

## Towards Understanding Moon Sighting Techniques for a United Spiritual Activity in Islam

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### **Abstract**

This article investigates the diverse moon sighting techniques in Islam with the aim of fostering unified spiritual observance, particularly in Nigeria. The study begins by exploring the theological and historical significance of moon sighting in Islam, rooted in prophetic traditions that mandate visual observation for marking key lunar months like Ramadan and Dhul-Hijjah. Despite these traditions, the advent of scientific and astronomical methods has created a dichotomy between traditionalist and modernist approaches, with each advocating different methods for moon determination. The main problem examined is the recurring disunity and confusion in Muslim communities, especially in Nigeria, where conflicting moon sighting announcements disrupt collective religious observance. The objectives include evaluating the jurisprudential foundations, technological advancements, and regional practices related to moon sighting, and recommending a harmonized approach. Methodologically, the study utilizes historical analysis, fiqh interpretations, and case studies, particularly Nigeria's institutional framework under the Nigerian Supreme Council for Islamic Affairs (NSCIA), to assess both traditional and modern moon sighting systems. The research draws on both classical Islamic texts and contemporary astronomical literature. Findings reveal persistent challenges: unreliable testimonies, environmental barriers, lack of observer training, and institutional fragmentation. Despite technological advances like telescopes, satellite imaging, and AI tools that enhance accuracy, theological resistance and lack of coordination continue to hinder unity. The study concludes that while tradition should be respected, it must be integrated with modern scientific insights to maintain both authenticity and consistency. It recommends a hybrid framework that combines verified astronomical data with visual sighting where feasible. Key recommendations include establishing regional coordination bodies, promoting public education, adopting scientifically validated visibility criteria, and preserving communal moon sighting as a spiritual tradition. By balancing tradition with technological reliability, this paper advocates for a practical path toward national and global unity in Islamic calendar observance.

**Key words:** Moon, Crescent, Lunar, Sighting, Astronomy

## 1. Introduction

In Islam, moon and sun play significant roles in spiritual activities that are required of the Muslims in fulfilment of their religious obligations. Sun is largely used for daily religious activities, hence the timing of daily compulsory Salawat depends largely on its movement and rotation. The moon on the hand is meant for monthly activities. Its sighting plays an important role in the observance of religious worships, as it is used in determining the commencement and the end of key lunar months like Ramadan, Shawwal and Dhul-Hijjah among others. The Islamic lunar months as established in *Suratul Tawbah* verse 36 are twelve, and the sighting of the crescent moon (*hilāl*) marks the beginning of each month (Hassan-Bello 2020). This practice of timekeeping is deeply rooted in Islamic tradition as it has been well established since the lifetime of the Prophet. In the popular hadith of Imam Bukhārī, it is reported that the Prophet instructed thus:

Fast when you see it [the crescent] and break your fast when you see it; if it is cloudy, then complete thirty days of Sha’ban” (Sahih al-Bukhari, Hadith 1909).

This directive explicitly emphasizes the need for physical observation and search for the crescent moon first (Ibn Al-Jawzi, *Zadul-Masir*, 143) rather than mere reliance on calculations. There are couple of other reports from Al-Bukhari which stress the importance of sighting the moon before commencement or termination of Ramadan fast. Most of them are in the same context as the one quoted, except that hadith No.1906 hinted the determination of the new month base by assumption, where the sky is cloudy and the calculation is stalled. This shall be explained later in this article.

Furthermore, the significance of moon sighting transcends mere calendar accuracy. It holds theological, jurisprudential, and communal outlook, shaping the rhythm of Islamic worship and festivity. However, in recent times, this practice has taken a different shift within the global Muslim. The bone of contention is whether to rely solely on traditional method of sightings or to incorporate modern astronomical calculations. Proponents of the latter argue that Islam is not against science or scientific advancements. As such, modern astronomical calculations could be instrumental for precise predictions, thereby reducing potential errors and avoiding confusion. Conversely, many scholars and institutions continue to uphold the traditional method, thereby prioritising and preserving the practice and tradition of the Prophet. (El-Banna, Omar nd)

In the heat of this discourse, Nigeria is not an exemption. The country’s apex Islamic body that oversees religious affairs, known as The Nigerian Supreme Council for Islamic Affairs (NSCIA), under the leadership of the Sultan of Sokoto, is the only officially recognized body responsible for coordinating moon sighting activities across the country (NSCIA, nd). The Council functions through organized committees set up in different states, responsible for observing and confirming the sighting of the crescent moon. Once the sighting is confirmed, the NSCIA officially announces the start or end of key Islamic months. (NSCIA n.d) However, despite this

structured approach, disagreements still occur. Some local scholars and groups make their own announcements, ignoring the NSCIA's decisions. This lack of coordination causes confusion and disunity, with different areas beginning Ramadan or celebrating Eid on different days. (Usman H Dukku, n.d)

