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Ecological Anthropological Analysis of Nyale Foraging and the Sasak Calendar System in Lombok

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Abstract

In Lombok Island of West Nusa Tenggara province, Indonesia, Nyale foraging is observed annually only at the spring tide around February. Nyale worms, which are identified into the family Eunicidae of Annelida, behave in mass spawning for reproduction once a year. Around West Nusa Tenggara province, people forage a part of Nyale bodies containing sperm and eggs for self-consumption or selling in market. Nyale are assumed to be rich in protein and micro-nutrients, hence people think Nyale consumption to enhance their health condition.

When viewed from a cultural issue, Nyale foraging in Lombok accompanies Bau Nyale Festival, derived from a story of Putri Mandalika. The main practitioner of Bau Nyale and oral tradition of Putri Mandalika is the Sasak, who have their own lunar calendar system. The date of Nyale appearance is fixed as "20th October" in Sasak calendar, then other dates are corrected by the date of "20th October". The dates around "1st January" in Sasak calendar is believed to be an ideal period for rice planting. Because rice cultivation has been the main subsistence of the Sasak, Nyale foraging has cultural and ecological significance for daily life in Lombok.

This study analyses the systematic relation between Nyale foraging and other cultural issues, in order to reveal the rationality of indigenous practices in Lombok. In addition, by describing Bau Nyale Festival as a tourism resource from different angle, sustainability of indigenous practices is discussed.

Keywords

Keywords: Lombok; Sasak; Nyale; Calendar system; Ecological Anthropology

1. Calendar system and anthropology

From the beginning of Anthropology, calendar systems have been one of important subjects for revealing cultural diversity and universality [e.g. Tylor 1859].

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Although almost all people in the world realize and accept western calendar system (precisely Gregorian calendar system) at present, local societies still use their local calendar system also in combination with their own cultural contexts. At present, coexistence of calendar systems is not only Anthropological issue but also social and political issue. For example, Northern European countries are relatively tolerant to receive refugees from Middle eastern countries, then refugees following Islamic calendar system practice Ramadan with difficulty under the condition that hours of daylight are too long in summer of Northern European countries [The Local 2015].

Originally, a calendar system of a local society has been referenced the local environment: astrological phenomenon, fluctuation of temperature and precipitation, biological phenomenon and so on. The need of agricultural practices is discussed as the primary factor of the invention of local calendar system [e.g. Steward 1949]. It is no wonder that the fluctuation of biological phenomenon should effect on agricultural practices. Moreover, astrological phenomenon and climate fluctuation also effect agricultural practices directly, or are used as indicators of biological phenomenon. Classical ecological anthropology has been eager to describe the relation between seasonal or annual cycle of agriculture (e.g. Rappaport 1968). However, recent studies tend to be indifference to the relation between local environments and calendar systems.

In this study we aim to describe the relation between Nyale Foraging and the Sasak Calendar System in Lombok as a case study. The Sasak, who are the majority of Lombok in Indonesia, annually forage Nyale, a kind of annelid worms. Because Nyale worms spawn regularly every one year, the regularity can be used to correct their calendar. By describing details of biological phenomenon of Nyale spawning, foraging practices and their calendar system, we will discuss flexibility of local calendar system. Problems of Ramadan above mentioned are caused by high mobility in modern global world. However, global world still consists of a lot of local societies, and mobile people also rely on some sort of local bases. Problems will never be solved without understanding the way of construction of local contexts.

2. Lombok Island in Indonesia

Lombok is an island in West Nusa Tenggara province, Indonesia. Between Lombok and Bali island, the Lombok strait lies, which is one of the landmark of Wallace's Line. Wallace's Line is a biogeographical boundary separating Austrasia ecozone (characterized by marsupial's habitat) and Indomalaya ecozone (characterized by placental mammal's habitat). Although mammals of Lombok island should be only marsupials originally, by artificial introduction of buffalo, deer or monkeys there are placental mammals at present.

The capital of West Nusa Tenggara and largest city in Lombok is Mataram. The climate features measured in Mataram are showed in Figure 1 and Figure 2. Seasonal temperature change is slight, while seasonal precipitation change is relatively remarkable. Under an influence of monsoon, precipitation decreases in dry season from April to September, and precipitation increases in wet season from October to March.

