Proximal: Jurnal Penelitian Matematika dan Pendidikan Matematika
ISSN 26158132 (cetak)
ISSN 26157667 (online)

ETHNOMATHEMATICAL PRACTICES AND AGRICULTURAL TIMING IN BUGIS CULTURE

Ja'faruddin[1], Khaerati[2], Takdirming[3]
Departement of Mathematics, Faculty of Mathematics and Natural Science, State University of Makassar[1]
Universitas Patompo[2]
Universitas Muhammadiyah Makassar[3]
Email: jafaruddin@unm.ac.id[1], khaeratijafaruddin@gmail.com[2], takdirmin@unismuh.ac.id[3]

Corresponding Author :Ja'faruddin email: jafaruddin@unm.ac.id

Abstract. *This study delves into the realm of ethnomathematics within the Bugis culture, specifically examining how good and bad days for farming are determined. Utilizing a descriptive qualitative approach, the research involved direct observations at Fort Rotterdam, Makassar, alongside extensive literature reviews. The findings indicate that the division of good and bad days is based on distinct time cycles, represented by unique symbols that denote the quality of time. These traditions, passed down through generations, provide insights into the cultural values and beliefs of the Bugis community regarding the optimal timing for various activities. The symbols and guidelines not only embody cultural heritage but also illustrate the interplay between traditional time concepts and mathematical principles, such as patterns in calendar calculations. In Bugis culture, time is more than just the passage of hours—it is a living guide that intertwines spirituality with daily life. Terms like Empty, Dead, Alive, Even, and Full are imbued with profound meanings that influence their actions, ensuring harmony with natural and spiritual rhythms. The traditional time-scoring system maintains balance, but skipping intervals like midday or afternoon can significantly alter the day's designation. Analyzing daily scores and excluded intervals highlights how time segments impact activities and symbolism, with Wednesday and Saturday deemed particularly suitable for farming.*

Keywords: **Ethnomathematics, Bugis Traditions, Cultural Calendar, Auspicious Days, Agricultural Timing**

A. Introduction

Indonesia is renowned for its rich cultural heritage, characterized by a unique diversity that sets it apart from other nations. This cultural heterogeneity has given rise to a plethora of traditions, encompassing customs, rituals, and various practices that are meticulously preserved by different ethnic communities. The Bugis community in South Sulawesi is notable for retaining a strong cultural identity (Nurhazmah.S, 2022). Geographically, South Sulawesi is located at the crossroads of important maritime trade routes, connecting the islands of the Indonesian archipelago with neighboring regions such as Malaysia and the Philippines. This strategic location historically fostered extensive interactions with traders and cultural influences from various parts of the world, enriching the Bugis culture while maintaining its distinct identity. The Bugis people, known for their seafaring traditions, played a significant role in maritime trade and exploration, which further shaped their unique customs, social structures, and values that persist to this day

South Sulawesi is home to a multitude of tribes and cultural practices, with the Bugis tribe being particularly distinguished by their traditional calendar. The Bugis calendar, often referred to as "Bilangeng Pattemu Taung" or in ancient manuscripts as "Kutika Bilangeng" (ritual calendar) or "Pananrang Ugi" (agricultural calendar), plays a significant role in their cultural heritage (Sukmawati, 2022). This calendar is primarily derived from ancient manuscripts, such as Lontara' Kutika, which contain detailed records of lunar phases, seasons,

and rituals significant to agricultural and societal activities. These manuscripts are often preserved by local elders or sanro (traditional spiritual leaders) who possess deep knowledge of Bugis cosmology and customs. The Lontara' Kutika serves as both a historical and spiritual guide, reflecting the Bugis people's connection to nature and their belief in harmonious living guided by celestial and environmental signs.

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Good days, according to Bugis culture, are those periods believed to possess positive qualities, making them ideal for initiating or conducting particular activities with the expectation of smooth progression. In contrast, bad days are perceived as less favorable, potentially bringing risks or negative consequences if activities are commenced during these times.

This cultural practice underscores the critical role of determining auspicious and inauspicious days within the Bugis community. They adhere to specific guidelines for identifying the appropriate times of day, with a firm belief that adherence to these guidelines ensures the successful and harmonious execution of their activities (Putra, 2022).

B. Method

This study uses a descriptive qualitative approach to examine the Bugis community's beliefs about good and bad days in relation to mathematical concepts. Data were gathered through direct observations, interviews with cultural practitioners, and literature reviews. Observations focused on traditional practices linked to the Bugis calendar . Field visits to Fort Rotterdam, Makassar, offered further context through artifacts and practices.

