Indigenous Calendars in Western Sumba Island, Indonesia:

Signals for "Bitterness" and "Sea Worms"

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This paper discusses the calendars of Indonesia's Western Sumba Island, which incorporate cycles of the sun, moon, and nature. Additionally, communities synchronize the calendar somewhat beyond the conventional boundaries of the administration and the language differences. This paper analyzes two unique points in the time reckoning mode of the Sumba, namely the Month of Sea Worms and the Month of Bitterness, which are crucial in the intercalation method. The Month of Sea Worms is characterized by the periodical swarming of a polychaete species called *Nyale* and the *Pasola* Festival, a mounted spear-fighting competition. Priests of Lamboya District recognize (forecast) the coming of the season by receiving signals from the sun and moon, and the Lamboya community conducts several rituals; this information is communicated to the Wanokaka District where the priests hold their rituals, and finally, all communities address the mass swarming of the sea worms. The Month of Bitterness started first in Lamboya and moved to the Lolina District after one lunar cycle interval. A month-long festival called *Podu* is held to intimate to all communities the end of the traditional year. The seemingly complex calendar is embedded in the daily lives, social norms, and rituals of the communities. This unconscious intercalation should be seen as a "signal transmission calendar" from the aspect of calendrical systems. This study concludes by noting that the Western Sumba people operate complex traditional calendars based on inherent flexibility and signal transmission for synchronization in the evidential absence of modern meteorological technologies.

Keywords

Nyale, Polychaetes, *Palolo*, *Pasola*, *Podu*

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I INTRODUCTION

This paper aims to look at calendars based on the movements of the sun, moon, stars, and nature in Indonesia, which has some of the most diverse calendars in the world, and to comprehend the calendar of Western Sumba, which incorporates different cycles into just one calendar. This paper focuses on two unique points in time for the people of Sumba, the Month of Sea Worms and the Month of Bitterness, which are vital to the intercalation method.

The calendar fulfills various roles, one of which is its use in promoting subsistence and livelihood. In this study, we center our attention on how traditional societies understand the law of seasonal changes, which recur annually, and its subsequent use in supporting livelihoods such as agriculture. In the case of agriculture, the calendar must coincide with the solar cycle, so that similar weather phenomena occur in the same month every year.

The solar cycle is approximately 365.2422 days, and in temperate regions, seasonal changes in winter, spring, summer, and fall make understanding the role of the sun easy, but in low-latitude tropical regions, this task is often difficult (Okada 2008). Additionally, measuring the exact cycle of the sun requires somewhat advanced technology, which is not available to many traditional societies. The lunar cycle averages 29.5309 days. The moon can be observed by examining its phase changes. Because the lunar cycle is approximately 29.5 days, it can be reproduced by repeating the 29-day month and the 30-day month. However, 12 lunar cycles account for only 354 days, which cause 11–12-day gaps in the solar cycle. Therefore, the intercalation process is necessary to align the calendar with the solar cycle, and notably, Indonesians have achieved synchronicity with the sun in their calendar by using different methods of intercalation.

II CALENDRICAL SYSTEMS IN INDONESIA

This introduction starts by discussing examples of the types of calendars extant in Indonesia.

1 Solar calendar systems

The Gregorian calendar is quite ubiquitous in the life of Indonesians. Table 1 shows words in Bahasa Indonesian for the Gregorian calendar. The historical background shows that the Dutch names of the months have been adopted almost verbatim.

Table 1. The Gregorian calendar in Indonesia

English	Dutch	Bahasa Indonesia
January	Januari	*Januari*
February	Februari	*Februari*
March	Maart	*Maret*
April	April	*April*
May	Mei	*Mei*
June	Juni	*Juni*
July	Juli	*Juli*
August	Augustus	*Agustus*
September	September	*September*
October	Oktober	*Oktober*
November	November	*November*
December	December	*December*

However, traditional solar calendars are also used in Indonesia. One such calendar is *Pranoto Mongso* (*Pranata Mangsa*), denoting the rules of the seasons in the Javanese language. This calendar was created and issued by a king of the Surakarta Kingdom in 1855 (Okada et al. 2014). The year starts on June 22, the summer solstice, and the number of days per year is 365 (366 in leap years). Therefore, the cycle of the year matches that of the sun.

A characteristic of this calendar is that the unit of months is not associated with the lunar cycle, which is approximately 30 days. Table 2 shows the names, the start day, and months in *Pranoto Mongso*. Starting with the summer solstice, there are six months of different durations (i.e., 41, 23, 24, 25, 27, and 43 days), and then six months of durations reversed (i.e., 43, 26/27, 25, 24, 23, 41 days) when the winter solstice is finally reached. This seemingly irregular cycle is proportional to the height and direction of the sun at the season's start (Okada et al. 2014); starting with the summer solstice, when the sun's shadow is longest facing south in the southern hemisphere, and finishing with the winter solstice when the sun's shadow is longest facing north, and the solar altitude is divided into regular intervals. This

Table 2. The Pranoto Mongso (Pranata Mangsa) calendar

Order of months	Name of the month	Approximate start day in the Gregorian calendar	No of days in the month
1	*Kasa*	June 22	41
2	*Karo*	August 2	23
3	*Katelu*	August 26	24
4	*Kapat*	September 19	25
5	*Kalima*	October 13	27
6	*Kanem*	November 9	43
7	*Kapitu*	December 22	43
8	*Kawolu*	February 3	26/27
9	*Kasanga*	March 1	25
10	*Kasapuluh*	March 26	24
11	*Dhestal*	April 19	23
12	*Sadha*	May 12	41

sense of seasonality is thought to be appropriate for farming in Java and in preparing for possible future (but chronic) climatic disasters.

