AL – AFAQ
Jurnal Ilmu Falak dan Astronomi
Fakultas Syariah Universitas Islam Negeri (UIN) Mataram
P-ISSN: 2685-0176. E-ISSN: 2722-0176 Vol. 6, No. 2 Desember 2024

The Concept of *Imkān al-Ru'yah* Sayyid Usman in the Book *Iqaz An-Niyam fī Ma Yataʿallaq bi Ahillah wa as-Siyam*

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Abstract: *This research aims to examine the concept of imkān al-ru'yah according to Sayyid Usman in the book Iqaz an-Niyam fi Ma Yata'allaq bi Ahillah wa as-Siyam and to analyze its relevance to contemporary crescent visibility criteria. The implementation of this research uses a approach qualitative based on a number of literature review, relying on Iqaz an-Niyam fi Ma Yata'allaq bi Ahillah wa as-Siyam as the primary source, along with e-journals, reference books, and relevant literature as secondary sources. The results show that Sayyid Usman's concept of imkān al-ru'yah is drawn from the views of various scholars, stipulating that in some locations, the new crescent can only be sighted if it reaches a minimum altitude of 7 degrees, while in other places, an altitude of 8 degrees or more is required for visibility. Sayyid Usman's concept of imkān al-ru'yah remains relevant to contemporary crescent visibility criteria. The relevance between Sayyid Usman's concept of imkān al-ru'yah and contemporary visibility criteria lies in their common ground in establishing crescent visibility standards, despite significant differences in their approaches.*
Keywords: *Sayyid Usman, Imkān al-Ru'yah*, *Crescent Visibility Criteria.*

Abstrak: *Penelitian ini bertujuan untuk mengkaji konsep imkān al-ru'yah menurut Sayyid Usman pada kitab Iqaz an-Niyam fi Ma Yata'allaq bi Ahillah wa as-Siyam dan menganalisis relevansinya dengan klasifikasi visibilitas atas hilal kontemporer. Kualitatif deskriptif merupakan pendekatan dalam pelaksanaan penelitian dengan kajian studi pustaka, mengandalkan Kitab Iqaz an-Niyam fi Ma Yata'allaq bi Ahillah wa as-Siyam sebagai sumber primer serta e-journal, buku referensi, dan literatur yang relevan sebagai sumber yang bersifat sekunder. Hasil penelitian menunjukkan bahwasanya konsep imkān al-ru'yah Sayyid Usman dikutip dari para ulama dengan menetapkan di beberapa tempat, hilal baru dapat terlihat jika mencapai ketinggian minimal 7 derajat, dan di beberapa tempat lain hilal memerlukan ketinggian 8 derajat atau lebih untuk dapat terlihat. Konsep imkān al-ru'yah Sayyid Usman masih relevan dengan klasifikasi visibilitas hilal kontemporer. Relevansi antara konsep imkān al-ru'yah Sayyid Usman dan kriteria visibilitas kontemporer terletak pada titik temu mereka dalam menetapkan kriteria visibilitas hilal, meskipun dengan perbedaan signifikan dalam pendekatan.*
Kata kunci: *Sayyid Usman, Imkān al-Ru'yah*, Kriteria Visibilitas Hilal.

A. Introduction

In the life of Muslims, the determination of the beginning of the Hijri month holds significant importance, especially for special months such as Ramadan, Shawwal, and Dhulhijjah, which mark key moments for religious observances.[1] In this context, *imkān al-ru'yah* emerges as one of the methods used to determine the start of the lunar month. In astronomy, *imkān al-ru'yah* refers to the visibility of the crescent moon—specifically, the condition in which the crescent reaches a sufficient altitude to be observable based on empirical field experience.[2] Meanwhile, according to Thomas Djamaluddin, *imkān al-ru'yah* is defined as the likelihood of

[1]Muhammad Akbar Herman, Qadir Gassing, dan Muhammad Shuhufi, "Kontroversi Hisab dan Ru'yah Dalam Penentuan Kalender Islam di Era Modern Pendekatan Fikih Kontemporer," *Media Hukum Indonesia* 2, no. 4 (2024): 617–25.
[2]Muhyiddin Kazin, *Kamus Ilmu Falak* (Yogyakarta: Buana Pustaka, 2005).

the crescent being visible, whereas *hilal visibility* refers to the actual appearance of the first crescent.[3]