Moreover, several factors have been advanced to have contributed to the complication in moon sighting in Nigeria which includes environmental and geographical factors, Unfavorable weather conditions such as harmattan dust and cloud that frequently obstruct visibility, rendering physical observation unreliable (NSCIA, 2022). Issue of credibility of individuals who claim to have sighted the moon without proper verification, including the verification process which is alleged to be faulty and defective. Also, other claim that NSCIA often rely on the declaration of the Saudi Arabia in determining the announcement of moon sighting (Usman H Dukku, n.d ) which to them is not appropriate especially when it is authentically reported that the direct each community to rely on its sighting as reported by Imam Muslim (No.1086).

In light of all these challenges, this study aims to explore the historical foundations, scientific development, and jurisprudential perspectives regarding moon sighting. It also examines critically the advantages and limitations of both traditional and modern approaches, and suggest a balanced framework that integrates technological precision with the spirit of Islamic tradition. This paper makes Nigeria as the case study to contribute to the ongoing discussions on fostering national and global unity in the observance of Islamic worship.

## **2. Historical Foundations of Moon Sighting**

The practice of moon sighting is deeply rooted in Islamic tradition and has been a subject of scholarly discussion for centuries. The Qur'an explicitly references celestial observation as a means of determining time: "It is He who made the sun a shining light and the moon a derived light and determined for it phases, that you may know the number of years and account of time" (Quran 10:5). This verse highlights the divine instruction for using the moon in timekeeping, which forms the basis for the Islamic lunar calendar.

The Prophet Muhammad provided clear guidelines on how to determine the beginning and end of Islamic months. One of the most cited hadiths on the subject states: "Do not fast until you see the new moon, and do not break your fast until you see it; but if the sky is cloudy for you, then complete the number (thirty days)" (Sahih Muslim, Hadith No. 1080). This hadith establishes and places premium on the principle that direct visual confirmation of the crescent moon over calculation before marking Islamic calendar.

Historically, early Muslim communities relied on naked-eye sightings to determine the lunar months. In the absence of sophisticated astronomical tools, they depended on experienced observers positioned at high altitudes or clear open spaces to sight the new moon. This method was widely practiced across various Islamic regions, including Arabia, Persia, North Africa, and the Indian subcontinent (Saliba, 2018).

During the Islamic Golden Age (8th–14th centuries), Muslim astronomers made significant contributions to the study of lunar phases. Scholars such as Al-Battani and Al-Zarqali developed

astronomical tables and models that improved the accuracy of lunar predictions. The renowned polymath Al-Biruni (973–1048 CE) wrote extensively on the movement of celestial bodies, proposing mathematical calculations to determine the new moon's birth with greater precision (Morrison, et al., 2013). Despite these advancements, Islamic jurists continued to emphasize the necessity of physical sighting, arguing that the prophetic instructions should be adhered to. Therefore, preference should not be given to calculations over naked sighting.

In the Ottoman Empire, moon sighting was institutionalized with official observatories and appointed moon sighters (*ruyat al-hilal* committees) responsible for declaring the start of Islamic months. These observations were often supplemented by astronomical data but remained subject to visual confirmation (Saliba, 2007).

In Nigeria, moon sighting has historically followed similar patterns, with local scholars and community leaders taking responsibility for sighting announcements. However, the lack of a centralized authority led to inconsistent practices. The establishment of the NSCIA sought to unify moon sighting efforts, but regional and sectarian influences continue to present challenges (Ibrahim S, 2022). As debates over moon sighting persist, the historical development of this practice reveals the enduring tension between tradition and scientific advancement.

### **3. Scientific and Technological Approaches**

The advancement of science and technology has significantly influenced moon sighting methodologies. While traditional Islamic practices emphasize the importance of naked-eye observations, contemporary scientific tools, such as astronomical calculations and optical telescopes, have been integrated into moon sighting processes worldwide. This section explores the role of astronomy, modern observational tools, and the controversies surrounding these methods in the context of Islamic jurisprudence.

