

A Study of Classifications of the Seasons by Sama-Bajau Fishermen:

From Four Cases in the Banggai Islands, Indonesia

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This research aims to report seasonal classifications by Sama-Bajau fishermen in the Banggai Islands, Indonesia, and consider the characteristic classification from a comparison of the cases in four villages and relevant with climatological data. A fieldwork survey in four villages reveals that they cognize the season focusing on the seasonal winds and there is a different classification for each season. They differ in the kinds of winds, the period, and the cycle. In some cases, a seasonal cycle is more than biannual. Other characteristic points are the main seasons cognized by two prominent winds: *Utara* (the season of the north wind) and *Salatan* (the season of the south wind), and usually have subdivided seasons cognized by the strength of winds. Climatological data of temperature, rainfall, atmospheric pressure, wind velocity, and wind directions in the Banggai Islands indicate that there are no prominent differences in these defined areas as a key expression by a retired fisherman has a possibility of locality in the cognition of the seasons in each village. This study reported first the differences in Sama-Bajau fishermen's classification of the seasons in defined areas. Future research is required to collect more cases of classification of the seasons and make comparisons to understand the cognition of the seasons by Sama-Bajau fishermen and their locality.

Keywords

Sama-Bajau, Seasonal Classification, Seasonal Cognition

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I Introduction

Indigenous people have cognized time based on daily observations for their livelihood. Primitive calendars and time reckoning formed by this accumulation of data have been recorded in various regions of the world. Yoshida (1980) revealed four fundamental elements in their system: sun phenomena, moon phenomena, the phenomena of stars or constellations, and other natural phenomena. Primitive calendars are often composed of a combination of the four elements. The most widespread elements are lunar calendar systems, while calendars referring to other natural phenomena are extremely rare (Yoshida, 1980).

In Northern Luzon, the beginning of farming is determined according to the swelling of mountain streams, the blossoming of certain trees, and the migration of birds. In addition, the Bontoc Igorot people begin sowing when the cry of the nestling of the killing bird was first heard (Scott, 1958: 569–570). In New Britain, people use the Maenga calendar, which consists of indigenous months. The names of the months are related to plants because each month begins when the leaves of certain plants begin to fall, or when the flowers of others begin to bloom. These phenomena determine the timing of Maenga's annual festivals as well (Panoff, 1969: 153–159).

In Indonesia, a Sundanese village in West Java utilized a traditional calendar, based on seasonality and stars, for agricultural operations (Igarashi, 1987). People from Sumba Island utilized an astronomical operation to determine the appropriate periods for rituals, which was shared by the transmission of information between settlements (Furusawa, 2017). These previous studies revealed the diversity of time reckoning and calendars that are still used in the local society.

Not all people who live with and use the natural environment create each calendar. Except for some cases, the appropriate or inappropriate period for fishing is not specifically identified in comparison with that of agriculture. It is better to classify the process as a cognition of classification of the seasons, rather than time reckoning or a calendar. Previous studies on natural calendars have mainly explored the former cases with

their systems and technologies.

This study aimed to report the fishermen's cognition of classification of the seasons from the perspective of the relationship between people, seasons, and natural phenomena. For this purpose, this article focuses on the ecological cognition of the Sama-Bajau fishermen in Indonesia.

The Sama-Bajau people are known as 'sea nomads,' and 'sea gypsies' because of their lifestyle of living in boats. These people have moved to the land and are scattered across Malaysia, the Philippines, and Indonesia. From the perspective of the studies of the Sama-Bajau people, it can be indicated that two points are to be studied.

The first point concerns ecological differences. Most of the research has been conducted on the surrounding Sulu islands or within the settlements built on or around coral reefs. The fishing activities and ecological cognitions within these communities provide representative examples of indigenous people. However, other Sama-Bajau people live in coral reef areas that have not been prioritized and are referred to as blank areas. The focus of this research, the Banggai Islands in Central Sulawesi, Indonesia, is a blank area.

The second point is the deviation from the academic discipline. Research on Sama-Bajau commenced with the history of its origin and included exploring the migration of scattered groups (Sopher, 1977 (1965); Nimmo, 1968) and linguistic classification (Pallesen, 1985; Grimes, 2000). In recent years, research has shifted to the creation and restructuring of identity by investigating relationships, such as those between the nations and religions of the Sama-Bajau people (Aoyama, 2006), as well as comparisons of mobility, and maritime networks (Nagatsu, 2012). Previous research emphasized that the Sama people are full-time fishermen, and are connected to the maritime environment, however, they have not devoted proper attention to maritime activities, nor considered the significance of environmental recognition (Nagatsu, 1997).

Therefore, this study aimed to report on the ecological cognition of seasons by the Sama-Bajau fishermen in the Banggai Islands, Central Sulawesi, Indonesia, by comparing the indigenous classification of the seasons

based on winds and analyzing them tentatively according to scientific data.

II The Sama-Bajau People and the Classification of the Seasons

In the coastal areas of the islands of East and Southeast Asia, some groups engage in fishing and live on board their boats. There are several marine-oriented ethnic groups on the islands of Southeast Asia. Among them, ethnic groups called Sama or Bajau (Bajau, Badjau, Bajo, etc.) are primarily found in eastern Indonesia, Sabah, Malaysia, and the southern part of the Philippines, and are characterized by their widespread diffusion as a maritime people.

Studies on the Sama-Bajau people have accumulated in the area around the Sulu Islands from the southern part of the Philippines to the northeastern tip of Sabah. The Sama-Bajau people are called “sea nomads,” or “sea gypsies” because of their onboard residency, their mobile lifestyle, and their “drifting” together in Southeast Asian countries. Sometimes referred to as “maritime people,” but with modernization, the traditional lifestyle of the Sama-Bajau people is changing. Presently, they do not live in houses (small boats that double as dwellings), but instead, reside in houses in shallow waters and on land, and therefore, are no longer

referred to as “drifters.”

Despite these changes, the Sama-Bajau people are still widely dispersed from the southern Philippines to Sabah, Malaysia, and the eastern part of Indonesia due to their former mobile life, and they remain dependent on their sea area network. People and things continue to move (Nagatsu 2018). The Sama-Bajau people’s livelihood is still centered on fishing, and the maritime trade and processing of marine products continue. The Sama-Bajau people are referred to as “people who speak Sama languages daily and generally call themselves Sama” (Nagatsu, 2012). As Grimes (2000) described, Sama-Bajau languages include various dialects in each region.