2 The lunar calendar system

In Indonesia, the Islamic calendar (Hijri calendar), a purely lunar calendar, is used for official requirements. As a rule, each 29-day month alternates with a 30-day month to match the lunar cycle (29.5 days on average). To not deviate from the real lunar cycle (29.5309 days on average), 11 times in 30 years, the 29-day month at the end of the year is altered to 30 days. The 12 months in the Islamic calendar deviate from the solar cycle by approximately 11–12 days per year.

Indonesians also use the Javanese Islamic calendar because many of the communities in Java have converted to Islam. This purely lunar calendar is similar to the Islamic calendar. Table 3 compares the Islamic and Javanese Islamic calendars, and most month names are, in fact, the same. Additionally, a 29-day month becomes a 30-day month three times in an eight-year period in a unique intercalation method. This unique quality may be due to the influence of the traditional Uku cycle.

3 Lunisolar calendars

Lunisolar calendars, for example, the Chinese calendar, have been used widely in Asia; these calendars can be considered to combine the advantages of the lunar calendar, allowing the understanding of daily progress

Table 3. Islamic (Hijri) and Javanese Islamic calendars

Order	Arabic names	Javanese names
1	*Muharram*	*Sura/Suro*
2	*Safar*	*Sapar*
3	*Rabi al-Awwal*	*Maulud/Mulud*
4	*Rabi al-Akhir*	*Rab Akhir/ Bakda Mulud*
5	*Jumada al-Awwal*	*Jumadil Awal*
6	*Jumada al-Akhira*	*Jumadil Akir*
7	*Rajab*	*Rejeb*
8	*Sha'ban / Shaaban*	*Ruwah*
9	*Ramadan*	*Puasa/Pasa*
10	*Shawwal*	*Sawal*
11	*Dhu al-Qa'da / Dhu al-Qaada*	*Apit/Sela*
12	*Dhu al-Hijja*	*Besar/Dulhijah*

Note: There are eleven leap days in thirty years in the Hijri calendar; three leap days in eight years in the Javanese Islamic calendar.

by examining the shape of the moon, with the utility value of the solar calendar, which matches the natural annual cycle.

Lunisolar calendars in several parts of Southeast Asia have been influenced by the Indian calendar, and both of those systems differ from that of the Chinese calendar. This difference occurred because of the spread of Hindu cultural influences, such as that from the Majapahit Kingdom, which flourished in the fourteenth and fifteenth centuries, mainly in Java, and ruled over much of what is today's Indonesia, including Bali. Bali has various local calendars, and the Balinese calendar played an official role by introducing the Hindu calendar paradigm to the traditional Javanese and Balinese calendars.

The mechanism of the Balinese calendar is complicated, and previous studies have analyzed it in detail (e.g., Igarashi 2008). Each year consists of alternate 29-day months and 30-day months, and by inserting leap days and missing out days at regular intervals, each month coincides with the lunar cycle. To synchronize with the solar cycle, leap months are added seven times every 19 years according to the Metonic cycle. However, calendar makers may differ on where to insert leap months.

Table 4 shows the names of the months in the Balinese calendar. Notably, the first through tenth months correspond to the Balinese numerals 1 through

Table 4. Order and names of months in the Balinese calendar

Order	Balinese name	Meaning
1	*Kasa*	1st
2	*Karo*	2nd
3	*Ketiga*	3rd
4	*Kapat*	4th
5	*Kelima*	5th
6	*Kenem*	6th
7	*Kepitu*	7th
8	*Kaulu*	8th
9	*Kesaga*	9th
10	*Kedasa*	10th
11	*Jiyestha*	Hindu month name
12	*Sadha*	Hindu month name

10, and the eleventh and twelfth months are in Hindu. This pattern is the same as that found in the Javanese *Pranoto Mongso* calendar (Table 2). It is believed that the ancient Javanese and Balinese calendars used only ten months, but later, with the introduction of the Saka calendar from India, the eleventh and twelfth months were subsequently added.

According to Igarashi (2008), who has studied the traditional Balinese calendar and the vernacular calendars still used in various regions of Bali, the end of the tenth month marks the period when people do not, in effect, count months, namely, the "no-name" month. The duration of this no-name month may be two or three lunar cycles, but the people are not aware of the real length of the period. Eventually, with the heliacal rising of the Pleiades, people start counting months again.[1] This phenomenon may be called an "unconscious" intercalation (Igarashi 1997).

The Balinese calendar sometimes has different dates depending on the calendar maker, which may affect the rituals. However, many rituals are based on the Uku cycle (Eiseman 1990). The Uku cycle is sometimes compared with the East Asian (Chinese) zodiac, but the cycles are different. In the Uku cycle, there are seven days per week, and this phenomenon is commonly applied worldwide, five days per week (5-day week: Paing, Pon, Wage, Kliwon, and Legi/Umanis), which are unique to Indonesia, and six days per week (six-day weeks: Tungle/Tungleh, Aryang, Warukung/Urukung, Paningron/Paniron, Uwas/Was, and Mawulu/Maulu) are the main cycles, and the least common multiple of these cycles is 210 days (Okada 2002). Additionally, there are 1-day to 4-day weeks and 7-day to 10-day weeks. In this way, a wide variety of days of the week are created, and each day of the week is thought to have its unique character, and some are considered festival days.

4 Sidereal calendars

Using stars or constellations to determine the calendar, namely sidereal calendars, is observed in various areas of Indonesia. Most of these areas use the stars to identify the time of year (e.g., the beginning of the year), but simultaneously, in many cases, the lunar calendar is used for the progression of the months, or the natural calendar, described later, is adopted.

