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CULTURAL ASTRONOMY OF THE BHIL, PAWRA AND KOKNA ETHNIC COMMUNITIES IN WESTERN INDIA

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Abstract: We report on the astronomy rooted cultural practices of three indigenous ethnic communities of western India, the Bhil, Pawra and Kokna, situated in north-western Maharashtra. These groups have their own unique connection with the sky which is influenced by their surroundings. Their astronomical lore is distinct from the astronomical lore in mainstream Indian culture, but shows a connection with other central Indian tribes. These communities determine local time, rainy periods, harvesting periods, etc. based on certain astronomical phenomena as well as the rising and setting of certain constellations and stars. Their level of astronomical knowledge provides interesting clues about their shared cultural roots.

In this paper we will also talk about our experiences and challenges of data collection, and what this led us to conclude about their astronomical beliefs.

Keywords: Indigenous astronomy, Bhil, Pawra, Kokna, Big Dipper, Milky Way

1 INTRODUCTION

The conventional astronomies around the world identify very similar patterns in the sky, and the Babylonians were probably the first culture to formalize them. Some early twentieth century historians like Tilak (1893) suggested that some constellation patterns were probably identified even before humans dispersed into Asia from further north. Hence these are stories of a common heritage of human beings even though local stories may vary from region to region (Vahia, 2021).

In this context, the study of the astronomy of isolated communities[1] plays an important role. Isolated tribes tend to have their own perspective of the sky. Some of us have been studying the astronomical beliefs of different tribes in order to get a perspective on their approach to the sky. Our studies have included tribes of Central India (Halkare et al., 2018; 2019; Vahia and Halkare, 2013; Vahia et al., 2014; 2016), South India (Vahia et al., 2017) and Andaman and Nicobar Islands (Vahia et al., 2018), and we have also summarised some results in a search for general patterns (Vahia and Halkare, 2017a; 2017b).

Here we report the astronomy of three tribal groups or communities of Western India (see Figure 1). We explain ethnic and cultural background of these communities in Section 2. In Section 3, we describe our methods of data collection and the demographic statistics of our participants. We also describe the geographical spread of our sample as the data collection was done *in situ*. In subsequent sections we present collected data in tabulated manner and discuss its significance.

2 THE COMMUNITIES

Participants of our sample may be grouped under three distinct cultural identities, namely 'Bhil', 'Pawra' and 'Kokna' (or Kokni / Kukna). Some anthropologists would argue that 'Pawra' are merely a subtype of the overarching 'Bhil' identity and some others would argue that even within each of these three groups, one encounters enough cultural markers to warrant a further division.

Genetic data suggests a shared recent common ancestry between individuals of the Bhil and Pawra tribal groups (Debortoli et al., 2020), and to a lesser extent between individuals of the Warli and Kokna tribal groups. In contrast, all the other pairwise population comparisons indicate much more limited IBD sharing. The Bhil and Pawra live in the same geographic area within the Nandurbar district in northern Maharashtra. The Pawra are often considered a sub-division within the Bhil groups but these are identified as different tribal groups

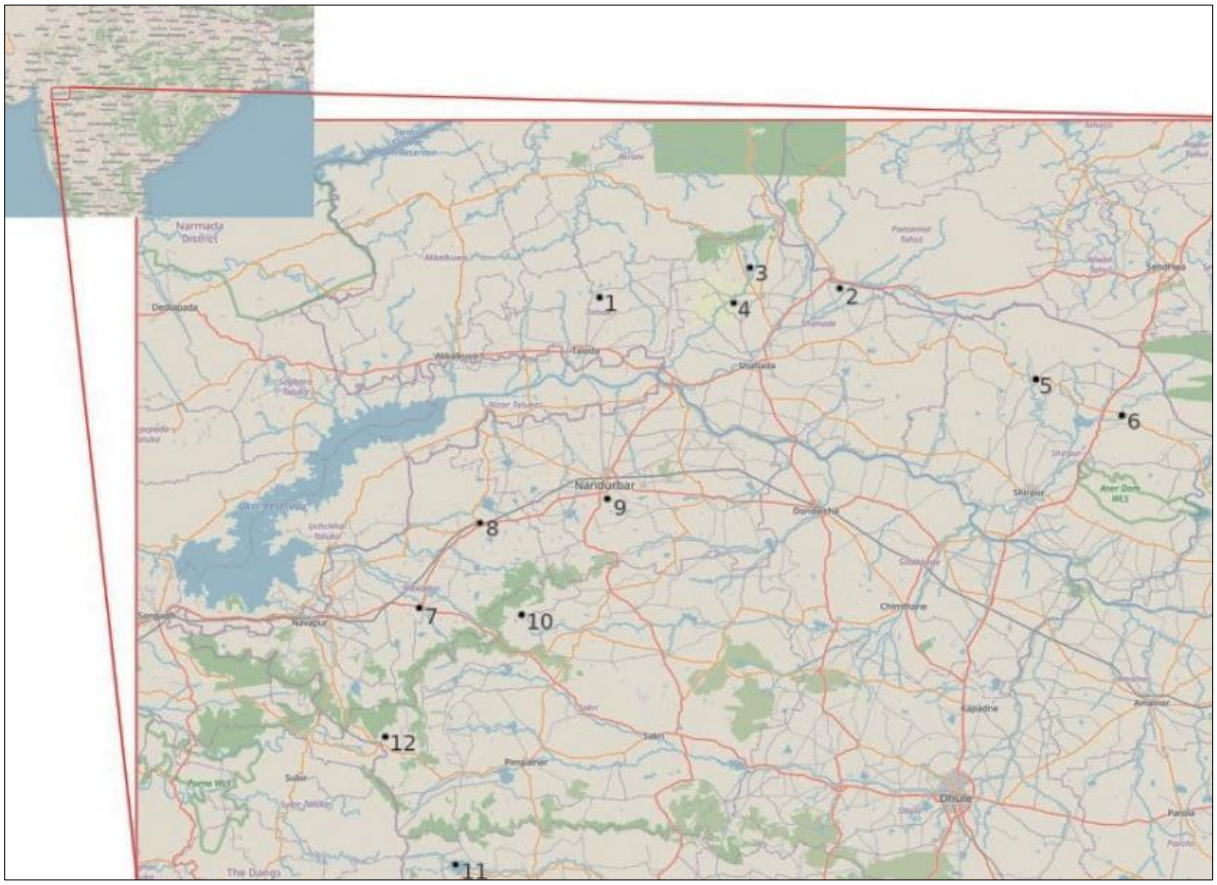

Figure 1: Location of the tribal villages. The background map is taken from the openstreetmap project. The numbers show the sequence of villages that we visited. For directions, North is at the upper side of the image. Green indicates protected forest areas; blue are water bodies. For scale, the distance from Village 5 to Village 6 is 16 km (base map: https://www.openstreetmap.org/#map=7/19.503/78.541; map modification: Aniket Sule).

by Enthoven (1990). The Kokana and Warli groups also live in the same geographic region in the Palghar district. Close affinity between the Bhil and Pawra and to a lesser degree between the Kokana and Warli was also previously shown by dental nonmetric traits and mitochondrial D-loop sequences. As a consequence of this close affinity, it will be shown later that there are instances where cultural astronomy of the three groups show similarities and there are instances where within the same community there is a diversity of beliefs.

Debortoli et al. (2020) conclude that although both Indo-European and Dravidian tribal groups have very high Ancient Ancestral South Indian (AASI) contributions, the Indo-European tribal groups tend to have higher Steppe contributions than the Dravidian tribal groups. This provides indirect support for a model that explains the spread of the Indo-European languages as a result of the migration of the Steppe pastoralists to Europe and South Asia, in contrast to the alternative model that supports the spread of Indo-European languages as a consequence of the migration of Anatolian farmers. Their results are in agreement with recent ancient DNA studies providing support for Steppe pastoralists as a source of Indo-European languages in Europe and South Asia. Comparisons of the mtDNA, Y-chromosome and autosomal data indicate that this migration was primarily male-driven.

2.1 The Bhil Tribe

The Bhil tribe is regarded by some as one of the oldest of India's indigenous groups. They are thought to have been the original inhabitants of the forests of central India, and were driven into deeper forests due to expansion pressure of more modern societies. This process probably started with the settling of a later wave of Indo-Europeans and continued until the Islamic Empires of the Middle Ages. Many of the Bhil villages are still very remote geographically.

The Bhil derive their name from the word 'billee' in some of the Dravidian languages, which means 'bow'. For years, the bow has been a characteristic weapon of the tribe, and the men usually carried their bows and arrows with them. The Bhils have two endogamous

groups called the Uyale Bhil and the Mele Bhil, that they can marry into.

The Bhils speak their own language that has an affinity to the Dravidian languages that are also believed to have been mentioned in the *Ramayana* (Chaubey et al., 2015). Their genetic makeup is very different from other populations in India, suggesting a long isolation (Papiha et al., 1978).

Chaubey et al. (2015) scanned more than 97,000 samples of single nucleotide polymorphisms among three major ancient Indian tribes. Using various statistical techniques, their analysis suggested that the genetic architecture of two of these tribes (the Kol and the Gond) was largely similar to their surrounding tribal and caste populations, while the Bhil showed closer affinity with Dravidian and Austroasiatic (Munda) language-speaking tribes. The haplotype-based analysis revealed a massive amount of genome sharing among the Bhil, Kol, Gond and other ethnic groups of South Asian descent. On the basis of the genetic component shared among the different populations, they suggested that the primary founding population of the indigenous Ancient Ancestral South Indian (AASI) component has prevailed in the gene pool at least for the last several thousand years.

With a population of 16 million, the Bhil tribe is one of the larger tribes of India.[2] The Bhils have always been regarded as a warrior community and they regard Eklavya, the warrior prince from Mahabharata as their ancient king. Bhils living in forested border regions of Gujarat, Rajasthan, Madhya Pradesh and Northwest Maharashtra speak Bhili, which is a language within the Indo-European family. This language is closely related to both Gujarati and Rajasthani, and may be considered as an intermediate of the two languages. In the last three decades, many Bhil villages were displaced due to the Sardar Sarovar Dam Project on the Narmada River and several of these villages have been relocated in Northwest Maharashtra.

The Bhil primarily work as peasant farmers, field laborers, and village watchmen. With a growth in population, their landholdings are mostly small and generally non-lucrative. Festivals, dance, drama and music are a large part of their culture. Like many isolated tribes of India, the Bhil usually marry within their own group.

Almost all of the Central Bhil practice ethnic religious practices that have been highly influenced by more modern religions such as Hinduism. In that sense, many Bhils are Hinduised. Their original ethnic beliefs have a concept of a supreme god and a pantheon of minor gods, like the mountain god and the tiger god (who is said to be the original ancestor of the tribe). The supreme god (Bada Dev or Bholo Iswor or Bhagwan) is many times identified with the god Shiva of Hinduism. Ancestor worship (praying to deceased ancestors) is also quite popular.

2.2 The Pawra Tribe

The Pawra or Pawari is one of the tribal communities that call the Western Satpura ranges their home. Many of the Pawra villages were displaced by the Sardar Sarovar Dam project and they have been resettled in northwestern Maharashtra.

Most Pawra are skilled farmers. They are dependent on rainfall to water their crops, since the ground is not very fertile. Some Pawra work as carpenters, blacksmiths, or wood cutters. Each man makes his own field tools, serves as his own barber, and weaves his own baskets.

The Pawra speak Pauri / Pawari, one of the languages from the Bhil family; however, they claim no relation to the other Bhil tribes. Some of the Pawra also speak Marathi, a language spoken by the Hindu Maratha who established an empire in Gujarat during the thirteenth century.

The majority of the Pawra have their ethnic religious practices. They have no priests, temples, or idols; however, they are involved in witchcraft. They worship a supreme creator god named Bhavan, whom they strive to please with sacrifices and offerings. They worship a god of the harvest named Bava Kumba. Each year, this god is offered goat sacrifices in the hope that he will bless their crops. They also worship a tiger god (Vaghdev), and believe that he can provide welfare for their cattle. They are quoted as saying, "Our gods do not walk. We have to stay where they live."