In the Sama-Bajau language in Sitangkay, Philippines (Fig. 1), the seasons are called *musim* or *timpu* (Nagatsu, 1995). In Sitangkay, *musim* or *timpu* are classified by seasonal winds, mainly from the southwest monsoons between May and October, and the northeast monsoons from October to March. The most prominent southwest monsoon, known as *musim satan* (season south, in Sama-Bajau language), occurs between June and September. The storm is subdivided into six winds: *satan tindaw labutan* (south, appear, anchor literally, it means the first south wind), *satan anak datu* (south, the indigenous name of a particular star means the south wind that blows when this star appears in the early

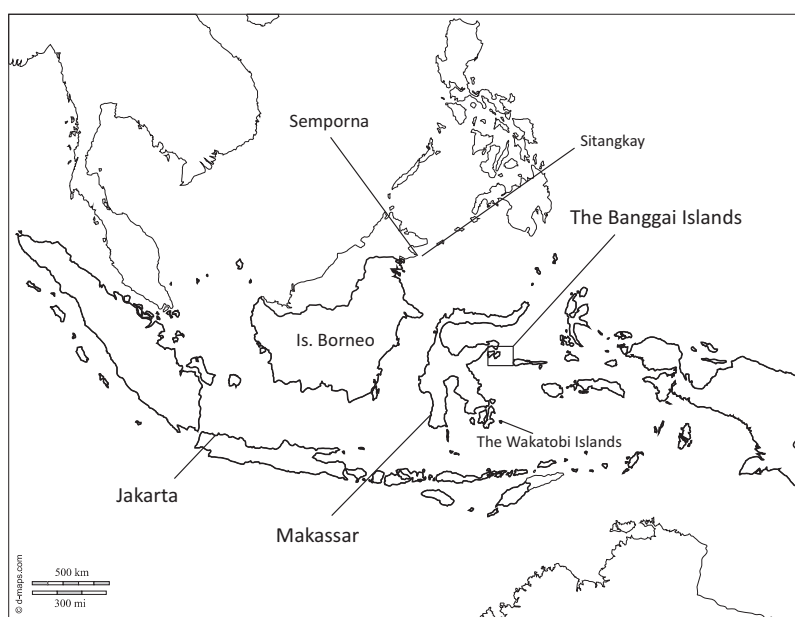


Fig. 1. The location map of the Banggai Islands and surrounding areas

(Developed by the author using d-maps.com)

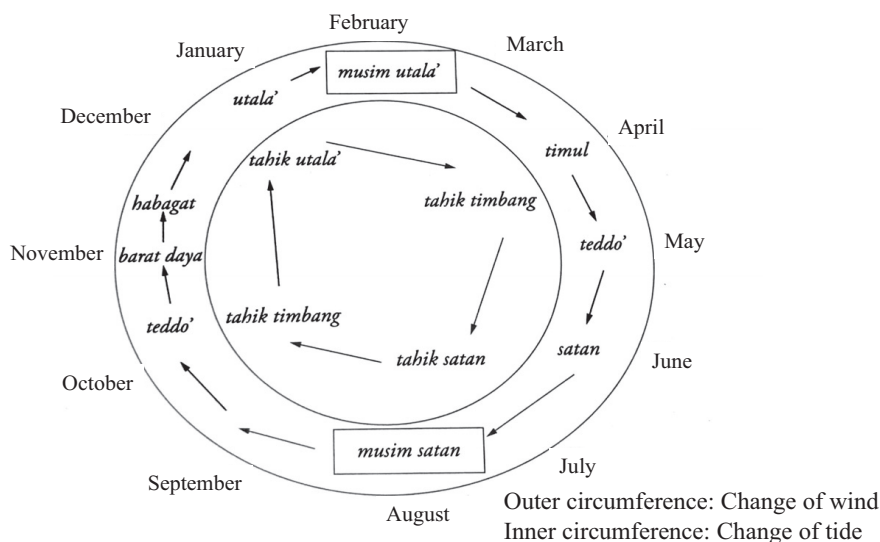


Fig. 2. Concept of classification of the seasons by the Sama-Bajau people in Semporna, Sabah state, Borneo Island, Malaysia

(Source: Ono (2011), translated by the author)

night) as the beginning of *satan tindaw labutan*, *satan manuk* (south—bird, which means the strong wind analogically sounding like a bird flapping its wings), *satan buntal* (south—the indigenous name of a certain star, which means the south wind which is blown when this star appears largely and clearly), *satan bungkal gamut* (south—pull out seaweed root, which means the strong south wind which is strong enough to pull out the seaweed root), and *satan anganggook gulami* (south—grab like hold it down rice ears, it means the strong south wind likes to grab rice ears and press them down). The most prominent northeast monsoon, called *musim uttalaq* (season—north), blows from December to February. It is not specifically subdivided, as in *musim satan*. Except for these two main winds, there are other transitional periods between *musim satan* and *musim uttalaq*: *barat daya* (the southwest), *habagat* (the west), *hilagaq* (the northwest), *timul* (the east), and *t'ddoq* (the calm). They are understood as periods, not as seasons (Nagatsu, 1995).

Characteristically, the *tahik* (tide) is a significant cycle that is overlaid annually with the wind and is classified annually into three *tahik* seasons. *Tahik satan* (tide—the south) is nearly overlaid with *musim satan*, *tahik uttalaq* (tide—the north) is nearly overlaid with *musim uttalaq*, and their transition periods are *tahik timbang* (tide—balanced, because the tide at dawn and

in the evening in these periods is at the same height) (Nagatsu, 1995).

Importantly, Nagatsu (1995) clarified the following: “—*Musim satan* or *musim uttalaq* is unlike the regular season within a certain annual period but is confirmed as the season when those winds blow.” The date of the *Mag'mboq* ritual, which connects with the season each year, is conditional. The *Mag'mboq* ritual is always conducted on the next low tide of the day when the first shipment of rice arrives from Tawi-tawi, which is the adjacent island. The date is overlaid with the *anganggook gulami* period, which is the conclusion of the *musim satan*. According to Monden (1986: 127), this ritual was held on August 13, 1984. That ritual recorded by Nagatsu in 1994 was held on September 20.

The overlaid cognition of winds and tides is also found in another Sama-Bajau village in Borneo Island, Malaysia (Fig. 2), also called *musim* and *tahik*, respectively.