The main stars and constellations used as sidereal calendars in Indonesia are the Pleiades, Antares, and Orion's Belt (Table 5) (Igarashi 1997). In Indonesia, which is geographically long from east to west, the dif-

Table 5. Examples of Sidereal calendars (Igarashi 1997)

Star/constellation observed	Astronomical event	Examples
Antares	Heliacal rising	Aceh (Sumatra)
Antares	Acronychal rising	Batak (Sumatra), Kedang (Lembata)
Belt of Orion	Heliacal setting	Batak (Sumatra)
Pleiades	Acronychal rising	Galela (Halmahera)
Pleiades	Heliacal rising	"Candra pralekha" (Bali)

Note: Heliacal setting: End of the period of visibility for a star; the last day on which the star is visible setting in the west after sunset.
Heliacal rising: Beginning of the visibility period of a star; the first day on which the star is visible rising in the east before sunrise.
Acronychal rising: the last day on which the star is visible rising in the east after sunset.

1 Recorded in the Saturnalia (Volume I, Chapter XII) of Macrobius is that the early Roman calendar, the Romulus calendar, also had only 10 months and counted only 304 days, but in spring the New Year began with the king's proclamation and the counting of months and days began. The mechanism is thought to be the same as that of the Romulus calendar.

ferences in latitudes are quite small, but the season to be identified depends on which stars are being examined and at what time the examination actually occurs. For example, in the case of *Candra pralekha* in vernacular Bali, which marks the time when the Pleiades become visible in the sky just before dawn after the period of prostration (heliacal rising), the year begins in mid-June or later. For Galera, which marks the time when the Pleiades are observed just after sunset (acronychal rising), the year begins in mid-October or later. In Aceh, where the heliacal rising of Antares is used as a marker, the beginning of the year is after late December, and in Batac and Kedang, where the acronychal rising of Antares is locally used as a reference, the beginning is after mid-May.

5 Natural calendars

This paper has thus far described calendars based on some celestial body or other. However, calendars are used in Indonesia and other countries that look to identify the seasons by natural movements. In the Lio region on the island of Flores, there are twelve named months in a year, but the rituals do not have to specifically coincide with the solar or lunar cycles [Sugishima 1990], and local farming is loosely based on the knowledge of natural phenomena. In the eastern part of Sumba, where the Antares calendar is said to be used, Forth noted that traditional months "are not intercalary months, and since their occurrence is moreover reckoned by natural phenomena and social activities, rather than by the phases of the lunar cycle" (Forth 1983).

One example of associating some natural phenomenon with a particular season is the use of the wind. According to Yoshida (1980), in Galera, Halmahera, the year is divided into two major seasons, the north wind season and the south wind season. As mentioned above, Galera begins counting the months with the acronychal rising of the Pleiades, but this is the season of the north wind, from which they count only six months, and stops counting the months when the season of the south wind arrives. The seasonal divisions of the Samas in the Banggai Islands, as reported by Makibi Nakano of this volume, are also notable.

Another famous example in oceanic Asia and Oceania is the reproductive group swarming of certain polychaete species. In Indonesia, this species is called *nayle* in the Lesser Sunda Islands, and *laor* or *wawo* in the Moluccas (Igarashi 2017). These sea worms are said to be members of the genus *Palola*, which is well known in Samoa as *palolo*,[2] but other species such as Nereididae are also included (Pamungkas 2015).

In particular, the *Bau Nyare* festival, which is associated with reproductive swarming in Lombok, is also famous tourist resource (Figure 1). This festival is said to be held on the 20th day of the 10th month of the Lombok (Sasak) calendar. The 10th month is approximately February, and the twentieth day is the night of the waning moon, roughly five days after the full moon. However, biological observations suggested that these sea worms appear not once but twice during February and March (Igarashi 2017).

Legend has it that the beautiful princess Putri Mandalika, who was courted by royalty from all over the island, jumped off a cliff into the sea and transformed herself into a plethora of sea worms, returning annually

Figure 1. *Nyale* caught during Bay Nyale Festival in Southern Lombok Island

2 Annual swarming of the palolo is the sign of the traditional New Year in Samoa and parts of Oceania (e.g., A Member of the Samoan Society 1928).

to be the property of all. The Maritime Museum in Jakarta has an exhibit on this legend, which has become a well-known story in Indonesia.

In any case, the reproductive swarming of sea worms is a natural phenomenon that occurs only once or twice in a given year, according to the solar and lunar cycles; thus, identifying the time of year is useful. However, it is not a complete solution because there is variation by the year (up to one lunar cycle). Notably, in Lombok, it is the 20th day of the 10th month—logically predictable at the beginning of the year—but the date of the ritual is not decided upon until just before the event.

III OUTLINE OF CALENDARS IN WESTERN SUMBA ISLAND

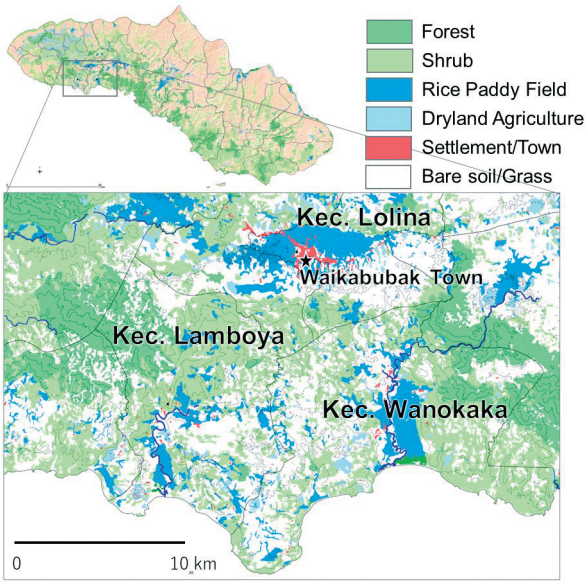
On the island of Sumba in the East Nusa Tenggara Province, traditions such as megalithic culture and the *Pasola* ritual of horseback fighting are practiced, and various rituals and social norms are related to the calendar, which has led to the study of the calendar.

The Western Sumba calendar is a unique admixture of solar, lunar, and natural calendars, as well as a complementary calendar that transmits signals between regions. This paper discusses this calendar and then presents examples of its use in practice (Furusawa and Siburian 2019).