2.3 The Kokna Tribe

The Kokna people[3] get their name from Kon, meaning mountain top. The word Konkan and, in turn Kokna, is derived from Kuṅkaṇ or Kuṅkaṇu. Different authorities explain the etymology of this word differently. It is also related to the name of indigenous mother goddess, who is sometimes Sanskritised to mean goddess Renuka. The Kokna people speak different dialects of Kokni, their native tongue, although a very high percentage are bilingual. According to Nandakumar and Kamat (2013), the Kokna language has tribal origins.

Kokna women wear a sari and fadki. They cut the sari in two and the top part is called a

Figure 2: Snapshots of interviews (photographs: Aniket Sule and Kishore Menon).

fadki and the sari covers the lower part of the body. They marry within their group.

Kokna people are known for being artistic, especially with wood carvings. They make masks from soft wood. They also make tobacco containers from wood, seeds or hard fruit skins, applying a thick coating of lead on the container, then carving designs in the lead. They sometimes make them in the shapes of animals.

Kokna people celebrate Hindu festivals and their own rituals. They are Hindus who worship tribal gods, goddesses and the tiger.

3 METHODOLOGY

For this study, we conducted semi-structured open-ended group interviews at multiple locations (see Figure 2 and Table 1). There was a set questionnaire for the interviews (see Section 9, Appendix 1). However, during actual interviews, participants were given a free hand to share their life experiences. The order of prompts was flexible and was based on the ongoing discussion. The questionnaire only served as a background reference to ensure that no important concept area were inadvertently missed.

The data were collected during a visit in February 2021 to the tribal villages in the Northwest corner (Dhule and Nandurbar districts) of Maharashtra state in Western India. This area has been home to tribes such as the Bhil, Kokna, Pawra etc. Although they each have their distinct cultural markers and different dialects, they are sometimes mistakenly grouped under the superarching 'Bhil' identity.

Contact with the tribes was established through a voluntary organization that was active in the area helping the tribal people in their struggle for their identity and rights over local land. Volunteers from the organization were given advanced copies of the questionnaire to clarify the purpose and scope of the study. These volunteers were tasked with identifying individuals in different villages who could talk about the cultural capital of their tribe.

Each interview group consisted of 20–25 individuals drawn from not just that village, but also surrounding hamlets. Whenever members of two or more distinct tribal communities were present at the same meeting, the group was split as per tribal identity, and the interviews were conducted separately. Each group interview lasted for about 1.5 hours. Typically, one researcher took the lead in interacting with the subjects and other researchers served as observers and wrote notes. One research team member was tasked with videotaping episodes of the most interesting and/or animated discussions.

Table 1: Space-time Coordinates for Each Meeting.*

Village	Community	Code	Meet	Latitude	Longitude	Date	Time
Varpada	Bhil	1	1	21° 38' 45.0" N	74° 13' 53.6" E	5-Feb	18:00 to 19:30
Shrikhed	Bhil	2	2	21° 39' 26.0" N	74° 36' 45.0" E	6-Feb	11:30 to 13:30
Madkani	Bhil	3	3	21° 40' 48.0" N	74° 27' 35.8" E	6-Feb	16:30 to 17:30
Chikhli	Bhil	4	4	21° 37' 55.4" N	74° 26' 49.9" E	6-Feb	18:00 to 19:30
Dhudhale Shivar	Bhil	9	9a	21° 20' 18.5" N	74° 15' 19.3" E	8-Feb	17:00 to 18:00
Pachmauli	Bhil	10	10a	21° 09' 40.8" N	74° 07' 04.6" E	9-Feb	10:50 to 12:30
Ajande	Bhil	11	11	20° 46' 17.9" N	74° 00' 35.4" E	9-Feb	16:00 to 17:30
Visarwadi	Mavchi Bhil	7	7a	21° 10' 56.9" N	73° 58' 03.9" E	8-Feb	11:00 to 13:30
Visarwadi	Mavchi Bhil	7	7b	21° 10' 56.9" N	73° 58' 03.9" E	8-Feb	11:00 to 13:30
Kelpada	Mavchi Bhil	12	12	20° 46' 17.9" N	74° 00' 35.4" E	9-Feb	15:30 to 17:00
Khandbara	Vasave Bhil	8	8a	21° 18' 15.9" N	74° 2' 57.44" E	8-Feb	14:30 to 16:00
Boradi	Pawra	5	5a	21° 31' 14.5" N	74° 53' 47.5" E	7-Feb	12:30 to 14:30
Boradi	Pawra	5	5b	21° 31' 14.5" N	74° 53' 47.5" E	7-Feb	12:30 to 14:30
Joyada	Pawra	6	6	21° 27' 54.8" N	75° 01' 38.76" E	7-Feb	16:30 to 17:30
Khandbara	Kokna	8	8b	21° 18' 15.8" N	74° 02' 57.44" E	8-Feb	14:30 to 16:00
Dhudhale Shivar	Kokna	9	9b	21° 20' 18.5" N	74° 15' 19.3" E	8-Feb	17:00 to 18:30
Pachmauli	Kokna	10	10b	21° 09' 40.8" N	74° 07' 04.6" E	9-Feb	10:50 to 12:30

* The code (column 3) represents the number given to the village in figure 1.

Although, during the 'icebreaker chats', the importance of the subject's cultural capital in the eyes of the researchers was emphasized, subjects were still initially apprehensive to share their stories and beliefs. In each interview it took some time for them to drop their apprehensions and speak freely. In most cases, subjects understood questions posed to them in the formal state language (Marathi), but most of them could only reply in their local dialects. Subjects were encouraged to talk in their local dialect to allow them to focus on astronomy and culture. Among the research team of 5 persons, three could speak Marathi as their first language, and the other two had transactional knowledge of Marathi and hence could pose questions to the subjects directly. The local dialects of the interviewees also had enough similarity with Marathi for the research-ers to make educated guesses of the subjects' responses. In addition, all groups included at least one person who could act as an interpreter between the researchers and the subjects. These interpreters sometimes were the volunteers coordinating that particular visit, or a teacher from the local school, or a member of the community who is used to interacting with the urban population in Marathi.

The questions included topics about the local calendar, social life, cosmogony, myths about the Sun and the Moon, eclipses, constellations, etc. As the research was carried out mostly in the daytime, researchers brought along printed star maps (prepared using Stellarium) and Stellarium software installed on an iPad, so that subjects could point directly at constellations or particular stars while talking about them. The printed maps covered specific areas of the sky, including bright and distinct patterns of stars (e.g. Orion, the Big Dipper, Leo), but without any names, labels, lines or patterns included. Typically, in the discussions about constellations, first the subjects would narrate a story about a constellation, then the researcher would make a guess about which specific constellation they are talking about, based on the stated season, time and direction, and sometimes on cross-referencing stories from previous interviews. The resesearcher would then show that constellation in printed form and/or on the iPad. Subjects could then reconfirm (or reject) the identifcation.

The validation of collected data was achieved in a two-fold manner. Since each group interview included 10–20 individuals, every story and all information shared by one individual in a group was subject to validation by others in that same group. Researchers explicitly asked others if they agreed with the story they had just heard or if they would like to add to, alter, or disagree with any parts of the story. This would sometimes ensure lively discussion among group members as each would try to stretch his or her own memory. The final story

was recorded when all participants agreed on a verison, sometimes after a few iterations. As a second level of verification, members of each tribe were met in more than one interview in different villages. If a particular story or belief was repeated more than once by a member of the same tribe but from a different village, it would be considered as authentic.

During such data collecting, it is easy for interviewees to mix their own cultural knowledge with knowledge that they acquired from other sources later in their life. One such source is modern astronomy, taught during formal schooling. To avoid this, researchers focussed on elderly members of the community, who had little or no formal schooling. How-ever, in a couple of cases, younger persons or those with formal education were also included in group interviews so that they could talk about the astronomical stories that they gathered from their forefathers. Although the tribal culture is about nature worship, these communities have been in contact with religious influencers for some time now. Thus, one can see traditional astronomical and cosmogonical beliefs seamlessly mixed with stories from Christian and mainstream (Vedic) Hindu theology. To differentiate such instances, the researchers themselves had to be acutely aware of the astronomical narrative of these modern influences.

3.1 Demographic Description of the Sample

Table 2 gives the demographic statistics of the subjects interviewed in each session. From this table, we can see that our sample predominantly consisted of older males with little or no education. Out of a total of 210 participants (excluding one meeting, see Table 2 for details), 79% were male, 56% were over the age of 60 and 85% had attended school for 4 years or less. While the age and educational profiles of the interviewees were intentional choices, the gender bias in the sample was not deliberate. Yet this was not surprising, because in most rural communities the public meetings in villages are male-dominated, and females, especially older ones, generally do not make an effort to attend.

The younger members of the sample were also the ones with the highest level of schooling. Usually these members were local school teacher or social workers, who hailed from the same community and acted as translators between the researchers and the group. However, barring two exceptions, these younger members did not possess any knowledge of local customs themselves and their fascination about the stories they heard from the elders in the community was very apparent.

Village 4 is known to be in an unnatural setting. This village was fairly recently relocated to its present position from the Narmada basin (north of the territory covered by the research team). The dialect and customs of the villagers differed somewhat from those found at other villages. The volunteer translator who accompanied the research team ascertained these differences. Thus, the cultural practices associated with this village were not expected to be identical to those found in other villages in our survey.

4 THE COMMUNITY'S CULTURAL CAPITAL RELATED TO ASTRONOMY

4.1 Days of the Week

Table 3 lists the names of the days of the week as reported in each meeting. We observed two distinct traditions for naming conventions of the days. In some Bhil villages (e.g. Varpada, Dudhale Shivar, Panchmauli, Anjade), the community retained some of their ethnic names for weekdays. These are listed in column 4 in Table 3. One can see that these ethnic names do have linguistic or cultural similarity with traditional Sanskrit-based names e.g. Sunday is the 'day of the Sun' in both Hindi as well as Bhili (Deet and Dihi).[4] Similarly, for Monday, Tuesday and Friday, the ethnic names are simply Sanskrit-based names pronounced differently and Wednesday is retained as it is. However, we cannot identify a connection between the names for Thursday and Saturday in Bhilori and their corresponding Sanskrit names.

In other villages (e.g. Khandbara, Kelpada), the days of the week were just names of the local market towns as per their weekly market schedule. We show an example in column 5 of Table 3. This set of names is taken from our session 8b, from the village of Khandbara. Here, the names from Tuesday to Saturday can be translated as Nandurbar's (day), Korode Market, Visarvadi Market, Chispada Market, Naupari's Market. In other examples, the names would change as per the local market towns. If there were no markets on a certain day, they fell back on traditional names from Sanskritic traditions. In this instance, the name for Sunday is the same as that in mainstream Hindi and the name for Monday is the same as in both Marathi and Hindi. In one village (Varpada), we saw a mix of the two systems, where five of the days—barring Thursday and Friday—were from ethnic Bhil traditions. Friday was called '*Aat*' (आट), presumably a derivative of the marathi word '*Haat*' meaning the market, and Thursday was called '*Vaahoo*' (वाहू), presumably to mean the day on which produce is carried to the market.

Table 2: Demographics of the Sample.