Number of population of Lombok Island was 3,394,280 at 2015 [Integrated Processing and Statistics Dissemination Division 2016: p.95]. The majority of Lombok is the Sasak. Number of the Sasak at 2010 was 2,838,239 [Ananta, Arifin and Hasbullah 2015: 299], that is, over 80% of Lombok population is occupied by the Sasak. With regard to other ethnic group, the Balinese inhabit around 10-15%, and the small remainder (the Javanese, the Peranakan or the Sumbawanese) also inhabit. Most of the Sasak are Muslim, so that they use Islamic Calendar combined with Western (Gregorian) calendar in their daily life. However, the Sasak have their own calendar system, so called Sasak calendar, which is used especially for ritual dating.

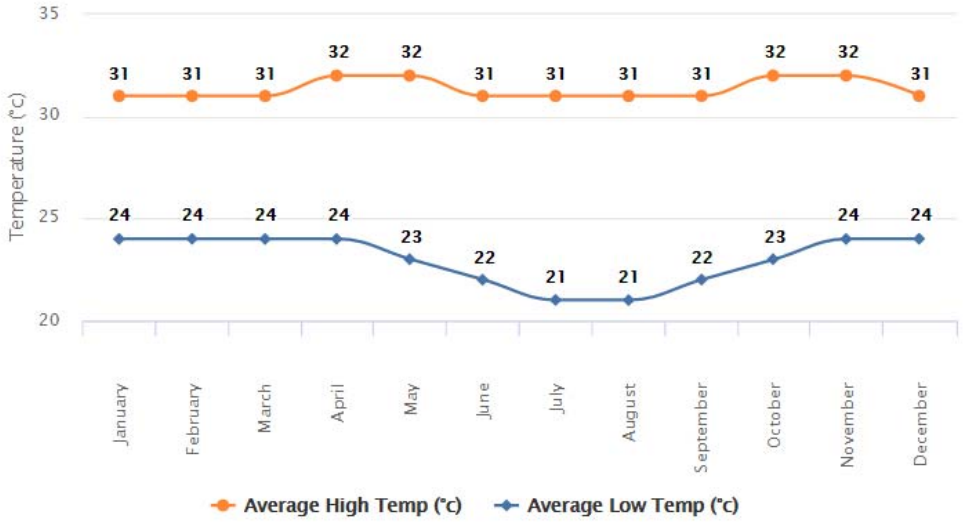

Figure 1. Temperature change in Mataram on average from 2000 to 2012. (The data are referred following website [World Weather Online 2016]: http://www.worldweatheronline.com/mataram-weather-averages/west-nusa-tenggara/id.aspx)

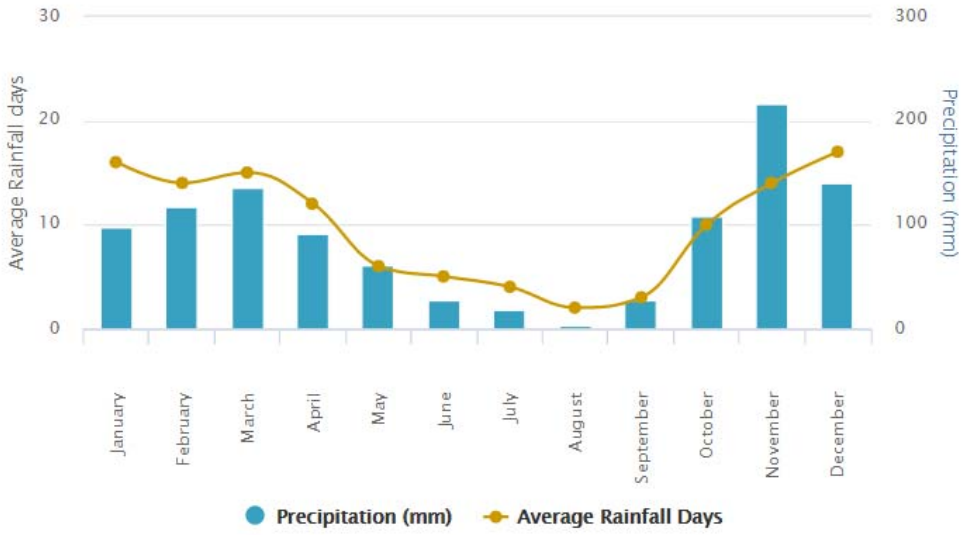

Figure 2. Precipitation change in Mataram on average from 2000 to 2012. (The data are referred following website [World Weather Online 2016]: http://www.worldweatheronline.com/mataram-weather-averages/west-nusa-tenggara/id.aspx)

