

The Potential Of Astro-Tourism In India

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Abstract:

Astro tourism is the practice of going outside to observe the stars and other celestial occurrences. This promotes community engagement, empowerment, and participation as well as regional growth. Being one of the important industries for promoting sustainable development in rural areas is tourism. It is important to find a product that combines the specific resources of the rural area with consumer demand. India being a vast country with about 75% of the rural population has a vast potential for Astro tourism. This study aims at reviewing the literature on Astro tourism and tapping its potential. This study also aims at identifying and developing Astro destinations all over the country and providing basic facilities at these destinations for tourists.

Key Words: Astro destinations, Observatory, Telescope, Astro tourism, Astronomy, Constellation, Milky way, Astro photographers.

Introduction:

Astro tourism is an alternative, niche, special interest, nature based, rural and a kind of Eco-Tourism. Astro Tourism, defined by John Barentine of the International Dark-Sky Association as "any kind of tourism that involves the night sky or visiting astronomy facilities like observatories, and combining that with a wider sense of ecotourism where visitor experience is primarily about interaction with nature. The thing about stargazing is that, in theory, you can do it from anywhere in the world. You can look up at the night sky for your favourite constellation or point a telescope at the International Space Station when it passes close to your latitude and longitude. Well, that used to be the situation. You see, darkness is necessary for the best conditions for extra-terrestrial tourism. Our world is more illuminated than ever as cities develop and suburban sprawl spreads. As a result, light pollution, which covers 80% of the earth's surface, including 99% of the skies in America and Europe, prevents us from seeing what is happening in space. For 80% of North Americans, the Milky Way is only visible in the form of a candy bar. They can no longer see the galaxy itself above them. The solar eclipse of 2017—during which an estimated seven million people travelled to and through America to be in its path—is another factor contributing to the rise in Astro Tourism. It was a celebration with solar curtains, daytime darkness, and a special view into the skies above that opened up new

possibilities for both tourists and destinations. The increasing demand for the night sky is due to the combined efforts of astronomers, academics, ecologists and associated movements to defend starry skies. These efforts have led to the creation of dark-sky reserves and starlight parks worldwide, which consist of spaces generally linked to intact natural areas with low air pollution values and far from light pollution sources (Tapada et al., 2021). Thus, Astro Tourism has become an important way to promote, use and defend night skies because of consumers' growing awareness of this resource (Iwaniszewski, 2015; Cooper et al., 2018).

Astronomy is a branch of science that includes the investigation of all extra-terrestrial events and objects. Astronomy was primarily concerned with noting and predicting the positions of the Sun, Moon, and planets up until the invention of the telescope and the discovery of the laws of motion and gravity in the 17th century, initially for calendrical and astrological purposes and later for navigational uses and scientific interest. The list of things being researched nowadays is significantly larger and includes the solar system, the stars that make up the Milky Way Galaxy, and other, more distant galaxies, in that order of increasing distance. Earth is now being examined as one of the planets thanks to the development of scientific space missions, however, a more in-depth examination of the planet is still the purview of Earth sciences.

Methodology:

1. The information was collected from various online and offline sources.
2. Mainly secondary source was used.

Objectives:

1. The main objective of the present study is to explore the potential of Astro tourism in India
2. To promote Astro tourism in the country.

Literature Review:

Following a review of the relevant literature, the concept of Astro Tourism presented here has been developed. Astro Tourism is a leisure activity that falls under the categories of ecotourism and scientific tourism. It is defined as the action of organising travel to, staying at, and experiencing new and diverse astronomical experiences that are not available where one resides. Due to its relationship to the preservation of the night sky, Astro Tourism is viewed morally as a sustainable and Eco touristic activity. As a result, even though Astro Tourism can be done in a non-sustainable fashion, it shouldn't be done, for example, Astro Tourism packages that include night-fishing or night-hunting, among other activities. There are currently four recognised Astro Tourism modalities: Astrophotography, amateur Astro Tourism, night Astro Tourism, and spiritual Astro Tourism. Astro-tourism, which is also categorised as a subclass of nature-based tourism, is a type of tourism focused on visitors' specific interest in sky-related activities including sky viewing and astrophotography (Cater, 2010; Weaver, 2011). This more recent type of tourism heavily relies on the location's physical characteristics, incorporating both earthly and shared sky aspects (Collison & Poe, 2013; Keller, 2010). Astro Tourism is built on travellers' interest in sky-related pursuits like astrophotography and dark sky viewing,