#### **The Role of Astronomy and Lunar Calculations**

Astronomy has played a crucial role in Islamic civilization since the early centuries, with Muslim scholars such as Al-Battani, Al-Biruni, and Al-Tusi making significant contributions to celestial observations (Saliba, 2007). The lunar calendar, which governs Islamic months, is based on the visibility of the crescent moon, a phenomenon that can be precisely calculated using mathematical and astronomical models (Yallop, 1997).

Modern astronomical calculations rely on precise mathematical models that account for the position of the sun, earth, and moon to determine the likelihood of crescent visibility (Schaefer, 1988). Tools such as the Yallop criterion, the Danjon limit, and lunar elongation models provide astronomers with accurate predictions on when and where the new moon will first become visible. These advancements have made it possible to forecast moon sighting dates years in advance, offering a high level of precision in determining Islamic months (Ahmed, 2006).

The adoption of scientific methods, however, has been met with mixed reactions in the Muslim world. Some scholars and Islamic organizations argue that astronomical calculations should be embraced to avoid human error and unnecessary disputes, particularly in cases where weather conditions obstruct physical sighting (Ahmed 2006). Others insist that Islamic teachings

emphasize physical moon sighting as the only valid method for determining the beginning of an Islamic month, making astronomical calculations a supplementary rather than a definitive tool (Shah, Zulfiqar Ali., 2009).

### **Optical Telescopes and Advanced Observational Tools**

Modern technology has introduced powerful observational tools that enhance the accuracy of moon sighting. High-powered telescopes, digital imaging techniques, and artificial intelligence (AI)-based lunar tracking systems are now employed to detect the crescent moon, even in conditions where the naked eye would fail (Umar *et.al.*, 2017). Countries like Saudi Arabia, Malaysia, and Turkey have established moon sighting committees that use observatories equipped with cutting-edge telescopic equipment to verify the appearance of the new moon (Odeh, 2004).

One of the major advantages of telescopic moon sighting is that it enables observers to detect the crescent moon earlier than is possible with the naked eye. In some cases, telescopes have identified the crescent when it is still too faint for unaided human observation. This raises theological questions about whether the use of artificial aids aligns with the Prophetic command to physically sight the moon before commencing Ramadan and other religious observances (Zainal, 2004).

In Nigeria, the Nigerian Supreme Council for Islamic Affairs (NSCIA) has taken steps to integrate technology into moon sighting processes. However, challenges persist, such as the reluctance of certain scholars and local communities to accept technological methods over traditional practices. The lack of uniform adoption of these tools across different Islamic groups in Nigeria contributes to disunity in the commencement of Ramadan and Eid celebrations (Hassan Bello, 2020).

### **Satellite Imaging and Artificial Intelligence in Moon Sighting**

Beyond ground-based telescopes, satellite imaging has emerged as a new frontier in lunar observation. Organizations like NASA and the International Astronomical Union (IAU) provide satellite data that can track the moon's visibility in real-time. Some Islamic countries have proposed using satellite imagery to confirm the presence of the crescent moon, eliminating reliance on human sighting, which can be affected by atmospheric conditions (Telescope).

Additionally, AI-based software is being developed to analyze images and determine the exact moment the crescent moon becomes visible. These AI-driven technologies can process vast amounts of lunar observation data to improve moon sighting accuracy. Some proponents argue that integrating AI and satellite imaging into Islamic calendar determination would resolve disputes over moon sighting by providing an objective, scientifically validated method (Gomaa, 2018).

### **Controversies Surrounding Modern Methods**

Despite the apparent advantages of technological advancements in moon sighting, controversies remain. A major issue is the interpretation of the Hadith that mandates physical sighting of the crescent moon to determine the start of Islamic months. Some scholars insist that reliance on

telescopes and calculations contradicts the prophetic tradition, while others argue that these tools merely aid the human eye in fulfilling the requirement of sighting the moon (Shaukat, 2015).

The Organization of Islamic Cooperation (OIC) has attempted to unify global moon sighting practices by recommending a hybrid approach that considers both naked-eye observations and astronomical data. However, differences in interpretation among major Islamic schools of thought have prevented the adoption of a standardized global methodology (Gomaa, 2018).

In Nigeria, the existence of multiple moon sighting committees, some of which operate independently of the NSCIA, has further complicated the situation. While the Sultan of Sokoto, as the leader of NSCIA, has the official mandate to declare the start and end of Ramadan, many local scholars make independent announcements, sometimes contradicting the official position (Adegoke, K. A., 2013). This lack of coordination undermines efforts to achieve nationwide unity in moon sighting practices.

