

The Interaction of *Fiqh* and Science in the Dynamics of Determining the Beginning of the Hijri Month in Indonesia

Interaksi Fikih dan Sains dalam Dinamika Penentuan Awal Bulan Hijriyah di Indonesia

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Abstract: The determination of the onset of the Hijri month in Indonesia has frequently sparked controversy, especially among prominent Islamic organizations such as Nahdlatul Ulama and Muhammadiyah, as well as governmental entities like the Ministry of Religious Affairs. This contention arises from the diverse methods and criteria they adopt for the sighting of the *hilāl* (new crescent Moon) to mark the beginning of the Hijri month. This article delves into the interplay between *fiqh* (Islamic jurisprudence) and astronomy in determining the start of the Hijri month within the Indonesian context. Employing literature research with a scientific-cum-doctrinal approach, the article highlights three interactions between *fiqh* and science. Firstly, astronomy serves as a translator of jurisprudential concepts into empirical criteria for determining the beginning of the Hijri month. It underscores the interdependence of these two domains in decision-making rooted in religious beliefs and empirical knowledge. Secondly, the dynamic process of determining the start of the Hijri month in Indonesia reveals a complex interplay between *fiqh* and science, with varying viewpoints among religious scholars and scientific researchers regarding the criteria for moon sighting. Lastly, *fiqh* plays a role in legitimizing astronomy in the *rukayah al-hilāl* (crescent moon sightings) process through testimonies, wherein scholars of Islamic jurisprudence establish criteria for witnesses and use oaths to validate empirical scientific evidence supporting lunar visibility. This article offers valuable insights into the intricate relationship between *fiqh* and science in determining the start of the Hijri month in Indonesia.

Keywords: *Fiqh*, Science, *Hilāl*, Determination of the Beginning of the Hijri Month, Indonesia.

Abstrak: Penentuan awal bulan Hijriyah di Indonesia sering kali memicu kontroversi, terutama di antara organisasi Islam arus utama seperti Nahdlatul



Ulama dan Muhammadiyah, serta lembaga pemerintah seperti Kementerian Agama. Kontroversi ini muncul dari beragamnya metode dan kriteria yang mereka gunakan dalam melihat kemunculan *hilāl* (bulan sabit baru) untuk menandai awal bulan Hijriyah. Artikel ini mengkaji interaksi antara fikih dan ilmu astronomi dalam penentuan tersebut dalam konteks Indonesia. Dengan menggunakan penelitian kepustakaan dan pendekatan *saintifik-cum-doktrinal*, artikel ini menyoroti tiga bentuk interaksi antara fikih dan sains. Pertama, ilmu astronomi berfungsi sebagai penerjemah konsep-konsep fikih ke dalam kriteria empiris untuk menentukan awal bulan Hijriyah. Ini menekankan ketergantungan antara kedua ranah dalam pengambilan keputusan yang berakar pada keyakinan agama dan pengetahuan empiris. Kedua, proses dinamis dalam menentukan awal bulan Hijriyah di Indonesia menunjukkan interaksi kompleks antara fikih dan sains, dengan berbagai pandangan di antara para ulama dan ilmuwan mengenai kriteria penampakan *hilāl*. Terakhir, fikih memainkan peran dalam melegitimasi ilmu astronomi dalam proses pengamatan bulan (*rukyaḥ al-hilāl*) melalui kesaksian, di mana para ulama menetapkan kriteria untuk saksi dan menggunakan sumpah untuk memvalidasi bukti ilmiah empiris yang mendukung visibilitas lunar. Studi ini memberikan wawasan berharga mengenai interaksi kompleks antara hukum Islam dan sains dalam menentukan awal bulan Hijriyah di Indonesia.

Kata Kunci: Fikih, Sains, *Hilāl*, Penentuan Awal Bulan Hijriyah, Indonesia.

A. Introduction

Determining the beginning of the Islamic month (Hijri) has consistently been a topic of contention in Indonesia.¹ In 2023, the Ministry of Religion and the Nahdlatul Ulama (NU) established the 1st of Syawal 1444 H on April 22, 2023. This decision contrasts with that of Muhammadiyah, which determined it to be on April 21, 2023.² A similar discrepancy occurred a year earlier in determining the 1st of Ramadhan 1443 H. The Ministry of Religion and NU set it on April 3, 2022, while Muhammadiyah chose April 2, 2022.³ Unlike the Ministry of Religion, an official governmental institution, NU and Muhammadiyah are major Islamic community organizations in Indonesia. Their varied determinations of the start of the Hijri

¹ Bashori Alwi, "Dinamika Penetapan Awal Bulan Hijriyah di Indonesia untuk Mencari Titik Temu" (Doctoral, Semarang, UIN Walisongo, 2020), 120-125.

² Fria Sumitro, "Lebaran 2023 Hari Apa? Ini versi Pemerintah, Muhammadiyah, dan NU," detiksumut, accessed June 16, 2023, <https://www.detik.com/sumut/berita/d-6684255/lebaran-2023-hari-apa-ini-versi-pemerintah-muhammadiyah-dan-nu>.