Village	Tribe	Sample Size	Above 60 years of age	Education Level			Gender	Language for	
				Nil	Primary school	More		Quest.	Resp.
Varpada	Bhil	16	81%	75%	6%	19%	M 94%, F 6%	Marathi / Bhilori	Bhilori
Shrikhed	Bhil	10	90%	60%	20%	20%	M 70%, F 30%	Marathi / Bhilori	Marathi / Bhilori
Madkani	Bhil	11	54%	27%	18%	55%	M 100%	Marathi / Bhilori	Bhilori
Chikhli	Bhil	8	87.5%	88%	0%	12%	M 100%	Marathi / Pawri	Pawri
Dhudhale Shivar	Bhil	16	80%	90%	10%	0%	M 100%	Marathi	Bhilori
Pachmauli	Bhil	11	18.2%	82%	18%	0%	M 54% F 45%	Marathi / Bhilori	Bhilori
Ajande	Bhil	13	46%	100%	0%	0%	M 69%, F 31%	Marathi / Bhilori	Marathi / Bhilori
Visarwadi	Mavchi Bhil	16	38%	44%	31%	25%	M 88%, F 12%	Marathi	Bhilori
Visarwadi	Mavchi Bhil	13	100%	92%	8%	0%	M 93%, F 7%	Marathi	Bhilori
Kelipada	Mavchi Bhil	23	65%	90%	10%	0%	M 79%, F 21%	Marathi	Marathi
Khandbara	Vasave Bhil	A large group of about 60–80 villagers. Only some of them were active participants. Statistics will be misleading.*						Marathi	Bhilori
Boradi	Pawra	26	50%	80%	15%	5%	M 85%, F 15%	Marathi / Pawri	Pawri
Boradi	Pawra	13	23%	8%	54%	38%	M 69%, F 31%	Marathi / Pawri	Marathi / Pawri
Joyada	Pawra	9	44%	44%	22%	34%	M 45%, F 55%	Marathi	
Khandbara	Kokna	8	62.5%	100%	0%	0%	M 75%, F 25%	Marathi	Marathi
Dudhale Shivar	Kokna	3	33.3%	66.7%	0%	33.3%	M 100%	Marathi	Kokni / Marathi
Pachmauli	Kokna	18	22%	11%	56%	33%	M 50%, F 50%	Marathi / Kokni	Kokni
Totals		210	56%	66%	19%	15%	M 79%, F 21%		

* Statistics for Khandbara's Mavchi Bhil meeting are not included in totals for the reason mentioned in the table.
Other villages / hamlets represented in different meetings:

- Varpada - Jambhai, Padharpur
- Shrikhed - Ojati, Kurangi
- Madkani - Talavdi
- Boradi - Parshipada, Chakdu, Tembhepada, Budkhi
- Visarwadi - Vaghti, Nagzari, Kamod, Daapur, Dhanmardi, Kotkhamb, Bhorpada, Maalvaan, Gaddani,
- Khadkipada, Bardipada, Bhardu
- Ajande - Mulhere, Jamori, Dagadpada, Jakhod, Chichbadh, Kharad

In all our sessions, the interviewees failed to explain the meaning behind the day names (when they were not corresponding to market names). That knowledge seems lost and our interpretation is based on our own understanding.

These names may lead us to conclude that the practice of naming the weekdays is fairly recent for these communities. When this idea was introduced to these tribes, some—presumably trading—communities adapted a utilitarian approach by naming weekdays after the

Table 3: Days of the Week.

No.	Weekdays	Hindi Names	Bhilori Names	Marketplace based names
1	Sunday	*Etvaar* (ईतवार)	*Deetvaar* (दितवार)	*Etvaar* (ईतवार)
2	Monday	*Somvaar* (सोमवार)	*Hummar* (हुम्मार)	*Somvaar* (सोमवार)
3	Tuesday	*Mangalvaar* (मंगलवार)	*Mungarvaar* (मुंगरवार)	*Nandurbaryo* (नांदुरबाऱ्यो)
4	Wednesday	*Budhvaar* (बुधवार)	*Budhvaar* (बुधवार)	*Korode Bazaar* (कोरोडे बाजार)
5	Thursday	*Bruhaspativaar* (बृहस्पतीवार)	*Vistarvaar* (विस्तरवार)	*Visarvadi Bazaar* (विसरवाडी बाजार)
6	Friday	*Shukravaar* (शुक्रवार)	*Hukkarvaar* (हुक्करवार)	*Chispada Bazaar* (चिसपाडा बाजार)
7	Saturday	*Shanivaar* (शनिवार)	*Thaavar* (थावर)	*Nauparya Bazaar* (नौपऱ्या बाजार)

Table 4: Months of the Bhil Calendar.

Sr no	Months	Corresponding Months of the Hindu Calendar	Approximate **P**eriod as per Gregorian calendar
1	*Utaraanu* (उतराणू)	*Pausha* (पौष)	January–February
2	*Daandu* (डांडू)	*Magha* (माघ)	February–March
3	*Balanyu* (बलन्यू)	*Falgun* (फाल्गुन)	March–April
4	*Kaathaavyu* (काठाव्यू)	*Chaitra* (चैत्र)	April–May
5	*Okhaatri* (ओखात्री)	*Vaishakh* (वैशाख)	May–June
6	*Daavaavyu* (दावाव्यू)	*Jyeshtha* (जेष्ठ)	June–July
7	*Budabuvu* (बुडबुवू)	*Ashadh* (आषाढ)	July–August
8	*Raakhyu* (राख्यू)	*Shravan* (श्रावण)	August–September
9	*Kellyu* (केल्ल्यू)	*Bhadrapad* (भाद्रपद)	September–October
10	*Doharu* (दोहरू)	*Ashwin* (अश्विन)	October–November
11	*Kaatakyu* (कातक्यू)	*Kartik* (कार्तिक)	November– December
12	*Puhu* (पुहू)	*Margshirsh* (मार्गशिर्ष)	December–January

markets and others simply took names from the Sanskritic traditions and modified them as per their linguistic conveniences.

4.2 Months of the Year

Table 4 lists the names of the months in a bhillori year as reported in each meeting. All these tribal communities start their month from the New Moon day. This was explicitly mentioned by interviewees in multiple sessions and in subsequent sessions (see entry 1 of Table 5), the interviewers reconfirmed this. The calendar seems to be luni-solar like the Sanskritic traditions in Western India. Although the start of the month (and hence the length of the month) is determined by lunar phases, the start of the year does not seem to drift in the long run. However, there was no mention of any intercalary days or months in any sessions. Obviously, some calendar correction has to exist to stop the months from drifting to the 'wrong' season, but this detail was never revealed to us.

At first instance, subjects told us their year starts from the month of '*January*' or by celebrating the festival of '*Gudi Padwa*'. They would also start listing months from these reference points. But these are actually the traditional beginnings of the year according to the Gregorian calendar and (some types of) Hindu calendar respectively. Hence a strong influence of Christian and Hindu calendars is evident. When asked again, they went back to their original and older names.

The pattern of identifying months with prominent socio-cultural events of that month was very common across all the villages. While naming the months, many times the subjects switched between the Hindu or Western calendrical names and their traditional names. Sometimes, instead of telling the actual names of months, subjects told us the festivals celebrated in that particular month e.g. the month of *Diwali*, *Dasara*, *Holi*, *Jatra*[5] etc. Researchers had to be well aware about this and ask them again in order to get the original tribal names.

Most of these tribal communities commence their year with the start of rainfall, i.e. 'the month of *Jeth*' as told by many subjects. *Jeth* or *Jyeshtha*, as we can see in Table 4, is actually the Hindu calendar name. Some tribal communities associate the start of the year with the start of the agricultural cycle (i.e. land tilling before the monsoon). Hence their year starts with the month of '*Okhaatri*'.

The subjects interviewed were unable to explain the meaning behind the traditional month names. Based on their description of act-

Table 5: Lunar Phases and Related Omens.

No.	Stories / Omens	Stated by	No.
1.	Months start after the new Moon day. Start of the month is called *Nawaa Ghadi* (नवा घडी) meaning 'new fold' or 'new time'.	Shrikhed	Bhil
		Chikhli	Bhil
		Dhudhale Shivar	Bhil
		Pachmauli	Bhil
		Visarwadi	Mavchi Bhil
		Dhudhale Shivar	Kokna
2.	Each lunar day is called *Ghadi* (घडी) meaning 'fold' (from Marathi) or 'time' (from Hindi). The lunar days are counted numerically as first *ghadi*, second *ghadi* etc.	Dhudhale Shivar	Bhil
		Visarwadi	Mavchi Bhil
		Boradi	Pawra
3.	The 5th day of each month is marked by a celebration.	Visarwadi	Mavchi Bhil
4.	A vertically standing crescent moon is a good omen.	Madkani	Bhil
		Dhudhale Shivar	Kokna
5.	A vertically standing crescent moon is a bad omen.	Ajande	Bhil
6.	More vertically standing the crescent moon, the more the rate of price inflation.	Khandbara	Vasave Bhil
7.	If the northern tip of the crescent is higher, then it will be a good month. If the southern tip is higher, then it will be a bad month.	Boradi	Pawra

ivities of those months and by comparing these names with linguistically similar Marathi / Hindi words, researchers could make an educated guess about some of these names:

- *Utaraanu:* The root word appears to be '*Uttarayan*', the Sanskrit word meaning the 'northward passage of the Sun'. Although the winter solstice has now moved to 22 December, the traditional (luni-solar) Hindu calendars ignore the precession of the equinoxes and the festival of '*Uttarayan*' is celebrated in many parts of India in mid-January. This timing fits with the typical start of the month of *Utaraanu*.
- *Daandu:* The celebrations of the *Holi* Festival begin in these villages exactly one month before the day of *Holi*. The first ritualistic act in the celebration is to erect a long wooden bamboo pole (*Daandu*) in the village square and then over the next month a pyre is assembled around it. This act lends its name to the month.
- *Budabuvu:* This name may correspond to 'heavy rain'. A colloquial term in Marathi for extreme rainfall is '*Budavanaaraa paus*' (बुडवणारा पाऊस), which means rain so heavy that it submerges everything. Typically, July corresponds to the month of highest rainfall, lending credibility to this interpretation.
- *Raakhyu:* As described by some subjects, this is the month of keeping a careful watch over the crops to protect them from wild animals. The name appears to have been derived from the Sanskrit verb '*Raksh*' (रक्ष) or the Marathi word '*Raakhane*' (राखणे), both of which mean 'to protect'.
- *Doharu:* Some of the subjects used words such as '*Doharaa*' to describe the Hindu Festival of *Dasara*, which falls in this month. Hence it may be assumed that this name derives itself from that Festival.
- *Kaatakyu:* This name appears to be a derivative of the name of the corresponding Sanskrit month '*Kaartik*'.
- *Puhu:* This is the flowering season of particular wild flowers which are used by tribal people in multiple products. The word '*Puhu*' was used repeatedly by the subjects to describe the flowering and the celebrations around it.

4.3 The Sun, Moon and Lunar Phases

The Bhils (including their subgrouping) and Pawras refer to the Sun as *Dihee, Din,* or *Dahaadaa*. The Koknas refer to the Sun as *Dit*, *Yaal* or *Yaa.* The words *Dihee*i, *Din*i, *Dahaadaa* and *Dit* mean day, and *Yaal* and *Yaa* mean time (see Table 6). Thus, in their culture, the Sun is intricately related to timekeeping.

Table 6: Sun, Moon, Full Moon and New Moon.

Village	Tribe	Sun		Moon		Full Moon		New Moon	
		Indic	Transcri.	Indic	Transcri.	Indic	Transcri.	Indic	Transcri.
Varpada	Bhil	दिही	*Dihee*	चांद	*Chaand*				
Shrikhed	Bhil	दिही / दिन	*Dihee / Din*	चांद	*Chaand*			अमावस / अवस	*Amaawas / Awas*
Madkani	Bhil	दिही	*Dihee*	चांद	*Chaand*				
Chikhli	Bhil	दिही / दिन	*Dihee / Din*	नवो	*Navo*	नवो देखाई / पुनव	*Navo Dekhaai / Punav*	अमाह / अमो	*Amaah / Amo*
Dhudhale Shivar	Bhil	दिन / सूर्य	*Dihee / Soorya*	चांद	*Chaand*				
Pachmauli	Bhil	याळ	*Yaal*	चान	*Chaan*	पुनेव / पुनो	*Punev / Puno*	अमोह / अवहे / अमाह / अमस	*Amoh / Awahe / Amaah / Amas*
Ajande	Bhil	दिवस / सूर्य	*Diwas / Soorya*	चांद	*Chaand*	पुनव	*Punav*	आवस	*Aawas*
Visarwadi	Mavchi Bhil	दिही	*Dihee*	चांद	*Chaand*	पुनू	*Punoo*	आवहें	*Aawahen*
Kelpada	Mavchi Bhil	दिही	*Dihee*	चांद	*Chaand*	पुनो	*Puno*	आवहे	*Aawahe*
Khandbara	Vasave Bhil	दिही	*Dihee*	चांद	*Chaand*				
Boradi	Pawra	दिही / दिन	*Dihee / Din*	चांद	*Chaand*	पूनम	*Poonam*	अमाहा	*Amaahaa*
Joyada	Pawra	दहाडा	*Dahaadaa*	चांद	*Chaand*				
Khandbara	Kokna	दीत	*Deet*	चांद	*Chaand*			अमा	*Amaa*
Dhudhale Shivar	Kokna	याळ	*Yaal*	चांद	*Chaand*	पुणेव	*Punev*	अवस	*Awas*
Pachmauli	Kokna	या	*Yaa*	चांद	*Chaand*	पुनव	*Punav*	अवस	*Awas*
Hindi		सूरज	*Sooraj*	**चांद**	*Chaand*	पूनम	*Poonam*	अमावस	*Amaawas*
	Day	दिन	*Din*						
Marathi		सूर्य	*Soorya*	चंद्र	*Chandra*	पौर्णिमा	*Pournimaa*	अमावस्या	*Amaawaasya*
	Day	दिवस	*Diwas*						
Marathi dialects						पुनव	*Punav*	अवस	*Awas*
	Time	याळ	*Yaal*						

All communities referred to the Moon as *Chaand*, which is the common Hindi word for the Moon. There is only one exception to this in the data. The villagers in Chikhali called it *Navo*, which means new. This is probably a case of translation mixup and we feel that villagers were describing the Full Moon (see the next point), which was improperly translated.