#### 4. Fiqh Perspectives on Moon Sighting: Local vs. Global Sighting Debate

The debate between local and global moon sighting is one of the most enduring fiqh discussions among Muslim scholars, particularly concerning the beginning and end of Ramadan and the celebration of Eid. The central issue revolves around whether the sighting of the new moon (hilāl) in one region is binding on other regions or whether each locality should rely on its own sighting based on geographical visibility.

The classical majority opinion favors local moon sighting, based on the well-known ḥadīth of Kurayb. According to the report found in Ṣaḥīḥ Muslim, Kurayb narrated that he sighted the moon in Sham and informed Ibn ‘Abbās in Madinah, who remarked: “No, this is how the Messenger of Allah commanded us”—implying that each region should follow its own sighting (Muslim, Ṣaḥīḥ, 1087). In fact, Imam Muslim named the chapter as “each community has its sighting of the moon” to establish the importance of the message of this Hadith. This view has traditionally been adopted by the Shāfi‘ī and Mālikī schools, and to some extent the Ḥanbalī school, which uphold the principle of *ikhtilāf al-maṭālī* (‘difference of horizons’). They argue that the moon’s visibility differs based on geographical location, and thus, a sighting in one area does not necessitate observance in another.

On the other hand, some Ḥanafī jurists and contemporary scholars argue in favor of a global sighting (*ittiḥād al-maṭālī*). This view is based on the understanding that the sighting of the new moon is a definitive event that, once confirmed, should apply to all Muslims irrespective of their location. They often cite the generality of the Prophet’s statement: “Fast when you see it and break your fast when you see it” (Bukhārī, Ṣaḥīḥ, 1900). The absence of a specified location in the ḥadīth leads them to conclude that a confirmed sighting anywhere suffices for the entire ummah (Ibn ‘Abidīn, Radd al-Muḥtār, 2/123).

In recent decades, the global sighting position has gained support among organizations seeking unity among Muslims in different regions. However, this position faces practical challenges due to differences in moon visibility, time zones, and the reliability of sighting methods. Contemporary scholars such as Muṣṭafā al-Zarqā’ and Yūsuf al-Qaraḍāwī have advocated for a middle-ground approach, suggesting the need for a unified Islamic calendar based on astronomical data supported by Sharī‘ah principles (Zarqā’, 1997; Qaraḍāwī, 2001).

### Interpretations by Major Islamic Schools of Thought

The four major Sunni schools of Islamic jurisprudence provide nuanced positions on moon sighting, though they agree on its significance in determining the beginning of lunar months, especially Ramadan and Shawwāl.

The Ḥanafī school, while generally accommodating local sighting, permits acceptance of a sighting from other regions if the report is verified and there is no reasonable ground for rejection. Abū Ḥanīfah allowed for some flexibility, particularly in non-ibādah contexts, but his students, Abū Yūsuf and Muḥammad al-Shaybānī, leaned more toward uniformity when sighting was confirmed by reliable testimony (Ibn Nujaym, *al-Baḥr al-Rā'iq*, 2/263).

The Mālikī school holds that each region should rely on its own sighting, especially when there is a significant geographical distance. They emphasize the principle of local authority in determining the commencement of fasts and festivals. Mālik is also reported to have considered communal consensus in a given region as essential (al-Kharsūshī, *Sharḥ Mukhtaṣar Khalīl*, 2/294).

The Shāfi'ī school is more stringent in advocating for *ikhtilāf al-maṭāli'*. Al-Nawawī explicitly ruled that a sighting in one region is not binding upon another if the two locations have different horizons. This view is based on the interpretation of the hadith of Kurayb and the understanding that Islamic rulings should consider natural phenomena as they affect real-life experience (al-Nawawī, *al-Majmū'*, 6/276).

The Ḥanbalī school, while echoing the Shāfi'ī position in principle, has internal flexibility. Ibn Qudāmah states that if the horizons are close, the sighting is binding, but in distant lands, it is not (Ibn Qudāmah, *al-Mughnī*, 3/35). The Ḥanbalī school also stresses the importance of avoiding confusion and division within communities.

Contemporary jurists and councils, such as the European Council for Fatwa and Research (ECFR) and the Fiqh Council of North America (FCNA), have proposed using astronomical calculations as an aid to moon sighting, while still requiring visual confirmation in line with traditional jurisprudence.