³ Yum Wamad Sudirman, "Penetapan Awal Ramadan 2022, Ini Menurut NU-Muhammadiyah Jabar," detikjabar, accessed May 5, 2023, <https://www.detik.com/jabar/berita/d-6012305/penetapan-awal-ramadan-2022-ini-menurut-nu-muhammadiyah-jabar>.

month have significant implications on religious practices among Muslims, influencing acts of worship like fasting, Eid al-Fitr, Eid al-Adha prayers, and more.⁴

The root of these discrepancies lies in their varied methodologies and criteria for defining the “*hilāl*” (new crescent Moon),⁵ which is foundational in determining the Islamic month’s commencement. The Quran states that a year consists of 12 months and provides a *manzilah* (lunar position) for each month (Sūrat Yāsīn [36]: 39 and Sūrat Yūnus [10]: 5). It also defines the *hilāl* as a sign of time (Sūrat al-Baqarah [2]: 189), yet does not detail specific criteria regarding the concept of *hilāl*.⁶ It means timelines for implementing Islamic law are intertwined with the new crescent. Proper interpretation of the *hilāl* is crucial for Muslim religious life, given its direct association with their worship practices.⁷ Additionally, varied interpretations of the *hilāl* and the emergence of new *hilāl* criteria further complicate Hijri month determinations in Indonesia.

Several scholars have delved into these dynamics. Wahidi explored the implementation of the *MABIMS* (Majelis Agama Brunei Darussalam, Indonesia, Malaysia, dan Singapura) criteria in the Hijri month’s determination.⁸ At the same time, Zufriani discussed the methods, challenges, and debates surrounding successful crescent sightings (*rukayah al-hilāl*).⁹ Subsequent studies have focused on the *hilāl* criteria from a scientific perspective, as undertaken by Odeh,¹⁰ Ilyas,¹¹ and

⁴ Zaenal Abidin, ‘Membangun Harmoni Lewat Kebersamaan: Studi Kasus Dampak Sosial Penanganan Awal Ramadhan dan 1 Syawal terhadap Umat Islam di Kota Padang’, *Harmoni* 11, no. 1 (31 Maret 2012): 56–66.

⁵ Jayusman, “Kajian Ilmu Falak Perbedaan Penentuan Awal Bulan Kamariah: antara Khilafiah dan Sains,” *Al-Maslahah* 11, no. 1 (2015): 16–30.

⁶ Muhammad Hasan, ‘Benda Astronomi dalam Al-Quran dari Perspektif Sains.’, *Jurnal Theologia* 26, no. 1 (2015): 93–104.

⁷ Ibn Ḥajar al-Aṣqalānī, *Fath al-Bārī Sharḥ Ṣaḥīḥ al-Bukhārī*, Juz 3 (Beirut: Dār al-Kutub, 1989), 202.

⁸ Ahmad Wahidi et al., “Implementation of the Mabims Criteria in Determining the Beginning of Islamic Month in Indonesia and Brunei Darussalam” in *International Conference on Engineering, Technology and Social Science (ICONETOS 2020)*, (Atlantis Press, 2021), 96–108.

⁹ Zufriani Zufriani et al., “Rukyat as Determination of the Lunar Month Beginning: A Method, Obstacles, and Debate in Indonesia,” *JURIS (Jurnal Ilmiah Syariah)* 22, no. 1 (June 13, 2023): 53–67.

¹⁰ Mohammad Sh. Odeh, “New Criterion for Lunar Crescent Visibility,” *Experimental Astronomy* 18, no. 1–3 (December 2004): 39–64.

¹¹ Mohammad Ilyas, *New Moon’s Visibility and International Islamic Calendar for the Asia-Pacific Region, 1407-1421 H* (Kuala Lumpur: Organization of Islamic Conference (OIC) Standing Committee on Scientific & Technological Cooperation (COMSTECH), 1994), 5–10.

Djamaluddin et al.¹² In parallel, Royyani et al.,¹³ Muhalling and Hasbi,¹⁴ and Marfaung¹⁵ have strived to harmonize religious and scientific perspectives in the Hijri month's determination. Chotban followed suit, probing the integration of religion and science.¹⁶ This article complements previous studies, exploring the interaction between *fiqh* (Islamic jurisprudence) and scientific knowledge in determining the start of Ramadhan and Syawal in Indonesia. The author argues that Islamic jurisprudence and science have intricate interplay in the context of Islamic month determination.

This paper is literature research employing a *scientific-cum-doctrinal* approach.¹⁷ This approach blends religious doctrine with empirical-scientific analysis.¹⁸ The literature study reviewed the determinations of the Hijri month's start by the Agency for Hisab and Rukyat (BHR, Badan Hisab dan Rukyat) from 2010-2023 and the Ministry of Religion's decisions from 2022-2023 as primary data. Additionally, the author scrutinized various jurisprudential literatures, both classical and contemporary, academic articles, research findings, and relevant websites focused on this research. It was done to analyze the decisions of the Ministry of Religion, NU, and Muhammadiyah in determining the month's start, linking them with the views of jurisprudential scholars concerning the *hilāl*. Upon collecting the data, the author then conducted a qualitative analysis.

¹² Thomas Djamaluddin, Muhammad Husni, and Sunarjo, *Hisab Rukyah di Indonesia serta Permasalahannya* (Jakarta: Pusat Penelitian dan Pengembangan, Badan Meteorologi Klimatologi dan Geofisika, 2010), 25.

¹³ Muh Arif Royyani et al., "Religious Dialogue and Astronomy from the Perspective of Indonesian Muslim Scholars," *Samarah: Jurnal Hukum Keluarga dan Hukum Islam* 7, no. 1 (March 31, 2023): 261–80.

¹⁴ Rusdin Muhalling and Muhammad Hasbi, "Religious Moderation in Indonesia: Study of Astronomy Implementation Toward the Baha'i Introduction System in Indonesia," *Baltic Journal of Law & Politics* 16, no. 3 (2023): 750–69.

