

## A Glimpse of Indian Calendars

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**Abstract:** Calendar is also known as ‘Panchanga’. In the context of Indian civilization its depends on the cultural and regional diversities of the country. Vedic calendars and astrological factors provides various dimension to finalize and calculate Indian calendars. This paper is mainly based on derivation of Indian Calendars with some interesting facts and calculations. How the Solar & Lunar system helps to formulate a 12 months calendar has been analyzed and presents its classification.

**Key Word:** calendar Panchanga Jyotisa Saka Vedic

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### I. Introduction

The birth of calendar took place in ancient times. India during the Vedic culture developed a sophisticated time keeping methodology and calendars for Vedic rituals and timekeeping. This helped in scheduling activities related to social and religious sphere and proved to be a very useful tool for sharing information, celebrating auspicious occasion in different parts of country leading to togetherness and fraternity feeling and above all streamlining day to day affairs.

Calendar is also known as ‘Panchanga’, a Hindu way of measuring time. Panchanga, a Sanskrit word, means “five limbs,” which refers to the fact that every panchangam includes the five basic elements of tithi (lunar day), nakshatra (the constellation the moon is aligned with), karana (half-day), yoga (a particular angle of the sun and moon) and vara or vasara (solar weekday). Panchangams furnish other astronomical information which is extensively used by astrologers and pundits for making, analyzing and matching horoscope, as well as predicting opportune time of all forthcoming religious events, e.g., Navratra, Ganesh Chaturthi etc. and auspicious occasions, e.g., marriage ceremony, Grihapravesh, shilanyasa etc.

India is a land of diversity having a number of languages, religions and cultures which mutually impact each other and create diversity in one form or the other as we go from one place to other. These changes may be minor or major. Hence, we have too many calendars to choose from but all of them are based on science of Jyotisa. Unlike Gregorian (Western) calendar, Vedic calendars provides vital information about astrological factors, planets and stars— aspects of our subtle environment which are unseen but strongly felt. With the knowledge available to us, we understand the characteristics of the planets and the stars and how they relate to the human psyche. These effects are real and dramatic. We experience the effects of the changes and movements of celestial bodies, just as the tides are influenced by the gravitational attraction of the moon and the sun. We come across seasonal changes with the change in position of earth with respect to sun.

Jyotisa in Sanskrit is combination of modern subjects of Astronomy, Astrology and Mathematics (Arithmetic, Algebra, Trigonometry etc.). Calculation of five limbs, i.e., vara, karna, yoga, nakshastra, tithi follows astronomical principles and mathematical methods but their significance is given by astrology. The astronomical periods related to Sun and Moon form the basic set of data for calendar and the basic astronomical units of day, month and year are its building blocks.

### II. Systems to frame calendars

In India, various systems have come into vogue at different times to mark the commencement of a new year. The system adopted to frame calendars across various regions of India belong to any of the following three types.

Solar System which uses days to approximate the tropical year by keeping it synchronised with the seasons. It follows the motion of the Sun and ignores the Moon. One example is the Gregorian calendar, where a common solar year will consist of 365 days and a leap year, 366 days. However, this is different for the Indian solar calendars, which uses days to approximate the sidereal year instead. Solar year represents the time taken by Earth revolving in its elliptical orbit around the Sun and consists of 365 years, 5 hours, 48 minutes and

46 seconds. Julian calendar, Gregorian calendar, Pre-Islamic Egyptian calendar, Iranian calendar are examples of solar calendar.

Lunar system which uses lunar months to approximate the lunar year. A lunar month is the time interval between two successive new moons (or fullmoons, for the Indian lunisolar calendars) and each month has an average length of 29.5 days. This amounts to about  $12 \times 29.5 = 354$  days a year, which is shorter than the tropical year by about 11 days. This difference is accounted for by an intercalation or suppression in the form of intercalary month (also known as 'Adhik Masa' and is the month during which there is no Sankranti) introduced every 2 years and 6 months to make the lunar year conform to the solar year. A lunar calendar follows the Moon and ignores the Sun. Islamic calendar is an example of a lunar calendar.

Luni-Solar System which uses lunar months to approximate the tropical or the sidereal year. Here the year is calculated by the solar cycle and the months by the lunar division. Since 12 lunar months are about 11 days shorter than the tropical year, a leap month (or intercalary) month is inserted about every third year to keep the calendar in tune with the seasons. The Indian lunisolar calendars, for example, are made to approximate the sidereal year, and not the tropical year. Chinese calendar, Pre-Christian Greek calendar, Jewish calendar are examples of luni-solar calendar.

It is interesting to discuss the various months within these three systems of calendar.

There are 12 solar months in a solar year that bear the names of the twelve zodiac signs called 'Rashis'. These are Mesha (Aries); Vrishabham (Taurus); Mithuna (Gemini); Karka (Cancer); Simha (Leo); Kanya (Virgo); Tula (Libra); Vrischika (Scorpio); Dhanus (Sagittarius); Makara (Capricorn); Kumbha (Aquarius); Mina (Pisces).