which is most frequently done in a setting that emphasises nature (Soleimani et al., 2019). According to Fayos-Solé et al. (2014), astronomical, cultural, and environmental activities are all included in the definition of "Astro Tourism," which is described as "tourism employing the natural resource of unpolluted night skies, and suitable scientific knowledge." It concentrates visitor attention on the observation and appreciation of naturally occurring celestial events (Weaver, 2011) and is thought to be a noble approach to bring visitors closer to nature (Fayos-Solé et al., 2014), providing a type of ecotourism (Weaver, 2011; Najafabadi, 2012). It has been labelled as sustainable tourism, meaning that its most valuable assets never require upkeep or expansion. Location is crucial for viewing space more deeply through a clear, starry night sky, which is a kind of "tourism in its most natural settings" (Najafabadi, 2012:129). It might potentially attract a sizable number of tourists to a location with clear sky free of artificial light pollution. Previously ignored by earlier travellers, these bleak locations with their apparent desolation have recently emerged as noteworthy attractions (Ingle 2010).

Niche tourism is a calculated strategy to match distinctive goods to a target market segment. It is special and location-specific (Boekstein & Tevera, 2012), more community-oriented, protective, and sustainable than other forms of tourism (Chan & Bhatta, 2013; Espiner et al., 2017), and so perfect for a rural tourist destination. Astro Tourism is a specialised industry with a developing global following (Fayos-Solé et al., 2014; Muir, 2014). It falls within the category of sustainable tourism, meaning that none of its best qualities ever need to be developed or maintained (Najafabadi, 2012; Belij & Tadic, 2015). Astro Tourism helps developing nations, even the smallest ones, to showcase their wares without the need for giant observatories or enormous telescopes (Belij & Tadic, 2015).

The numerous trip composition types allow the location the chance to design a variety of travel packages with a wide range of activities and services (Collison & Poe, 2013). As a result, Astro Tourism offers chances for unanticipated partnerships between local communities, scientific institutions, and tourism stakeholders (Fayos-Solé et al., 2014). A desired feature would seem to be tour guiding and interpretation, with some level of expert supervision and knowledge needed to improve product delivery (Ingle, 2010). The market is viewed as being extremely expensive and demanding high-end, heavy equipment. In certain places, tours are offered both during the day and at night, including online ones that don't require attendees to be physically present at the observatory (see Collison & Poe, 2013). Travelers that engage in science tourism also utilise standard tourist infrastructure, such as hotels, restaurants, and transportation, as well as the most cutting-edge audio-visual equipment for seminars and experiments (Molokacova & Domaracka, 2011)

The term "Astro Tourist" refers to a traveller who plans and undertakes an Astro Touristic journey and whose motives, interests, and desires are strictly related to any type of Astro Touristic activity or Astro Touristic destination. In other words, astronomy enthusiasts who are interested in the leisure activity of Astro Tourism are known as Astro Tourists. Astro Tourism is only successful when the target audience's action (attending astronomy-related activities) is ongoing or has been finished when the traveller/customer is on the trip. Regardless of the audience's motive for travelling, if the Astro Touristic activity is postponed or cancelled for whatever reason, even though the public objective may have already arrived at the site, it will

not be regarded as Astro Tourism. As Astro excursionists exhibit the same behaviour as Astro Tourists, with the exception that they engage in same-day activities, therefore this concept and the examples that follow are also applicable to them. However, they will not be completely examined in this dissertation. Eight different categories of Astro Tourists can also be highlighted, including academic groups, professional stargazers, amateur astronomers, astronomy enthusiasts, Astro photographers, cultural and natural Astro Tourists, and visitors from astronomy-based institutions.