The terms for the Full Moon in most villages are just linguistic variations of *poonam*, which is the common Hindi word for the Full Moon day. Again in Chikhali which is a village that has been relocated from another region, we see a different phrase. They refer to the Full Moon as *navo dekhaai* (i.e. seen as new).

Similarly, the terms for the New Moon in all of the villages are just linguistic variations of *amaavas*, which is the common Hindi word for the New Moon day.

Days of the lunar month are called *Ghadi* (i.e. fold or time). The first day of the month is called *Nawaa Ghadi* (i.e. new fold, or new time). From the second day onwards, it is numerical counting of the days e.g. *Dusaraa ghadi* second fold or time), *teesaraa ghadi* (third fold or time), etc.

In one village, the interviewees described in detail the special celebrations they have, including a ritual worship on the 5th day of each month. The researchers reconfirmed that this is not a ritual in a particular month but it was indeed done every month. However, we did not get corroborating testimony from other meetings. Thus, it is unclear if this is a local custom of that particular village or if it is a wider custom which remained unreported in other meetings.

Table 7: Identification of Directions, East and West.

Village	Community	East			West			Sense
		Indic	Transcription	Transla.	Indic	Transcription	Transla.	
Varpada	Bhil	दिही उगतो	*Dihee Ugato*	Sun rises	दिही बुडयो	*Dihee Budayo*	Sun sinks	Local
Shrikhed	Bhil	दिन उगता	*Din Ugataa*	Sun rises	दिन बुडता	*Din Budataa*	Sun sinks	Local
Madkani	Bhil	दिही उगता	*Dihee Ugataa*	Sun rises	दिही बुडता	*Dihee Budataa*	Sun sinks	Local
Chikhli	Bhil	उगवणू	*Ugavanu*	rising	बुडवणू	*Budavanu*	sinking	Local
Dhudhale Shivar	Bhil	दिही उगता	*Dihee Ugataa*	Sun rises	दिही बुडता	Dihee Budataa	Sun sinks	Local
		दिही निंग्यो	*Dihee Ningyo*	Sun starts				
		हेट्य	*Hetyaa*	–	वरा	*Waraa*	–	Absolute
Pachmauli	Bhil	हेट्या	*Hetyaa*	–	वरा	*Waraa*	–	Absolute
Ajande	Bhil	येट्या	*Yetyaa*	–	व्हरा	*Vharaa*	–	Absolute
Visarwadi	Mavchi Bhil	दिही उगता / उदय	*Dihee Ugtaa / Uday*	Sun rises / sunrise	दिही बुडता	*Dihee Budataa*	Sun sinks	Local
Visarwadi	Mavchi Bhil	दिही निंग्यो	*Dihee Ningyo*	Sun starts	दिही बुडयो	*Dihee Budayo*	Sun sinks	Local
Kelpada	Mavchi Bhil	दिही उद्ये	*Dihee Uddye*	Sun rises	दिही बुडता	*Dihee Budataa*	Sun sinks	Local
Khandbara	Vasave Bhil	दिही उगता	*Dihee Ugataa*	Sun rises	दिही बुडता	*Dihee Budataa*	Sun sinks	Local
Boradi	Pawra	उगवणो	*Ugavno*	rising	बुडवणो	*Budawano*	setting	Local
Boradi	Pawra	उगवणू	*Ugavanu*	rising	बुडवणो	*Budawano*	setting	Local
Joyada	Pawra	--	--	--	--	--	--	--
Khandbara	Kokna	हेट्या	*Hetyaa*	–	व्हरा	*Vharaa*	–	Absolute
Dhudhale Shivar	Kokna	हेट्या	*Hetyaa*	–	व्हरा	*Vharaa*	–	Absolute
Pachmauli	Kokna	हेट्या	*Hetyaa*	–	वरा	*Waraa*	–	Absolute

There are some peculiar beliefs related to the orientation of a crescent Moon in the sky. All these beliefs concern the social life of these communities. Some interviewees mentioned that a vertically standing crescent Moon is considered to be a good omen whereas some others believe it is a bad omen. Some stated that the rate of inflation of prices depends upon the inclination of a crescent Moon: the more vertically the crescent Moon is standing, the more will be the rate of price inflation. Some believe that if the northern tip of a crescent Moon is higher, it will be a good month; but if the southern tip is higher, then it will be a bad month.

Astronomically, this idea of a vertical crescent is very curious. A vertical crescent is fairly common in high latitude regions but uncommon in tropics. In northern tropical latitudes, the condition for a (nearly) vertical crescent is that the Moon should be as below the ecliptic as possible for the crescent Moon around winter solstice. For tropical latitudes, the inclination of the crescent does not vary much from one month to the next and it would be extremely challenging to compare any crescent with the mental image of the crescent from the previous month. Thus, this belief is either related to harvesting of grains in December or it is just some chance coincidences which became an ingrained belief.

4.4 Sense of Cardinal Directions and Their Use

Tables 7 and 8 list names of directions as reported in each meeting. We can see some clear patterns. The Bhils (including their subgroupings) and Pawras explicitly associate the East and the West with sunrise and sunset. In their language, the East was called *Dihi-ugta*, *Dihi-ningyo* or *Ugavnu*, which is translated as 'the direction from where the Sun rises'. Sim-

Table 8: Identification of Directions, North and South.*

Village	Community	North			South			Sense
		Indic	Transcri.	Transla.	Indic	Transcri.	Transla.	
Varpada	Bhil	No answer						---
Shrikhed	Bhil	डोंगराळू	*Dongaraalu*	Towards mountain	तप्ताळू	*Taptaalu*	Towards Tapi	Local
Madkani	Bhil	डोंगराळू	*Dongaraalu*	Towards mountain	तप्ताळू	*Taptaalu*	Towards Tapi	Local
Chikhli	Bhil	पालो	*Paalo*	--	देह	*Deh*	--	--
Dhudhale Shivar	Bhil	तप्ताळू	*Taptaalu*	Towards Tapi	मावचार	*Maavchaar*	Mavchi area	Local
		खालं	*Khaal*	down	वर	*War*	up	Absolute
Pachmauli	Bhil	खाली	*Khaali*	down	वर	*War*	up	Absolute
Ajande	Bhil	तपत	*Tapat*	(towards) Tapi	दख्खन	*Dakkhan*	(towards) Dakkhan	Local
Visarwadi	Mavchi Bhil	तपताडू	*Taptaadu*	Towards Tapi	डांग	*Dang*	(towards) Dang	Local
Visarwadi	Mavchi Bhil	तपती	*Tapati*	(towards) Tapi	डांग	*Dang*	(towards) Dang	Local
Kelpada	Mavchi Bhil	तपती एहँ	*Tapati ahan*	Towards Tapati	डांगाहँ	*Daangaahan*	Towards Dang	Local
					दक्खन	*Dakkhan*	(towards) Dakkhan	Local
Khandbara	Vasave Bhil	तपतीवेल	*Tapati Wel*	Towards Tapi	डांगावेल	*Dangavel*	Towards Dang	Local
Boradi	Pawra	बखवरा	*Bakhavaraa*	--	दाखवरा	*Dakhavaraa*	--	--
Boradi	Pawra	पखवरा	*Pakhavaraa*	--	दखवरा	*Dakhavarra*	--	--
Joyada	Pawra	--	--	--	--	--	--	--
Khandbara	Kokna	सातपुरा	*Satpura*	(towards) Satpura	डांग भाग	*Dang bhaag*	Dang Area	Local
Dhudhale Shivar	Kokna	खालं	*Khaal*	down	वर	*War*	up	Absolute
Pachmauli	Kokna	खालं	*Khaal*	down	वर	*War*	up	Absolute

*Notes:

- The Tapi (तापी) is the biggest river in the region.
- The 'mountain' implied in the directions refers to Satpura Mountain Range.
- Dang (डांग) is a tribal district in the state of Gujarat, roughly southsouthwest of the surveyed region.
- 'Dakkhan' (दख्खन) is the name for the South popularised by Medieval Islamic rulers. It is derived from the word is 'Dakshin' (दक्षिण), the Sanskrit name for the South. It typically refers to the Indian peninsula South of Satpura and VIndhya Mountain Range.

ilarly, West is called *Dihi-budta* (and slight variations of the words, depending on the local dialect), which can be translated as 'the direction where the Sun sets, submerges, or sinks'. In a sense, this is based on the daily life of the local observer. Since their East/West notion is utilitarian, they do not feel any need to give an independent or absolute name to these directions. This may become an important barrier while communicating modern scientific information where independent names of direction are crucial (e.g. explaining that the Sun rises in the West with Venus).

On the other hand, Kokna villages and those Bhil communities that are in close contact with Koknas have adapted names that are not tied (as far as we can tell) to sunrise or sunset (see Table 7). This absolute naming convention indicates slightly more astronomical sophistication.

In most Bhil villages, North and South were

Table 9: Directional Sense in Burial Practices.

No.	Burial Practices	Stated by	
1.	The burials follow the practice of keeping the head towards the North.	Shrikhed	Bhil
		Ajnade	Bhil
		Khandbara	Vasave Bhil
		Khandbara	Kokna
2.	The burials follow the practice of keeping the head towards the South. (Opposite of 1)	Dudhale Shivar	Bhil
		Kelpada	Mavchi Bhil
		Dhudhale Shivar	Kokna
		Pachmauli	Kokna
3.	Those who died unnatural deaths are appeased by erecting a memorial stone pillar (*Khaamb* - खांब) in the graveyard. The face on the pillar must face East.	Dhudhale Shivar	Bhil
		Khandbara	Vasave Bhil
4.	Dead are cremated. After cremation of any male, an arrow is shot towards the East in his honour.	Boradi	Pawra
5.	The month of *Paadawaa* (First month of Hindu calendar, March–April in Gregorian calendar) is the month of the dead. The memorial stone pillars (*khaamb*) are only erected in that month.	Pachmauli	Kokna

given names based on the local geography. The region we explored is bordered by the Satpura Mountain Range to the North. The main river, i.e. Tapi, runs from roughly the middle, with half the villages in our sample to the North of the Tapi and half to the South. The jungles of the Dang tribal region are to the southwest of our area of study. Thus, the villagers situated to the North of Tapi, referred to the North as 'towards the mountain' and the South as 'towards Tapi', while the villagers to the south of Tapi, referred to the North as 'towards Tapi' and the South as 'towards Dang' or 'towards southern parts' (*Dakkhan*). This again indicates that the sense of direction for the Bhils is utilitarian and not absolute.

However, there are some exceptions to this. Those in the relocated village of Chikhali (which was originally to the North of the Satpura Range), use *paalo* and *deh* for the North and the South. But we were unable to ascertain the origins of these names. In the villages of Dudhale Shivar and Panchmauli, where the Bhils are in close contact with the Kokna tribe, even the Bhils use the terms *khaala* (down) and *var* (up) for North and South respectively. One can speculate that these names have probable origins in the local terrain as the Kokna tribe mostly resides in the northern foothills of the Sahyadri Range. Thus, if they travel towards the South, they would be walking up the mountain and if they travel towards the North, they would be going down to the plains of the Tapi River.

The Pawras use the terms *Bakhwaraa* and *Daakhwaraa* for North and South respectively. The etymology of these terms is unclear, and interviewees were unable to provide any clarification.