Figure 2 illustrates the concept of seasonal classification by the Sama-Bajau people in Semporna County, on the east coast of the Sabah state, on Borneo Island. In the remote islands of Semporna, the southwest monsoon occurs generally from May to September, whereas the northeast monsoon is prevalent from December to March. The two seasons are further classified according to wind direction and strength. However, these detailed

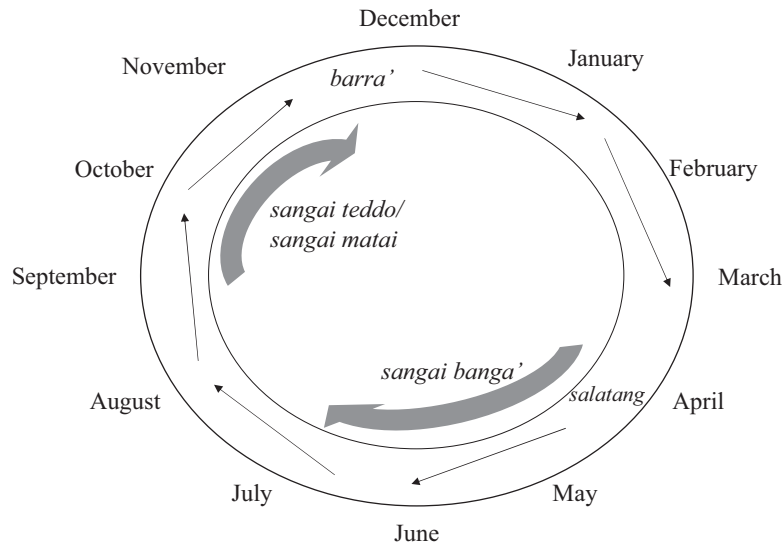


Fig. 3. Concept of classification of the seasons by the Sama-Bajau people in the Wakatobi Islands, Indonesia

(Source: Stacey (2007), developed by the author)

classifications are dependent upon the day, and thus, can be flexible. Ono mentioned that the fishing activity of the Sama-Bajau people has traditionally been conducted with constraints dictated by the seasonality of the winds, moon phases, and tidal movement, which is indirectly verified by the fact that they classify and recognize the seasons by detailed moon phases and tidal situations, based upon the direction and strength of winds (Ono, 2011).

Stacey (2007) described the case in the Wakatobi Islands (Fig. 3) as follows: Sama-Bajau people in the Wakatobi Islands in Indonesia also cognize the seasons by winds. The east monsoon (*saltatang* in Sama-Bajau words/*musim timur* in Indonesian words) begins in April and ends in November. The beginning of the east monsoon is characterized by strong easterly winds (*sangi banga' / angin timur kencang*) lasting until July. These winds bring light rain between the months of May and July. This is followed by a period of light south easterlies and a period of calm or no winds (*sangi teddo/sangi matai/ angin mati/ angin teduh*) between September and November. The latter part of the east monsoon is a transitional period of changing wind directions (*sangi taputar/ angina pancaroba*) that leads to the beginning of the west monsoon (*barra' / musim barat*). The west monsoon starts in late November or sometimes early December and lasts until March. It is a

period of strong westerly winds, heavy rains, high seas, storms, and squalls. The end of the west monsoon in March is another transitional period with winds that may blow from the southwest, northeast, or northwest. This is followed by the doldrums, a period of light variable winds and smooth seas usually lasting for a week or two, which is ideal for fishing, but there is still the possibility of intermittent squalls or cyclonic activity in the waters of northern Australia. Then the strong easterlies return, and the cycle begins again (Stacey, 2007: 37–38).

Previous studies focusing on the Sama-Bajau people often mention indigenous knowledge of seasons (Sinapoy & Djalante, 2020). However, only a few reports have referenced specific data and local names.

Several common points can be noted. First, the seasonal cycle is one year. Second, the seasons are classified by winds, or overlaid with winds and tides. Third, the wind classifications are mainly divided into two monsoons in a year and include subdivided winds and transitional periods.

Thus, a significant question remains. Do these three characteristic points apply to all other villages of the Sama-Bajau people, despite differences in locations and ecological conditions?

III Overview of the Research Villages in the Banggai Islands

This research used semi-structured interviews and participant observation, and fieldwork was conducted intermittently from August 17, 2016, until December 2, 2018 in four villages in the Banggai Islands, Central Sulawesi, Indonesia. Fieldwork was conducted primarily in villages A, B, C, and D, for comparative fieldwork in 2019. The interviews were conducted in the Sama-Bajau language and Indonesian languages. A retired fisherman, P, in Village A, assisted the author in interpreting the Sama-Bajau language.

Village A is the settlement with the largest population among the Sama-Bajau people in the Banggai Islands (Nagatsu 2017). According to the village office, as of 2017 the population of Village A comprised 3,793 residents and 1,010 households. The main inhabitants of the village are Sama-Bajau, Mandar, Bugis, Makassar, and Chinese. They intermarried resulting in mixed ethnicities. Despite their intermarriage, diversity remains in language. The primary fishing methods in Village A are net fishing, bombs, longline fishing, handline fishing, and skin diving. Other sources of livelihood include gathering shells and farming fish and seaweed (Nakano, 2020).

Before the semi-structured interview in Village A, an interview regarding basic fishing activity was conducted with 15 fishermen. They were chosen by fisherman P, to include all fishing methods. Interviews with three out of the total number of interviewees: fishermen A, F, O, and P were conducted to obtain comprehensive information about fishing knowledge.

Fisherman A engages in handline fishing and fake lures and sometimes engages in longline fishing for general fish. Both methods are conducted by him alone. He was born in Village A in 1958 and is friends with fisherman P, who with him, is particularly well known “*nelayan pintar*” (wise fisherman) by villagers. He has no experience of staying for a long time in other settlements but occasionally rests within them. Similarly, Fisherman F engages in handline fishing and fake bites, conducted by him alone. He was born in Village A in 1960 and has no experience staying for a long time in

other settlements, but again, occasionally rests within them.

Fisherman O engages in skin diving, sometimes handline fishing, and fake bites. Usually, he fishes with his friends or relatives (*keluarga*), after arriving at fishing spots, and engaging in separatory, not cooperate in fishing. He was born in Village A in 1972, has no experience staying for a long time in other settlements, but sometimes rests in other settlements.

Fisherman P engaged in handline fishing and fake bites and sometimes engaged in longline fishing for general fish and sharks and is a retired fisherman. Usually, he goes fishing with fisherman A and utilizes longline fishing. His parents are Mandar, which is an ethnic group in Indonesia, who were known as maritime people, and who were born in Kendari city in Southeast Sulawesi. Fisherman A sailed and sometimes stayed briefly in Village A. Although he was not affiliated with the Sama-Bajau people originally, after marrying a Sama-Bajau woman in Village A, he joined the Sama-Bajau people as he and others cognize. He began living with his wife in Village C and then moved to Village A in 1971. He fished with another fisherman until his wife died. According to the interviewees, the four settlements are inseparably linked by family relationships.