¹⁵ Watni Marpaung and Nurhayati Nurhayati, 'Determination the Beginning of Qomariyah Month According to Government', *Jurnal Ilmiah Islam Futura* 19, no. 2 (28 December 2019): 278–93.

¹⁶ Sippah Chotban, "Membaca Ulang Relasi Sains dan Agama dalam Perspektif Nalar Ilmu Falak," *ELFALAKY: Jurnal Ilmu Falak* 4, no. 2 (December 15, 2020): 222–32.

¹⁷ A. Mukti Ali, *Metode Memahami Agama Islam* (Jakarta: Bulan Bintang, 1991), 32.

¹⁸ Asif Trisnani and Asep Awaludin, "Scientific-Cum-Doctriner dalam Studi Islam Menurut Mukti Ali: Studi Analisis Perspektif Worldview Islam," *Aqlania* 13, no. 2 (2022): 197–222.

B. Bridging *Fiqh* and Science: Translating the Terminology of *Hilāl* into Astronomical Language

Etymologically, the word “*hilāl*” originates from Arabic, signifying the crescent Moon or the first 1-2 nights of a new month.¹⁹ Terminologically, *hilāl* represents the partial white light of the Moon visible to observers at the beginning of the Hijri month. According to Ibn Manẓūr, the crescent Moon can be called *hilāl* only during the first two nights of each month. However, some scholars argue that the *hilāl* is present for three nights, after which it is called *qomar* (Moon). The majority opinion states that the *hilāl* lasts only two nights because its illumination is more pronounced on the third night.²⁰ Based on these definitions, *hilāl* is the partial white light of the Moon visible, especially on the first day. Thus, a new moon is identified by its visibility or its usual appearance. Consequently, an unobservable moon, even above the horizon, cannot be declared as the new Moon at Sunset.

The Quran uses the terms “*hilāl*” and “*qomar*” to denote the Moon. “*Hilāl*” appears only once in the Quran, specifically in Sūrat al-Baqarah [2]: 189. In this verse, the term *ahillah*, a plural form of *hilāl*, suggests that the phenomenon occurs more than once. According to al-Zuḥaylī, the Moon appears in varying sizes, beginning as a crescent, expanding to full size, and then waning until it disappears. The term *hilāl* is used because it emerges after being obscured. Hence, the *hilāl* is observed on the first, second, and third nights, after which it is termed *qomar*.²¹ Hasan distinguishes between *qomar* and *hilāl*, both of which denote the Moon. “*Qomar*” refers to the full Moon, an interpretation derived from Sūrat al-Insyiqāq [84]: 18, which associates *qomar* with the full Moon. The Quran always refers to *qomar* in the singular, suggesting the full Moon’s singularity within a month.²²

According to al-Qurthūbī, the verse was revealed in response to a query by Jewish individuals posed to Mu‘ādh bin Jabal about *hilāl*. Mu‘ādh relayed this to Prophet Muhammad, leading to the verse’s revelation. Thus, the verse primarily

¹⁹ Ahmad Warson Munawir, *Al-Munawir Kamus Arab-Indonesia* (Surabaya: Pustaka Progressif, 1997), 1514.

²⁰ Ibn Manẓūr, *Lisān al-‘Arabī*, (Beirut: Dār Shadir), 701.

²¹ Wahbah al-Zuḥaylī, *Tafsīr al-Munīr*, Juz 2 (Beirut: Dār al-Fikr al-Mu‘āshir, 1411 H), 169.

²² Muhammad Hasan, ‘Benda Astronomi dalam Al-Quran dan Perspektif Sains,’ *Jurnal THEOLOGIA* 26, no. 1 (2015): 111–13.

addresses the wisdom of the Moon's phases, not its orbit.²³ The verse illustrates the transformation of the new crescent from its subtlest to its most prominent state. As Ibn Kasīr states, these transformations serve to calculate specific periods such as the *'iddah* (waiting period) for women, pilgrimage times, and the commencement and conclusion of the Ramadan fast.²⁴ Ibn Taimiyyah believes that the *hilāl's* validity relies on its visibility and being reported by one or two individuals. If someone observes the *hilāl* but does not report it, then it is not recognized as *hilāl*. The indicators for *hilāl*, according to Ibn Taimiyyah, are its appearance (*al-zhahūr*) and the raising of voices in announcements (*rafā'a al-shaut*). It means that even if the *hilāl* is in the sky but not visible from Earth, it is not recognized as such. The same holds if it is seen from Earth but not reported.²⁵

In Indonesia, scholars define *hilāl* astronomically, referencing crescent sightings. This definition originates from extensive debates and studies on the concept of *hilāl* in *fiqh*,²⁶ including the criteria of MABIMS and Neo MABIMS. Raharto, for instance, has categorized the concept of *hilāl* into four types, grounded on the definition of *hilāl* and witness accounts from Indonesia. Islamic jurisprudence scholars agree upon the understanding of *hilāl* Raharto uses. Furthermore, crescent criteria have been developed based on the definition of the new Moon and empirical data. In 2009, Djamaluddin proposed that for the *hilāl* to be valid, the angular distance between the Moon and the Sun should be $>6.4^\circ$, and the distance between the Moon and the Sun $>4^\circ$. Djamaluddin later revised these criteria in 2013. Based on long-term *rukyaḥ al-hilāl* data, Djamaluddin argues that specific criteria bind the *hilāl's* existence.