Table 9 shows how the directions are relevant to the social life of these tribes. The Bhils and the Koknas bury their dead, and the orientation of the dead body is always North–South. However, as can be seen in the table, some villages bury with the head towards the North and some villages bury with the head towards the South. They also erect memorial stone pillars (*khaamb*) for those who have died unnatural deaths (accidents, murders etc.), to seek protection from their wandering soul. These pillars have faces carved on one side and this side is always oriented towards the East, which is the direction of the souls.

The Pawras cremate their dead. They are proud of their warrior heritage. When a male member is cremated, from his pyre, they shoot an arrow towards the East, so that the departing soul can carry a weapon to the next life.

4.5 Changes in the Sun's Rising Point

At each meeting researchers probed if subjects

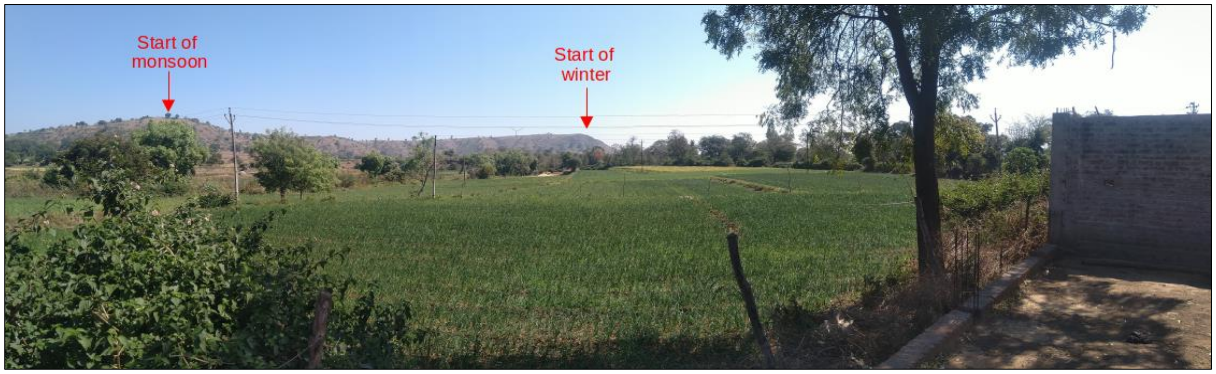

Figure 3: Rising points of the Sun as pointed out by a local Kokna shaman from Village 10. The left marker is a tree at the top of the hillock, where the Sun rises at the start of the monsoon. The right marker is the sloping part where the Sun rises at the start of Winter or the village fair season (photograph: Aniket Sule).

showed any awareness about changes associated with changing declination of the Sun at sunrise. In general terms, the subjects mentioned longer days in the Summer and shorter days in Winter, but mostly did not mention anything about change in the rising or setting point of the Sun.

The only exception to this trend was one participant in Pachmauli's Kokna community, who was also the local shaman. He clearly articulated that the Sun rises from different points on different days. After the interview, he also took one of the researchers outside the village and pointed to several natural markers that he uses to calibrate his cycle season. See Figure 3 for details.

4.6 Dark Regions on Moon

Like most other cultures, these communities also acknowledge the existence of dark regions on the 'face' of the Moon. Researchers found five distinct folklores associated with the dark regions on the Moon.

One folklore describes the dark spots on the Moon as a huge banyan tree. Further, a witch is supposedly tied upside down to the aerial roots of this tree. The Bhil subjects narrating this folklore were unable to provide more details.

The Koknas also had a similar folklore in their collective memory. But, in addition, a second—very different—folklore was also narrated. According to it,

> One fine day the Moon came on the Earth and committed some inexcusable blunder. This led to the Moon being punished by a Sage (*rishi*) and hence there are spots on the Moon.

Some Pawras from Village 6 imagine the figure of a deer or a rabbit on the Moon, but this can be attributed to mainstream cultural influence.

There were two exceptions to this general pattern. The Bhils at Village 4 narrated a tale in which

> Moon's old mother was sweeping the floor, when suddenly she felt some clouds touching her back. Irritated, she turned around and saw the Moon. She hit the Moon with the broom that was in her hand, and hence there are spots on the Moon.

Meanwhile, some Pawras at Village 5 gave a unique narration:

> One day, Sun and Moon were sent out by their mother for agricultural work. The Sun, being the sincere child, worked hard for the entire day, whereas the Moon just passed his time relaxing. In the evening before going home, just to show that he too had worked hard, he stained his clothes with soil. However, their mother saw right through his lies and punished him for his dishonesty. Hence the spots on the Moon are the permanent soil stains.

4.7 A Halo Around the Moon or the Sun

A halo around the Sun or the Moon is an optical phenomenon produced when light interacts with the ice crystals in the Earth's atmosphere. It can have many forms but the most common one is a circular halo (22° halo). As seen in Table 10, all communities refer to the lunar halo as *Chaand Khayaa* or *Chaand Maandvaa* or *Chaand Mandal,* and in one case as *Saanravalaa* (which is probably again a derivative of the same name). We had only one instance (Visarvadi), where the interviewees mentioned a separate name for the halo around the Sun, which is rarer to observe.

Although different communities interpret the occurrence of a lunar halo differently, all of them associate its appearance with rainfall (see

Table 10: Names for a Lunar Halo.

Village	Community	Halo around Moon		
		Indic	Transcription	Translation
Varpada	Bhil	चांद खया	*Chaand Khayaa*	Lunar threshing circle
Shrikhed	Bhil	चांद खया	*Chaand Khayaa*	Lunar threshing circle
Madkani	Bhil	चांद मांडवा	*Chaand Maandawaa*	Meeting tent
Chikhli	Bhil	चांद खया / मांडवा	*Chaand Khayaa / Maandawaa*	Lunar threshing circle / Meeting tent
Dhudhale Shivar	Bhil	चांद खया	*Chaand Khayaa*	Lunar threshing circle
Pachmauli	Bhil	सानरवळा	*Saanarawalaa*	Lunar threshing circle
Ajande	Bhil	चांद खळा	*Chaand Khalaa*	Lunar threshing circle
Visarwadi	Mavchi Bhil	चांद मांडळ / दिही मांडळ	*Chaand Maandala / Dihee Maandala*	Gathering of the Moon / Gathering of the Sun
Visarwadi	Mavchi Bhil	चांद मांडला	*Chaand Maandalaa*	Gathering of the Moon
Kelpada	Mavchi Bhil	चंद्र मांडव	*Chaand Maandav*	Meeting tent
Khandbara	Vasave Bhil	मंडलो	*Mandalo*	Gathering
Boradi	Pawra	मंडवा, मोंडवा	*Mandawaa, Mondawaa*	Meeting tent
Joyada	Pawra	मांडवो	*Maandawo*	Meeting tent
Dhudhale Shivar	Kokna	चांद खळं / चांद कोंबडा	*Chaand Khala / Chaand Kombadaa*	Lunar threshing circle / Lunar clock
Pachmauli	Kokna	चांद खळा	*Chaand Khalaa*	Lunar threshing circle

* '*Khala*' (खळं) is the term for traditional circular clearing on agricultural land which is used for threshing of grain.

Table 11). Some believe that the halo is seen when their gods call a meeting to decide when to bring the rain and how much rain should be falling that year. All villages acknowledged that sometimes the halo is tighter around the lunar disk and sometimes it is a much larger circle with a clear gap between halo and lunar disk. However, there were opposite views on interpreting these. Some said a tighter halo is associated with delayed rainfall but a wider halo indicates early rainfall, whereas some communities believe the exact opposite. Some communities also predict the quantity of the rainfall based on lunar halo observations. Some associate a tighter halo with less than average rainfall, whereas a wider halo is considered to be a sign of a good rainfall, and again there are others who have the exact opposite view.

Overall, it would be fair to say that the observation of the lunar halo and its association with rainfall is a common thread. However, the correlation between the two is misremembered by at least a few of these villages.

4.8 Eclipses

All communities refer to the eclipse as *Giran*, or *Giraan* or *Giryaan,* except the Bhil community at Varpada which refers to it as *Dihee-tihaay*, where *Dihee* is the Sun and *Tihaay* means to hold. The Bhils in Varpada stated that a solar eclipse occurs because the Sun is being held by some bigger star. Some variations in this story amongst the Bhil community are seen depending on villages. Some Bhils believe that some monster has hold of the Sun or some demon has swallowed the Sun, which is again similar to the mainstream (Hindu) folklore.

There are some common rituals performed during eclipses and some superstitions associated with eclipses. Almost all villages asserted that during any eclipse, a pestle will stand up-right in a water-filled plate without any support, and towards the end of the eclipse it will start gyrating and fall when the eclipse ends. All subjects could narrate this belief, but none of them claimed to have witnessed it first hand. They just attributed this story to their ancestral knowledge.

They throw grains, coins etc. on a plate as an offering during the eclipses. They also bang pots and pans and make noise to scare away the evil powers grabbing the Sun and Moon. The Bhils at Chikhli village narrated the folklore associated with this ritual, which goes as follows:

> The Sun and the Moon are brothers. One day their mother instructed them to bring some seeds from a moneylender. On their way back, the Moon lost the bag filled with seeds. Hence as a punishment, both Sun and Moon are sometimes grabbed by the moneylender to

Table 11: Stories and Omens about the Lunar Halo.

No.	Lunar Halo Stories / Omens	Stated by	No.
1.	The lunar halo is what we see when the gods sit together for a meeting to discuss timing and quantity of the rains.	Dhudhale Shivar	Bhil
		Pachmauli	Bhil
		Ajande	Bhil
		Visarwadi	Mavchi Bhil
		Dhudhale Shivar	Kokna
2.	Tighter (closer) halo means the rain will be delayed. If the halo is farther from the Moon, the rain will come soon.	Shrikhed	Bhil
		Madkani	Bhil
		Chikhli	Bhil
		Khandbara	Vasave Bhil
		Boradi	Pawra
		Khandbara	Kokna
3.	Tighter (closer) halo means the rain will come soon. If the halo is farther from the Moon, the rain will be delayed. (Opposite of no. 2)	Ajande	Bhil
		Kelpada	Mavchi Bhil
		Joyada	Pawra
		Pachmauli	Kokna
4.	If the halo is seen then the rain will come soon.	Visarwadi	Mavchi Bhil
		Dhudhale Shivar	Kokna
5.	Tighter (closer) halo means the rain will be less than average. If the halo is farther from the Moon, the rain will be good.	Dhudhale Shivar	Bhil
		Visarwadi	Mavchi Bhil
6.	Tighter (closer) halo means the rain will be good. If the halo is farther from the Moon, the rain will be less than average. (Opposite of no. 5)	Pachmauli	Bhil

demand repayment of debt. The villagers throw seeds and coins in the plate as a token repayment to the moneylender and then the moneylender releases the Sun and Moon.

Generally, in all the communities surveyed, an eclipse was looked upon as a bad omen although it is not always explicitly mentioned that way. Some of the other superstitions narrated by subjects are common to mainstream communities, hence they were not documented separately.

4.9 The Rainbow

The Bhils and the Pawras refer to the rainbow as either an arrow or a bow and arrow, whereas the Koknas call it God's bow (see Table 12).

There are different stories and omens relating to the rainbow in different communities. Nearly all the beliefs correlate rainbows with rainfall. The most recurrent one and common to all three tribes is that a rainbow in the sky marks the end of the rainy season. In other words, they consistently observe that rainbows occur only during the receding monsoon. The Koknas added another layer by stating that the rainbow can sometimes be seen in Summer and in that case it indicates the start of the rain.

As listed in Table 13, we documented a number of beliefs pertaining to the rainbow's direction and visibility. The direction of the rainbow or its shape (full or partial) are related to rainfall prediction. These beliefs are purely local, varying from village to village. The Pawra visualize a rainbow as a cobra fang peeking out from the top of an anthill.

More importantly, at least in a few meetings, the villagers explicitly mentioned that a

Table 12: Phrases for the Rainbow in Different Villages, and their Meanings.