Lunar month ends either with new moon (Amavasya) or full moon (Purnima). There are two methods for the commencement of the month under lunar system. They are either 'Amasanta' or 'Purnimanta', i.e., they start either with the bright fortnight (Shukla Pascha) or with the dark fortnight (Krishna Pascha) on the day following either the new moon or full moon, respectively. The lunar month or moon month is followed in most parts of India.

The lunar day is called 'Tithi' or 'Vasara' whereas the solar day is called 'Divasa'. The duration of lunar day (23 hours, 37 minutes) is shorter than solar day (24 hours) by 23 minutes. The 'Tithi' is further divided into 'Ghatika' (equal to  $1/60^{\text{th}}$  of Divasa), 'Pala' (equal to  $1/60^{\text{th}}$  of Ghatika) and 'Vipala' (equal to  $1/60^{\text{th}}$  of Pala). Two 'Ghatika' is equal to one 'Muhurta' which is equal to 48 minutes of Gregorian calendar.

'Pradosha' is the time-period stretching for two muhurtas ( $1/15^{\text{th}}$  of the time between sunrise and sunset; approximately 1 hour 36 minutes) after sunset. 'Madhyahna' is one-third of the time-period between sunrise and sunset. This fraction covers mid-day. These dates are valid only on non-intercalary thithis for all lunisolar festivals. Both leap days and non-leap days in leap months are deemed unfit for festivals. Kshayamasas (the month during which there are two surya sankantis and the month is deleted or dropped) are not an issue here because jugma months are deemed fit for religious observance and in the Eastern and Northwestern schools, the extra intercalary month is deemed to be normal. And finally, if the given 'Tithi' doesn't cover the given time, or covers the given time on two solar days, then the second solar day is reckoned to be the respective festival.

The twelve places or 'Rashi' through which the Sun passes during a year are named after group of stars called 'Nakshatras'. There are 28 nakshatras or constellations. Nakshatras, being unequal in size, do not have same number of stars, some have even one or two. Each Rashi consists of two or three nakshatras.

The solar year is divided into two halves under Hindu calendar. 'Uttarayan' is the movement of Sun apparently (actually due to movement of Earth around the Sun) towards the Northern hemisphere in first six months from 'Makara Sankranti' to 'Karka Sankranti', i.e., from Pausha (January) to Aashaadha (June). The period of Uttarayan is also called God's Day in Hindu mythology. On the other hand 'Dakshinayana' is the period of six months from July to December when Sun moves towards Southern hemisphere. This period is called God's Night. Thus, one solar year equals one day and one night of the God.

In Hindu mythology, there is reference of four eras or 'Yugas'; Satya Yuga, Treta Yuga, Dvapara Yuga, Kali Yuga. It is believed that 'Krita Yuga' or 'Satya Yuga' is the golden age of truth and perfection as there existed one religion, and all men were saintly. There was no requirement to perform religious ceremonies and all mankind could attain supreme blessedness. There was peace, tranquility, fulfilment and bliss in this era for one and all. During 'Treta Yuga' virtue diminished. Many Kings rose to dominance and wars for superiority in terms of wealth, land and other earthly pleasure became order of the day. Changes occurred in weather conditions resulting into formation of oceans and deserts. Agriculture and other economic sources declined and average lifespan of humans reduced. In 'Dvapara Yuga' people became tainted with tamasic qualities and fall prey to diseases and ill will. There was further reduction in the average lifespan of human beings. Presently, we

are in 'Kali Yuga' which started in 3102 BC. This is the age of darkness and ignorance. People become sinners and lack virtue. They become slave to their passions and the lifespan of human is drastically reduced.

### **III. Indian Calendars in use**

Indians have used many kinds of calendars during their long history. The beginnings of the astronomical ideas can be traced to the Vedas and the earliest treatise of vedān'gajyotisa is aware of the ingredients of the calendar. Out of all ancient cultures, India alone did not have one official calendar across the whole country due to historical reasons. Region wise calendars being followed in India can be categorized as below.

The Southern Amaanta Lunisolar Calendar is predominantly followed in the South and South-West Indian states of Andhra Pradesh, Karnataka and Maharashtra. The Southern Amaanta Calendar differs from the Western Amaanta Calendar in its treatment of kshayamaasas, the New Year Day and the Era followed. It is believed that the Southern Amaanta Calendar follows the Southern School for treating kshayamasas. Some scholars suggest that it follows the Salivahana Saka Era starting with Chaitra Sukla Pratipada, the lunar day after the last new moon before Mesha Sankranti. The years are also named according to the names of the Jovian years. The Eras and handling of kshayamaasas will be discussed in detail in their respective segments.

In West India, specifically, in the state of Gujarat, the Amaanta calendar is of two forms, one that starts with Aashaadha (followed in the Kathiawar region) and one that starts with Kartika (followed all throughout Gujarat). Both calendars follow the Vikrama Era and both also possibly follow the North Western School for kshaya months.