Majority of Lombok engage in primary industry including agriculture, forestry, hunting and fisheries (table 1). The main crop in agriculture is paddy rice (Wetland and Dryland total): 1,005,822 tons per year at 2014 (The data are referred from Table 5.1.2 of *Nusa Tengara Barat Province in Figures 2016* p.212). Judging from these data, main subsistence of the Sasak is paddy rice cropping.

Table 1. Number of workers in Lombok Island.

	Agriculture, Forestry, Hunting, and Fisheries	Mining and Quarrying	Manufacture ing Industry	Electricity, Gas, and Water	Construction	Wholesale Trade, Retail Trade, Restrant,	Transportati on, Warehousin g, and Communicat	Financial, Insurance, Real Estate, and Business	Community, Social, and Personal Services	Total
Number of Persons	829,993	34,544	199,542	3,191	156,641	459,137	69,790	24,356	350,309	2,127,503

(The data are referred and modified from Table 3.2.5 of *Nusa Tengara Barat Province in Figures 2016* p.112)

Nyale foraging is observed at some parts of the southern coast of Lombok, mainly at Pantai Seger, Pantai Kuta, Pantai Selong Belanak, Pantai Tanjung Aan or Pantai Batu Kijuk. Pantai Seger is believed the best point for catching Nyale, and the main spot relating the legend of Putri Mandalika mentioned later locates their also. Observation of this study was conducted mainly at Pantai Seger (Figure 3). The stages of Bau Nyale festival (celebrating Nyale foraging and Putri Mandalika) stand around main foraging spots. The biggest stage stands on Pantai Kuta.

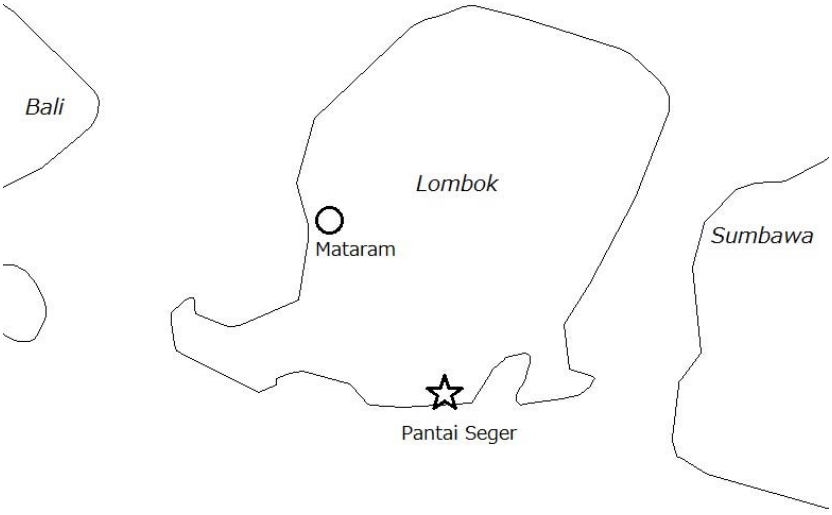

Figure 3. Location of Pantai Seger.

3. Nyale

Nyale is assumed to be a kind of annelid worms of the family Eunicidae. Same customs of foraging worms of Eunicidae as an attractive food resource are observed other Islands in Pacific Ocean. Foraging Palolo worm in Samoa, Fiji, or Vanuatu Islands have been most well studied [Caspers 1984, Miller and Pen 1959, Mondragón 2004], which is identified as *Palola viridis* or *Eunice viridis*. In Samoa, Palolo worm's mass spawning is observed at spring tide from October to November. The worm cut off and release their posterior parts fulfilled with sperm or eggs. Some populations in Samoa, Vanuatu, Fiji or other Islands in Pacific Ocean forage and eat the reproductive portion of the palolo worms.