Village	Community	Rainbow Phrase		
		Indic Script	Transcription	Translation
Madkani	Bhil	बाण पडला	*Baan Padla*	Arrow dropped
Dhudhale Shivar	Bhil	धनुबाण	*Dhanu-baan*	Bow & Arrow
Pachmauli	Bhil	बाण	*Baan*	Arrow
Ajande	Bhil	बाण / धनुष्य	*Baan / Dhanushya*	Arrow / Bow
Visarwadi	Mavchi Bhil	बाआं	*Baaan*	Arrow
Khandbara	Vasave Bhil	बाआं	*Baaan*	Arrow
Boradi	Pawra	बाण	*Baan*	Arrow
Joyada	Pawra	बाण / धनुष्य	*Baan / Dhanushya*	Arrow / Bow
Khandbara	Kokna	देवधनी	*Dev Dhani*	God's Bow
Dhudhale Shivar	Kokna	देवधनु	*Dev Dhanu*	God's Bow
Pachmauli	Kokna	देवधनी	*Dev Dhani*	God's Bow

* Only includes the rows where the term for rainbow appeared in the discussion.

Table 13: Stories and Omens About the Rainbow.

No.	Rainbow Stories / Omens	Stated by	No.
1.	There is usually an anthill at the location where the rainbow touches the ground. Dig that anthill and you can find a mushroom-like growth called *paataal tumbadi* (पाताळ तुंबडी). It is usually found during the monsoon. It has medicinal properties / it can be intoxicating when mixed with alcohol.	Varpada	Bhil
		Chikhli	Bhil
		Khandbara	Vasave Bhil
2.	Rainbow indicates that the rainy season will be over soon.	Varpada	Bhil
		Madkani	Bhil
		Dhudhale Shivar	Bhil
		Ajande	Bhil
		Visarwadi	Mavchi Bhil
		Kelpada	Mavchi Bhil
		Boradi	Pawra
		Khandbara	Kokna
3.	If the rainbow is seen during monsoon, the rain reduces. But if it is seen during the summer, it indicates the start of the rain.	Pachmauli	Kokna
4.	If the rainbow is in the East rain will stop soon. If it is in the West rain will continue.	Visarwadi	Mavchi Bhil
		Kelpada	Mavchi Bhil
		Dhudhale Shivar	Kokna
5.	The rainbow is always seen opposite of the Sun. The rainbow cannot be seen in the North / South. The rainbow is always seen in the direction opposite to the rain.	Visarwadi	Mavchi Bhil
		Khandbara	Vasave Bhil
		Khandbara	Kokna
6.	If you see a full rainbow, it prevents further rain. If you see a partial rainbow, expect more rain.	Pachmauli	Bhil

7.	If there is a halo around the Moon, then we won't get the rainbow.	Dhudhale Shivar	Bhil
8.	The rainbow is nothing but a cobra's fang that is peeking out from top of an anthill.	Boradi	Pawra

Table 14: Phrases for Shooting Stars in Different Villages, and their Meanings.

Village	Community	Shooting Stars		
		Indic	Transcription	Translation
Varpada	Bhil	तारो तुट्यो	*Taaro Tutyo*	Star broke and fell
Shrikhed	Bhil	तारो तुट्यो	*Taaro Tutyo*	Star broke and fell
Madkani	Bhil	तारो तुट्यो	*Taaro Tutyo*	Star broke and fell
Chikhli	Bhil	तारा तूटैन	*Taara Tuttain*	Star broke and fell
Dhudhale Shivar	Bhill	ताऱ्या तुट्यो	*Taarya Tutyo*	Star broke and fell
Pachmauli	Bhil	तारा तुट्यो	*Taara Tutyo*	Star broke and fell
Ajande	Bhil	तारा तुट्यो	*Taara Tutyo*	Star broke and fell
Visarwadi	Mavchi Bhil	चराखं / चराखा	*Charakha / Charakhaa*	Star
Kelpada	Mavchi Bhil	चोराखो पडे	*Choraakho Pade*	Star broke and fell
Khandbara	Vasave Bhil	तारा तुटयो	*Taara Tutayo*	Star broke and fell
Boradi	Pawra	तारो तुट्यो / तारा हागला	*Taaro tutyo / Taara Haagalaa*	Star broke and fell / Star defecated
Khandbara	Kokna	ब्रह्मादेवाचा तारा	*Brahma-Devaachaa Taara*	Lord Brahma's Star
Dhudhale Shivar	Kokna	तारा तुट्यो	*Taara Tutyo*	Star broke and fell
Pachmauli	Kokna	तारा तुटना	*Taara Tutanaa*	Star broke and fell

rainbow is always seen opposite to the direction of rain and that of the Sun, and hence can never be seen to the North or the South.

4.10 Cosmogony

In many villages, interviewers posed questions about the traditional beliefs regarding the start of the world, the Universe, the human race, and their own community. However, we were unable to get a coherent account. In some interviews, some participants mentioned bits and pieces of some stories they heard from their forefathers, but these rarely progressed beyond names of the characters in the story. In some cases, the participants told stories from Sanskrit literature (*Hiranyakashyapu, Trishanku* etc.) or biblical stories of the origin of the world (Adam and Eve). In one case, there was a seamless account which started from Adam and Eve and then introduced Hindu gods like Indra somewhere along the way. In all these cases, the participants were asked to focus on their own tradiitions and not to repeat stories of their recently acquired religions. But that line of enquiry drew a blank. It seems this piece of cultural heritage is already lost.

4.11 Shooting Stars (Meteors)

A shooting star is a layman's term for a meteor. In most of the interviews, with the Bhils and Koknas, the subjects identified the phenomenon as a star that breaks and falls downwards (see Table 14).

There were just two exceptions to this common phrase. The Pawras in only one village showed any recognition of a meteor and they called it star excreta, while the Koknas also in a solitary village (Village 8) called it Lord Brahma's star.

There were various beliefs associated with shooting stars (see Table 15). The Bhil in Villages 2, 3, 4 and 8 and some Koknas in Villages 9 and 10 considered it to be a bad omen. If one saw a shooting star, it was an indication of some elderly person's death, or if one saw a shooting

Table 15: Stories and Omens About Shooting Stars.

No.	Stories / Omens	Stated by	No.
1	Bad omen. If one sees a shooting star, it is an indication of some elderly person's death.	Shrikhed	Bhil
		Madkani	Bhil
		Chikhli	Bhil
		Khandbara	Vasave Bhil
		Pachmauli	Kokna
2.	Bad omen. If one sees a shooting star, one should spit out and mutter curse words.	Dhudhale Shivar	Kokna
3.	Good omen. If one sees a shooting star, one should make a wish and it will come true.	Khandbara	Kokna
		Varpada	Bhil
4.	Good omen. It falls at a place where god resides (temples mostly).	Visarwadi	Mavchi Bhil
5.	It falls where God resides. If one sees a falling star, one should put some saliva on the chest.	Dhudhale Shivar	Bhill
6.	A star falls when it bumps into another star. The mountain god's abode was created by a falling star.	Pachmauli	Bhil
7.	God is traveling from one place to another for a meeting / messages sent to earth from heaven. (advised not to see)	Visarwadi	Mavchi Bhil
8.	If you see a meteor falling, lift seven stones and don't tell anyone.	Kelpada	Mavchi Bhil

star, one should spit out and mutter curse words.

Communities living in some other villages considered it to be a good omen and related it in some way to their God. They have a tradition that if one sees a shooting star, one should make a wish and it will come true. The Mavchi Bhil in Village 7a and the Bhil in Village 9 also believe that a shooting star falls at a place where their God resides. The Bhils in Village 10 believe that a star falls when it bumps into another star. The Mountain God's abode (one of their deities) was created by a falling star. The Mavchi Bhils in Village 7b believe that a shooting star is actually an indication of their God traveling from one place to another for a meeting, or it is a message sent to Earth from heaven.

4.12 Comets

All communities referred to a comet as *Zendya Taara* or *Shendya Taara* (with some variations according to the local dialect) which means a star with a flag or a star with a braid. The Bhil community (from Villages 2 and 3) additionally also referred to a comet as *Sheput Taara* or *Sheptyaa Taara*, meaning a star with a tail (Table 16). In most cases, the subjects also noted that they had not actually seen such a star in the past couple of decades (note that the last naked eye comet was seen about 20 years back).

The beliefs about comets are documented in Table 17. As there had not been any sightings of comets in the recent past, there were not too many inputs about stories and beliefs associated with them. Even among the few villagers who shared some beliefs, the opinion seems to be evenly divided.

4.13 Venus

When it is visible, Venus is the brightest object in the pre-sunrise or post-sunset skies. It is popularly, albeit erroneously, called the 'morning star' or 'evening star'. In our interviews, most subjects readily agreed that a very bright star is seen in the pre-sunrise eastern sky (Figure 18). In most cases, it was referred to as the 'eastern star'. In some cases, the influence of main-stream culture was apparent as the object was referred to as Suk, Sukh and Shuk, which are clearly derivatives of the word *Shukra* (which is the Sanksrit, Hindi and Marathi name for Venus).

The Mavchi Bhil community had different names for Venus in different villages. In one interview, it was referred to the Moon's sister. In other places it was referred as the vomiting star or blinking star. In most cases, interviewees stated that they take the rise of this 'star' as a signal to get up from their beds and start their daily routine (see Table 19).

In some cases, there was clear misidentification with other celestial events or objects. The Bhil community in Viillage 2 called it *Zendyaa*

Table 16: Phrases for Comets in Different Villages, and their Meanings.

Village	Community	Shooting Stars		
		Indic	Transcription	Translation
Shrikhed	Bhil	शेपूट तारा / झेंड्या तारा / शेंड्या तारा	*Sheput Taara / Zendya Taara / Shendya Taara*	Star with a tail / star with a flag / star with a braid
Madkani	Bhil	झेंड्या तारो / शेपट्या तारो	*Zendya Taaro / Sheptyaa Taaro*	Star with a flag / star with a tail
Chikhli	Bhil	सिमट्याल तारा	*Simtyaal Taara*	(meaning unclear)
Dhudhale Shivar	Bhill	झेंड्या तारा	*Zendya Taara*	Star with a flag
Pachmauli	Bhil	शेंडाळी	*Shendaali*	Star with a braid
Visarwadi	Mavchi Bhil	शेंड्या तारा / शेंडयो तारा	*Shendya Taara / Shendyaa Taaro*	Star with a braid
Khandbara	Vasave Bhil	शेंडी तार्यो	*Shendi Taaryo*	Star with a braid
Kelpada	Mavchi Bhil	शेंड्या बाअऱ्यो	*Shendya Baa-a-ryo*	Star with a braid
Boradi	Pawra	झेंड्या तारा / शेंड्या तारा	*Zendya Taara / Shendyaa Taara*	Star with a flag / star with a braid
Boradi	Pawra	शेमटदावू तारो	*Shematdaavu Taaro*	Star with a braid
Dhudhale Shivar	Kokna	शेंडाळी चांदणी	*Shendali Chandani*	Star with a braid
Pachmauli	Kokna	शेंडाई चांदणी	*Shandaai Chandani*	Star with a braid

Table 17: Stories or Omens About Comets.

No.	Stories **or** Omens	Stated by	
1.	Good omen.	Madkani	Bhil
		Visarwadi	Mavchi Bhil
2.	When it was seen, those 4-5 years were good for people and they were happy.	Dhudhale Shivar	Kokna
3.	Bad omen. very less availability of water / robbery / draught / lot of other crises / crops may fail	Chikhli	Bhil
		Boradi	Pawra
4.	The year in which a comet is seen, elder brother's marriage will not be possible	Pachmauli	Bhil

Taara, which means a star with a flag, and refers to comets. Meanwhile, the Bhil community in Village 9 referred to it as the Pole Star.

Most interviewees seemed to be unaware of the idea that the morning star is the same as the evening star, or for that matter that the bright 'star' is sometimes seen in the evenings (Table 20). Barring one exception, they did not volunteer this piece of information despite our probing them in different ways. It is even uncertain if the interviewees who attested seeing a bright evening star were actually referring to Venus or were generally talking about some random bright star in the evening. The researchers have no explanation for why the notion of morning or eastern star is so common but the notion of evening or western star is not.

4.14 Identification of Stars, Constellations and Asterisms

Lastly, we mention a few patterns regarding the identification of stars, constellations and asterisms (see Table 21). One of our subjects stated: "All the things that we can see on the ground (the Earth) can be seen in the sky". Hence, most of the famous constellations or asterisms are associated with things that are found in their surroundings. With a philosophy like this, one expects many different inanimate and animate figures drawn in stars. However,

Table 18: Phrases for the Morning Star in Different Villages, and their Meanings.