There are two main approaches in determining the beginning of the Hijri month: *hisab* (astronomical calculation) and *ru'yah* (visual observation of the crescent). In this regard, the concept of *imkān al-ru'yah* serves as a bridge connecting the two. *Imkān al*-ru'yah refers to the visibility of the new Moon (hilal), namely a specific range of limits, both minimum and maximum, that serves as a reference for determining the possibility of sighting the hilal, either directly with the naked eye or with the aid of optical instruments such as a ru'yah telescope.[4] According to Fitriyani et al., *imkān al-ru'yah* is an effort to reconcile differences in determining the beginning of the Hijri month in Indonesia. This concept integrates elements of astronomical calculation (hisab) and direct observation (ru'yah).[5] Imkān al-ru'yah plays an important role because the hilal is a marker for the beginning of a month in the Islamic calendar. Various discussions regarding *imkān al-ru'yah* have been developed by Islamic scholars.

Sayyid Usman bin Yahya was a prominent figure who made significant contributions to the concept of *imkān al-ru'yah*. He was one of the leading scholars from Betawi, originating from the Pekojan area in Central Jakarta, born in 1822 and passed away on January 19, 1914.[6] In his book *Iqāz an-Niyām fī Mā Yataʿallaq bi Ahillah wa al-Ṣiyām*, Sayyid Usman established criteria and conditions for a valid *ru'yah* (moon sighting), namely when the hilal is in a state that makes it possible to be seen—whether in customary, physical, logical, or religious terms. According to Sayyid Usman, the *hilal* can be sighted (*imkān al-ru'yah*) if it reaches a height of 7 degrees. However, the origin of this 7-degree figure is not clearly known, raising questions about the scientific basis or empirical experience underlying it. This is important to investigate, considering that Sayyid Usman lived in an era when astronomical technology was not as advanced as it is today.

Sayyid Usman's concept of *imkān al-ru'yah* differs from contemporary visibility criteria, such as those used by MABIMS, which state that the *hilal* can be considered visible if it meets the standard minimum altitude of 3 degrees with an elongation angle of 6.4 degrees.[7] This difference reflects the development in the understanding of the hilal, both from the perspective of classical scholarly traditions and modern scientific approaches. However, such differences in criteria often lead to polemics, especially when the results of Moon sighting (ru'yah) do not align with astronomical calculations (hisab). In this context, studying the thoughts of earlier

[3]Thomas Djamaluddin, *Astronomi Memberi Solusi Penyatuan Ummat* (Jakarta: Lembaga Penerbangan dan Antariksa Nasional, 2011).

[4]Arino Bemi Sado, "Dakwah Inside: Solusi Penyatuan Madzhab Hisab dan Madzhab Ru'yah dalam Penentuan Awal Bulan Kamariah," *TASÂMUH* 18, no. 1 (2020): 79–95.

[5]Fitriyani, Isfihani, dan Astrie Octasari, "Implikasi Kriteria Imkanur Ru'yah Mabims Baru Terhadap Penyatuan Awal Bulan Kamariah Di Indonesia," *Jurnal MEDIASAS: Media Ilmu Syari'ah dan Ahwal Al-Syakhsiyyah* 7, no. 2 (2024): 462–82.

[6]Nur Rahmah, "Khazanah Intelektual Ulama Betawi Abad ke-19 dan 20 M," *Jurnal Lektur Keagamaan* 16, no. 2 (2018): 195–226.

[7]Waliawati dan M. Ihtirozun Ni'am, "Konvergensi Ru'yah Tarbi' dan Badr dengan Kriteria Imkanur Ru'yah Neo MABIMS (Praktek Penentuan Awal Bulan Kamariah di Pondok Pesantren Nurul Hidayah Garut)," *Al Afaq* 4, no. 2 (2022): 237–53.

scholars such as Sayyid Usman becomes relevant to understand how the criteria for *imkān al-ru'yah* were formulated in the past, and how these ideas can be compared or even integrated with modern concepts.

The aim of this research is to conduct an in-depth study of Sayyid Usman's concept of *imkān al-ru'yah* as presented in his book *Iqāz an-Niyām fī Mā Yataʿallaq bi Ahillah wa al-Ṣiyām*, and to analyze its relevance to contemporary *imkān al-ru'yah* concepts. Through this research, it is expected to contribute to the development of Islamic astronomy (*ʿilm falak*) and to encourage constructive dialogue between classical scholarly traditions and contemporary scientific methods in determining the beginning of the Hijri month.