1 Regional Context

Sumba Island has one of the lowest rainfall rates in Indonesia and distinct wet and dry seasons. The island is classified as a savanna climate with little precipitation, and the western part has high precipitation and a tropical monsoon climate depending on the year. In the West Sumba Regency, where this study was conducted, paddy rice cultivation is practiced in several places, as well as field farming. However, the rice paddies and field crops had to be harvested by using the limited rainy season effectively to provide food for the year. The beginning and end of the rainy season and the annual rainfall fluctuate substantially because they are affected by El Niño and La Niña (Furusawa and Siburian 2019).

This study focused on the Wanokaka, Lamboya, and Lolina Districts (*kecamatan*) in the West Sumba Province (Figure 2). A district in Sumba is said to constitute the former royal domain (*swapraja*), although the kingdom system was not always clear in West Sumba. Different languages are used in these districts, and there were commonalities such as the traditional belief in the ancestral deity *Marapu*, but each had a different history and culture.



Map data source: Indonesia Geospatial Portal (http://portal.ina-sdi.or.id) and ASTER GDEM2 (METI/NASA)

Figure 2. Map of the study sites

2 Characteristics of Western Sumba Calendars

Ethnographers and other scholars such as Hoskins (1993), Geirnaert-Martin (1992), Mitchell (1984), and Gunawan-Mitchell (1981) have studied the calendars of Western Sumba.

A characteristic of the Western Sumba calendar is the month named after the *Nyale*, when the polychaete sea worms mass, and a grand festival called *Pasola* is held (Figure 3). However, *Pasola* is held only in coastal areas such as Wanokaka, Lamboya, and Kodi, not in inland communities such as Lolina, which is among the areas surveyed in this study.

Another feature is the month of *Podu* (*Pidu*), with a big festival occurring in inland areas such as Lolina District. *Podu* can be translated as “Month of Bitterness (or Holiness).” In the mountainous areas of Lolina and Lamboya counties, *Podu* is the last month of the year, and the following month is *Kobba* (*Kabba*, *Ka’a*),

Figure 3. Pasola Festival in Kodi

which is the New Year, denoting freedom from taboos.

The third feature is that the times of *Podu* and *Nyale* are synchronized across the material boundaries of districts and languages. Table 6 shows the names and order of months based on my interview with the *rato* (local priest) from each district. For example, *Nyale* (*Nale*) starts in Lamboya and then moves to Wanokaka (or Gaura) over the next month. *Podu* starts in Lamboya (or Lamboya Bawa) and moves to Lolina (or Tarun Waitabar, the center village of Lolina). Notably, these orders and names differ from the information in the extant literature because there were inter-individual variations in the knowledge on calendars; however, the times of *Podu* and *Nyale* were almost identical among informants and the extant literature (see other analyses in Furusawa and Siburian 2019). After *Podu*, all three districts enter *Kobba*.

The fourth feature is that *Nyale* and *Podu* are determined by solar and lunar cycles, and the other months do not necessarily follow a particular cycle (Furusawa and Siburian 2019). During the dry season, between the end of *Nyale* and the beginning of *Podu*, the names and order of the months vary person to person, and sometimes the names of the months are unknown. This finding implies that the intercalation similar to the "no-name month" of the lunisolar calendar in Bali is made in approximately *Podu*.

The fifth feature is that *Podu* and *Nyale* represent vital times for agriculture. For field agriculture, predicting the onset of the rainy season is necessary (Furukawa 1991), and for rice paddies, predicting the end of the heavy rain season is equally important. A custom had been that rice planting should be made after the appearance of the *Nyale* sea worms because the timing corresponds to the latter part of the rainy season and is adjudged the best season for that purpose (Furusawa and Siburian 2019).

The sixth feature is the "unconsciousness" and "flexibility" in the real operation of month reckoning. In reality, only a limited number of priests know the calendar and organize the several attendant rituals. Although most people's awareness is unconscious regarding the real progress of calendars, they can conduct agricultural activities at the right time, because they internalize

Table 6. Example of names and orders of months of three study sites according to informants; Knowledge within each district varies

Approximate	Lolina	Lamboya	Wanokaka
Nov.–Dec.	*Kobba*	*Kabba Ro Yayu*	*Ka'a* or *Mangata*
Dec.–Jan.	*Mangata*	*Mangata*	*Hi'u*
Jan.–Feb.	*Nale Laboya*	*Nyale Lamboya*	*Nyale Lamboya*
Feb.–Mar.	*Nale Wanokaka*	*Nyale Wanokaka* or *Nyale Gaura*	*Nyale Wanokaka* or *Biha*
Mar.–Apr.	*Nale Mobu*	*Mahera Makahi Kari*	*Ngura*
Apr.–May.	*Ngura*	*Lima* (or no-name)	*Meting Katiku*
May.–Jun.	*Tua*	*Wolu Hura*	*Bada Rara*
Jun.–Jul.	*Meting Katiku*	*Kabba Pari Beru*	*Oting Mahing*
Jul.–Aug.	*Manamo*	*Kuru Tanah*	*Palu Dong*
Aug.–Sep.	*Kadekara* or *Taina Mesi*	*Bani Diha* (or no-name)	*Podu Lamboya Bawa*
Sep.–Oct.	*Podu Laboya*	*Podu*	*Podu Tou Dangu*
Oct.–Nov.	*Podu Lolina* or *Podu Touma Dangu*	*Podu Lolina*	*Podu Tarun Waitabar*

See Furusawa and Siburian (2000) for additional details and a comparison with the literature.

important time points by their own participation in the related rituals and festivals. In other words, priests decide the times for rituals and festivals, and thus, the dates are flexible, to allow calendars to be adjusted to synchronize with certain phenomena.

Thus, the multiple districts in Western Sumba would appear to read each other's signals from celestial, natural, and neighboring sources to create a complex calendar that is embedded in daily lives, social norms, and rituals.