Villagers generally utilize small boats without sails. According to the interviewees from Village A, after an era of using dwelling boats that they lived in, they resorted to sailing ships with paddles, because sailing ships are easily driven by the direction and strength of the winds, which is a useful characteristic. After all, fishing time and route are dependent on the wind. However, their fishing style changed significantly after the introduction of boats with engines because they no longer relied on the monsoon, although they cannot sail in the direct direction of the monsoon. For example, they cannot sail to the east during the southeast monsoon. Fishermen A and P were the first to obtain an engine in Village A. They borrowed an engine from a Chinese broker in Village A. During this era, fishermen in Village A generally sailed and fished in the south. Initially, however, they sailed to the east and finally discovered a new fishing location. Additionally, the era indicates that before modernization, a livelihood in the

village was dependent upon seasonal winds. Thus, wind knowledge was essential for them. Today, the Sama-Bajau people continue to observe seasonal calendars according to the winds, although they can sail to any place at any time. During the author's fieldwork, several fishermen were asked about the season of a particular day, and each fisherman answered according to the wind calendars.

Village B is a settlement with a large population of the Sama-Bajau people in Banggai Islands. In 2000, the Sama-Bajau population totaled 1,079 residents (Nagatsu, 2017). The main inhabitants of the village were Sama-Bajau. Chinese are rare in Village B. According to the oral history in Village B, it was formed by several fishermen who moved from Village A following the earthquake. Fisherman Q was born in Village B, was 39 years old, and engages in handline fishing for octopi and skin diving.

Village C is a settlement with a large population of the Sama-Bajau people in the Banggai Islands. In 2000, the Sama-Bajau population comprised 1,064 residents (Nagatsu, 2017). The main inhabitants of the village were Sama-Bajau. According to the oral history in Village C, it was formed by several fishermen who aimed to catch a shark from the Salabangka Islands in Central Sulawesi. It is near Banggai City, which is the center of the old kingdom of Banggai. Fisherman R was born in Village C, was over 40 years old, and engages in handline fishing.

Village D is a settlement of the Sama-Bajau people in

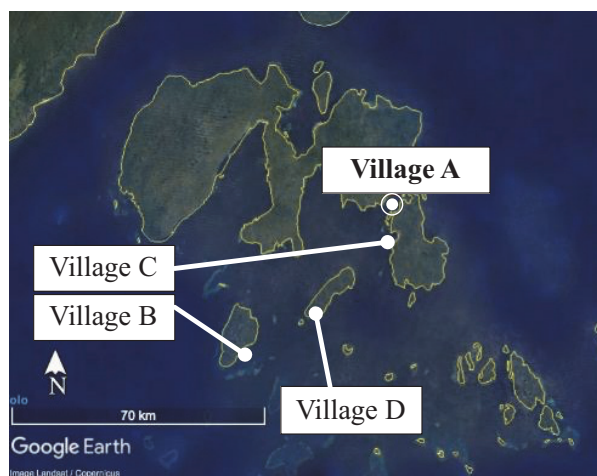


Fig. 4. Research villages in the Banggai Islands

(Source: Developed by the author using Google Earth Pro)

the Banggai Islands. In 2000, the Sama-Bajau population comprised 751 residents (Nagatsu, 2017). Except for the Sama-Bajau people, other ethnic groups are Buton, Jawa, Madura, Bima, and Selayar. According to the oral history in Village D, it was formed by the people from Kendari intent on a limited stay. Fisherman S was born in Village A, was 35 years old, and moved to Village D from Village A in 2002 because of an earthquake in 2000.

There are daily movements of the Sama-Bajau people among the four villages. Their primary purposes are to trade materials for fishing, giving food, and ceremonies. Fishermen traverse these four villages in their small boats, and others easily find regular or irregular boats for portals. These villagers acknowledged the Sama-Bajau people in each village as “keluarga” (family) or “kemanakan” (brother).

IV Seasonal Changing in the Banggai Islands

In the Banggai Islands, the rainy season is from April to July, and the dry season is from August to March. The area consists of three regencies: the Banggai Regency, the Banggai Kepulauan Regency, and the Banggai Laut Regency (Fig. 5). Within them, villages A and C are in the Banggai Kepulauan Regency, and villages B and D are in the Banggai Laut Regency. In the Banggai Regency, Luwuk is the largest city in the surrounding area. According to Köppen's climate classification, it is classified as a tropical rainforest climate (Af).

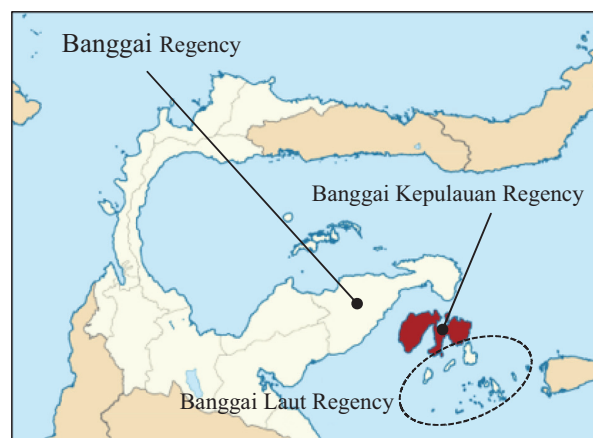


Fig. 5. The location of regencies in the Banggai islands area after 1999

(Developed by the author)

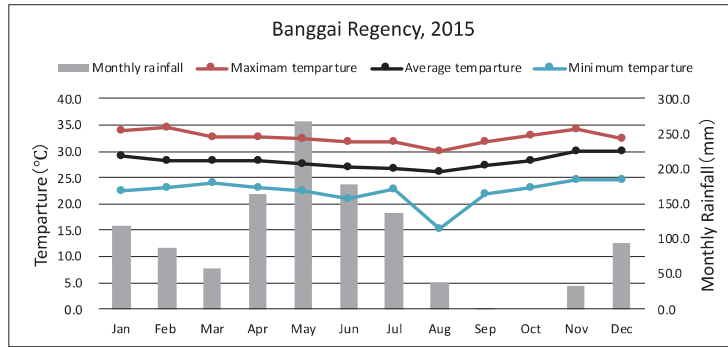


Fig. 6. The hithergraph of the Banggai Regency in 2015
(Made by the author based on data from BPS)

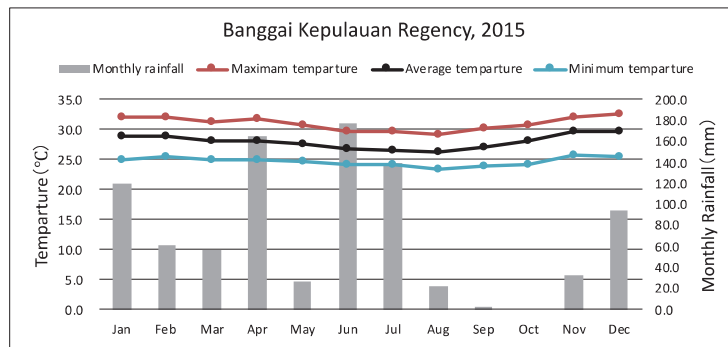


Fig. 7. The hithergraph of the Banggai Kepulauan Regency in 2015
(Made by the author based on data from BPS)