B. Methods

This research is a literature study that relies on written sources as the primary basis for data collection. The study uses the book *Iqāz an-Niyām fī Mā Yataʿallaq bi Ahillah wa al-Ṣiyām* as the primary source, and e-journals, reference books, and relevant literature as secondary sources. Since the desired data and results are in the form of narrative explanations, this research employs a descriptive qualitative method, with documentation techniques used for data collection. This technique involves examining documents and related literature. In carrying out this research, descriptive analysis is adopted as the method of data analysis, which involves elaborating in detail on the historical concept of *imkān al-ru'yah* proposed by Sayyid Usman, followed by a comprehensive analysis of its relevance to the contemporary context, in order to draw conclusions regarding the concept of *imkān al-ru'yah* from Sayyid Usman's perspective.

C. Result and Discussion

1. Biography of Sayyid Usman

The full name of Sayyid Usman at birth was 'Uthmān bin 'Abdillāh bin 'Āqil bin Yahyā al-'Alāwī.[8] He was born into the al-Yahya family, whose lineage can be traced through his grandfather, Sayyid Umar, who was born in Hadramaut, in the village of Qarat al-Syekh.[9] Sayyid Usman was born on 17 Rabiʿ al-Awwal 1238 AH, which corresponds to December 1, 1822 CE, in the Pekojan area of Batavia (now Jakarta).[10] His father, 'Abdullah bin 'Aqil, was born in Mecca and was known as both a scholar and a merchant from the Hadrami diaspora. Meanwhile, his mother, Aminah, was the daughter of 'Abdurrahman al-Misri, a scholar of Egyptian descent who had settled in Indonesia.[11]

[8]Karel A Stenbrink, *Beberapa Aspek Tentang Islam di Indonesia Abad ke 19* (Jakarta: Bulan Bintang, 1984).

[9]Syifa A'Wuru Putri dan M. Mufti Najmul Umam, "Pemberontakan Petani Banten Tahun 1888dalam Kitab Manhaj Al-Istiqamah Fi Ad-Din Bi As-Salamah Karya Sayyid Utsman Bin Yahya," *MISTER: Journal of Multidisciplinary Inquiry in Science, Technology and Educational Research* 2, no. 1 (2024): 411–29.

[10]Muhammad Zaelani dan Muhammad Nida' Fadlan, "The Events of Friday Ta'addud in the Text of Min al-Mihnah wa al-Musibah Ta'addud al-Jumu'at bi al-Ghasibah by Sayyid Uthman bin Yahya al-'Alawi: A Historical Review," *LITTERATURA: Jurnal Bahasa dan Sastra* 2, no. 1 (2023): 1–14.

[11]Nico J. G. Kaptein, *Islam, Kolonialisme, dan Zaman Modern di Hindia-Belanda: Biografi Sayyid Utsman (1822-1914)* (Yogyakarta: Suara Muhammadiyah, 2017).

Sayyid Usman became one of the most influential figures among the Arab-Hadrami community in the Nusantara during the late 19th to early 20th centuries. He served as the Mufti of Batavia, a position officially recognized by the Dutch colonial authorities. Additionally, Sayyid Usman held a special role in the colonial government as an honorary adviser on Arab affairs. His responsibilities often involved addressing issues related to the indigenous population and Islam. He was also a close associate of Snouck Hurgronje, a high-ranking official in the Dutch colonial administration.[12]

Sayyid Usman's carier and academic journey began at a very young age, starting at the age of 3 when he began learning directly from his maternal grandfather. By the age of 19, he had received extensive education in various fields of knowledge. During this time, he was not only taught manners and cultural customs but was also introduced to fundamental religious sciences. In addition, Sayyid Usman studied Qur'anic exegesis (tafsir), hadith, as well as other fields of knowledge such as astronomy and astrology. This foundational education laid a strong basis for his continued studies under teachers in Mecca and Hadramaut, which further developed his expertise in various Islamic disciplines.[13]

In 1847, his grandfather, Sheikh al-Miṣrī, passed away. At that time, Sayyid Usman was only 18 years old. He then decided to reside in Mecca to deepen his religious knowledge. For seven years, he studied under one of the prominent scholars, Sayyid Ahmad Ibn Zainy Dahlan, who was the Mufti of the Shafi'i school. After completing his studies in Mecca, Sayyid Usman returned to his homeland in Hadramaut to reunite with his father, Sayyid Abdullah, and reconnect with his extended paternal family. While in Hadramaut, Sayyid Usman continued his studies with Sayyid Abdullah Ibn Husain Ibn Thahir.[14]