IV RITUALS AND ECOLOGY IN MONTHS

In this section, this paper focuses on the month of the Sea Worms (*Nyale*) and the Month of Bitterness (*Podu*) and explains what they entail, based mainly on the author's field observations in 2016 and 2017.

1 The Days toward Pasola in Wanokaka

Wanokaka was one of the most traditional places in West Sumba where *Nyale* rituals are practiced. Some areas had begun to hold *Pasola* festivals on dates that were more convenient for tourists than the actual dates of the celestial and natural cycles, but Wanokaka culture prioritized celestial and natural cycles.

The word *Nyale* is the word for food, or substance, but these kinds of sacred sea worms are named differently in a poetical manner. In the Wanokaka language, there is a couplet for "the best of the best":

Maruahu harru	Purified rice
Innu gading	Polished ivory

This couplet is followed by the following couplet.

Leli lima	Turquoise bracelet
Rewa koku	Red necklace

The latter half of this phrase translates as bronze for the arms and beads for the neck, but people refer to them as "turquoise (blue/green) bracelets" and a "red necklace." These metaphors describe the colorful sea worms in reproductive groups, with blue and green being female and red and brown being male worms.

In 2016, February 8 was the new moon, and from then on, this month became the month of Nyale Wanokaka. During this month, people were not allowed to go near the beaches where the sea worms were, wear red clothes, or use fire. Each village had a different role: Waigali village was the main village (*ina ama* = leader: father/mother village), Ubu Bewi village watched the celestial bodies, Wai Wuwang village watched the tides, Lahi Pangabang village watched to ensure that people did not use fire, and predicted what would occur, and Praigoli village watched to ensure people did not wear red clothes and so forth.

February 23 was the full moon, and around this time, it was announced that this year's Pasola would be held on February 29. The last four days were the days of rituals called *Pati Rahi*. All the priests were instructed from Waigali village to first stay one night in Wai Wuwang village, then one night in Praigoli village, and two nights in Ubu Bewi village, arriving in Ubu Bewi approximately some five days after the full moon. The next day, the *Pasola* was to be held. These events were held in the middle of the rainy season, and a good omen was said to be when the rain clouds disappear as the priests move from village to village on foot.

Following this custom, on the night of February 27, priests gathered in Ubu Bewi village, and rituals were held during the night, but before midnight, all but the priests left the village. According to informants, at midnight, two priests from Ubu Bewi, walking slowly and stealthily so that no one could hear them, went to the traditional village of Ahi Pangabang, where they slaughtered chickens and made fortune-telling by reading the entrails of the chickens.

Later on that same night, people gathered at a beach called Wai Tena. Some priests had arrived earlier to watch the tide. When the moonlight illuminated the beach, people gathered to begin what is called a *pajura* in Sumba (Figure 4). This custom was likened to boxing; men split up into groups and fought.

On the next day, February 28, another ritual was performed. Eighteen priests gathered in Ubu Bewi, and each slaughtered a chicken to be offered to the sea worms for good luck (Figure 5). There are nineteen

Figure 4. Pajura, a traditional fist-fighting ritual at Waitena Beach

Figure 5. A scene of a ritual in Ubu Bewi village

Figure 6. Horsemen gathering for a rehearsal of Pasola

Figure 7. A megalith from which priests observe the moon

priests in Wanokaka, and the only female priest did not have a role in *Pasola*. The chickens were then cooked and served. In the afternoon of the same day, the horses that would compete in the *Pasola* gathered for a dress rehearsal. The horses and riders were dressed up as contestants, but sometimes, the riders were children, not the actual contestants (Figure 6).

On this night, all the priests would sit on the megalith and watch the moon (Figure 7). When the moon is in the position where the sea worms are supposed to appear, they go to the beach, calling out for the sea worms, and let the people know with their voices that the time has come. A couplet describes this process.

Wula patangara	Look up the moon
Doungu pakatutu	Look at the year

As for the beginnings of *Pasola*, what I heard from a priest in Waigali was the following legend.

> There was once a noble man named Ubu Dulla in Wanokaka. His wife was a beautiful woman named Rabu Kabba. One day, when Ubu Dulla was away, a man from Kodi named Teda Gaiparona came to Wanokaka to fish, and Teda Gaiparona and Rabu Kabba were attracted to each other, so they took Teda Gaiparona's boat to Kodi. It was as if Teda Gaiparona had actually stolen Ubu Dulla's wife.
>
> Ubu Dulla was just up the beach from Wai Tena. There, he heard that his wife had been taken. He left the boat there and tried to return to the village by land, stopping at Lahi Pipa. He was very thirsty, so he took some coconuts and drank from them. At this time, a *mamuli* (metal ornament with a shape that represents the female genitalia) fell into the fruit.
>
> When he returned to the village, his wife was already gone, but a boat had been prepared for him, and he took four men with him.
>
> On the way to Kodi, they stopped at Lamboya. The people of Lamboya said they did not know that Rabu Kabba had been taken, but that they had heard the sound of voices.
>
> Next, they stopped at Gaula. Again, the people said they heard the sound of voices. They also said they saw a man and a woman going by boat.
>
> Finally, they arrived at Kodi. The community was rejoicing over the arrival of the woman, singing and welcoming her but when the people saw Ubu Dulla coming, they were surprised.
>
> The people of Kodi tried to get him to leave with gifts of buffaloes and horses,[3] but Ubu Dulla refused to accept them and instead asked for his wife back.
>
> Eventually, Rabu Kabba came out wearing a large necklace called a *madaka*. She gave the necklace to Ubu Dulla as a sign that she would not go back with him.
>
> At that moment, Ubu Dulla sensed a very wonderful smell coming from the air. All around him, people were preparing a feast to appease Ubu Dulla's anger, but it was a smell that came from somewhere else. It was the smell of a *Nyale* sea worm, and Ubu Dulla wanted to eat it. People said it was not the food for him, but Ubu Dulla still wanted to eat it. When he tried it, it was better than anything he had ever tasted before. When he asked where it was caught, the people of Kodi said it was caught at the border between the sea and the river.
>
> The people of Kodi gave *Nyale* to Ubu Dulla. The people told him that instead of eating it, he should do a *Pasola*; if he did a *Pasola* in Wanokaka, they would then do a *Pasola* in Kodi. Thus, Ubu Dulla decided to bring back only *Nyale*.