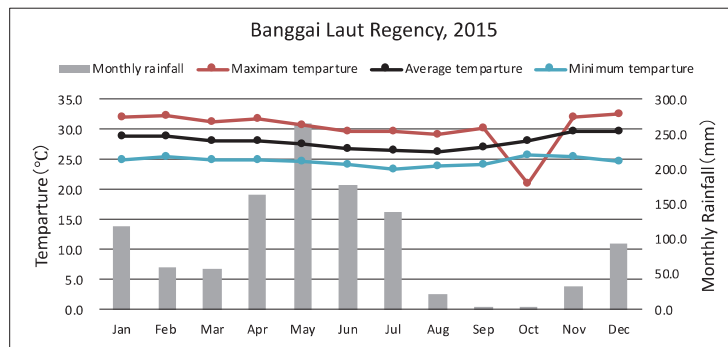


Fig. 8. The hithergraph of Banggai Laut Regency in 2015
(Made by the author based on data from BPS)

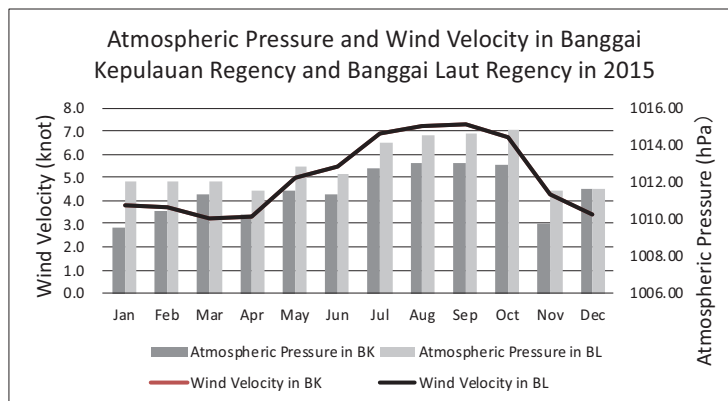
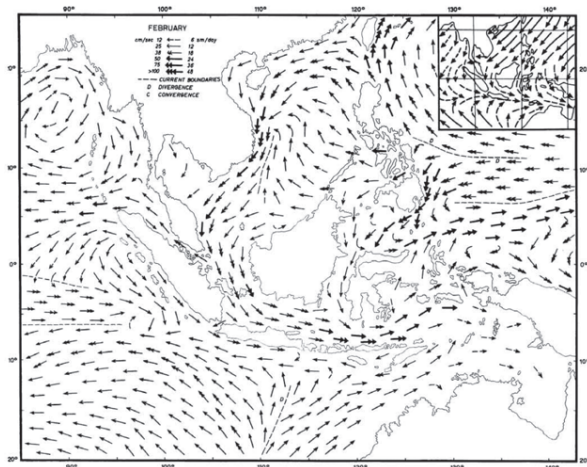
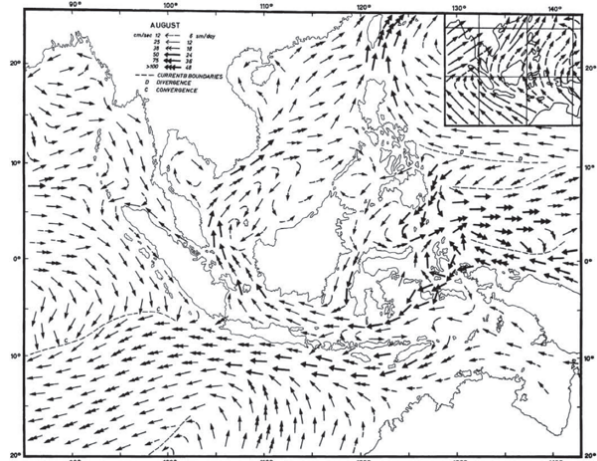


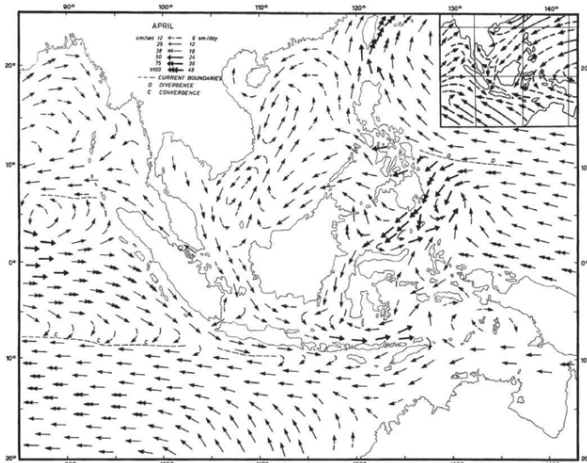
Fig. 9. Monthly average atmospheric pressure and monthly average wind speed in the Banggai Kepulauan Regency (BK) and the Banggai Laut Regency (BL) in 2015
(Made by the author based on data from BPS)