### Role of Witness Testimonies in Shariah Guidelines

Islamic jurisprudence places a strong emphasis on the credibility and reliability of witness testimonies in confirming moon sightings. The general rule is that one upright Muslim (‘adl) is sufficient for declaring the beginning of Ramadan, while two upright witnesses are required for confirming the end of Ramadan and the beginning of *Shawwāl*. This differentiation is based on the ḥadīth: “Fast upon seeing it and break your fast upon seeing it. If it is concealed from you, then complete thirty days of Sha‘bān” (Bukhārī, *Ṣaḥīḥ*, 1909).

The scholars interpret this as emphasizing caution in ending Ramadan, which involves ceasing a religious obligation (*ṣawm*), and hence the requirement of multiple testimonies. This view is affirmed in all four Sunni *madhāhib* with slight differences in implementation.

The testimonies must meet certain conditions: the witnesses must be Muslim, adult, sane, and known for their integrity (‘*adālah*). Testimonies from those who are unreliable, mistaken, or

known for lying are rejected. The local *qāḍī* (judge) or recognized Islamic authority is responsible for evaluating testimonies and issuing a public declaration. Ibn Qudāmah notes that if the ruler accepts a sighting, it becomes binding on the community he governs (Ibn Qudāmah, *al-Mughnī*, 3/41).

In contemporary contexts, moon sighting committees have been established in many Muslim countries and communities. These committees often consist of scholars, astronomers, and trusted individuals who collectively assess moon sighting reports. Some modern scholars have called for stricter standards due to the proliferation of false sightings and misinformation. Shaykh Ibn Bāz and the Permanent Committee of Iftā' in Saudi Arabia stress the need for rigorous examination before declaring a sighting (*Lajnah al-Dā'imah*, *Fatāwā*, vol. 10).

Moreover, the integration of astronomical data with Sharī'ah principles has become an accepted practice in many places. Astronomical data can help negate false sightings by establishing the impossibility of visibility due to moonset before sunset, for instance. However, most scholars insist that astronomical data should support but not replace actual visual sighting, maintaining fidelity to the Prophetic sunnah.

## 5. Regional Practices and Organizational Efforts

Moon sighting practices vary considerably across regions, shaped by legal traditions, cultural expectations, and institutional structures. While the principles of Islamic jurisprudence remain consistent, the application of moon sighting rules demonstrates significant regional diversity.

Saudi Arabia follows a centralized, state-managed approach to moon sighting. The Supreme Court of Saudi Arabia oversees the process and issues official announcements regarding the beginning of Ramadan and the two Eids. The state encourages citizens to observe the new moon and report sightings, which are then examined by judicial authorities. Despite growing access to astronomical data, Saudi Arabia continues to prioritize naked-eye sightings, although recent years have seen greater consideration of astronomical reports in confirming or denying visibility claims (Jawaid, M, 2014). The reliance on minimal testimony and preference for early declarations have at times attracted criticism, particularly when scientific data indicated the impossibility of visibility. Nonetheless, the unity achieved through a centralized system contributes to national coherence and communal observance (Hussain, 2016).

In Nigeria, the process is decentralized and often influenced by both religious and political considerations. The Nigerian Supreme Council for Islamic Affairs (NSCIA) is the principal body responsible for announcing the start and end of Ramadan. The Council collaborates with regional emirs, and moon sighting committees, especially the office of the Sultan of Sokoto, who serves as the President-General of the NSCIA. The sighting process in Nigeria blends local testimonies with modern astronomical inputs. Despite this, the diversity of Islamic sects and regions within Nigeria often results in different Eid celebrations due to divergent moon sighting reports and disagreements over the legitimacy of witnesses (Hassan-Bello, 2020). The government, though not officially Islamic, often follows the NSCIA's announcement in declaring public holidays, underscoring the intersection of religion and governance.

In Western countries, especially in North America and parts of Europe, Muslims face unique challenges due to the absence of centralized Islamic authority and the diversity of ethnic and jurisprudential backgrounds. Organizations such as the Fiqh Council of North America (FCNA) and the European Council for Fatwa and Research (ECFR) play crucial roles in standardizing practices. The FCNA, for instance, has adopted a policy of using calculated astronomical data to determine the Islamic lunar calendar, citing the need for predictability and unity in diaspora communities (Islamic jurisprudence). This approach departs from the traditional requirement of visual sighting but is justified on the basis of public interest (*maṣlaḥah*) and the lack of access to traditional moon sighting methods in Western contexts (Keller, 2007).

Some Muslim communities in the West prefer to follow announcements from their countries of origin or major Islamic centers like Saudi Arabia, leading to fragmentation and confusion. However, initiatives such as the United Kingdom's Moon Sighting UK and grassroots moon sighting networks in the United States continue to advocate for local sightings based on traditional methods, often clashing with calculation-based calendars (El-Banna Omar, nd).