The analysis involved identifying patterns in traditional calendar calculations and understanding how values are assigned to time intervals and days. Mathematical principles were applied to analyze scoring systems, including exclusions of specific intervals such as midday or afternoon, and their impact on determining good or bad days. The results reveal a strong connection between Bugis cultural traditions and mathematical reasoning, enriching the understanding of time-based decision-making.

C. Results and Discussions

1. Result

The Buginese calendar incorporates traditional wisdom in determining favorable and unfavorable times for agricultural activities, such as rice fielding. This system is deeply rooted in the cultural concept of "Pakkita-Kita Esso," which categorizes days and times into symbolic states: Lobbang/Kosong (Empty), Uju/Mati (Dead), Tuo/Hidup (Alive), Palebola/Impas (Even), and Mallise/Berisi (Full). By analyzing these states mathematically, we propose a model to predict optimal farming days and times.

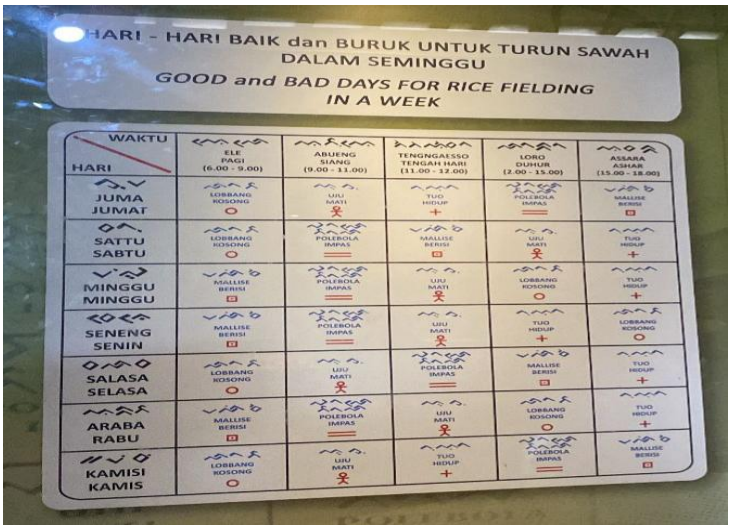

Figure 1. Good and Bad Days for Rice Fielding in a Week

Table 1. Good and Bad Days for Rice Fielding in a Week

Day	Morning (06:00–09:00)	Mid-Morning (09:00–11:00)	Midday (11:00–12:00)	Afternoon (12:00–15:00)	Late Afternoon (15:00–18:00)
Friday	Lobbang/Empty	Uju/Dead	Tuo/Alive	Palebola/Even	Mallise/Full
Saturday	Lobbang/Empty	Palebola/Even	Mallise/Full	Uju/Dead	Tuo/Alive
Sunday	Mallise/Full	Palebola/Even	Uju/Dead	Lobbang/Empty	Tuo/Alive
Monday	Mallise/Full	Palebola/Even	Uju/Dead	Tuo/Alive	Lobbang/Empty
Tuesday	Lobbang/Empty	Uju/Dead	Palebola/Even	Mallise/Full	Tuo/Alive
Wednesday	Mallise/Full	Palebola/Even	Uju/Dead	Lobbang/Empty	Tuo/Alive
Thursday	Lobbang/Empty	Uju/Dead	Tuo/Alive	Palebola/Even	Mallise/Full

The field data indicates that communities adhering to these time guidelines have distinct perspectives. They believe that every day is suitable for various activities, with success dependent on selecting the appropriate time. The concepts of "good time" and "bad time" encapsulate this idea. Consequently, those who follow these time guidelines (pakkita-kita esso) do not recognize the existence of inherently unlucky or ill-fated days, often referred to as nakkase taung (Jumarni & Junaeda, 2024).

The table of symbols shows the varying levels of auspiciousness for different states and times: Palebola/Even, Uju/Dead, Lobbang/Empty, and Tuo/Alive. On Thursday, the states are Lobbang/Empty, Uju/Dead, Tuo/Alive, Palebola/Even, and Mallise/Full.

