come and destroy the roof of the house. If some houses are destroyed by *horol sing*, then it is believed that houses have obstructed the natural path of *horol sing*, and that is why it faced the ire of windstorms.

10) Winds (Hoyo)

The winds (*hoyo*) based on direction, character, indication, and timing are given names. The *Sanga ol hoyo* blows from the east mostly during July and August. People would assume that if there were a heavy wind coming from the east, the rain would be reduced. The *Singasur hoyo* or *Jojo hoyo* comes from the west, or *Singasur hoyo* flows, which causes more rain. The *Horosi* or *Bokodawa hoyo* blows from the south and is not as strong as *Anga Bire* or *Sanga ol hoyo*, but when it blows, there will be continuous, slow rain for 4 to 5 days. People believe that many different types of insects (*chidu)*, such as grasshopper *(bata),* are prevalent during such winds. These insects destroyed paddy cultivation. The *Anga Bire hoyo* coming from the north is considered more auspicious. In Barandiya, *Angabire* is considered a bonga whose abode is in the north forest (*buru*). Earlier, it was believed that *Anga Bire Bonga* used to give paddy to people on loan. After one year, this loan with extra interest has to be repaid.

5. INDIGENOUS METEOROLOGY

Understanding and predicting weather patterns and other climatic factors are significant for rural communities whose livelihoods are directly dependent on climate and weather change. The Ho elders have preserved elaborate traditional metrological knowledge and they share it with ease and assurance as described below.

1) Rain (Gamma)

In Ho knowledge system, the clouds (*rimil*) coming from different sides collide, causing thunder and rain. When clouds come from the west and south, that rain is considered pure rain and is good for agriculture. But the dark, black cloud from the north does not bring pure rain. When a black cloud comes from the east, there is a very low possibility of rain because they believe this cloud is scattered throughout the air. In the annual rain cycle, there are usually three phases, and each rain phase has its own quality.

The first rain phase (*dete gama, jaati gama, haar da gama, and ruka gama*) is considered one of the essential rain cycles for Ho because all the agriculture-related activities depend on it. This rainy phase will probably occur between mid-June and

mid-September. Farmers will begin plowing their agricultural fields once the rain arrives. When the second rain comes in the same cycle, it is called *aira gama*, because of which they plough the agriculture fields at that time. This rain is primarily used for the staple food source of Ho, which is paddy cultivation, which is essential for their survival.

The second phase (*jaargi da/goma gama/rath gama*) of the rainy season is generally during mid-October. The agricultural field shown during the first rain phase is again plowed. Due to re-ploughing after rain, paddy plants get more space to grow. All rabi crops are cultivated during the rainy season, including paddy (*Kundi baba, Beda baba, and Saal baba*) and vegetables such as ridge gourd (*juni*), tomato (*bilaati*), radish (*mulaati*), long beans (b*odie/barbati*), seim bean (*sirmi*), pumpkin (kokadu), etc.

This third phase of rain (*indi gama/sardi gama*) occurs from January to February, and pulses like yellow gram (mungi), tur gram (riyadi), black gram (ramba), red lentil (masoorie), chikpea (*moroye jang*), a local variety of small-sized pea (kalaya), and oilseeds such as flaxseed (*uchi*) and mustard (*khesari*) are reliant on this rainy phase.

2) Rain Forecasting

Most of the indigenous communities worldwide utilize traditional weather and climate forecasting to guide critical decisions that help them deal with and adapt to climate change-induced extreme weather conditions. Indigenous knowledge has typically predicted rain based on observations of many biophysical entities, such as cattle, insects, birds, plants, and animals (Balehegn, 2019). For example, East Africa uses biological indicators for weather forecasting, which can be further subdivided into animal and plant indicators (Radeny, 2019). Ho has a remarkable set of knowledge of rain forecasting related to biological such multispecies indicators.

Plant behaviour and Rain prediction: The first flower of Palash (*mur daru*) blooms in the spring. Ho people predict the rain by looking at the direction of the seed of the palash fruit. If the seed is in the upper part of the fruit, it will rain earlier than usual. And if the seed is in the central part of the fruit, then rain will be delayed in that year; if the seed is in the lower part of the fruit, then there is a possibility of less rain in that year. In any year when there are more flowers on mango (*ulli*) and sal (*sarjom*) trees, it is believed that there is a possibility of more rain in that year. People believe that when these trees bear fruit and flowers on the lower branches, it is a sign that good rains can be expected throughout the monsoon. Conversely, when the trees bear fruit and flowers on the upper branches, it is a sign that good rains cannot be expected throughout the monsoon. When the fruits of sal (*sarjom*), piyar (*tarob*), kendu (*tiril*), jujube (*bakara*), kusum (*baru*), and mahua (*madkam*) are in bunches, strong winds are predicted. There is no chance of good rainfall, and there is a high chance of crop failure. But when the tamarind (*jojo*) tree bears abundant fruit, it indicates good rains. When the tamarind tree does not bear much fruit, it indicates fewer rains. On the occasion of *Otili* in the *Maghe* festival, when rice beer is poured into earthen pots in the courtyard by the village Preist (*deuri*), they watch to see in which direction this extra rice beer flows. It is believed that the first rain will be from that direction.