The Purnimaanta Calendar is followed in most of North India, i.e., in the states of Bihar, Himachal Pradesh, Uttar Pradesh, Haryana, Punjab, Jammu and Kashmir and Rajasthan. (Earlier literature fails to mention Uttaranchal, Chattisgarh, Jharkhand and Delhi, but they are off-shots of bigger states and would necessarily follow the same calendar). The last of the three Indian lunisolar calendars, this one differs from the Amaanta calendar in that the months are reckoned from full moon to full moon. Therefore, the Purnimaanta calendar starts two weeks before the Amaanta calendar does; that is, it starts with the lunar day after the last full-moon before Mesha Sankranti. The Vikram Era is followed, along with the Northern School of Jovian-year names.

The Malayali Calendar is predominantly followed in the South Indian state of Kerala. It is essentially a solar calendar. The year starts with the Simha Sankranti and follows the Kollam Era. The month begins on the same day as a Sankranti if it occurs before aparahna, i.e., three-fifths of a day. Otherwise, it begins on the next day.

The Tamil calendar is followed in Tamil Nadu. This calendar is also solar; the month begins on the same day as a Sankranti if it occurs before sunset. The Kali Era is followed along with the Southern Jovian cycle. One peculiarity about the Tamil calendar is that its month names start with Chittirai (Chaitra).

The Bengali calendar is predominantly followed in West Bengal, Assam and Tripura. The Era is the Bengali San. The rule for the beginning of the month is again different; the month begins on the day after a Sankranti, if it occurs before midnight. Otherwise, it begins on the third day.

The Oriya calendar is followed in the Eastern state of Orissa. In addition to the Bengali San, the Saka, Vilayati and Amli eras are followed. The month begins on the same day as that of the respective Sankranti.

Promulgated in 1998 CE, the Nanakshahi Calendar is followed in Punjab. It's intrinsically linked to the Gregorian calendar, except in its usage of the Nanakshahi Era.

### **IV. Classification of Indian Calendars forms**

In India, various forms of calendar came into picture based on various eras, e.g., Vikram Samvat, Saka Samvat, Hijri Calendar, Gregorian Calendar. While Gregorian is solar system based, Hijri is Lunar system based, Vikram and Saka Samvat are Luni-Solar system based.

The Vikram era started 56 years before the Christian era, e.g., 56 BC and is in force in almost all of India except the region of Bengal. Historians believe that this era is established by King Vikramaditya of Ujjain to commemorate his victory over Saka rulers. Others are of the opinion that Vikram Samvat was originally instituted by the Malwa Ganarajya and is named after Chandragupta Vikramaditya when he conquered Malwa around 400 AD.

The Calendar is 56.7 years ahead of the solar calendar. The new year begins with the first day after the new moon, in the month of Chaitra which usually falls in the month of March-April in the Gregorian calendar. In Nepal, it begins in mid-April marking the start of the solar new year. It has 354 days in a year divided in 12 months namely, Chaitra, Vaisakha, Jyeshtha, Aashaadha, Shraavan, Bhadrapada, Ashwin, Kartika, Margashirsha, Pausha, Magha, and Phalgun. To adjust the difference of 11 days with the solar year, Vikram Samvat has an extra month added known as Adhik Masa after a cycle of every 3 years and every 5 years, 13 months.

The calendar form of Saka Samvat was initiated by King Shalivahan in 78 AD. Historians have confusion of whether Shalivahan was Saka himself or had conquered Sakas. Saka calendar begins on 22 March every year except in Gregorian leap year when it starts on 21 March.

Hijri calendar is Arabic in origin. Previously termed as 'Amulfil', it changed to Hijri or hejira after the death of Prophet Mohammed to commemorate his hijrat, from Mecca to Medina, which took place in the 52<sup>nd</sup> year of his life in 622 AD. This year became the zero year for the Hijri era. A year under this calendar is lunar and is divided into 12 months, having 354 days in a year. The day commences with a sunset in this calendar. This calendar was adopted in India during the reign of Muslim rulers. The 12 months are Muharram (Islamic New Year), Safar, Rabi-al-Awwal, Rabi-ath-thani, Jamada-al-ula, Jamada-al-akhirah, Rajab, Shaban, Ramajan, Shawwal, Dhu-al-Qadah, Dhu-al-Hijjah. The months are completely lunar and occur in such a sequence that there is no relation whatsoever either to the cycle of the season or the solar year, as the difference between the solar year and the lunar year is not adjusted under hijri calendar. Thus, it falls short of one year every 33 years compared to the Gregorian calendar.

Gregorian calendar is based on the birthday of the founder of Christianity, Jesus Christ. It is a solar year commencing from the first day of January and consists of 365 years, 5 hours, 48 minutes and 46 seconds. This extra time over 365 days is adjusted by adding one day every four years in the month of February.

### **V. Conclusion (National Calendar of India)**

The Saka calendar was adopted as the National Calendar in the year 1957 by the Calendar Reforms Committee after certain rectification of some local errors through notification in the Official Gazette by Government of India. It came in use on 22 March, 1957 as per Gregorian calendar which was actually Chaitra 1, 1879 as per Saka Samvat. It was adopted as National Calendar of India in order to synchronise the usage of 30 different kinds of calendar used in India at that time.

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