Sayyid Usman later migrated to the city of Medina to pursue further education under several prominent scholars such as Sayyid Alwi, Sheikh Muhammad ibn al-'Azab, Habib Hasan ibn Soleh al-Bahar, and Sayyid Umar ibn Abdullah al-Jufri. During his time in Medina, he actively interacted with Indonesian scholars and students, strengthening the bonds of Islamic brotherhood among them. Afterwards, Sayyid Usman traveled to Egypt, specifically to the Dhimyath region, to meet his maternal relatives and stayed there for eight months. There, he also deepened his knowledge by studying under several renowned muftis across the Arabian Peninsula. While in Egypt, he not only focused on his education but also on his personal life. On the recommendation of the scholars, he married Syarifah Khadijah and decided to stay in Egypt for eight months.[15]

Throughout his life, Sayyid Usman was frequently consulted for legal opinions on various issues faced by the community. With his vast knowledge, he authored numerous classical works addressing various problems encountered by the people of Batavia at the time. In total, Sayyid

[12]Arwin Juli Rakhmadi Butar-Butar, *Warisan Ilmu Falak Sayyid Usman (w. 1331 H/1913 M)* (Medan: UMSU Press, 2021).

[13]Sayyid Abdullah bin Usman bin Abdullah bin Aqil bin Umar bin Yahya, *Suluh Zaman* (Jakarta: Percetakan Sayyid Usman, n.d.).

[14]Stenbrink, *Beberapa Aspek Tentang Islam di Indonesia Abad ke 19*.

[15]M. Basithussyarop dan Ahmad Izzudin, "Kajian Awal Bulan Kamariah dalam Kitab Keker Bulan Karya Sayyid Usman," *DIKTUM: Jurnal Syariah dan Hukum* 20, no. 2 (2022): 415–31.

Usman wrote at least 104 works covering a wide range of disciplines, including fiqh, inheritance law (*fara'id*), Qur'anic recitation (*tajwid*), theology (*tawhid*), ethics (*adab*), Arabic grammar (*nahwu-sarf*), mysticism (*tasawwuf*), Sufi orders (*tariqa*), and Islamic astronomy (*'ilm al-falak*). Of these 104 works, 14 focused on Islamic astronomy, and of those, 7 have been found from various sources, while the rest have yet to be discovered.[16]

2. The Concept of *Imkān al-Ru'yah* Sayyid Usman in the Book *Iqaz an-Niyam fi Ma Yata'allaq bi Ahillah wa as-Siyam*

Sayyid Usman's conception of the concept of *imkān al-ru'yah* is included in one of his books entitled *Iqaz an-Niyam fi Ma Yata'allaq bi Ahillah wa as-Siyam*. Sayyid Usman's understanding of astronomy was acquired through the education provided by his grandfather, Sheikh Abdurrahman bin Ahmad al-Misri, and through his scholarly travels to various countries, including the Holy Lands. According to Sayyid Usman, the ru'yah method is the most appropriate method to be applied in Indonesia for determining the beginning of the month, based on several hadiths of the Prophet Muhammad SAW that explain how to determine the beginning of the month, namely through ru'yah. Not only that, Sayyid Usman also simplified the implementation of *ru'yah al-hilal* into two conditions, although he stated that there are many conditions that must be fulfilled in its implementation.

First, its implementation must follow the general procedure, which is conducted after Sunset and without using additional equipment such as telescopes. Second, it must align with the phases of the Moon's orbit, meaning the visibility of the crescent must be possible (*imkān*) from the perspectives of custom, physical reality, logic, and shar'i.[17] Culturally, this means that based on the experiences and customs of the community, the crescent moon is indeed likely to be visible under similar conditions as before. Physically, this means that the crescent moon is actually visible in the sky and can be seen by the human eye. Logically, this means that it is reasonable or rational for the crescent moon to be visible. For example, if the crescent moon is still below the horizon or too thin to be seen by the human eye, claiming to have seen it is considered illogical. From a religious perspective, it means that the visibility of the crescent moon must align with the principles and guidelines of Islamic law. This means that the determination of the beginning of the lunar month must be based on ru'yah or hisab recognized in fiqh, and the ru'yah report must be valid according to Islamic law.

The origins of the concept of *imkān al-ru'yah* Sayyid Usman stem from a debate regarding the limits of *imkān al-ru'yah* between Sayyid Usman and Abdul Hamid bin Muhammad Damiri, as well as the students of Sheikh Abdurrahman al-Misri. Abdul Hamid and the students of Sheikh Abdurrahman al-Misri argued that it is difficult to see when the position is below 7 degrees, but it is not impossible to see (not *istihalah*). On the other hand, according to Sayyid Usman, this condition makes the crescent moon impossible to see (*istihalaturru'yah*).