Meanwhile, scientists in Indonesia have astronomically defined the *hilāl* by referring to lunar sighting data. These definitions arise from their extensive studies and debates on the jurisprudential meaning of *hilāl*, including the evolution of

²³ Abū' Al-Qurthūbī and Allāh Abd, *Al-Jāmi' li Ahkām al-Qur'ān* (Cairo: Dār al-Kitāb al-'Arab, 1967), 101.

²⁴ Abū al-Faḍā' Ismā'īl bin 'Umar bin Kasīr al-Qurayshī al-Dimashqī ibn Kasīr, *Tafsīr al-Qur'ān al-'Aẓīm*, Tahqīq by Samī bin Muḥammad Salāmah, 3rd ed. (Beirut: Dār Ṭayyibah li al-Nasrī wa al-Tawzī'), 29.

²⁵ 'Abd Raḥmān ibn Muḥammad ibn Qāsim al-Aṣṭurnī al-Aṣīmī al-Najdī, *Majmū' Fatāwā Shaykh al-Islām Aḥmad ibn Taymiyyah* (Beirut: Dār al-Kutub al-'Ilmiyyah), 109–10.

²⁶ Muhammad Hasan, "Imkān ar-Ru'yah di Indonesia (Memadukan Perspektif Fiqih dan Astronomi)" (Doctoral, Semarang, IAIN Walisongo, 2012), 197–199.

MABIMS and Neo MABIMS criteria. Raharto, for instance, formulated four distinct concepts of *hilāl*. First, any crescent moon visible after conjunction or at the closest Sunset following the conjunction remains above the horizon, implying that the fraction of the new Moon is $F > 0^\circ$ and its altitude $h_{\text{moon}} > 0^\circ$ at $t = \text{time of Sunset}$. Second, the crescent Moon that can be first observed with the naked eye post-conjunction must satisfy $F > F_{\text{critical}}$ (where $F_{\text{critical}} > 0.7\% - 1\%$) and $h_{\text{moon}} > h_{\text{critical}}$ when $h_{\text{critical}} > 0^\circ$ at $t = t_0 + \Delta t$, where $t = \text{time of sighting}$, $t_0 = \text{time of Sunset}$, and $\Delta t = \text{time interval between sighting and Sunset}$. Third, the crescent Moon aligns with agreed-upon criteria, such as an altitude of 2° at Sunset. Fourth, there are instances of crescent moon hallucinations, where the Moon is reportedly sighted despite poor viewing conditions or even before the actual conjunction occurs. The fourth category pertains to crescent hallucinations. There are instances where the new Moon was reportedly sighted even when observation conditions were overcast, the Moon had set before the Sun, or the conjunction had not yet taken place.²⁷ Raharto's formulation relies on the definition of *hilāl* and testimonial data from Indonesia. His understanding of *hilāl* resonates with the consensus of Islamic jurisprudence scholars.

Furthermore, crescent criteria have been developed based on the definition of the *hilāl* and empirical data. In 2009, Djamaluddin posited that the *hilāl* must meet two criteria: angular distance between the *hilāl* and the Sun $> 6.4^\circ$ and the distance between the *hilāl* and Sun $> 4^\circ$.²⁸ Djamaluddin refined these criteria in 2013: angular distance between the Moon and Sun $> 6.4^\circ$ and distance between the Moon and Sun $> 3^\circ$.²⁹ Based on long-term *rukayah al-hilāl* data, Djamaluddin contends that the presence of the *hilāl* is bounded by *ḥisāb* (lunar calculations) criteria, including a minimal altitude of several degrees when the separation from the Sun is also by

²⁷ Moedji Raharto, "Islamic Calendar: A Need and Hope", *In the National Seminar: Finding Solutions for the Visibility of the New Moon and the Unification of the Islamic Calendar in the Perspective of Science and Shari'ah* (Bandung: Bosscha Observatory, 2009), 5.

²⁸ Thomas Djamaluddin, Muhammad Husni, and Sunarjo, *Hisab Rukyah di Indonesia serta Permasalahannya*, 30.

²⁹ Thomas Djamaluddin, "Redefinisi Hilal Menuju Titik Temu Kalender Hijriah," June 22, 2010, <https://tdjamaluddin.wordpress.com/2010/06/22/redefinisi-hilal-menuju-titik-temu-kalender-hijriyah/>.

several degrees, a time difference between the Moon and the Sun setting of several degrees and minutes, and a percentage of illumination.

These findings reveal that science is employed to translate the regulations of *hilāl* in *fiqh* into astronomical language. The process entails analyzing the results of *rukayah al-hilāl*, deemed Sharia-compliant by the government, and the observed new moon conditions within astronomers' calculations.³⁰ Science relies on *fiqh* concepts in determining *hilāl* criteria. These criteria serve as the method for determining the month's beginning and verifying *rukayah al-hilāl* in the field. Hence, the month's commencement in Indonesia is rooted in *fiqh*, articulated in scientific language. It aligns with Royyani's research, suggesting that the study of celestial science, coupled with an astronomical approach, can strengthen understanding *fiqh* texts through scientific principles.³¹ Regrettably, Royyani's findings remain largely theoretical, not adequately reflecting the specific practices of determining the month's start. This research underscores the significance of intertwining *fiqh* and astronomy in translating *hilāl*, both theoretically and practically.