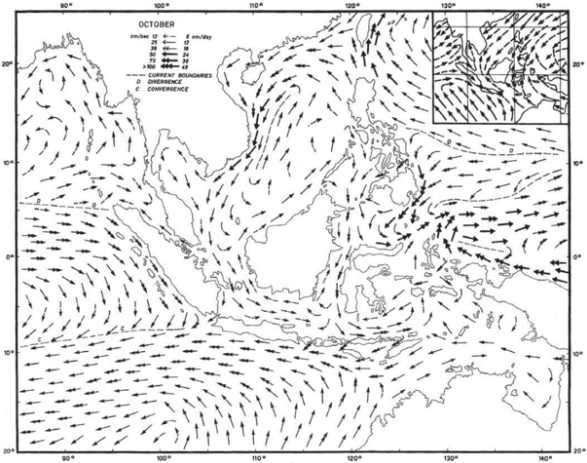
10-a. Surface currents in February



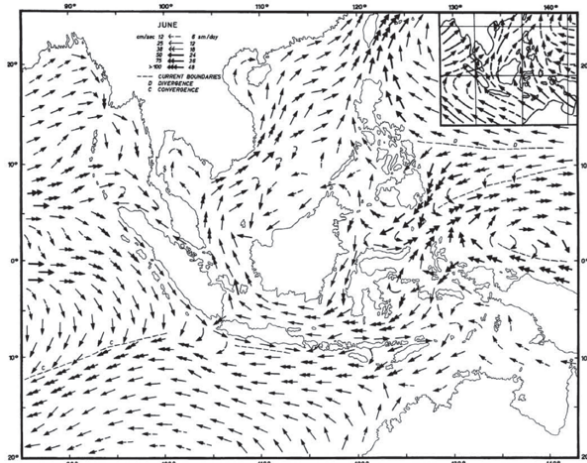
10-d. Surface currents in August



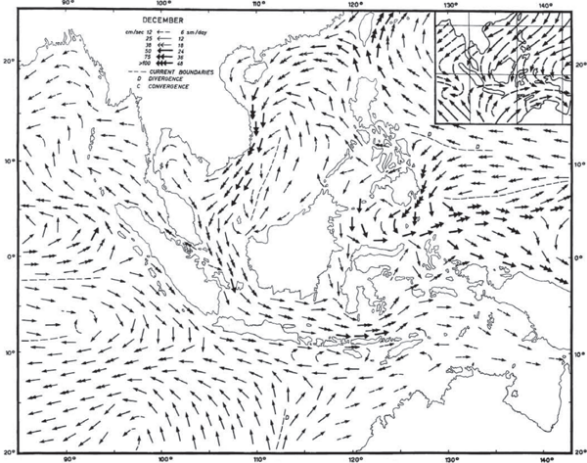
10-b. Surface currents in April



10-e. Surface currents in October



10-c. Surface currents in June



10-f. Surface currents in December

Fig. 10. Surface currents in Southeast Asia

(Wyrtki 1961: 164–169)

Figures 7, 8, and 9 illustrate the hythergraph in the three regencies in 2015. Figure 10 illustrates the monthly average atmospheric pressure and monthly average wind speed in the Banggai Kepulauan Regency and the Banggai Laut Regency for 2015. According to

this data, monthly rainfall is typical in May for the rainy season and September and October for the dry season. In the three regencies, the seasonal changes in temperature, rainfall, atmospheric pressure, and wind speed were not prominent.

In the islands of Southeast Asia, monsoon winds blow twice a year. In Sulawesi, Indonesia, during the north-west monsoon (November to April), the currents run approximately anticlockwise around Sulawesi. From May to November, no such simple pattern can be discerned (Fig. 10, Wyrski, 1961: 164–169; Whitten et al., 1988: 108).

V Seasonal Classification by Sama-Bajau People in the Banggai Islands

In the four villages in the Banggai Islands, the season is “*battu*” or “*musim*” in the Sama-Bajau language. The latter is identical in the Indonesian language. During the interviews, the rainy and dry seasons in the four villages were not mentioned. According to them, there are no original terms in the Sama-Bajau language for the rainy and dry seasons. Fishermen answered the question about the season based on winds, rather than temperature or rainfall.

In each of the four villages, the units of the year, month, and day were the same as a general calendar. However, fishermen vaguely remember specific dates, and sometimes do not recall the actual months.

The seasonal classifications within the four villages are completely different; nevertheless, fishermen live in villages that are socially and proximally close and commonly answered questions based on winds.

1 Seasonal classifications in Village A

As with Village A, the interviews revealed that four main seasons were classified according to the direction and strength of the winds: *Utara* (the season of the north winds), *Salatan* (the season of the south winds), *Banggak* (the season of hard winds), and *Paneddoh* (the season of calm winds) (Fig. 11). During the *Salatan* season, five wind directions were noted: *Selatan*, *Barat* (west), *Tunggara* (southeast), and *Timur* (east). In these winds, the *Selatan*, *Barat*, and *Tunggara* blow successively in this order. However, wind durations were not constant. *Timur* winds blow approximately three times during the *Salatan* season for approximately one week.

Importantly, a cycle of seasons extends for two years, although in general, a season can last for one year. According to them, for example, if 2017 is the first year of a cycle, June is considered the *Utara* season for 2017. However, the month of June was considered the *Salatan* season of 2018, the opposite wind direction of the *Utara* season. Interviewees mentioned this seasonal cycle as “*putar*” (turn).

The characteristic points of the seasonal classification by winds in Village A are as follows: First, the *Utara* and *Salatan* seasons are the main seasons, whereas the *Banggak* and *Paneddoh* seasons are lower distinctions of these main seasons. According to Figure 11, a year is configured by the *Utara* and *Salatan* seasons, and the *Banggak* and *Paneddoh* seasons comprise subdivisions of the former. In this paper, the former represents the main season, and the latter signifies the sub-season.

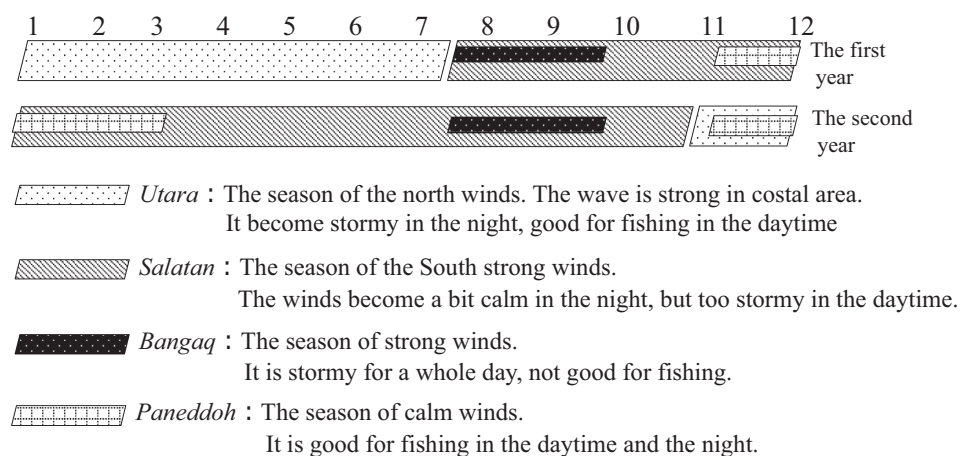


Fig. 11. Seasonal classifications by winds in village A

(Developed by the author)

Second, the main seasons are dependent upon wind direction, whereas the *Banggak* and *Paneddoh* sub-seasons are dependent on wind strength.

Third, the *Utara* and *Salatan* seasons occur in irregular patterns, whereas the *Banggak* and *Paneddoh* seasons are practically regular seasons.

Fourth, except for the duration of the *Salatan* season from approximately January to April of the following year, the periods for the main seasons are like the scientific calendar.

During the interviews, Fisherman P, who provided supporting translations, answered again with the interviewed fishermen. Sometimes, he answered with a discrepancy of about one month compared with his initial answer. According to him, the beginning and end of each season are off by about one month. The difference is caused by these seasonal transition periods; therefore, all mentions are the same. Other fishermen mentioned this when they did not define the beginning and end of seasons according to a specific month.

2 Seasonal classifications in Village B

Regarding Village B, four main seasons are observed, which are nearly the same as those for Village A, namely, *Utara*, *Salatan*, *Banggak*, and *Paneddoh* (Fig. 12). Every four seasons manifested regularly, and a cycle of the seasons was completed within one year.