3 Animals, especially buffaloes, are the highest valued properties in Sumba.

> On the way back, Ubu Dulla stopped at Lamboya, where the people were away hunting, and Ubu Dulla rested with a bag of *Nyale* hanging from a tree. When Ubu Dulla woke up, the people of Lamboya asked him to share some of it with them, but Ubu Dulla said that he could not give it to them because it was sacred and precious.
>
> However, the people of Lamboya insisted, so Ubu Dulla gave them a little of the liquid and said, "if you ever see *Nyale* in the sea of Lamboya again, your crops will not be fruitful." He also told them to do *Pasola* before Wanokaka.

This is the story of *Nyale*. Later, I was told by a priest of Lamboya that the last part of the story varied in content: while Ubu Dulla was sleeping, the people of Lamboya District drank the liquid that dripped from the bag. At that time, Ubu Dulla woke up and said, "From now on, there will be no more *Nyale* in Lamboja."

After this, Ubu Dulla began to perform *Pasola* in Wanokaka.

> Ubu Dulla decided to do *Pasola* in Wanokaka. He first tried it at Wai Wuang village, but it did not work well, then tried again at Praigoli, Lahi Magela, and other villages, but still with no luck. He went to Waigali—the father-mother (*ina ama*) village—but found that Waigali was geographically too low to see the sky, so it did not work. However, Ubu Bewi village was on a hilltop, so they could see the sky.
>
> Waigali village decided to ask Ubu Bewi village to count the days of the moon for them. Waigali was the leader village, but they needed to ask, and a rice field was gifted from Waigali to Ubu Bewi.
>
> Eventually, the roles of each village were divided: Ubu Bewi counted the months, Waigali was the leader of the whole group, and one of the priests spent two nights on Wai Tena beach, performing rituals for the boat left behind by Ubu Dulla.
>
> In addition, the village of Lahi Pangapang guards against fire, and the village of Praigoli guards against wearing red clothes.

The relationship between the sea worms and the *Pasola* becomes clearer when I added the stories I heard in the Kodi region in August 2016. The first story is that Ubu Dulla took the sea worms he received in Kodi back to Wanokaka, where he then released them into the sea. The second story is that the people of Kodi decided to entertain Ubu Dulla to appease him and held *Pasola* to achieve that aim. These two pieces of additional information make it possible to understand why the sea worms appear in both Kodi and Wanokaka. This information also seems to lead to the story of the people of Kodi asking Ubu Dulla to hold *Pasola* in Wanokaka as well.

I have heard these stories from priests. However, variations of these stories are told. For example, a variation was introduced in Berita Satu by an Indonesian news station (Beritasatu 2019). First, the reason was mooted that Ubu Dulla left his village to search for food, was to help the people suffering from a food shortage, and he never returned. Thus, people thought that Ubu Dulla was dead, and his wife Rabbu Kabba ascended the throne. Rabbu Kabba then met and fell in love with Teda Gaiparona, a man from Kodi, and traveled to Kodi. Finally, Ubu Dulla's army and Kodi's army were about to fight over Rabbu Kabba. She did not want to be the cause of a battle and threw herself into the sea. Rabbu Kabba transformed herself into a plethora of sea worms and became a part of everyone in Sumba. This tale is more heroic than what I heard in the field. However, this version of the story is thought to have originated from the more famous myth of Putri Mandalika in Lombok.

2 The Pasola Festival in Wanokaka

This part of this paper continues to explain the process toward *Pasola*. On February 29, Rato Waigali (the highest priest of Waigali) left home. He and other priests walked along shouting, "Whoo! Whoo! Whoo–whoo–whoo–whoo–whoo–whoo," followed by a gathering crowd of people. This voice was said to be a call to the sea worms.

Figure 8. People gathering to catch *Nyale* sea worms

Eventually, we arrived at Wanokaka Beach. People who had gathered there waited patiently and quietly for the time to pass. Just as the morning sun began to rise on the horizon, a voice suddenly broke the silence, "Whoo! Whoo! Whoo–whoo–whoo–whoo–whoo–whoo." The two priests, known as the Rato Nyale (priests of the sea worms), were the first to break the taboo and enter the sea to confirm the arrival of the sea worms.

Each priest looked cautiously into the water and eventually put his hand into the water and made a motion as if he was scooping something out. The sea worms seemed to have appeared. I wondered whether there were many of them this year. After a while, the two priests returned to the land, and as if to take their place, many people who had been waiting entered the sea at once and started to gather the sea worms (Figure 8).

Colorful sea worms appeared in the sea, moving and undulating on the surface. People became absorbed in catching them and collected many in their containers. This year, the quantity was a little smaller than expected, but the quality was said to be good, and Rato Waigali also looked relieved (Figure 9).

Figure 9. Rato Waigali at the beach on the morning of Pasola

Sea worms appear for a limited time, and after approximately one hour, their numbers gradually dwindled. As this happened, the excitement of the people was quietened. At that time, the cavalry on dressed-up horses started to gather, and their riders rang bells. The riders gathered the horses in the meadow near the beach. This event was the beginning of the "*Pasola* on the beach."

At the start, one horseman from each herd came out and threw a thin wooden stick that looked similar to a spear (Figure 10). Until approximately a couple of decades ago, they had used spears, but after frequent fatal accidents, spears were banned under contemporary laws. Even with wooden sticks, people are still injured every year.