C. New *Hilāl* and the Dynamics of Determining the Start of the Hijri Month: Between *Fiqh* and Science

The dynamics of determining the start of the Hijri month in Indonesia began with the emergence of criteria for the new *hilāl*. Islamic scholars differ on the visible limit of the crescent based on its altitude, duration above the horizon (*mukus*), and weather conditions during observation. Firstly, an opinion states that the crescent's altitude should be at least $2/3$ *manzilah* (with 1 *manzilah* equaling 13°), translating to $8^\circ 40$ minutes. The second view requires an altitude of 7° . The third opinion, by al-Baṭāwī, stipulates a minimum altitude of 6° .³² These opinions do not provide a clear criterion for the crescent's eligibility for observation, as it is limited only to altitude. It is because the appearance of the crescent is not solely dependent on the Sun's

³⁰ Rupi'i, "Upaya Penyatuan Kalender Islam di Indonesia (Studi Atas Pemikiran Thomas Djamaluddin)" (Semarang: IAIN Walisongo, 2012), 88–90.

³¹ Muh Arif Royyani et al., "Religious Dialogue and Astronomy from the Perspective of Indonesian Muslim Scholars," 261–80.

³² Muḥammad Manṣūr al-Baṭāwī, *Sullām al-Nayyirain* (Al-Manshūriyyah), 9.

position at Sunset but also on how far the Sun is from the Moon and the crescent's altitude above the horizon. These factors greatly influence the crescent's visibility.³³

Al-Jailānī offers more detailed *hilāl* criteria. He discusses the differing views among Islamic jurists.³⁴ He believes the *hilāl* is visible if it meets three criteria: it is light (*nūr al-hilāl* or crescent width), reaches 1/5 of a finger's breadth (*jari*),³⁵ its arc (*qaus al-mukš*) is 3°, and its altitude (*irtifā'*) is 3°. The new Moon is hard to spot if any of these is below 3°. It is unseen if either of the first two criteria is below 2°. Al-Jailānī cites instances when these criteria were employed in Indonesia during crescent observations, notably in the determination of the beginning of the months of Syawal in 1958 at Batangkarang and Zulhijah in 1958 and 1970 at Majalengka and Tangkuban Prahū.³⁶

Apart from individual scholars, Indonesia's two primary Islamic organizations also differ in their criteria for the new crescent. The NU employs the *rukayah al-hilāl* method and requires an altitude of 2°, an *hilāl* criteria updated to 3° in 2021. Muhammadiyah utilizes the 'presence of the crescent' (*wujūd al-hilāl*) method, establishing three criteria related to the Moon's conjunction (*ijtimā'*) with the Sun: the conjunction has occurred, the conjunction takes place before Sunset, and the Moon sets after the Sun. Meanwhile, the Ministry of Religious Affairs uses criteria of 2° altitude, 3° elongation, and the crescent's age being 8 hours.³⁷ In 2021, the government revised these criteria to an altitude of 3° and elongation of 6.4°.³⁸ Differences in crescent criteria have implications for the necessity of crescent

³³ Muhamad Syazwan Faid et al., "Islamic Historical Review on Middle Age Lunar Crescent Visibility Criterion," *Journal of Al-Tamaddun* 17, no. 1 (June 30, 2022): 109–25.

³⁴ Zūbayr 'Umar al-Jailānī, *Al-Khuḷāṣah al-Wāfiyah* (Suci: Menara Suci), 132.

³⁵ The term "*jari*" is a translation of the Arabic word "*usbū'*," a unit of measurement used by ancient timekeepers. According to al-Jaelani, the *hilāl* can be visible when the width of the crescent is > 1.66%.

³⁶ Al-Jailānī, 132.

³⁷ Ichtijanto, *Almanak Ilmu Falak* (Jakarta: Badan Hisab Rukyat Depag RI, 1981), 43.

³⁸ "Letter from the Director General of the Religious Judiciary Agency No. 2084/DJA/HM.00/3/2022 on the Confirmation of Witnessing the New Crescent Moon for the Beginning of Ramadan," March 28, 2022, <https://badilag.mahkamahagung.go.id/pengumuman-elektronik/pengumuman-elektronik/itsbat-kesaksian-rukayat-hilal-awal-ramadan-syawal-dan-zulhijah-1443-h-31-3>.

testimony. For NU, witnessing the crescent is essential, while for Muhammadiyah, it is unnecessary.³⁹

Historically, the determination of the beginning of the Hijri month in Indonesia has been dynamic. This dynamism can be observed from the methodology and its practical application. Since 1960, Persatuan Islam (Persis) has employed various methodologies with periodic modifications. From 1960-1995, Persis applied the *ḥisāb ijtimā' qabla al-ghurūb* method. Between 1996 and 2001, they shifted to the *ḥisāb wujūd al-hilāl* method. From 2002-2012, Persis utilized the *imkān al-rukyah* method aligned with MABIMS guidelines: an altitude of 2°, elongation of 3°, and lunar age of 8 hours. Since 2013, Persis has adopted the *imkān al-rukyah* method, which involves an altitude of 3° and an elongation of 6.4°.⁴⁰

Contrastingly, NU and Muhammadiyah have their distinct methodologies for lunar determination. Initially, Muhammadiyah used the *ḥisāb hakiki imkān al-rukyah* method. In 1937, it switched to *ijtimā' qabla al-ghurūb* without considering the Moon's position above the horizon at Sunset. In 1938, it adopted the *wujūd al-hilāl* criteria.⁴¹ On the other hand, NU used a moon altitude of 2° to establish the onset of the Hijri month. It was updated in 2021 to a moon altitude of 3°, reflecting the organization's evolving stance in line with recent scientific findings.⁴²

Moreover, the criteria employed by the Ministry of Religious Affairs have also evolved. Initially, the government utilized the MABIMS criteria—agreed upon by Brunei, Indonesia, Malaysia, and Singapore—comprising a moon altitude of 2°, an elongation of 3°, and a moon age of 8 hours. In 2021, these criteria were revised to a moon altitude of 3° and an elongation of 6.4°, known as the new MABIMS criteria.⁴³

³⁹ Majelis Tarjih dan Tajdid PP Muhammadiyah, *Pedoman Hisab Muhammadiyah* (Yogyakarta: Majelis Tarjih dan Tajdid PP Muhammadiyah), 78.