Village	Community	Morning Star		
		Indic	Transcription	Translation
Varpada	Bhil	उजातारो (उगवतीचा तारा)	*Ujaa Taaro (Ugavtichaa Taaraa)*	Eastern star
Shrikhed	Bhil	शेंड्या तारा	*Zendya Taara*	Star with a flag (possible misidentification)
Pachmauli	Bhil	सुक तारी / सुख तारा / उजाव वऱ्यो चादालो	*Suk Taari / Sukh Taara / Ujaav varyo Chadalo*	Venus (Indian name) / Eastern star
Ajande	Bhil	सुखतारा	*Sukhtaara*	Venus (Indian name)
Visarwadi	Mavchi Bhil	ओग्रीयो तारो / जेंजलपाखड्या	*Ogreeyo Taaro / Jenjalpaakhdyaa*	Vomiting star / blinking star
Kelpada	Mavchi Bhil	चंद्राल्ये	*Chandralye*	Moon's sister
Khandbara	Vasave Bhil	ओगऱ्यो तारा / हगरा तारा	*Ogreeyo Taara (Hagraa Taara)*	Vomiting star (possible misidentification)
Boradi	Pawra	ऊजाओ तारो	*Ujaao Taaro*	Eastern star
Khandbara	Kokna	सुखतारा	*Sukhtaara*	Venus (Indian name)
Dhudhale Shivar	Kokna	शुक तारा	*Shuktaara*	Venus (Indian name)
Pachmauli	Kokna	शुक तारा	*Shuktaara*	Venus (Indian name)

Table 19: Stories, Practices and Omens About the Morning Star.

No.	Stories / Omens	Stated by	
1.	People can start their work after this star is seen in the sky.	Varpada	Bhil
2.	If this star is seen in the sky (dawn) it is an indication for the people to wake up and go to the washroom.	Visarwadi	Mavchi Bhil

Table 20: Phrases for the Evening Star in Different Villages, and their Meanings.

Village	Community	Evening Star		
		Indic	Transcription	Translation
Pachmauli	Bhil	चानची बायको	*Chan chi bayko*	Moon's wife (may be any bright star)
Pachmauli	Bhil	शेंड्या तारा	*Shendyaa Taara*	Star with a braid
Ajande	Bhil	गोंडमार	*Gondmaar*	
Kelpada	Mavchi Bhil	चंद्राल्ये	*Chandralye*	Moon's sister
Khandbara	Kokna	सुखतारा	*Sukhtara*	Venus (Indian name)
Pachmauli	Kokna	तारी	*Taari*	Star (may be any bright star)

our interactions paint a different picture.

4.14.1 Orion Region

Orion, being one of the prominent constellations seen in the night sky, especially in the Winter evenings, was easily recognised by all the communities. However, the number of stars taken into consideration from the original constellation as well as the stories and imagination behind it differed in different communities.

Table 21: Identification of Constellations.

Village	Community	Orion	UMa	Taurus	Leo	Scorpio	Auriga	Pleiades	Milky Way
Varpada	Bhil	Yes	Yes	No	No	No	No	Yes	Yes
Shrikhed	Bhil	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Madkani	Bhil	Yes	Yes	No	Yes	No	No	No	Yes
Chikhli	Bhil	Yes	Yes	–	Yes	No	–	Yes	Yes
Dhudhale Shivar	Bhil	Yes	Yes	No	No	No	Yes	Yes	Yes
Pachmauli	Bhil	Yes	Yes	No	No	No	No	Yes	Yes
Ajande	Bhil	Yes	Yes	No	No	Yes	Yes	No	Yes
Visarwadi*	Mavchi Bhil	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Kelpada	Mavchi Bhil	Yes	Yes	No	No	No	Yes	Yes	Yes
Khandbara	Vasave Bhil	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Boradi*	Pawra	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Joyada	Pawra	Yes	Yes	No	Yes	Yes	No	Yes	No
Khandbara	Kokna	Yes	Yes	No	No	No	No	Yes	Yes
Dhudhale Shivar	Kokna	Yes	Yes	No	Not sure	No	No	Yes	Yes
Pachmauli	Kokna	Yes	Yes	Yes	No	No	No	Yes	Yes

* Both meetings at these locations are represented in single rows.

The Bhil community (Villages 1, 2, 3, 4, 8 and 9) identified the Belt and Sword region of Orion as *Pambar* (पांबर) i.e. an agricultural implement used to sow seeds. It was manufactured by some incompetent worker who could not assemble the entire equipment perfectly. Thus, the four main stars (Betelguese, Bellatrix, Rigel and Saiph) formed the spare parts of this implement. The subjects from Villages 5 and 6 (Pawras), 7 (Mavchi Bhil) 8 and 9 (Koknas), and 11 (Bhil) identified the Belt region of Orion as a deer, or in some cases three deer.

In the southwest part of our sampling region, we have a more elaborate depiction. The Bhils (Village 10), Koknas (Village 10) and Mavchi Bhils (Village 12) all imagine the three Belt stars to be deer, surrounded by hunters. In some villages only the four corner stars (Betelguese, Bellatrix, Rigel and Saiph) are imagined to be hunters boxing in the deer, while in other villages, they also included a few more bright stars from the surrounding constellations in the group of hunters.

According to Koknas (Village 10), the three Belt stars of Orion form a deer and the other three stars (Sirius, Canopus, Procyon) are the hunters chasing the deer. Sirius, being closest to the deer, quickly shoots an arrow at it before the other two hunters can. Hence the other two are angry with Sirius.

An exception to this common story was seen in the Pawra community at Boradi. They visualised the three Belt stars of Orion as three eggs of a pigeon-like bird called the *Hulgi.*

The Bhil in Villages 4 and 9 used this constellation as a time indicator during the night.

4.14.2 Ursa Major

The second obvious constellation common to all communities was Ursa Major.

The four central stars (i.e. Dubhe, Merak, Phecda, Megrez) form a near-rectangle and are identified as being ‘a cot’, while the three trailing stars (Alioth, Mizar, Alkaid) are imagined to be three thieves intent on stealing the cot. In most of the villages, communities could also recognise Mizar to be a binary star. They expressed this by stating that this particular star (i.e. the middle thief) was either a pregnant lady or that the thieves were accompanied by a small child.

Most of the communities also realized that the shape of the cot so formed by the four stars was not a perfect rectangle. They explained the distortion by saying that one of the legs of the cot had been pulled by a thief or some other character in the local version of the story

Table 22: Varying Intereptations of the Three 'Tail Stars' of Ursa Major.

Village	Descriptions of the Three Stars
General Theme	Three thieves.
Bhils (Village 1)	Two brothers and one pregnant sister (with an infant in tow).
Bhils (Village 2)	Diala (डायला) – village elder, Patil (पाटील) – village chief, Kotwal (कोतवाल) – sheriff.
Bhils (Village 4)	Talathi (तलाठी) – revenue collector, Patil (पाटील) – village chief, Kotwa' (कोतवाल) – sheriff.
Bhils (Village 4)	Father, son, daughter-in-law (with grandson in tow).
Kokna (Village 10)	Two sons and mother.

The Bhil community at Varpada identify the three thieves as two brothers and one sister. The sister was pregnant and hence needed a bed (cot) for her delivery. The two brothers set out to find one. By the time they came back with the (stolen) cot it was already too late. The delivery had happened without the cot. Hence, the furious sister pulled at the cot, holding one of its legs. This accounts for the distorted shape of the bed, or cot, as seen in the sky.

Table 22 lists the variations in the stories of the three 'tail stars' of Ursa Major as told in different villages.

The Pawras in Village 6, the Mavchi Bhil in Village 7 and Vasave Bhil in Village 8 all believed that the four legs of the cot were made from four different elements—gold, silver, copper and iron. One of the thieves pulled at the golden leg of the cot while stealing it, thus deforming the shape of this cot.

The Kokna at Pachmauli imagined the three thieves to be a mother (Alkaid) and two sons. After a theft, the mother did not share the loot with her children. She hid the stolen goods under the cot and lied to her children saying she got nothing (no money) to share with them. The sons got very angry and pushed their mother over a cliff. It is Interesting that when Ursa Major is rising, it is aligned with a local cliff in such a way that the scene can be perfectly imagined.

The Bhil and Kokna from Village 10 used this constellation as a calendar marker. Whenever Ursa Major was seen rising at sunrise, the flowers of the Mahua (*Madhuca Indica*) tree started falling on the ground; when it was at the meridian at sunrise the number of falling flowers increased; and finally, when it was seen setting at sunrise, one could see a maximum amount of flowers falling on the ground.

The Kokna community has a different way of marking the calendar. They stated that whenever the two legs (lines joining Dubhe–Megrez and Merak–Phecda) were parallel to the ground it was midnight in the month of February, and when they were perpendicular and touching the horizon, it was dawn in February.

4.14.3 The Pleiades

The Pleiades is again one of the most noticed asterisms in the sky. In the majority of the villages, it was easily identified, in the vicinity of the Orion. There were a broad range of interpretations, based on the community and also on the local geography.

The Bhils at Varpada and Pachmauli identified the Pleiades as eggs of a pigeon-like bird named *hulgi.* A trap had been set by the cattle herders to obtain these eggs.

The Mavchi Bhils Visarwadi had a different interpretation. They imagined the Pleiades as a group of young girls who were crushing grain. It also was used as a time indicator in the olden times, and if it was not present in the sky then that period of time remained undefined.

The Bhils at Dhudhale Shivar pictured the Pleiades as a scorpion.

The Bhils from Villages 2 and 4 and the Pawras from Villages 5 and 6 called it *Guvavya, Govaadi* or *Dhorkya porya,* which translates as 'cattle herders'. The Pawras also mentioned that these cattle herders were hiding behind shrubs (i.e. Taurus) in order to capture birds named *Hulgi*.

The Kokna community also had a wide range of visualizations of the Pleiades in different villages. Those in Khandbara called it *Kodana Kutara*, which means a heap of hay. Subjects belonging to the same community who lived in Pachmauli identified the Pleiades as "a long tailed bird", while those living at Dhudhale Shivar visualized it as depicting the scene when one throws a stone in the mud. Interestingly enough, subjects in both these villages call the Pleiades *Chirkhandaa*.

4.14.4 Taurus

In most cases, Taurus was identified along with the Pleiades, since they were a part of the same local myth.

The Bhils at Varpada notice the Hyades cluster as a group of cattle herders in Taurus. The Pawras have a common story that incorporates the Pleiades, Taurus and Orion. The three Belt stars of Orion form the eggs of a bird named *Hulgi*, and the Pleiades are the cattle herders who want to capture these eggs, so they have set a trap and are hiding behind Taurus, which is a shrub.

The Vasave Bhil at Khandbara call it *Kaaltyaa*, and they use it for time measurement, the exact details of which were not given.

4.14.5 Leo

The Bhils identified it as *Daatiya* or *Daatlo,* which means a sickle. The Pawras recognised it as *Daatu or Daatla*. They further believed that if the Moon passes beside Leo this is a good omen, but if it merely grazes along the head of Leo then this is a bad omen.

The Koknas call it *Dhanushya baan*, meaning a bow and arrow.

4.14.6 Scorpio

The constellation of Scorpio was identified simply with a scorpion by the Bhil and Pawra communities, which were familiar with this region of the sky. The Mavchi Bhil called the tail of the scorpio *ali (अळी),* meaning worm. The Pawras stated that Orion and Scorpio were 180° apart so that when one rises, the other sets. Strangely, the Kokna community did not identify anything noteworthy in this area.

4.14.7 Auriga

In all the interviews it was seen that only a small triangle within the Auriga constellation (ε, η and ζ Aurigae), between Capella and Hassaleh, was identified by the subjects. The Bhil from Villages 9 and 11, Mavchi Bhil from Villages 7 and 12 and the Kokna from Village 10 all referred to it as the *Hulgi* bird (ε Aurigae) and its two eggs (η and ζ Aurigae). In addition, the Mavchi Bhil from Village 12 and the Kokna from Village 10 identified the star Hassaleh as *dhorkya*, meaning cattle herder.

4.14.8 Milky Way

All the communities noticed the Milky Way and imagined it to be a path. Some communities further noted that it bifurcates into two paths, and they had different explanations for this, based on local stories.