Rain predication based on animal behaviours: People predict the rain by observing the direction of the sparrow's (*dedem*) nest. So, in the direction predicted from which the rain is most likely to come, there is no door of the nest in that direction, but it is in the opposite direction, and in the direction from which the chances of rain are lower, the door of the nest is often towards the front. A ringtail (*gindari*) often flies from above to below and then downwards. In the years when it

is going to good rain, this bird will make its nest in the field under a small plant, and in the years when it is not going to rain or when there will be less rain, this bird will make its nest in the middle of the agriculture fields. These birds are more commonly seen in the rainy season.

Whenever a chameleon (*donda*) suddenly falls from a tree, people believe that there is a possibility of rain. Similarly, when a white heron (*ko*) suddenly appears around the fields, there is a possibility of rain in that way. The herons are mainly seen in the cultivated areas, and whenever they are seen flying from above to below and from below to above, there is a possibility of rain. Similarly, when the rain is good, the crab (*kadob*) makes its burrow at the edge of the agricultural field, and when the rain is not good, the crab makes its burrow in the middle of the field. Pigeons (*dudlum*) always build their nest on the tree, but perhaps sometimes the nest is built on the ground to show that the rain won't be much that year.

Ants (*mui ko or hau*) and the houses of ants (*bunum*) are sources of rain forecasting. It is estimated that when red ants live on the top branches of trees, the rain will be heavier that year, but when an ant lives in the bush or on the ground, it is more likely that the rain will be heavier that year. Snakes (*binku*) are also a good way to foretell rain. The harvest will be good if rat snakes (*jambu binku*) come out of their rat holes and are seen in significant numbers that year. When *loyog binku* are more visible around the village shrubs and grasses, the rain will be very heavy. Then cobra (*pandu nage binku*) making slow noise like 'tar-tar' means that the rain will be deficient, but when the sound gets louder or higher, it means that the rainfall will be increased. Frogs are also good indicators of rain. So, when the big frog (*aaun chokeko*) makes a sound, it means that the sun will be hot and there will be intense rain very soon.

3) Forecasting rain through celestial bodies

Ho people utilize celestial bodies, such as the sun, moon, etc., to predict the rain. When the sun appears white, it is an indication that rain will not come, but when the sun appears red and a white ring is found around the sun, it indicates rain. But if the ring is farther from the sun, it suggests no rain. This knowledge is mostly used during the rainy season. When the sun does not rise in the morning, it is said that the clouds have stopped. It is believed that if the sun is white at the time of its rise, it will not rain soon, but when it is fiery red, it will rain soon. Similarly, a ring closer to the moon signifies early rain, but a farther ring suggests rain after the next full moon (*punai chandu*). When the moon appears light red, people guess it will rain, and when it looks white, they believe it will not rain. People believe that when the moon appears slightly bent (*koche*) shaped in the sky, it signifies a bad future for their crops and rain, causing them to anticipate unfavourable weather conditions.

6. INDIGENOUS HOROLOGY

Indigenous time prediction techniques are generally based on various interpretations of the sun, moon, stars and their direction, as well as some indications from animals and birds. The people also have the concept of time for hunting, marriage, agriculture, and so on in their cosmological knowledge system.

1) Understanding Time

Ho understanding of the existence of the day and night cycle is linked to religious spirits and their powers. *Singbonga* has given day and night, so the sun rises, and when the clouds cover the sun, night happens, and when the clouds diverge, the sun then gets morning again. People believe it is time for the night when the sun is not fully visible. Morning (*Sita Pang)*, afternoon (*Tikin or Muli Tikin)*, time

between noon and evening *(Tara Singi),* and night (*Nid*a) are four phases in an entire day. Earlier, when the clock was not invented, people used to know the time by looking at the sky. In the sky, the essential elements used to determine the time are the position of the sun, the moon, stars, etc. But at present, having the facility of being aware of the time, people guess the time based on their early experiences with watches. However, some elders still use this ancient method to guess the time, and people working in the fields often find the time only based on sunlight. People know about the morning by looking at the stars. *Ango epil* is the morning star; seeing this in the sky, people guess that morning is about, and it is corroborated with cocks making noise for people to wake up. When the sun is located above the head, it indicates noon. In the same way, if the shadow of a person is standing in the middle of the person, then it is noon. When the birds fly together, it indicates that it is evening because this is the time when birds and humans should go back to their respective nests and families.