⁴⁰ Ai Siti Wasilah, "Dinamika Kriteria Penetapan Awal Bulan Kamariah (Studi terhadap Organisasi Kemasyarakatan Persatuan Islam), Jakarta, UIN Syariaf Hidayatullah, 2015), 74-78.

⁴¹ Suziknan Azhari, "Sejarah dan Dinamika Pemikiran Hisab Muhammadiyah," Museum Astronomi, February 19, 2012, <http://museumastronomi.com/sejarah-dan-dinamika-pemikiran-hisab-muhammadiyah/www.museumastronomi.com>.

⁴² NU Online, "Mengenal Rukyatul Hilal Metode NU dalam Penentuan Awal Bulan Hijriyah," accessed May 1, 2023, <https://jabar.nu.or.id/ubudiyah/mengenal-rukkyatul-hilal-metode-nu-dalam-penentuan-awal-bulan-hijriyah-PIBad>.

⁴³ See: Windi Rezani Anas, Fatmawati, and Sippah Chotban, "Implementasi Kriteria Visibilitas Neo-MABIMS dalam Penentuan Awal Bulan Hijriyah," *HISABUNA: Jurnal Ilmu Falak* 4, no. 2 (July 3, 2023): 76-86; Muthiah Hijriyati and Ahmad Fakhrudin Fajrul Islam, "Implikasi Kriteria Neo-

Despite the government's adoption of these new criteria, the onset of significant Islamic months like Ramadan, Shawwal, and Dhul-Hijjah is still officially determined through the *hilāl* sighting meeting (*sidang isbat*) conducted by the Ministry of Religious Affairs.

The differences in criteria for determining the beginning of the Hijri month have implications for implementing religious practices, particularly between the NU and Muhammadiyah organizations. In 2022, NU established the beginning of Ramadan on April 3, 2022, due to the *hilāl* being unobservable with an altitude of less than 3°. On the other hand, Muhammadiyah declared the onset of Ramadan as April 2, 2022, based on their observation that the *hilāl* was present with an altitude ranging between +1° and less than 2°. The government, adhering to its updated MABIMS criteria of 3° altitude and 6.4° elongation, also designated April 3, 2022, as the beginning of Ramadan. Discrepancies in religious practices are also evident in determining the start of Syawal. In 2023, NU set 1 Syawal 1444 H to fall on April 22, 2023, as the *hilāl* was not visible on 29 Ramadan 1444 H, and its altitude was below 3°. Using the *wujūd al-hilāl* criteria, Muhammadiyah determined 1 Syawal 1444 H to be on April 21, 2023. Meanwhile, the government, following the *sidang isbat*, established 1 Syawal 1444 H on April 22, 2023, because the *hilāl* failed to meet the new MABIMS criteria (3° altitude and 6.4° elongation) on 29 Ramadan 1444 H.⁴⁴ These differences have tangible consequences for the commencement of fasting and the Eid al-Fitr prayers. Muhammadiyah community members observe these practices a day earlier than the date set by the government.

The dynamics of determining the start of Ramadhan and Syawal seem to be influenced by the interplay between Islamic jurisprudence and science. While Islamic scholars and scientists agree on the definition of the *hilāl*, they differ in its determination criteria. It highlights the dynamic relationship between jurisprudence and science in determining the Islamic lunar calendar in Indonesia. Jurisprudence offers interpretation and juridical reasoning, while science provides the

Mabims pada Penentuan 1 Dzulhijjah 1443 H (Studi Kritis Konsep Matla' dalam Hadis)," *Azimuth: Journal of Islamic Astronomy* 4, no. 1 (January 14, 2023): 1–29.

⁴⁴ Yulia Rahmadani Hidayah and Rahma Amir, "Pandangan MUI terkait Perbedaan Penetapan 1 Syawal 1444 H di Indonesia," *ELFALAKY: Jurnal Ilmu Falak* 7, no. 1 (June 15, 2023): 89–104.

methodology to understand and calculate the Moon's movements. When either evolves, the other adjusts.

This research reinforces the intertwined nature of religion and science in lunar calculation and observation. The dynamics in jurisprudence and science affect the determination of the Islamic lunar month's beginning. This finding differs from previous research focusing solely on integrating lunar calculations and observations using the Kastner model,⁴⁵ religious moderation in implementing *ḥisāb* and observations,⁴⁶ and religious moderation in general.⁴⁷ However, it does corroborate some prior research results.