### **Institutional Roles**

Institutions have emerged globally to manage the complexity of moon sighting in the modern world. These bodies vary in authority, from state courts to independent religious councils—and play a pivotal role in coordinating moon sighting efforts.

The Supreme Court of Saudi Arabia functions as the highest judicial body responsible for confirming moon sightings. The court issues official calls for moon sighting and deliberates on reports received from different regions of the kingdom. Once validated, the court's ruling is binding across the country. This institutional role is backed by Islamic law and national governance structures, offering a unique blend of religion and statehood (Al-Sa'īd, 2010). While the court has historically favoured manual sightings, recent policy shifts show a willingness to incorporate astronomical calculations to negate clearly impossible sightings.

The Nigerian Supreme Council for Islamic Affairs (NSCIA), although a non-state religious organization, wields significant influence. It harmonizes efforts between religious leaders, astronomers, and traditional rulers. The NSCIA encourages the establishment of zonal and state-level moon sighting committees, which are tasked with verifying reports and sending them to the national body. The NSCIA's announcement is widely respected, but it sometimes competes with regional initiatives or sectarian groups that follow different interpretations (Ibrahim S., 2022). In Nigeria's pluralistic context, this institutional effort remains vital in reducing fragmentation.

In the Western context, institutions like the Fiqh Council of North America (FCNA) have developed methodological frameworks that integrate traditional Islamic jurisprudence with modern scientific tools. FCNA's adoption of astronomical calculations is grounded in a minority opinion within classical jurisprudence, particularly as found in the Mālikī and Ḥanafī traditions, which permit the use of *hisāb* (calculations) in exceptional circumstances. FCNA justifies its position based on the need to serve diverse Muslim communities across vast geographic areas without access to reliable local moon sighting (FCNA, 2006).

The European Council for Fatwa and Research (ECFR) has issued similar rulings. In a 2004 fatwa, the ECFR stated that relying on astronomical data, particularly to confirm the impossibility of a sighting, is consistent with Islamic principles and helps maintain unity in the Muslim calendar (ECFR, 2004). While such positions remain contested among traditional scholars, these institutions have become essential voices in applying Islamic law in non-Muslim societies.

Collectively, these institutional efforts highlight the dynamic interplay between tradition and modernity. While the reliance on testimony remains central to classical fiqh, the institutionalization of moon sighting practices reflects the changing social, political, and scientific realities of Muslim societies today.

## 6. Challenges in Moon Sighting

Despite its foundational role in determining the Islamic calendar, moon sighting is fraught with practical and jurisprudential challenges. These range from environmental and observational issues to concerns about the reliability of testimonies and the accuracy of identifying the crescent. Each of these factors continues to fuel debate among scholars and communities, thereby complicating efforts to achieve calendar unity.

### Weather Conditions and Visibility Issues

One of the foremost challenges in moon sighting is the impact of atmospheric and weather conditions on visibility. Cloud cover, haze, dust, and even urban light pollution can obstruct the clear sighting of the new crescent (*hilāl*), especially in densely populated or tropical regions. Visibility is further influenced by the moon's altitude, age, elongation, and the observer's geographical location (Sahid et al., 2024).

The classical Islamic requirement of a *'adālah*-qualified witness reporting the crescent sighting presupposes ideal observational conditions, which are not always feasible. This practical limitation has led some scholars and institutions to advocate for the use of astronomical calculations either to confirm or negate claimed sightings, particularly in regions where meteorological unpredictability is frequent (Al-Madina Institute, 2007). For example, in Nigeria and parts of Southeast Asia, monsoon weather often impairs visibility, complicating efforts to conduct local moon sightings (Sahid et al., 2024).

Scholars of the *Mālikī* and *Shāfi'ī* schools have historically accepted the principle of *ikmāl*—completing 30 days of *Sha'bān* or *Ramaḍān* when the moon is obscured—based on the prophetic injunction: “If it is obscured to you, complete thirty days” (*Ṣaḥīḥ al-Bukhārī*). However, persistent reliance on *ikmāl* without efforts to improve visibility or verification methods has been critiqued in modern legal discourse (Al-Madina Institute, 2007).