The Bhils in Varpada village recognised the Milky Way as "*Jeth (husband's elder brother) and sunbai's (daughter in law) road*." They noticed that the road bifurcates and they also have a story to explain this. They say that on the main path a person is walking and after some time he encounters his younger brother's wife coming in the opposite direction. Out of respect for her husband's elder brother she walks away and takes another path.

The Bhils (Villages 4, 9 and 11), Vasave Bhil (Village 8) and Kokna (Villages 8 and 10) identified it as 'the path of Gods'. The Kokna state that it further divides into two paths, which they call the Gods' and the daughter-in-law's paths. The Mavchi Bhil (Village 7) and Bhil (Village 10) identified it as a 'the path of cows (cattle)—a path along which cows walk'. The Mavchi Bhils (Village 11) acknowledged it as a ghost's path, which subdivides into the father-in-law's (ghost's) path and the daughter in law's path.

4.14.9 The Pole Star

The Bhil in very few villages were aware of the existence of the Pole Star (Polaris). Even though this is currently seen to be one of the important stars in the night sky, this was not something that they mentioned on their own. We had to probe them, drop clues and ask questions to make them think and recall if they have heard of such a star.

The Bhils in Chikhli called the Pole Star *Medhi Taara*, and they associated it with the central pole from the oil extraction mill of olden times. They also mentioned that all the stars go around this particular *Medhi Taara*, similar to the oxen tied to this central pole and made to go round and round to extract oil.

The Mavchi Bhil called it *Juga Medhi* (i.e. the central pole of the world).

The Bhils at Madkani have heard about this star and believe that if at any time it is not seen in the sky then this marks the death of an important person. The Pawra community identified it as *Shendi Taro,* but we think that they may have confused it with a comet. The Koknas at Pachmauli spoke about it, saying that they could only faintly recall it being called *Raaja,* which means the king.

4.14.10 Other Constellations and Asterisms

Apart from the usual conventional constellations, we would like to mention a few other observations which we came across.

The Bhil community in Village 1 identified the Hyades cluster as cattle herders and the

Crux as *Kaat*, meaning a cross. In late June and early July (Jyestha Month, as per the Hindu Calendar) the constellations Scorpio and Crux can be seen in the sky simultaneously. This does not happen in other months. This event is considered by the subjects to be an indicator for rainfall.

The Pawra community in Village 5 identified the constellation Corona Borealis as *Kundo* meaning a pot. This Kundo is seen near the zenith late in the evening in June. This was also considered to be the marker for the start of the monsoon.

The Mavchi Bhils at Visarwadi and Vasave Bhil (Village 8) noticed the star Canopus and its varying brightness. They called it *Janjal Pakhadi*, meaning the act of dusting the old bed-ding. The Mavchi Bhil community in Village 12 mentioned that they identified the circlet of the constellation Pisces as *Pola,* meaning a beehive. They also identified the constellation Crux as a palm tree.

The Vasave Bhil community in Village 8 noticed the Stars Vega and Altair. They were imagined to be trees on either side of the Milky Way path.

The Kokna community at Village 10 mentioned that they recognized the constellation Pegasus. They call it *Kodhava udavaa*, which means a place to store grain.

5 CONCLUDING REMARKS

The objective of the present study was to document the astronomical knowledge and beliefs of some of the tribal communities dwelling in the western Satpura Mountain Range. This objective was achieved by doing *in situ* semi-structured interviews with a number of community members. All information was cross-verified through other independent interviews or on-the-spot questions of clarificaton.

The three communities surveyed exhibited a rich and diverse cultural capital relating to astronomy. Some of the folklore and beliefs, such as stories about Ursa Major and lore about rainbows were similar to those of other ethnic communities dwelling further east in central India, but within the same Satpura Mountain Range. This is evidence of cultural continuity along the Mountain Range, even though these groups have their own distinctive linguistic and social identities. Yet, a lot of unique information about astronomical knowledge and folklore was revealed in the process.

The communities have their own distinctive stories about various constellations, eclipses, lunar halos, lunar markings, etc. If properly documented, these stories, can become important resources for local schools, and make their teaching more sensitive to local cultures.

However, the recent assimilation of these communities with mainstream cultures and education, means that some of this cultural capital is forgotten and has been lost. We particularly saw evidence of this in our questions regarding their cosmogonical stories. Thus, urgent efforts are needed to document this knowledge from all Indian tribal communities. As seen in our interviews, two communities living next to each other may have different cultural capital, and sometimes that is even true of the same community if the subgroups are living at considerable distances from one another.

6 NOTES

1 'Isolated', in this context, means groups that are not unduly influenced by modern society, or those groups that are still able to maintain their cultural beliefs about the sky.
2 For a summary see the Joshua project - www.joshuaproject.net/people_groups/16414/IN
3 For a summary see the Joshua project - joshuaproject.net/people_groups/17238/IN
4 Vaar / वार simply stands for __day as in Sunday.
5 The season of village fairs in late December.

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9 APPENDIX: THE REFERENCE QUESTIONNAIRE

Interview Protocol

Date: Time: Interview Code:

Tribe: Village:

GPS Coordinates:

0. Interviewee's consent

Before the start of the interview, following should be explained to the interviewee(s) in the local language:

1. This interview has following purposes:
a. Document all the stories related to sky from their culture, before they are forgotten.
b. Compare those stories with groups from other parts of the country.
c. Try to understand how their ancestors came up with these stories / traditions.
2. We are not interested in formal astronomy, which is taught in schools and we are not interested in getting 'correct' answers. As far as we are concerned, everything said by the interviewee is important, even if it doesn't agree with what is taught in the school.
3. We will be conducting similar interviews with many people and then write articles / book about what we learn from these interviews. We will not reveal real names of any participants in our reports. No photos or videos will reveal the identity of participants.

After explaining these points, the participant(s) will be asked if they agree to talk to us. Only after their explicit consent, the interview should be continued further.

Interviewer should sign here after the interviewees give their consent: _____

1. Personal Information

* शाळेत गेलेलात का? किती वर्ष? / Have you done any formal schooling? For how many years?

** तुम्हाला आकाशाबाबत कोणी शिकवलं? तुमचा आजा / पणजा किंवा गावचा भुत्या किंवा अजून कोणी? Who taught you the stories about the sky? Was it your grandparent / great grandparent or the village priest or somebody else?

2. Sun & Moon

a. सूर्योदय / सूर्यास्त का होतो? / Why does sunrise / sunset happen?
b. रोज त्याच वेळेला उजाडतं / अंधारतं का? नाही तर असं का होतं? Does the sunrise / sunset happen at the same time every day? If not, why not?
c. रोज सूर्योदय त्याच जागेवरून होतो का? नाही तर असं का होतं? Does the sunrise happen from exactly same place every day? If not, why not?
d. चंद्र रोज त्याच वेळी उगवतो का? नाही तर असं का होतं? / Does the moonrise / moonset happen at the same time every day? If not, why not?
e. चंद्र उगवतच नाही असं कधी होतं का? / Does it ever happen that the Moon doesn't rise at all?
f. चंद्र दिवसा दिसतो का? कधी आणि का दिसतो? / Is the Moon ever visible during the daytime? If yes, why does it appear during the day?
g. चंद्राच्या कला का दिसतात? / Why do we see the phases of the Moon?
h. तुमच्या भाषेत दिशांची नावं काय आहेत? / What are the names of directions in your language?
i. दिशा कशा ओळखता? / How do you identify which direction is which?
j. दिशांची नावं काय आहेत? का? What are the names of directions? Why?
k. चंद्र-सूर्याबद्दलच्या पारंपरिक गोष्टी / Mythological stories around the Sun and the Moon.
l. चंद्र-सूर्य हे एवढे मोठे आणि बाकी सारे तारे इतके छोटे असं का? / Why are the Sun and the Moon so big / bright and other stars so small?
m. चंद्रावर डाग का आहेत? / Why are there so many dark regions on the Moon?
n. चंद्राला कधी कधी खळं का पडतं? / Why do we sometimes see a halo around the Moon?

3. Calendar

a. तुमच्याकडे वेळ कशात मोजायचे (तास/ घटका की अजून काही)? How do you measure time (for time units smaller than one day)?
b. तुम्ही दिवसा / रात्री वेळ कशी ठरवायचात (जेवायचं कधी, घराकडे परतायचं कधी)? How do you know the time of the day (when to eat / when to return home etc.)?
c. तुमची दिवस मोजायची पद्धत काय होती (आठवडा / पंधरवडा)? Did you have a system similar to week or fortnight? What was that?
d. वारांना नावं असायची का? कोणती? What were the names of days of the week, if they existed? (and origin of those names)
e. महिना कसा मोजायचे (सुरूवात कुठल्या दिवसापासून)? एका वर्षात किती महीने असायचे? How did you count the month? When would it start? How many months were there in a year?
f. महिन्यांची नावं काय होती? What were names of the months?
g. उन्हाळा / हिवाळा वगैरे ऋतु असतात का? ते कधी सुरू होतात आणि कधी संपतात? Do you have a concept of seasons like Summer / Winter? When do they start and when do they end?
h. तुमचे मुख्य सण कोणते आणि ते कधी साजरे करायचे ते कसे ठरवतात? Which are your important festivals and how do you decide their dates?
i. तुमच्या पारंपारिक वर्षाची सुरूवात कधी होते? When does your traditional year start?

4. Planets and night sky

a. रात्री वाट शोधायला तुम्हाला आकाशातल्या ताऱ्यांचा उपयोग होतो का? कसा? How can one find directions in the night using the stars?
b. ध्रुव ताऱ्याचे वैशिष्ट्य माहित आहे का आणि त्यामागील पारंपारिक कथा काय आहे? Do they know importance of the Pole Star and why it is Pole Star (folklore)?
c. रात्री ध्रुव तारा कसा शोधावा? How to identify Pole Star in the night?
d. तारकासमुह ओळखता येतात का? त्यांच्या पारंपारिक कथा काय आहेत? Can they identify any constellations? What are the folklores behind them?

कृत्तिका, मृग, वृश्चिक, सप्तर्षी ओळखता येतात का? त्यांच्या पारंपारिक कथा काय आहेत? Can they identify the Pleiades, Orion, Scorpio, Ursa Major? What are the folklores behind them? Any other constellations?

e. ताऱ्यांची नावं काय आहेत? त्यांच्या पारंपारिक कथा काय आहेत? What are names of individual stars? What are the folklores behind them?
f. रात्रीच्या आकाशातले ग्रह ओळखता येतात का? त्यांच्या पारंपारिक कथा काय आहेत? Can they identify the planets in the night sky? What are the folklores behind them?

g. मंगळाचा रंग लाल का असतो? Why is Mars red?
h. काही तारे लाल का असतात? Why are some stars red?
i. संध्याकाळच्या आकाशातला शुक्र आणि सकाळच्या आकाशातला शुक्र हे एकच आहेत हे कळले आहे का? Can they identify that the morning star & evening star are the same planet (Venus)?
j. आकाशगंगेबद्दल पारंपारिक कथा काय आहेत? What is the folklore behind the Milky Way?

5. Part 5: Unusual events in the sky

a. ग्रहणे का होतात? Why do eclipses happen?
b. तारे तुटताना दिसतात (उल्का) ते का होते? When we see a falling star (meteor), why does that happen?
c. धुमकेतू पाहिले आहेत का? ते का येतात? Have you seen any comet? Why do they appear?
d. इंद्रधनुष्य का दिसते? Why do we see a rainbow?

6. Part 6: Social Aspects and cosmogony

a. मृतांचे दहन / दफन करताना दिशांचा विचार केला जातो का? मृतात्म्यांचे पुढे काय होते? Are directions important in the funerary practices? What happens to people after they die?
b. आकाशाचा उपयोग हवामानाच्या अंदाजासाठी होतो का? Can we use sky to predict weather?
c. तुमचे पारंपारिक देवता मंडळ कसे असते? ते आकाशात दिसतात का? Can you describe your pantheon of gods? Can we see them in the sky?
d. तुमच्या समाजाची सुरूवात कशी झाली? What is the origin story of your community?
e. मानवजातीची सुरूवात कशी झाली? What is the story of the origin of humankind?
f. जगाची / विश्वाची सुरूवात कशी झाली? What is the story of the origin of the world / Universe?
g. तुम्ही आकडे कसे मोजता (नावं)? Number System
h. तुमची लिहायची अक्षरं कशी असतात?Alphabets

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