Because the custom of eating the eunicid worms is observed in geographically contiguous areas from Lombok island to eastern islands reaching to Samoa, it is reasonable to classify Nyale into *Palola viridis*. However, it is also possible to assume that Nyale belongs to some different species. At first, the spawning and foraging period

of Palolo in Southern Pacific Islands is from October to November, while the period of Nyale is from February to March. At second, we observed two types of Nyale, that people consumed or traded in markets. One type has green or brown skin without chaetae (bristles) (see Picture 1), on the other hand, another type has red or orange skin with chaetae (see Picture 2.). The green and brown type is same shape that former studies reported, so that it is reasonable to classify this type into *Palola viridis*. However, because another type is assumed to be other species, biological survey to identify the species of Nyale is needed yet.


Picture 1.


Picture 2.

In Lombok, a festival so called Bau Nyale is hold simultaneously with Nyale foraging between February and March. Although it is still needed to study biologically whether Nyale spawning can be observed only once between February and March or plural times in a year, The Sasak focus on the time between February and March. Nyale foraging and this festival is used for correcting their calendar mentioned later. Such practice correcting calendar by Palolo spawning was observed in other population in Pacific Islands [e.g. Mondragón 2004].

4. Nyale foraging

In 2016, Nyale foraging started from 27th February at Pantai Seger. From around 20th February, some people started to searching Nyale, and stalls for Bau Nyale festival were preparing. However, because most people thank Nyale would appear after several days after full moon (i.e. spring tide) of February and Full moon was 21th February in 2016, Nyale appearance was predicted around 25th February. Some rumor was heard that professional fishermen had caught Nyale in offshore on dawn of 26th. Thousands of people crowded to Pantai Seger or other foraging spots from evening of 26th.

The mass spawning of Nyale was observed from 3:00 o'clock on 27th. People chatted, looked around stalls or fell asleep for waiting, then as soon as Nyale appearance they entered shallow to catch Nyale simultaneously. They used a kind of net called "Solok" to catch Nyale: some could catch about 1kg of Nyale, or some could not catch any. Until sunrise, people continued catching.

Already on 27th morning, selling of Nyale started in local markets. Nyale in good condition, which contained only Nyale's body, were sold about 15,000 IDR / 100g (about 120 Japanese Yen). The one in bad condition, which contained seaweeds or other rubbish, were sold about 3,000 IDR / 100g (about 25 Japanese Yen). People said that the one in good condition was caught by professional fishermen in offshore and the one in bad condition was caught by nonprofessionals in seashore.

Because our research ended 29th February, we could not observe the duration of Nyale spawning. However, people think Nyale spawning continues about one month. The idioms in Sasak language, Nyale Poto, Nylae Tanga and Nyale Punutuk, represent

Nyale spawning timing and duration. Nyale Poto, which means first Nyale Spawning, is thought to occur a full moon of late February. Nyale Tanga, which means middle Nyale Spawning, is thought to occur around the next spring tide (that is next new moon). Nyale Punutuk, which means last Nyale Spawning, is thought to occur the next spring tide (That is next full moon). People said the amount of Nyale capture was the most in Nyale Poto, in Nylae Tanga slightly declined, and after Nyale Punutuk there were no Nyale observed.

People prefer to eat raw Nyale, when it is in good condition. Stale one or the one in bad condition is cooked to "Pepes", in which grained Nyale is mixed with spices and roasted in Banana or other large leaf. People believe that consuming Nyale guarantees their health in one year.

5. Bau Nyale festival and Putri Mandalika

Bau Nyale festival is hold around Nyale Poto period, that is from late February to early March. In 2016, the period was from 22th to 29th February. Traditionally, the festival was a ritual practice of private sector. However, at present, public sector participates to hold the festival then the festival is not only a ritual practice but also tourist attractions. The ministry of Tourism and Culture of West Nusa Tenggara province organizes many kinds of events and decides dates of events. The events were as follows: social meeting, beauty contest to name Miss Putri Mandalika, stick fight contest, Wayang shadow playing, musical performance on stage and so on. Main audience of these events are assumed to the Sasak people, however, not a few foreign tourists also visit to see events.