### Trustworthiness of Observers and Testimonies

The Islamic legal tradition places significant emphasis on the moral integrity (*'adālah*) and competence (*baṣar*) of those who testify to moon sightings. However, determining the credibility of witnesses has become increasingly difficult in contemporary settings, particularly in regions with no formal system for vetting or cross-checking testimony. This issue has resulted in

controversies over false or mistaken reports, leading to premature or delayed announcements of Ramadan and Eid (Hassan-Bello, 2020).

In some instances, as recorded in Saudi Arabia and parts of Nigeria, testimonies have been accepted despite astronomical data suggesting that sighting was impossible, prompting criticism from both religious scholars and astronomers. The absence of standard operating procedures for verifying testimonies means that the reliability of reports can vary widely between regions and even within the same country.

Moreover, the reliance on limited numbers of observers sometimes as few as one or two in some jurisdictions, raises questions about the sufficiency and representativeness of their reports. While the Ḥanafī and Mālikī schools typically require a larger number of witnesses (up to 50 in some views) for Ramadan and Eid al-Fiṭr, some contemporary authorities have relaxed this standard due to logistical constraints, a development that has not gone unchallenged (Hassan-Bello, 2020).

### **Errors in Observation of the Crescent**

Another recurring challenge is the potential for human error in observing the crescent. Even experienced observers can mistake planets, stars, or atmospheric phenomena such as cirrus clouds or contrails for the hilāl, especially when under pressure to report a sighting. The crescent moon is often faint and appears very close to the horizon shortly after sunset, making it difficult to distinguish with the naked eye (Al-Saadi, 2008).

Reports of misidentifications are not uncommon. For instance, in 1981, an erroneous crescent sighting led to differing Eid celebrations between Muslim-majority countries in Southeast Asia, despite similar atmospheric conditions and calculated data suggesting invisibility. The increased availability of binoculars and telescopes has somewhat improved accuracy, but the traditionalist view maintained by many jurists insists on unaided visual sighting, further complicating matters.

Another key challenge of moon sighting and observation in a country like Nigeria is epileptic observation of the crescent. It is only during Ramadan everyone is alive to it, as if it is the only Islamic activities that depends on sighting a crescent for its observation. Although the sultanate of Sokoto has a standing committee that releases newsletters on monthly basis to update the Muslims on the ending and commencement of a new month, the month of Ramadan receives a considerable attention than others, from not only the sultanate but also the independent observers across the country. This makes the observation to epileptic and less emphatic.

In adequate technical know-how of moon rotations by many observers, hence their efforts are largely based on goodwill not the knowledge of the moon and its rotation. It is generally known that the authorities and the expertise set out to look out for the new crescent on the 29<sup>th</sup> of the ending month. This is a technical error as it would not be possible for someone who does not know when the moon disappears to look out for its appearance. An observer must be conversant with all the phases of the moon from waxing crescent to full moon and waning crescent. Most of the observers are not aware of these phases but only focused on a day to the last day month of the new month

In response, astronomers and Islamic legal theorists have recommended greater collaboration between religious authorities and scientific experts. The aim is to distinguish valid sightings from false reports using data such as moon age, angular separation from the sun, and altitude above the horizon (Al-Madina Institute, 2007). While some councils, such as the Fiqh Council of North America, fully embrace this integration, others remain cautious or resistant, fearing the erosion of prophetic tradition.

## **7. Towards a Unified Approach**

The quest for a unified Islamic calendar and consistent moon sighting practices has long been a topic of scholarly deliberation. With increasing globalization and the need for synchronization of Islamic events, especially in pluralistic societies, there have been growing calls for adopting more coherent and scientifically informed methods, particularly astronomical calculations, alongside traditional sighting.

### **Arguments for Astronomical Calculations**

Proponents of astronomical calculations argue that such methods offer precision, objectivity, and reliability in determining the beginning of lunar months. Unlike human observation, which is subject to environmental limitations and human error, astronomical data can accurately predict the moon's position, age, and visibility across various regions. These calculations are based on well-established scientific principles and are widely accepted in determining prayer times and Qiblah direction. Thus, some argue there is no valid reason to exclude them from the lunar calendar framework (Shah, 2009).

The Ḥanafī, Mālikī, and Shāfi'ī schools traditionally insisted on physical moon sighting, but some modern jurists within these traditions have revisited the textual basis and concluded that the 'illah (effective cause) is knowledge of the moon's appearance, not the act of sighting itself. This opens the door for calculations to be used as a valid substitute or complement. Ibn Taymiyyah, although critical of exclusive reliance on calculations, conceded that astronomical data may be used to reject false testimonies when they contradict observable reality (Shah, 2009). In practice, several Muslim-majority and minority communities have embraced this approach. For example, the Fiqh Council of North America (FCNA) and the Islamic Society of North America (ISNA) have officially adopted a calendar based on astronomical data, citing the need for consistency and unity in observance. FCNA's decision emphasizes that the objective is to start the month of Ramadan with certainty, and that actual sighting is a means to achieve this certainty, not an end in itself (FCNA, 2006).