The symbols represent varying levels of auspiciousness:

a. *Mallise/Berisi (Full): Highly favorable (+2)*
b. *Tuo/Hidup (Alive): Favorable (+1)*
c. *Palebola/Impas (Even): Neutral (0)*
d. *Lobbang/Kosong (Empty): Unfavorable (-1)*
e. *Uju/Mati (Dead): Highly unfavorable (-2)*

Scoring Model

Each day is divided into five intervals:

a. *Morning (06:00–09:00)*
b. *Mid-Morning (09:00–11:00)*
c. *Midday (11:00–12:00)*
d. *Afternoon (12:00–15:00)*
e. *Late Afternoon (15:00–18:00)*

The score for a day is computed as the sum of the scores for all intervals.

For example:

Friday:

a. *Morning: Lobbang/Kosong (-1)*
b. *Mid-Morning: Uju/Mati (-2)*
c. *Midday: Tuo/Hidup (+1)*
d. *Afternoon: Palebola/Even (0)*
e. *Late Afternoon: Mallise/Berisi (+2)*
Total Score: (-1) + (-2) + (+1) + 0 + (+2) = 0 (Neutral Day)

Modified Theories for Exclusions

1. Excluding Midday (11:00–12:00)

Midday is traditionally avoided due to its unfavorable conditions for farming. Omitting this interval, the day's total score becomes the sum of the remaining four intervals. For Friday:

- *Morning (-1), Mid-Morning (-2), Afternoon (0), Late Afternoon (+2)*
Revised Total Score: (-1) + (-2) + 0 + (+2) = -1 (Bad Day)

2. Excluding Afternoon (12:00–15:00)

If afternoon is excluded for rest and prayer, the score is recalculated based on the other four intervals. For Friday:

- *Morning (-1), Mid-Morning (-2), Midday (+1), Late Afternoon (+2)*
Revised Total Score: (-1) + (-2) + (+1) + (+2) = 0 (Neutral Day)

General Formula

The total score for a day (S_{day}) is computed as:

$$S_{day} = \sum_{i=1}^{n} C_i$$

Where:

C_i is the score for the $i^{\{th\}}$ interval.
n is the number of intervals considered (adjusted for exclusions).

Application and Interpretation

a. *High Scores (+4 to +8): Excellent days for farming activities.*
b. *Moderate Scores (+1 to +3): Suitable for routine farming tasks.*
c. *Low Scores (0 to -5): Avoid farming activities.*

Here is a summary for each day based on the calculations seen in Table 2.

Table 2. Summary of Daily Calculations

Day	Morning	Mid-Morning	Midday	Afternoon	Late Afternoon	Total Score	Excluding Midday	Excluding Afternoon
Friday	Lobbang (-1)	Uju (-2)	Tuo (+1)	Palebola (0)	Mallise (+2)	0 (Neutral Day)	-1 (Bad Day)	0 (Neutral Day)
Saturday	Lobbang (-1)	Palebola (0)	Mallise (+2)	Uju (-2)	Tuo (+1)	0 (Neutral Day)	-2 (Bad Day)	+2 (Good Day)
Sunday	Mallise (+2)	Palebola (0)	Uju (-2)	Lobbang (-1)	Tuo (+1)	0 (Neutral Day)	+2 (Good Day)	+1 (Moderate Day)
Monday	Mallise (+2)	Palebola (0)	Uju (-2)	Tuo (+1)	Lobbang (-1)	0 (Neutral Day)	+2 (Good Day)	-1 (Bad Day)
Tuesday	Lobbang (-1)	Uju (-2)	Palebola (0)	Mallise (+2)	Tuo (+1)	0 (Neutral Day)	0 (Neutral Day)	-2 (Bad Day)
Wednesday	Mallise (+2)	Palebola (0)	Uju (-2)	Lobbang (-1)	Tuo (+1)	0 (Neutral Day)	+2 (Good Day)	+1 (Moderate Day)
Thursday	Lobbang (-1)	Uju (-2)	Tuo (+1)	Palebola (0)	Mallise (+2)	0 (Neutral Day)	-1 (Bad Day)	0 (Neutral Day)

2. Discussion

In Buginese culture, several terms related to time hold deep symbolic meanings that reflect traditional beliefs and practices. These terms—Lobbang/Kosong (Empty), Uju/Mati (Dead), Tuo/Hidup (Alive), Palebola/Impas (Even), and Mallise/Berisi (Full)—are closely tied to the rhythms of daily life and spiritual practices.

Lobbang/Kosong (Empty) refers to a neutral or void state, often seen as a time when energies or spiritual influences are at their lowest. This is generally considered an unsuitable period for beginning significant activities or making important decisions, as it symbolizes a lack of vitality or potency. Uju/Mati (Dead) symbolizes dormancy, representing moments of reflection, rest, or pause. Cultural practices often avoid new endeavors during this time, believing it to be an inauspicious period that may lead to stagnation or failure.