Eventually, the intervals between the horsemen coming out of the two herds became shorter, and they started coming out two riders per group at a time. Next, the number of riders per group increased to three, then four, and finally, they came out in groups and threw sticks at each other. When the sticks they threw hit their opponents, the audience would cheer. Sometimes, the horsemen would catch the

Figure 10. A scene of Pasola on the Beach in Wanokaka

Figure 11. Pasola in Wanokaka

Figure 12. A meal cooked from the *Nyale* sea worms (left plate)

sticks thrown by their enemies with their hands, eliciting even louder cheers.

The duration of *Pasola* on the beach is relatively short, and by the time the sun rose, we moved to a venue a little further inland (Figure 11). There were even more horsemen and spectators, and the crowd was very enthusiastic. Sometime after the cavalry had started throwing sticks at each other, the men eventually began to fight in a frenzy, and armed police had to stop them each time.

Figure 13. The priest of *Nyale* showing his first catch to other priests and participants

Thus, the *Pasola* was celebrated with great pomp. Back at home, sea worms were served in a dish of shaved coconut palm and ground citrus fruit peel; the sea worms cooked in this way can be kept until around August (Figure 12).

Sea worms have become a valuable predictor of crop yield. When the priests of the sea worms assess the sea, if there are many beautiful sea worms, they can predict a good harvest (Figure 13). If the priests catch sea worms and are bitten on the hand, they predict that rats will eat the crop and that the harvest will be bad. If the priests catching sea worms scratch their hands, they predict heavy rains, the crop will die, and there will thereby be a bad harvest.

The local government considers Pasola to be an important tourist resource and was trying to announce the dates as soon as possible to attract tourists. They have also subsidized the priests of Wanokaka; however, on a per capita basis, the amount was very small. In the past, Wanokaka had been requested by the government to schedule the festival early, but this plan produced a negative outcome: there were almost no sea worms extant. The low number of sea worms was considered a sign of the anger of the ancestral deity Marapu, and to rectify this, Wanokaka priests thought they had to slaughter many buffaloes and spend a lot of money to hold another festival. Therefore, this year, they abandoned the government's plan and followed the traditional way—they set the date at the last minute.

With the introduction of irrigation systems such as water pumps and improved rice varieties, the rice planting cycle has shifted, but in the past, the custom was to start planting after *Pasola* of Wanokaka. The rice planting process was still largely un-mechanized in this region and was performed with a song and dance called "*heri kaninggi*" to relieve fatigue. Only after *Pasola* can people can sing songs while farming.

3 Pasola in Lamboya

There were many villages in Lamboya, but Pasola began with a ritual in the village of Sodan (Hodana) on top of the mountain, where there was a House of *Nyale*. Rato Hodana (a high priest of Lamboya) resides beside it. As mentioned before, the sea worms must not appear in Lamboya. If the sea worms appear in the month of Nyale Lamboya, the rainy season will end. Nevertheless, the sea worms are worshiped with great care.

The Month of Sea Worms (*Nyale*) in Lamboya is one month earlier than that of Wanokaka, and the priests, as in *Podu* (described later), know the time of the sea worms and inform everyone of it.

Pasola is some nights after the full moon, according to the priests. In preparation for *Pasola*, the paddy fields are tended for several days. At that time, the paddy fields are already flooded, and it takes two days to stop drawing water. During this period, the chickens are killed, and rituals are performed. Next, for three days, all the buffalo are pulled into the paddies and made to walk to soften the mud. From this time on, people eat only the ancient red rice. At approximately the same time, waterfalls and irrigation canals are cleaned. Pigs and chickens are slaughtered and offered as food. Subsequently, on the day before *Pasola*, after performing rituals in the House of *Nyale*, all the priests and people go to Kere Wei Beach, shouting for the sea worms (Figure 14).

The night of February 17, 2017, was five nights after the full moon (February 11) (nights rather than days were counted). On this day, the priests of Lamboya held rituals at the House of *Nyale* and walked toward the sea in the evening (Figure 15). On the way (the trip took a few hours), along the path through the forest, meals were prepared for them by other people. They spent the night on Kere Wei Beach.

After sunrise on February 18, the priest of the sea worms (*Rato Nyale*) entered the sea. The scene, however, differed from that of Wanokaka. In Wanokaka, a loud shout signaled that the time had come but in Lamboya, the priest started walking without much warning. Just then, from the east side of the beach, the horsemen arrived, dressed in their finery, and the crowd turned its attention to them. With the assistance of my excellent local interpreter, I followed the priest of the sea worms, without being overly distracted by the horses; the priest went to the west side of the beach, the opposite of where the crowd was headed, and entered the water. Other than Lamboya priests and myself, few people were paying attention to this move. I had the impression that this was not only because the sea worms were not available in Lamboya but also because the priest was attempting to distract the crowd.

Figure 14. Ritual at the House of Nyale in Lamboya

Figure 15. Priests and people of Lamboya marching to the beach

Normally, in Lamboya, as in Wanokaka, there were two priests of the sea worms, but at this time, there was only one because the other had died and no one else had been appointed. The priest was ankle-deep in the sea and walked with ease. He did not seem to be carefully observing the sea, and eventually, he made a motion similar to scooping seawater with his hand and then walked again (Figure 16). When he reached a rock at the edge of the beach, he made a motion as if pouring the seawater he had scooped up into that one spot. This ritual is said to be a means to report to Marapu that no *Nyale* has appeared. This ritual was how they conveyed

Figure 16. The priest of the sea worms (*Rato Nyale*) confirming the "non-appearance" of the sea worms

their hope that no *Nyale* would appear in Lamboya this year.

The Pasola Lamboya was then held on a flat hilltop, and the neighboring districts participated. However, the village of Sodan only performed the rituals and did not participate in the *Pasola*. A belief was that if a priest from Sodan rode a horse, either the horse or the priest would die. Because the sea worms did not appear, people naturally did not eat the sea worms. The people of Lamboya, even if they had the sea worms, would only drink the liquid, and even if the sea worms appeared, they would not catch them.