[16]Arwin Juli Rakhmadi Butar-Butar, *Warisan Ilmu Falak Sayyid Usman (w. 1331 H/1913 M)* (Medan: UMSU Press, 2021).

[17]Sayyid Utsman bin Yahya, *Iqazhun an-Niyam fi ma Yata'allaq bi al-Ahillah wa ash-Shiyam* (Jakarta: Al-Mubarokah, 1321).

This difference in opinion arose because Sayyid Usman referred to the Zaij from his teacher, Sheikh Rahmatullah al-Hindi in Mecca, rather than the Zaij from Sheikh Abdurrahman al-Misri. Additionally, Sayyid Usman and Sheikh Abdurrahman never had the opportunity to meet directly, as Sayyid Usman had migrated to Arabia at a young age.[18]

Furthermore, during Sayyid Usman's time, there was an incident where the Betawi Sharia Court accepted the testimony of the sighting of the crescent moon for Ramadan 1299 H on Sunday night, even though according to astronomical calculations, the height of the crescent moon at that time was only 2.5 degrees. The chairman of the Betawi Sharia Court at that time was Muhammad Salih bin Syarbini, a student of Abdurrahman al-Misri. Sayyid Usman sharply criticized the Sharia Court's decision through an article he wrote. Sayyid Usman stated that a crescent moon with an altitude of less than 7 degrees cannot be seen, based on the view of Ali bin Qadhi in the book *Taqrib al-Istidlal*. This view later became widely accepted in Betawi, considering a crescent moon below 7 degrees as impossible to see. As a result, the public became reluctant to perform ru'yah if the astronomical calculations indicated an altitude of less than 7 degrees.[19]

In establishing the criteria for *imkān al-ru'yah*, Sayyid Usman cited the opinions of several scholars, such as Sheikh Ibn Hajar and Imam Sheikh Ali bin Qadhi, who stated that the position, altitude, and inclination of the crescent moon do not have fixed values. However, all of this depends on the geographical latitude of the location, the Moon's latitude, and the angular distance between the Moon and the Sun (elongation). Here is the opinion of Sheikh Ali bin Qadhi, as quoted by Sayyid Usman in the book *Taqrib al-Istidlal*:

> "In the book *Taqrib al-Istidlal*, Sheikh Ali bin Qadhi states that the minimum limit for the visibility of the crescent moon is 2/3 of the value of 1 manzilah, or equivalent to 9 degrees minus 3 (8.6667) degrees. In another discussion, he mentions that the minimum limit for the visibility of the crescent moon is 7 degrees. After conducting a thorough analysis, Sheikh Ali bin Qadhi affirms that this minimum threshold applies generally or universally. However, he also notes that sometimes the crescent moon with an altitude of 9, 10, or 11 degrees remains invisible."[20]

Additionally, there is an opinion from Imam Ibn Hajar, also cited by Sayyid Usman, as follows:

> "Sheikh Ibn Hajar, in his fiqh fatwa, quotes the opinion of astronomers who state that when the angular distance between the Moon and the Sun reaches approximately half of 12 degrees or slightly less, depending on the location, cloud cover, visual acuity, and the Moon's latitude, then the illuminated and tilted portion of the Moon facing us and visible is what is referred to as the crescent moon."[21]

[18]Muhammad Manshur Al-Betawi, *Mizanul I'tidal* (Jakarta, n.d.).

[19]Iqnaul Umam Asshidiqi dan Fathor Rausi, "Pemikiran Muhammad Mansur Tentang Imkān al-Ru'yah dalam Kitab Mîzān al-I'tidāl," *Al Afaq* 3, no. 1 (2021): 1–24.

[20]Sayyid Utsman bin Yahya, *Iqazhun an-Niyam fi ma Yata'allaq bi al-Ahillah wa ash-Shiyam* (Jakarta: Al-Mubarokah, 1321).

[21]Sayyid.

The opinions of Sheikh Ibn Hajar and Sheikh Ali bin Qadhi were further explained by Sayyid Usman, stating that the minimum threshold mentioned earlier applies globally and is not a permanent minimum threshold. Additionally, he stated that in the observation of the crescent moon, there are no specific parameters for the height of the crescent moon each month. Nevertheless, each time has different calculations. Based on the opinion of Imam Ali bin Qadhi mentioned earlier, Sayyid Usman concluded that in some places, the crescent moon can only be seen if it reaches a minimum height of 7 degrees, and in other places, the crescent moon requires a minimum height of 8 degrees to be visible, based on calculations of location and time. This limit is the global minimum limit.[22]

This difference depends on astronomical calculations that consider factors such as time and observation location, including geographical position, the time of Sunset and Moonrise, and the angle of elongation between them. Additionally, non-astronomical factors such as atmospheric conditions, cloudy weather, light pollution levels, and sky clarity also influence the visibility of the crescent moon. Therefore, this limit is understood as a general global minimum limit, but actual visibility still depends on local environmental conditions at the time of observation.