In contrast, Tuo/Hidup (Alive) represents vitality and growth, seen as an ideal time for taking action, starting new projects, or making crucial decisions. This term reflects a belief in the alignment of human actions with the natural flow of life. Palebola/Impas (Even) signifies balance and harmony, suggesting that this is a suitable time for consolidating efforts, resolving conflicts, and maintaining equilibrium. Finally, Mallise/Berisi (Full) represents abundance and success, regarded as the most auspicious period for high-energy activities that require focus and ambition.

These terms guide daily activities in Buginese culture, ensuring that actions are in harmony with the natural and spiritual rhythm of life. For example, farmers might avoid planting during Lobbang/Kosong but favor Mallise/Berisi, while rituals are often planned during Tuo/Hidup to attract positive energy. This worldview integrates time, spirituality, and practical living, fostering balance and harmony.

The analysis of the daily scores and interval-based exclusions provides valuable insights into how time-based intervals influence daily activities and their symbolic meaning within the cultural context. The findings suggest that the traditional time-based scoring system inherently maintains a balance, as seen in the neutral total scores for all days when all intervals are considered. This balance reflects a sense of harmony in the traditional practice of time segmentation, where even though individual intervals may vary, the overall outcome tends to be neutral. This could symbolize equilibrium within the cultural understanding of time.

When the midday interval (11:00–12:00) is excluded, a significant shift in the day's total score occurs. Traditionally avoided for farming due to its unfavorable conditions, the omission of this interval leads to a noticeable change in the overall assessment of the day. For instance, on Friday and Thursday, excluding midday results in a "bad day" with a total score of -1, highlighting the importance of this interval in maintaining a balance. In contrast, for other days like Monday, Wednesday, and Sunday, excluding midday shifts the day to a more favorable status, reflected in a positive score of +2, suggesting a beneficial redistribution of scores across the remaining intervals.

Similarly, excluding the afternoon interval (12:00–15:00), which is typically reserved for rest and prayer, affects the daily scores differently. While the exclusion of afternoon results in a neutral score of 0 for Friday and Thursday, other days like Saturday and Sunday experience an improvement

in their scores. Saturday, for example, scores +2, and Sunday scores +1, indicating that the remaining intervals—morning, mid-morning, midday, and late afternoon—have a positive influence on the day when the afternoon is excluded.

These findings underscore the cultural significance of certain time intervals, such as midday and afternoon, and their impact on the perception of a "good" or "bad" day. The negative scores assigned to intervals like **mid-morning** (Uju/Mati, -2) reflect the deep-rooted traditional beliefs about inauspicious periods. However, these negative effects can be mitigated by favorable intervals, showcasing the adaptability of the cultural system.

The research contributes significantly to education by introducing the concept of ethnomathematics. This field connects mathematics with everyday life practices and cultural traditions. In this case, the study explores how the Bugis people use mathematical principles in their agricultural calendar, such as lunar phases and seasonal cycles, to plan their farming activities. By highlighting these practices, the research provides an opportunity to integrate local cultural knowledge into mathematics education, making the subject more relevant and tangible for students. It helps students understand that mathematics is not just theoretical but is deeply embedded in practical, real-world contexts.

Furthermore, the research promotes contextual learning by linking mathematics with local traditions. It encourages students to see the application of mathematical concepts like time, patterns, and cycles in cultural practices, bridging the gap between abstract mathematical theories and cultural practices. This approach not only enhances students' understanding of mathematics but also fosters critical thinking and creativity. By exploring how the Bugis use traditional knowledge to manage agricultural practices, students can engage in problem-solving activities that connect mathematics with cultural heritage, strengthening both their mathematical and cultural awareness.

D. Conclusion

In Buginese culture, time isn't just hours ticking by—it's a living guide weaving spirituality into daily life. They've infused intervals like Empty, Dead, Alive, Even, and Full with deep meanings that steer their actions. This alignment keeps them in sync with natural and spiritual rhythms. Their time-scoring system naturally balances out, but skipping intervals like midday or afternoon can shift a day's vibe entirely.

Analyzing daily scores and excluded intervals in Buginese culture shows how time segments influence activities and symbolism. The traditional scoring system maintains balance, but omitting intervals like midday (11:00–12:00) or afternoon (12:00–15:00) shifts days from neutral to good or bad for this case suitable day to farming are Wednesday and Saturday.

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