The non-appearance of the *Nyale* in Lamboya is recognized as word of a successful *Pasola* Festival in Lamboya. This news was delivered through participants to Wanokaka, and then the Wanokaka people confirmed that they would hold their *Pasola* in the next traditional month.

4 The Podu from Lamboya to Lolina

The *Podu*—bitterness—season has been passed down from region to region. It is said that several taboos and restrictions are practiced during this period, which is why this month is called bitterness. In Lamboya, the high priest knew when the *Podu* season began. Other priests were present to determine when the next *Podu* would be. The place where the sacred stone (*ubu*) was located was in front of the home of the priest (Ubu Beina is the priest in charge of *Podu* and *Nyale*), and my measurement disclosed that the direction in which the priest was pointing was the place where the sun rises to signal the coming of the *Podu*, which was due east; the priests of Lamboya start the *Podu* at the new moon after the autumnal equinox. The sun and moon are likened to a man and a woman, respectively, and it was also said that the season of the *Podu* is when the sun rises from the same place where the moon rises, which also implies the time of the autumnal equinox.

In preparation for the *Podu*, the village is cleaned in September. The first thing to do in the month of the *Podu* is to perform *pajura* on the first night. On the second day, people burn the mountain meadows, and all the Lamboya people participate because the burning is believed to cleanse them of their sins. The third day is the *Malaba* ceremony, which means to be absolved of sins related to the water and fishing. The fourth day is *Mananga*, a ritual of gathering living things from the lake, mangroves, or brackish water. The fifth day is for hunting. On the eighth day, the waterfall or spring is cleaned. When eels come, the harvest is good. On the ninth day, people cook and eat a traditional food called *kade'i*. On the tenth day, people go to the river to catch fish, especially big fish. Next, people perform *pajura* again.

At this time, the smoke from burning the grass in Lamboya can be observed in Lolina. In addition, Lolina people can recognize the time of the *Podu* in Lamboya through various sources. From the next new moon, it will be the *Podu* in Lolina.

During the *Podu* in Lolina, the high priest (*Rato Rumata*) does not leave and thus remains in Tarung village. During this period, men go into the forest almost every day to hunt pigs and are not allowed to return empty-handed (Figure 17).

The first day is called *Nga'a I Bo'una* (=*Tauna Marapu Karada*), a time when the new rice that has

Figure 17. Priests dancing with swords on a day during *Podu* in Waitabar Village

been harvested and stored is opened and eaten for the first time, and a time to wait for the first rainfall of the rainy season. There is also a day called *Tobba Wanno*, when people clean their houses and themselves. Thus, many rituals start from the new moon, and the biggest ritual (*Dekela Kara*) is held three days after the full moon. The last ritual of the month of *Podu* is *Kalango*, which lasts for three days. Rato Rumata dances for three hours.

Before the Western calendar was used, *Podu* was the last month of the year—at least in Lolina and Lamboya. *Kobba* was the first month in the next year. *Podu* in Lolina is the biggest *Podu* ritual and known by all other districts. *Podu Lolina* is also known as *Podu Tou Dangu*, meaning *Podu* for all people. In addition, the center village, Tarung, is in Waikabubak, the capital of the West Sumba Regency. This celebration is so large and famous that all the people in Western Sumba know the time of the end of the year and synchronize their schedule around it.

During the two months of the *Podu*, the dry season ends (i.e., the first rain falls) and the rainy season starts. People prepare and start dry-land agriculture when they observe the signs of the *Podu*.

V DISCUSSION

This paper has summarized six features of the Western Sumba calendars and showed how periodical rituals were practiced in situ. Another case is worthy of discussion. The Wanokaka community celebrated their *Hi'u Pa'ana* ("nesting of wild pigs") ritual in the month of *Hi'u*, from January to the beginning of February 2016. However, because they had heard that the Lamboya would be organizing their *Pasola* Festival on February 2, 2016, they simultaneously recognized that they were in the month of *Nyale Lamboya*. Thus, the next month was identified as the month of *Nyale Wanokaka*. This way of determining the months logically meant that one month was split into two or simply that one month was almost skipped. This case suggests that intercalation-based synchronicity is also implemented during the process of *Nyale* and that the synchronicity was mainly at the start of the *Podu*.

In this way, we observe that the seemingly complex system of the Western Sumba calendar is synchronized with the sun, moon, nature, and agriculture through only two ritual rites, *Podu* (bitterness) and *Nyale* (sea worms) and that the decisions of a few priests can reach all the people through the ritual participants.

Hilltop communities are at an advantage to observe celestial signals, but are not perfect, because human observation can miss signals due to poor weather or human bias. Communities on the coast are at an advantage to observe the sea worms swarming, but the time of swarming, which occurs in regular relation to the lunar cycle, may differ by approximately one month in the solar cycle. Cross-checking between mountain and coastal communities can thereby minimize such errors.

Because the lengths of months are not as fixed as in the Gregorian or solar, lunar, or lunisolar calendars in Indonesia, the fixation of errors can be made unconsciously and flexibly; this implied similarities with calendars in the Austronesian-speaking Oceanic populations (e.g., Palau and Samoa; Johannes1981; Igarashi 1997). Only the priests know the time and host the rituals, making top-down synchronicity possible, and intercalations are made without confusing the wider society.

This unconscious intercalation should be interpreted as a "signal transmission calendar" from the aspect of calendrical systems (Furusawa and Siburian 2019). Signals from the sun, moon, nature, and neighboring communities are transmitted within and between communities, and this signal transmission played roles of intercalation. Many undocumented calendars remain, the intercalation methods of which have not been revealed; and the signal transmission can be essential in understanding them.

This study concluded that the Western Sumba people operate such complex traditional calendars based on flexibility and signal transmission for synchronization as a means of predicting the need for adaptive livelihood activities in the absence of modern meteorological technologies.

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