D. *Fiqh* as the Legitimation of Science: Testimony in *Rukyah al-Hilāl*

Testimonies concerning the sighting of the new *hilāl* based on oaths have been practiced since the time of the Prophet Muhammad. Textually referring to the hadith from Abū Hurayrah regarding fasting and celebrating Eid upon sighting the Moon, lunar observations are necessary to determine the beginning of the Islamic lunar months.⁴⁸ Al-Aṣḡalānī states that this hadith does not obligate every Muslim to see the Moon but is sufficient when observed by a just individual.⁴⁹ Islamic scholars widely support this view, consistent with another hadith in which a Bedouin informed the Prophet of his Moon sighting.⁵⁰ Subsequently, the Prophet instructed Bilāl to announce to the Muslim community that they should commence fasting for Ramadan the following day.⁵¹ However, according to Ibn Rushd, the community was not immediately allowed to commence their fast before another testimony corroborated the Athā's claim.⁵²

⁴⁵ Judhistira Aria Utama and Othman bin Zainon, "Integrasi Hisab Rukyat Awal Ramadan 1442 H dengan Model Visibilitas Kastner," *Elfalaky: Jurnal Ilmu Falak* 6, no. 2 (2022): 278–97.

⁴⁶ Rusdin Muhalling and Muhammad Hasbi, "Religious Moderation in Indonesia," 750–69.

⁴⁷ Abdullah A. Afifi and Afifi Fauzi Abbas, "Moderate Way Implementing Rukyah and Hisab to Determine a New Moon in Ramadan," *AL-IMAM: Journal on Islamic Studies, Civilization and Learning Societies* 3 (December 22, 2022): 11–18.

⁴⁸ Abū al-Ḥusayn Muslim bin al-Ḥajjāj bin Muslim al-Qushayrī al-Naysābūrī, *Al-Jāmi' al-Shāḥīḥ al-Musammā Shahīḥ Muslim*, Juz 2 (Beirut: Dār al-Jīl), 762.

⁴⁹ Ibn Ḥajar al-Aṣḡalānī, *Fath al-Bārī Sharḥ Ṣaḥīḥ al-Bukhārī*, Juz 3 (Beirut: Dār al-Kutub, 1989), 89.

⁵⁰ Abū Dāwūd al-Sijistānī, *Sunan Abī Dāwūd* (Beirut: Dār al-Fikr, 1994), 101.

⁵¹ Muḥammad bin Ismā'īl al-Kahlānī al-Shan'ānī, *Subūl al-Salām*, Juz 2 (Bandung: Dahlan), 152.

⁵² Abū al-Walīd Muḥammad bin Aḥmad bin Muḥammad bin Aḥmad Ibn Rushd, *Bidāyah al-Mujtahid wa al-Nihāyah al-Muqtashid* (Beirut: Dār al-Kutub al-'Ilmiyyah, 1996), 208.

Islamic jurists concur that the testimony of *rukyah al-hilāl* should come from a Muslim. However, opinions differ regarding the number of witnesses required. Imam Hanafi believes that the start of Shawwal should be confirmed by two male witnesses or one male and two female witnesses.⁵³ In contrast, Imām Mālik posits that the *rukyah al-hilāl* should be witnessed by at least two individuals or a consensus that they would not collectively lie.⁵⁴ Differing from these views, Imām al-Shāfi‘ī and Imām Aḥmad ibn Ḥanbal opine that one witness suffices to start fasting, but ending it requires two witnesses.⁵⁵ Ibn Rushd suggests that Imām al-Shāfi‘ī requires two witnesses to end the Ramadan fast due to the greater risk involved in ending it compared to starting it.⁵⁶

Moreover, particularly controversial sightings of *rukyah al-hilāl* should be solidified with an oath.⁵⁷ In Islamic jurisprudence, taking an oath from someone who successfully witnesses the crescent is valid. Moreover, those who see the Moon are generally esteemed individuals known for their faith and honesty. If discrepancies arise between the testimony of *rukyah al-hilāl* and the calculations of astronomy experts, al-Subkī maintains that the testimony should be discarded, as calculations are deemed definitive, while the sighting by one or two individuals is presumptive (*ẓanni*).⁵⁸ Another perspective asserts that if astronomers unanimously agree that their premises are definitive and are relayed by a significant number, the Moon sighting testimony should be dismissed. Otherwise, it should be accepted.⁵⁹

Ahmad argues that for a *rukyah al-hilāl* to be a foundation for determining the month’s beginning, it must be conclusive.⁶⁰ Legally and scientifically accountable

⁵³ ‘Abdurrahmān al-Jazīrī, *Kitāb al-Fiqh ‘alā al-Madhāhib al-Arba‘ah*, Juz 4 (Beirut, Lebanon: Dār al-Kutub al-‘Ilmiyyah, 1990), 502.

⁵⁴ Ibn Ḥajar al-Ashbahī, *Al-Mudawwanah al-Kubrā*, Tahqīq by Ibn Rusdy Abī al-Walīd Muḥammad bin Aḥmad (Lebanon: Dār al-Kutub al-‘Ilmiyyah), 266–67.

⁵⁵ Muḥammad bin Idrīs al-Shāfi‘ī, *Al-Umm*, Tahqīq by Rif‘at Fauzi ‘Abd al-Muthalib, Juz 3 (Beirut, Lebanon: Dār al-Wafā’ li al-Ṭabā‘ah wa al-Nashr wa al-Tawzī‘), 232.

⁵⁶ Ibn Rushd, *Bidāyah al-Mujtahid wa al-Nihāyah al-Muqtashid*, 643.

⁵⁷ ‘Abdurrahmān al-Jazīrī, *Kitāb al-Fiqh ‘alā al-Madhāhib al-Arba‘ah*, Juz 1 (Beirut, Lebanon: Dār al-Kutub al-‘Ilmiyyah, 1990), 502.