The three characteristic points of seasonal classification by the wind in Village B are first, the *Utara* and *Salatan* seasons which comprise the main seasons, whereas the *Banggak* and *Paneddoh* seasons act as a subdivision of the main seasons. Second, the main seasons are dependent on the wind direction, whereas the sub-season is dependent on wind strength. Third, the main and sub-seasons arrive and last punctually every year.

3 Seasonal classifications in Village C

In Village C, seven seasons were mentioned, namely *Utara*, *Salatan*, *Banggak*, *Paneddoh*, *Barat*, *Tunggara*, and *Baleba* (Fig. 13). *Baleba* is the season of the north-west winds. The cycle of the seasons lasted for three

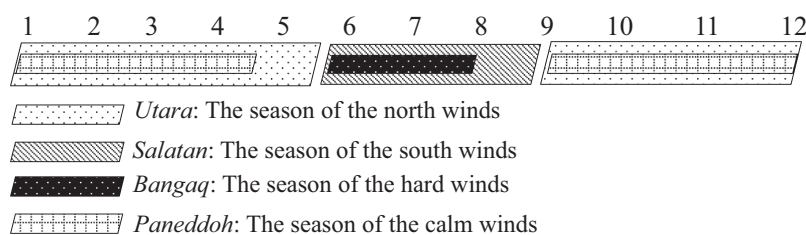


Fig. 12. Seasonal Classification of winds in village B

(Developed by the author)

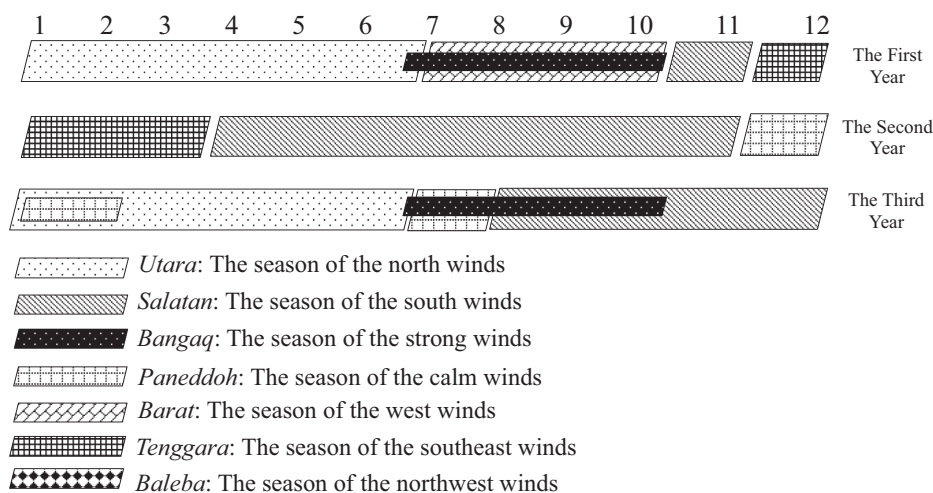


Fig. 13. Classification of the seasons by winds in village C

(Developed by the author)

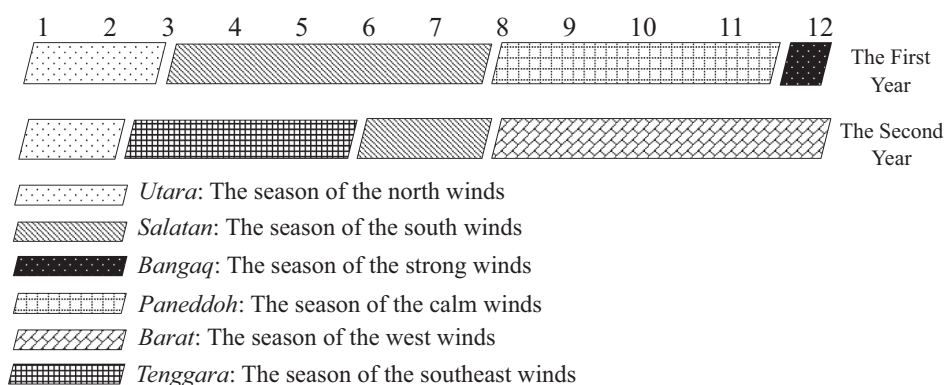


Fig. 14. Classification of the seasons by winds in village D

(Developed by the author)

years.

The characteristic points of the seasonal classification by winds in Village C are as follows. First, the *Utara*, *Salatan*, *Barat*, *Tunggara*, and *Baleba* seasons are the main seasons, whereas the *Banggak* and *Paneddoh* seasons are sub-seasons. According to Figure 13, in terms of duration, the former five seasons last in parallel, and the *Banggak* and *Paneddoh* seasons are included as subdivisions of these main seasons. The *Paneddoh* season is considered the main and subdivision of that as mentioned above. Second, the main seasons were classified by wind direction, whereas the sub-seasons were classified by wind strength. Third, all seasons were irregular. However, there are some regular occurrences. For example, November is the season of south wind every year. The duration of the *Utara* and *Banggak* seasons in the first and third years were the same.

4 Seasonal classifications in Village D

Six seasons were mentioned in Village D namely, *Utara*, *Salatan*, *Banggak*, *Paneddoh*, *Barat*, and *Tunggara* (Fig. 14). A cycle of seasons lasted for two years.

The characteristic points of the seasonal classification by winds in Village D are as follows: First, the seasons last in parallel and are not classified into main and sub-seasons hierarchically. Second, the seasons were classified by wind direction or strength. Third, only the *Utara* season was nearly on time. Fourth, the *Utara* season is nearly the same as the scientific calendar.

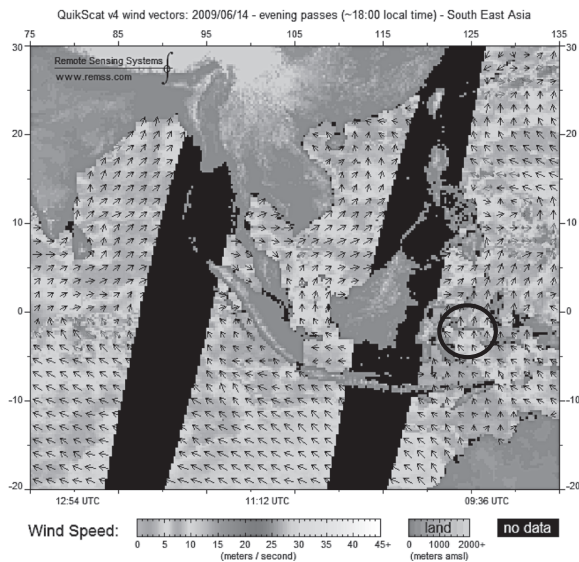
VI The Ecological Cognition of Seasons by the Sama-Bajau People