The ritual aspect of Bau Nyale was formed by the legend of Putri Mandalika. The story is as follows. Once upon a time, the king of Lombok had a beautiful daughter named Putri (princess) Mandalika. Because of her beauty, many men including some princes asked to marry. To prevent all of them to be disappointed, she could not decide and reply. Then, the king held an archery competition at the Seger beach to decide ideal husband. However, there was no winner, because all participants had same ability and equipment. Then the participants started to argue and resulted in fighting. Soldiers following princes also started to fight, so that war came to near breaking out. Putri Mandalika did not want war and hurt many people. Then, she said that "I do not want to be one's wife. I don't want to hurt many people. I will change to something that everybody can satisfy. I will change to Nyale that all of you can share and enjoy". She jumped to the sea and disappeared. After that, suddenly a lot of sea worms appeared on the beach. People realized that she had changed to sea worms.

6. Correction of Calendar

The Sasak fix the date of starting Nyale Poto on "20th October" in Sasak calendar. Because of Sasak calendar is lunar calendar system, length of one year would be shorter than 365 days without intercalation. Other lunar calendar systems in the world adopt various ways of correction. For example, Islamic calendar never insert intercalation and leaves the one year cycle faster than solar calendar systems. Chinese calendar system insert intercalation and fix the last new moon before "yushui", that is 29.5 days before vernal equinox, on the new year day in order to adjust one year to be 365days. The custom of the Sasak that fixes the date of starting Nyale Poto has the same function to adjust lunar calendar system to the period of revolution of the earth.

Table 2 shows the date of the first appearance of Nyale from 2000 to 2014, which surveyed at Pantai Kuta by preceding study (Igarashi 2014). From this data, we can see regular appearance once a year. Palolo worms take the opportunity of the biggest sea

level change at the spring tide near to autumnal equinox, in order to diffuse their fertilized eggs to broader space [Caspers 1984]. Nyale is also assumed to have same behavior, although the period of spawning at the spring tide near to vernal equinox oppositely. Equinox is the phenomenon caused by revolution of the earth, and spring tide is the phenomenon caused by revolution of the earth of moon. Using the date of Nyale appearance to adjust lunar calendar system to the solar cycle is one of ideal way of correction of calendar.

Table 2. The date of the first appearance of Nyale.

Year	Date
2000	24 Feb.
2001	13 Feb.
2002	3 Feb.
2003	21 Feb.
2004	10 Feb.
2005	28 Feb.
2006	17 Feb.
2007	7 Feb.
2008	26 Feb.
2009	15 Feb.
2010	4 Feb.
2011	25 Jan.
2012	12 Feb.
2013	1 Jan.
2014	19 Feb.

The new year day in Sasak calendar is around from middle April to early may in Western calendar, which is 70days after the date of starting Nyale Poto ("20th October"). Around new year day it is the end of wet season and the start of dry season. People think that this period is ideal to rice planting. Even at present, main subsistence of the Sasak is paddy rice cultivation. It is reasonable for the Sasak or other Lombok people to correct calendar by Nyale appearance and adjust the new year day to the ideal date for rice planting.

7. Globalization and local calendar system

Former studies of ecological anthropology discussed that calendar systems of local society have been referred the local environment and the need of agricultural practices are the primary factors of organizing of local calendar systems. This study has verified these discussions by describing the case of the Sasak's practices. They enjoy and profit by Nyale foraging, and at the same time they correct their calendar for paddy rice cultivation. Although consuming and cerebrating Nyale seem to be strange from outsider, they are reasonable in local ecological and social system.

At present, Bau Nyale festival is not only a ritual practice but also tourist attractions, in which foreign tourists participate too. The legend of Putri Mandalika is relatively well-known to tourists, because the story is quite impressive and beauty contest to name

Miss Putri Mandalika is held in the festival. However, logical aspect of Nyale foraging and Bau Nyale festival also should be highlighted more. The foreigner can understand the implication of "strange" customs in the context of the Sasak culture and their environment. Moreover, the Sasak also can revalue their own custom in scientific context.

Indigenous practices would be vulnerable in global world, if people felt "strange" or "primitive". Otherwise, the practices would be treated troublesome conventions by outsider. Local calendar systems and relating ritual practices are one of the typical subject about this issue. Some calendar systems have disappeared without logical analysis in local cultural or environment context. Contradiction between migrant's calendar system and local environment of a foreign country causes some problems. In order to keep indigenous practices sustainable, scientific studies for logical explanation in local context are needed. Moreover, when these practices attract tourists as one of cultural resources, logical explanation will enhance the value of resource.

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