⁵⁸ Al-Subkī, *Fatawā al-Subkī fī Furū‘i al-Fiqh al-Syāfi‘ī*, vol. 1 (Beirut: Dār al-Kutub al-‘Ilmiyyah, 2004), 226.

⁵⁹ Abū Bakar al-Dimyathi, *I‘ānat al-Ṭālibīn*, Juz 2 (Egypt: Mustafa al-Bābī al-Ḥalabī, 1342 H), 216.

⁶⁰ Noor Ahmad, ‘Developing Accurate *Rukyah* Methods, Papers of the 1427 H/2006 M Imsakiyah Workshop in Central Java and the Special Region of Yogyakarta’ (Semarang, PPM IAIN Walisongo, 2006), 4-7.

sightings, termed as *rukayah muktabar*, should meet five criteria: the sighting should occur during Sunset on the night of the 30th or the end of the 29th day; it should be on a clear day without obstructions; the new Moon should be above the horizon; the new moon sighting should be feasible, and the crescent should be visible between -30° to 30° in the western point. The author believes these conditions are theoretically ideal, as surveying the crescent outside these conditions is implausible.

Indonesia's Ministry of Religious Affairs uses these jurisprudential rules to determine the start of Ramadan and Shawwal. In practice, a local religious court judge must supervise any *rukayah al-hilāl* activity, whether for Ramadan or Shawwal. If someone testifies to seeing the crescent, they should elucidate its position and shape to the judge. Such a testimony must be sworn in front of the judge. A sworn testimony is deemed valid if approved by the Ministry of Religious Affairs to support the *sidang isbat* committee's data. Conversely, testimonies regarding the *hilāl* are invalid unless a religious judge swears in the witness.⁶¹

In Indonesia, crescent moon sightings can be empirically and scientifically verified, strengthened by an oath. In 2016, the crescent of Shawwal month was visible at locations including Bukit Condrodipo (Gresik), Tanjung Kodok (Lamongan), Bojonegoro, and Kepulauan Seribu. At Bukit Condrodipo, five observers successfully photographed the crescent. A local religious court judge swore in their testimonies. In 2011, the crescent met the minimum astronomical criteria, with altitudes between $4^{\circ} 25'$ and $6^{\circ} 34'$. This crescent was observed at Bukit Condrodipo by Ahmad Azhari and H. Irwanuddin.⁶² These data emphasize that while empirical observations are crucial, they must be fortified with a sworn testimony in Islamic jurisprudence. Thus, *fiqh* plays a pivotal role in legitimizing scientifically-conducted *rukayah al-hilāl*. Prior research predominantly emphasized the astronomical approach and scientific observations of the crescent. For instance, studies by Odeh,⁶³

⁶¹ Umniyah Wahidah Asriyah, "Urgensi Keterangan Saksi Perukyat dalam Sidang Pelaksanaan Rukyat Hilal di Indonesia" (Thesis, Jakarta, UIN Syariaf Hidayatullah, 2022), 27-43.

⁶² "Minister of Religious Affairs of the Republic of Indonesia Decree Number 192 of 2011 Regarding the Determination of the Date of 1 Dhu Al-Hijjah 1432 H."

⁶³ Mohammad Sh. Odeh, "New Criterion for Lunar Crescent Visibility," 39-64.

Ilyas,⁶⁴ and Djamaluddin et al.⁶⁵ lack religious validity and overlook the *fiqh* aspect in concluding. Similarly, Wahidi's findings spotlight inconsistencies in applying the MABIMS criteria.⁶⁶ This research underscores the indispensability of *fiqh* in making decisions about the new crescent.

E. Conclusion

The determination of the beginning of the Hijri month in Indonesia represents a complex collaboration between *fiqh* and empirical science. This relationship entails three critical aspects: Firstly, science aids in translating *fiqh* concepts into empirical criteria for ascertaining the commencement of the Hijri month, indicating a mutual dependency between religious interpretation and empirical knowledge in decision-making. Secondly, the dynamics of determining the start of the lunar month in Indonesia reflect the intricate interplay between *fiqh* and science, characterized by varied perspectives among Islamic scholars and scientists on the criteria for observing the *hilāl*, even though the foundational understanding of *hilāl* remains consistent. Lastly, *fiqh* serves to legitimize scientific endeavors in this context through the testimony of *ruk'yah al-hilāl*, wherein Islamic scholars establish the criteria for testimony and employ oaths to validate empirical evidence that substantiates the appearance of *hilāl*.

This study illuminates the complexities surrounding the relationship between *fiqh* and empirical science in determining the onset of the lunar month. Though the data focus is limited to the period between 2010 and 2023, this analysis provides invaluable insights into the role of the BHR in developing methods and criteria. Future research could broaden the scope of the data to acquire a more comprehensive understanding. Consequently, this study contributes to a deeper appreciation of the integration of *fiqh* and scientific knowledge in defining the concept of *hilāl*. This integration warrants continuous development by

⁶⁴ Mohammad Ilyas, *New Moon's Visibility and International Islamic Calendar for the Asia-Pacific Region*, 1994), 50–51.

⁶⁵ Thomas Djamaluddin, Muhammad Husni, and Sunarjo, *Hisab Rukyah di Indonesia serta Permasalahannya*, 25.

⁶⁶ Ahmad Wahidi et al., "Implementation of the Mabims Criteria in Determining the Beginning of Islamic Month in Indonesia and Brunei Darussalam," 96–108.

amalgamating data on the interconnection of *fiqh* with advancements in empirical science in Indonesia.

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