### **Recommendations from Islamic Councils**

Islamic legal bodies across the world have proposed various frameworks to address the moon sighting dilemma. The European Council for Fatwa and Research (ECFR) recommends the use of astronomical calculations for confirming the new moon while retaining visual sighting where feasible. ECFR acknowledges that astronomical calculations have become precise and can be

relied upon to determine the beginning of lunar months, thereby reducing confusion and disunity among Muslims (ECFR, 2007).

Similarly, the Fiqh Academy of the Organization of Islamic Cooperation (OIC) has acknowledged the role of calculations in verifying sightings and preventing error. ISNA's position reflects a well-structured system: it uses the conjunction (new moon) and a calculated minimum visibility threshold to determine the beginning of each month. This method allows for prior knowledge and fixed dates, reducing confusion over Ramadan and Eid announcements (Shah, 2009). The intention is not to discard tradition, but to harmonize it with modern scientific capabilities.

These recommendations often underscore the need for local and international cooperation between religious scholars, astronomers, and legal authorities. However, resistance persists in many traditionalist circles, especially where moon sighting is seen as a communal act of worship tied to prophetic practice.

### **Balancing Tradition with Modernity**

Striking a balance between tradition and modernity remains a critical concern. Many scholars argue that using astronomical calculations should not be seen as a departure from prophetic teachings but rather as a modern means of achieving the same objective, certainty (*yaqīn*) about the start of the month. The Prophetic statement "Fast when you see it..." (*Ṣūmū li-ru'yatihi...*) is interpreted by some jurists to mean "fast based on knowledge of its appearance," whether by sight or verified calculation (Shah, 2009).

Importantly, the embrace of calculation does not necessitate the abandonment of communal moon sighting. It is possible to maintain the practice of gathering to view the crescent as a spiritual tradition while relying on calculations for legal rulings. Such a model would uphold the symbolic and religious significance of *ru'yah* while preventing disputes caused by faulty or unverifiable testimonies.

The middle path involves adopting a hybrid model where calculations are used to pre-verify visibility, and sightings are encouraged but accepted only when aligned with scientific feasibility. This approach respects both classical jurisprudence and the realities of the modern world.

### **8. Conclusion**

The issue of moon sighting in Islam sits at the intersection of theology, jurisprudence, culture, and science. It is a matter that has historically unified communities but, in contemporary times, has also been a source of division. The four major Sunni schools have nuanced positions on moon sighting, with varying requirements for local versus global applicability and the number and trustworthiness of witnesses. Additionally, practical challenges, ranging from weather conditions and visibility issues to errors in observation and inconsistencies in institutional processes, have hindered efforts toward global uniformity.

While modern advancements in astronomy offer a solution to many of these problems, integrating these with traditional jurisprudential frameworks requires cautions but deliberate

effort. Islamic councils and institutions in both Muslim-majority and minority contexts have shown that harmonisation is possible, as seen in the policies of ISNA, ECFR, and the Fiqh Academy of the OIC.

### **Proposals for Global Consensus on Moon Sighting**

To move toward a unified Islamic calendar and moon sighting system, several recommendations are proposed:

1. **Establish Regional and Global Coordination Bodies:** International moon sighting committees composed of religious scholars, astronomers, and legal experts can standardise criteria and improve coordination.
2. **Adopt Calculated Visibility Criteria:** Rather than relying solely on conjunction or visual sightings, adopt a visibility-based model that ensures the crescent can actually be seen under normal conditions.
3. **Promote Community Awareness and Education:** Clarify to the public the jurisprudential and scientific bases for moon sighting decisions to reduce misconceptions and resistance.
4. **Preserve the Spiritual Value of Moon Sighting:** Continue traditional moon sighting events as communal practices, while making final decisions based on verified calculations and testimony alignment.
5. **Encourage Unity Over Uniformity:** Recognise that diversity of practice may persist, but mutual respect and intra-faith dialogue can promote practical unity.

By carefully balancing adherence to prophetic tradition with the tools of modern science, the Muslim world can arrive at a unified and credible approach to moon sighting—one that enhances the spiritual significance of Islamic observances while avoiding division and confusion.

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