In practice, there are two methods for determining whether the crescent moon has reached the classification of *imkān al-ru'yah* or not, namely:

a. Observing four aspects related to the movement of the Sun and Moon that can be directly observed, namely:
   1) Observing the altitude of the crescent moon on the second night to estimate its position on the first night, thereby determining how many degrees the crescent moon has reached on the first night. In astronomy, the Moon's altitude changes by an average of about 13 degrees each day, based on the Moon's movement in its orbit around the Earth. This is in line with the indication in the Qur'an[23], surah Yā Sīn verse 39:

      وَٱلْقَمَرَ قَدَّرْنَٰهُ مَنَازِلَ حَتَّىٰ عَادَ كَٱلْعُرْجُونِ ٱلْقَدِيمِ[24]

      "*And We have determined for the Moon phases, so that (after it reaches the last phase) it returns as an old crescent*."

      This verse indicates that the Moon has fixed and regular phases. Based on this principle, when the crescent moon reaches an altitude of 25 degrees on the following night, it can be concluded that its altitude was approximately 12 degrees on the first night. In this case, the criteria for the visibility of the crescent moon are met.
   2) Observing the duration of the crescent moon's visibility, from the first time it is seen until it sets. Each 1-degree increase in the crescent's altitude corresponds to a 4-minute duration of visibility. This is because each 360 degrees requires 24 hours.

[22]Sayyid.
[23]Sayyid.
[24]Kementerian Agama RI, *Al-Qur'an dan Terjemahannya* (Jakarta: Lajnah Pentashihan Mushaf Al-Qur"an Badan Litbang dan Diklat Kementerian Agama RI, 2019).

This duration of visibility is used as an indicator in observations, depending on the crescent's altitude. As the crescent's altitude increases, its duration of visibility also increases.

3) Observing the tilt and position, whether it is leaning toward the north or south.
4) Observing the increase in the height of the crescent moon in a country in the west compared to a country in the east.

b. Through accurate calculations related to the movement of the Moon and Sun.

The calculations regarding the beginning of the Hijri month and the data related to the movement of the Moon and Sun, as recorded in the book *Iqaz an-Niyam fi Ma Yata'allaq bi Ahillah wa as-Siyam*, were obtained by Sayyid Usman during his studies under Sayyid Abdurrahman bin Ahmad al-Misri. Furthermore, regarding the movements of the Moon and the Sun, Sayyid Usman referred to the *Zeij* work of *Ulugh Beg*, which was based on the Ptolemaic Theory formulated by Claudius Ptolemy.

3. The Relevance of Sayyid Usman's *Imkān Al-Ru'yah* to Contemporary Crescent Visibility Criteria

The criteria for crescent visibility (imkān al-ru'yah) in determining the beginning of the Hijri month is a form of integration between the hisab and ru'yah approaches, which aims to provide an astronomical interpretation of the fiqh arguments used as a basis.[25] These criteria have evolved significantly as they are based on scientific knowledge, particularly astronomy. Additionally, the limits of crescent visibility (*imkān al-ru'yah*) also vary across different astronomical contexts.[26]

The Danjon Limit states that the crescent may not be visible if the angular distance between the Sun and the Moon is less than 7 degrees.[27] This conclusion was reached after he observed 75 crescent moon appearances in the northern United States on six dates in April 1989. Using spherical triangle calculations, it was found that with a reduction of 0 degrees in azimuth, the crescent moon's altitude reached 7 degrees; with a 2 degrees difference in azimuth, the crescent moon's altitude was 6.7 degrees; with an azimuth difference of 5 degrees, the crescent's altitude drops to 4.9 degrees; and with an azimuth difference of 6.6 degrees, the crescent's altitude is at 2.25 degrees.[28]

The Danjon Limit and Sayyid Usman's *imkān al-ru'yah* share a fundamental similarity in establishing the minimum visibility limit for the crescent based on astronomical optical principles, not merely administrative considerations. The Danjon Limit (7 degrees elongation)

[25]Ridhokimura Soderi, Darlius, dan Riza Afrian Mustaqim, "Rekontruksi Kriteria Visibilitas Hilal Serta Dampak Implementasi Kriteria Imkanuru'yah MABIMS Baru Dalam Kemaslahatan," *ASTROISLAMICA* 3, no. 2 (2024): 233–55.