2) Annual Seasonal cycle

Ho believe in the role of the sun and the moon in bringing about seasonal changes. Ho has ideas about seasonal variations and has named three seasons according to local nomenclature. The Ho use a lunar calendar; therefore, a year is split into three major phases consisting of four lunar cycles each. Therefore, these three phases are: summer, autumn (*upun chandu riya rampya*), spring, rainy (*upun chandu tiraltada*), and winter (*upun chandu kakaya kukaya*). The Ho's agricultural works are divided into these seasonal cycles. People see the moon and estimate the time and month. According to them, the day from the first full moon to the second full moon counts as one month. People may know that the second month has begun when the moon moves towards the east. The rising moon is called *Uju Chandu.* Their month begins with the month of Push. In the month of Push, the half-day of December (*sardi*) and the half-day of January (*push*) together are considered as one month. From the day when the moon first appears in the sky and then gradually becomes a complete circle one day, this day is called full moon (*punai chandu*). Then, after the full moon, when the moon gradually decreases until the day it is not visible, that day is called the new moon (*hende chandu*). The time from the new to the full moon is one month, and the second month will start when the moon appears slowly after the new moon day. The moon that emerges after the new moon is called *Mulu Chandu*.

3) Monthly Calendar of Ho tribes

According to the Ho people, the twelve months of the whole year are divided into three different seasons, which have been mentioned in detail below, which is as follows.

Seasons in Ho Cosmology	Months	Month in Ho	Weather	Cultivation Pattern
Upun Chandu Riye Rampya	January	Push	The cold weather in January and February retreats and March, April is the autumn season when trees shed their leaves.	In the month of January, Maize, Bajra, Kudrum, and Gora Paddy get mature and ripe in the field. In February, crops are harvested, and pluses (Arhar, Tisi, and Masoor daal) get matured and ready for harvest.
	February	Mage		
	March	Chandu		
	April	Ba Chandu		

Upun chandu tirla tadad	May	Jaith Chandu	May, June, hot weather, and July and August are rainy seasons.	In June, after the rains, the process of sowing of paddy starts. In August, the process of Karhan happens. This is core cultivation phase.
	June	Babaher Chandu		
	July	Jaragi		
	August	Jaregi		
Upun chandu kakaya kukaya	September	Rabang	These three months are winter season.	Goda paddy becomes mature and ripe in September and October, and even the harvesting process gets started. This process gets completed by December.
	October	Rabang		
	November	Saardi		
	December	Saardi		

The conception of time and seasons allows people to decide regarding important events like marriage and other rituals. Ho decides the timing for hunting expeditions, preferably on full moon nights. On the full moon, it is believed that all animals fast. As a result, these animals remain sluggish, making it easy for humans to hunt them. This hunting ceremony is called *Sangar* in the Ho language. People go hunting also when the moon's light is evident. Ho decides the date of marriage by looking at the moon. The two days before and three days after the full moon are fixed for the marriage. This does not happen often because the reason for holding the wedding during the full moon is for the moonlight.

7. YOUNG GENERATION'S ATTITUDE TOWARDS ECO-COSMOLOGY

After finishing elementary school, most of the Barandiya's youngsters move to a neighbouring urban area to pursue their senior secondary and other higher education. These students are not familiar with conventional eco-cosmology and, when asked, will say, "We don't have any knowledge on this topic and go ask our father or grandfather who might be able to share this information". The new generation, which is now being trained in basic geography in school, has started interpreting the environment through such western scientific terms. On the other hand, those young boys and girls who are still living in the village have acquired this traditional eco-cosmic knowledge. They continue to preserve information about agriculture, rain, seasonal changes, and other topics through this traditional knowledge, mainly through the behaviours of trees and animals. The younger generation has contributed by its inputs in preparation of this comprehensive ethnographic material and, to an extent, depicts their interest in oral knowledge of the community. While interacting with older people in the field, they were better able to explain the knowledge shared by the older generation to make researchers understand the topic being discussed. However, they were not very convinced by the older generation's explanations on several topics. Even high school and college-going students are aware of the creation stories. According to their own interpretation of what they have heard and what they might have learned from the textbooks, these are two different realities. The youngsters in the village are quite keen to acquire the traditional knowledge. Thus, eco-cosmic knowledge is still practiced today and is given significant value by the younger generation, and it is believed to be part of their spiritual tradition and cultural roots. The young are able

to consciously differentiate between bookish knowledge and community wisdom and practically deploy both understandings as per the situations.

8. CONCLUSION

People's assumptions, predictions, and beliefs about their cosmos and environment are profound. Eco-cosmological belief systems are essential for nature conservation, and at the same time, they keep man and nature together. For example, the knowledge of weather and climate change in the lives of Ho people is considered necessary for their economic work, as their agricultural practices are still based on rain and seasons. These people have a practical experience of understanding almost every ecological event in their surroundings and they are worried about changes in the environment today. Traditional eco-cosmological knowledge is still relevant in their everyday survival in a given environment and provides resilience mechanisms to cope with the environmental changes. The young generation, though, is less aware of these specific human cognitive connections with nature, but they never question or ridicule the knowledge of their elders. Therefore, it is significant to document this knowledge and find value in them providing for human life in a shared environment with other species and material beings.

CONFLICT OF INTERESTS

None.

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