1 Discussion

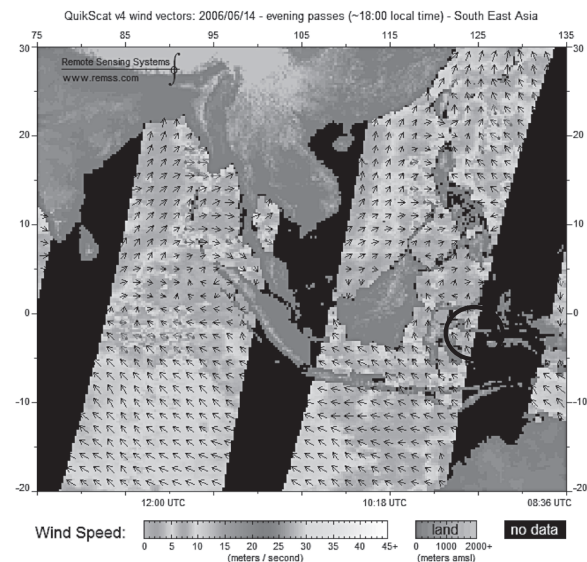
The most important point of these four cases is that every village is different, and three of them utilize a seasonal cycle lasting more than two years. In the case of Village A, the seasons of the first and second years do not match. Figure 10 illustrates the surface currents in Southeast Asia, including the Banggai islands, it is necessary to compare the same date in the first and second years in Figure 11. The interviews in Village A were primarily conducted between August 20 and October 20, 2017, which is represented as the first year of Figure 11. Hence, 2018 was the second year. Therefore, the first year is the odd-numbered year and the second year is even-numbered. Then the active data of the wind direction on the same date of odd and even years were selected. Figure 15 illustrates the wind direction on the same dates in 2006 and 2009. The circle indicates the location of the Banggai Islands and the surrounding areas.

Figure 15-a illustrates the wind direction for the evening of June 14, 2009, which is an odd-numbered year, and illustrates that it blows the south wind in the Banggai Islands, which is the opposite direction to those winds that were blown on the same date during the first year. Figure 15-b illustrates the wind direction for the evening of June 14, 2006, which is an even-numbered year, showing that the direction of the wind is also south, identical to that of the second year.

There is a possibility that the fishermen in Village A



15-a. Wind direction on the evening of June 14th, 2009



15-b. Wind direction on the evening of June 14th, 2006

Fig. 15. Wind direction in Southeast Asia
(QuickSCAT with addition from the author)

cognize the subtle differences in geography according to the location of small islands and the shape of bays that cannot be analyzed in the meteorological data. To address this possibility, measurements must be performed using an anemometer. However, even if they understand this data and reflect on their seasonal classification, it is difficult to explain that wind directions are opposite on dates during the odd- and even-numbered years. In addition, why a cycle of seasons is two years long cannot be explained.

While these uncertain points should be studied, this study attempted to consider the character of the seasonal classification and the Sama-Bajau people's ecological cognition according to other possibilities.

Interestingly, fisherman P mentions the key expressions concerning the differences in each seasonal classification.

Fisherman P, who had immigrated to Village A, explained the differences in the seasons among the four villages:

"If (someone) has the experience of staying in a settlement, (he) can understand the season of that settlement. If not, (he) cannot know it."

"When (we) utilize only the natural calendar (kalender alam in Indonesian), no one will mistakenly identify a season. However, after the modern calendar (I do not know who made it, maybe a wise one), people started

making mistakes. Therefore, using a natural calendar is better for identifying seasons."

(Recorded by the author 2020).

The cognition of fishermen is localized, even if the location is very close. Their seasonal cognition is embedded in the locality, and seasonal cognition by the Sama-Bajau people who are scattered throughout diverse areas and the various environmental conditions can still interact.

From the latter explanation, fishermen are continuing to use the seasonal calendar, based on their indigenous cognition, even though they can refer to the modern calendar. The fact that fishermen still fish following their seasonal cognition reveals the advantage and importance of indigenous knowledge against the scientific information in modern Sama-Bajau society.

Based on this, the uniqueness of seasonal cognition in the four villages renders a high interest in seasonal winds, due to differences in maritime conditions and fishing methods. In contrast to the seasonal cognition in previous studies of the Sama-Bajau people who engage in coastal fishing in the prominent coral reef areas, there is no such area in the Banggai Islands, and the fishermen usually engage in open sea fishing (Nakano 2020). For them, knowledge of the direction and strength of the winds is necessary to determine the fishing grounds.

Seasonal cognition based on the high interest in the

winds embedded in Village A appeared in a traditional song among villagers:

Madambila timurna patanaang Peling (The east of Peling)

Madiata boe mannanna kampohku (On the water, there is my village)

Missa patanaanne manning parumaang (There is no dry place at home)

Lamu takatonangnta irune kampohku (If you know, that is my village)

Battuna Salatan A dikamaseang (When it is in Salatan season, A is calm)

Battuna Utara A dipagegerang (When it is in Utara season, A is rowdy)

Coba coba pikirta ai sabana (Try to think what the reason is)

Lamu takatonangnta lingau tuntukta (If you know, tell me)

The lyrics explain the situation during the *Utara* season and the *Salatan* season. This song is sung daily, when children perform housework, or when parents sing children to sleep.

2 Toward a study of seasonal cognition by Sama-Bajau fishermen

This article reported the Sama-Bajau fishermen's ecological cognition of seasonal classification tentatively and compared the cases in four villages and with climatological data. Based on semi-structured interviews and participant observations, several characteristic points of seasonal cognition were indicated.

While this study reported several characteristic aspects of the ecological cognition of the Sama-Bajau people, additional points must be considered. Further questions include the following: How are multiple natural phenomena referred to in the interaction of seasonal cognition? How are diversity and commonality achieved among individuals, fishing communities, and other livelihoods, including gender and age? Does seasonal cognition embedded in localities interact? These questions must be answered by future studies. In the field of ecological anthropology and cognitive anthropology, few researchers have reported on these queries, particularly from the perspective of the indigenous cal-

endar for agriculture and rituals (Hata 1976; Furusawa 2017), and the calendar to predict the seasons.

This study identified the possibility of a confirmative cognition of the seasons by fishermen. Future work revealing the above points can reconsider seasonal cognition as the previous of the Sama-Bajau people (Nagatsu 1995; Stacey 2007; Ono 2011), such as why the date of the *Mag'mboq* ritual differed by almost one month in 1986 and 1994 (Monden 1986; Nagatsu 1995).

There are additional issues to consider, though this study is the first to discuss seasonal cognition and its interaction with the Sama-Bajau fishermen. The results are meaningful for future research concerning the interaction between ecological environments and people, and for the Sama-Bajau studies. Further research can build upon this study to systematize the ecological cognition of Sama-Bajau fishermen.

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