[26]Asshidiqi dan Rausi, "Pemikiran Muhammad Mansur Tentang Imkān al-Ru'yah dalam Kitab Mîzān al-I'tidāl."

[27]Novi Sopwan dan Abu Dzarrin Al-Hamidy, "Implikasi Kriteria Visibilitas Hilal Rekomendasi Jakarta 2017 Terhadap Penanggalan Hijriah di Indonesia," *Azimuth: Journal of Islamic Astronomy* 1, no. 1 (2020): 52–73.

[28]Bashori Alwi, "Dinamika Penetapan Awal Bulan Hijriah di Indonesia untuk Mencari Titik Temu" (UIN Walisongo, 2020).

indicates that, physically, the crescent moon cannot be seen if the angular distance between the Moon and the Sun is less than 7 degrees because the crescent moon becomes too thin to reflect sufficient light. This is supported by Danjon's empirical observations of 75 crescent moon cases and spherical geometry calculations. Meanwhile, Sayyid Usman sets a minimum altitude of 7 degrees, a value that indirectly aligns with the Danjon Limit, as at that altitude, the Moon-Sun elongation typically meets or approaches 7 degrees under ideal azimuth conditions. The similarity of the 7 degrees figure in both criteria is not coincidental but the result of different approaches to the same problem: Danjon through pure astronomical calculations, while Sayyid Usman through traditional empirical observations that have considered tropical atmospheric factors. Thus, both are complementary: the Danjon Limit explains the theoretical boundary for the formation of the crescent moon, while Sayyid Usman sets the practical conditions for visual observation.

Amir Hasanzadeh stated in 2012 that the accuracy of the elongation angle for the crescent is 5 degrees. This theory contradicts Danjon's theory, which states that 7 degrees is the minimum elongation angle for the visibility of a crescent. Based on data obtained from Kamaneasemani, the Unprofessional Group of Crescent Sighting (UGCS) Iran, the Islamic Crescent Observation Project (ICOP), and a total of 74 data previously adopted by Danjon, including observations with the naked eye and optical instruments, it was found that the crescent can be seen at an elongation angle of 5 degrees. This view is supported by McNally (1983) and Sultan (2007), who also provide similar information.[29]

Although this criterion is lower than Sayyid Usman's, this approach emphasizes the importance of empirical data in determining visibility limits, which is an important element in Sayyid Usman's thinking, despite living in an era of limited astronomical technology. The fundamental concepts in both approaches share a common emphasis on understanding crescent visibility based on astronomical parameters, albeit with different limitations.

The South African Astronomical Observatory (SAAO) developed crescent visibility criteria based on two main parameters: the crescent's topocentric altitude and the azimuth difference between the Moon and the Sun. These criteria were developed based on an analysis of 42 observational data points. In establishing these criteria, SAAO classified observations based on the use of optical instruments and observations relying solely on the naked eye. If the crescent is at an altitude of 7 degrees, the likelihood of seeing it with the naked eye increases, though it remains challenging. The higher the crescent's position, the smaller the required azimuth difference for it to be visible.

The SAAO criteria are relevant to Sayyid Usman's concept of *imkān al-ru'yah*, which also sets a minimum altitude of 7 degrees, although without additional parameters such as azimuth difference. The SAAO approach enriches Sayyid Usman's concept by incorporating additional variables that were not available in the classical concept of *imkān al-ru'yah*.

There is also Odeh's criterion, which sets the criteria for crescent visibility using a slightly different method, namely using the physical characteristics of the crescent and focusing on the

[29]Amir Hasanzadeh, "Study of Danjon Limit in Moon Crescent Sighting," *Astrophysics and Space Science* 339 (2012): 211–21.

width of the crescent (W) in arc minutes (’). These criteria are distinguished based on the observation method, namely using optical instruments (ARCV1), using optical instruments but still allowing direct observation with the naked eye (ARCV2), and direct observation with the naked eye (ARCV3), as shown in the following table.[30]

Table. 1 Criteria Visibility of the Crescent Moon Odeh

W	0.1’	0.2’	0.3’	0.4’	0.5’	0.6’	0.7’	0.8’	0.9’
ARCV 1	5.6º	5.0º	4.4º	3.8º	3.2º	2.7º	2.1º	1.6º	1.0º
ARCV 2	8.5º	7.9º	7.3º	6.7º	6.2º	5.6º	5.1º	4.5º	4.0º
ARCV 3	12.2º	11.6º	11.0º	10.4º	9.8º	9.3º	8.7º	8.2º	7.6º

The table shows that the crescent moon can be easily seen with the naked eye if the ARCV value is greater than ARCV3. In addition, in very clear atmospheric conditions, the crescent moon can be seen with the naked eye or with optical instruments if the ARCV value is greater than ARCV2. However, if the ARCV value is greater than ARCV1, the crescent moon can only be seen with the aid of optical instruments.

These visibility criteria indicate that technological advancements have enabled a reduction in the minimum altitude threshold for observing the crescent moon compared to the 7-degree standard proposed by Sayyid Usman. Odeh’s highly technical approach shows that although the altitude of the crescent is no longer the sole determinant of visibility, criteria such as those proposed by Sayyid Usman remain an initial reference in understanding traditional crescent visibility, which is then refined through quantitative analysis.

In Indonesia, there are criteria proposed by Thomas Djamaluddin, previously known as the Jakarta criteria, based on astronomical data, which state that the crescent moon can be seen if it meets two main conditions: the minimum lunar elongation is 6.4 degrees with a height of at least 3 degrees. This classification is based on global crescent observation data, which indicates that no crescent sighting can be considered astronomically valid if the altitude difference between the Sun and the Moon is less than 4 degrees or if the Moon’s altitude at Sunset is below 3 degrees.

These criteria are less stringent compared to Sayyid Usman’s concept. The MABIMS criteria were developed based on modern empirical data that accommodates the geographical and atmospheric conditions in Southeast Asia, making them more flexible than Sayyid Usman's classical approach. MABIMS uses advanced technology such as satellites and optical devices, providing a more scientific approach to determining crescent visibility. Meanwhile, Sayyid

[30]Thomas Djamaluddin, *Astronomi Memberi Solusi Penyatuan Ummat* (Jakarta: (Lembaga Penerbangan dan Antariksa Nasional, 2011).

Usman, who lived in an era without modern technology, emphasized traditional visual observation and did not recommend the use of aids such as telescopes. In this context, Sayyid Usman's concept can be considered as providing the initial foundation for the development of astronomy, while the MABIMS approach represents the evolution of this science through the use of current technology.

Based on the criteria for crescent visibility presented, it can be concluded that even though the crescent is below 7 degrees in elevation, it can still be seen. Although Sayyid Usman considered a crescent below 7 degrees to be impossible to see, as per his observations, such a low-elevation crescent is not bright enough to be seen by the human eye without assistance. His thinking aligns with the general principles of astronomy, which consider the Moon's brightness, altitude, and position relative to the Sun. In this case, Sayyid Usman relied on empirical experience and direct observation, supported by astronomical calculations using the *Zeij* from his teacher in Mecca.

The visibility criteria for the crescent moon at an altitude of 7 degrees established by Sayyid Usman are undoubtedly based on astronomical considerations. As is known, the elongation of the Moon and the Sun can affect the brightness of the crescent moon. Additionally, altitude criteria are necessary for the crescent moon to be clearly visible and overcome the light of twilight. The higher the position of the crescent moon, the easier it is to see.

Thus, the relevance between Sayyid Usman's concept of *imkān al-ru'yah* and contemporary visibility classifications lies in their common ground in establishing criteria for crescent visibility, despite significant differences in approach. Sayyid Usman's more traditional concept, which emphasizes direct observation without the aid of tools, remains relevant in providing a historical foundation for the development of crescent visibility standards and modern approaches that are more technology- and data-driven. Meanwhile, the modern approach, which combines technology and scientific calculations, has introduced greater flexibility in determining crescent visibility, enabling a more adaptive determination of the start of the Hijri month in response to various geographical and atmospheric conditions.

D. Conclusion

The concept of *imkān al-ru'yah* by Sayyid Usman is quoted from several opinions of scholars, such as Ibn Hajar and Sheikh Ali bin Qadhi. Based on these two opinions, Sayyid Usman concludes that in some locations, the crescent moon can only be seen if it reaches a minimum altitude of 7 degrees, while in other locations, the crescent moon requires an altitude of 8 degrees or more, based on calculations of location and time. This threshold represents the global minimum threshold. Sayyid Usman's concept of *imkān al-ru'yah* remains relevant to contemporary crescent visibility criteria, such as the Dajon Limit, SAAO, Odeh, and MABIMS. The relevance between Sayyid Usman's concept of *imkān al-ru'yah* and contemporary visibility classifications lies in their common ground in establishing crescent visibility criteria, despite significant differences in approach.

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