The places where Astro Tourism activities take place are known as Astro destinations or Astro Touristic destinations. Destinations for Astro Tourists fall into two categories: Specific Sites and Non-Specific Sites (adapted from Matos, A. 2017). The locales that are ideal for hosting Astro Tourism experiences and are surrounded by favourable atmospheric, physical, technological, and geographic characteristics are known as Specific Sites. These locations can be separated into two subcategories: those that are infrastructure-related, such as planetariums and astronomical observatories, and those that are locations of extremely specific astronomical events, such as eclipses, northern lights, and constellations, among others. Non-Precise Sites are places where Astro Tourism activities can be carried out impromptu without the requirement for extremely specific geographical, physical, technological, and atmospheric conditions. These locations can also be found in regions that are home to certain astronomical phenomena like meteor showers, constellations, the northern lights, and others. Mountainous locations, the ocean, protected sky parks, and desert regions are a few examples of non-specific sites. (Hobkirk, 2020)

Astro Tourism, commonly referred to as astronomical tourism, is a growing industry that is revolutionising both traditional rural and nature tourism. Astro Tourism is one of the ways that contemporary provincial tourism could revitalise rural communities and draw visitors to fashionable locales by promoting environmental conservation (unpolluted nightscapes, and igniting preservation policies) and popularising science among travellers (Hobkirk, 2020). The joint efforts of astronomers, academics, ecologists, and related movements to protect starry skies are to blame for the rising demand for the night sky.

Dark-sky reserves and starlight parks, which are generally connected to unaltered natural areas with low levels of air pollution and far from sources of light pollution, have been established as a result of these efforts all over the world. Because consumers are becoming more aware of this resource, Astro Tourism has emerged as a crucial means of promoting, using, and defending the night sky (Iwaniszewski, 2015; Cooper et al., 2018). This tourism practise is a clear and sound alternative that brings visitors closer to nature and at the same time an intelligent way of igniting people's interest in astronomy (Fayos-Solá E. et al., 2014).

Observations of comets and eclipses, astrophotography, trips to open-air astronomical observatories, archaeotourism, and Ethnotourism are only a few examples of the many types of Astro Tourism. Visitors are drawn to astronomy-related destinations because Astro Tourism participants take part in celebrations or observations of solstices, equinoxes, aurora borealis, and other astronomical events (Iwaniszewski, 2015). These initiatives encourage the preservation and protection of starry skies by highlighting the inspiration that led humanity to

make scientific and technological advancements (Soleimani et al., 2019), promoting the preservation and maintenance of starry skies (Marn & Jafari, 2007). However, and keeping in mind that amateur and professional astronomy first emerged in the second half of the 18th Century and has existed for centuries, there has been a pronounced growth in the number of people who have started variable star observing (VSO) because of the increasing ease of being able to buy affordable equipment and the growing need for originality inbred among new wave fans, due to their desire to seek out unique meaningful tourism experiences (Kannappan S., 2001).

Astronomical tourism is a complex, multifaceted phenomena that sits at the nexus of different social relationships (Charlier & Bourgeois, 2013). For low-density areas, this specialised tourism can be a valuable resource (Rodrigues, Rodrigues, & Peroff, 2015; Jacobs, Du Preez, & Fairer-Wessels, 2019; Soleimani, Bruwer, Gross, & Lee, 2019), but the emphasis on Astro Tourism is relatively new and is a result of a growing consumerist trend that views the night sky as a scarce, debatable resource. According to Fayos-Sola, Marn, and Jafari (2014), Matos (2017), Cooper et al. (2018), and others, Astro Tourism encourages new experiences and direct engagement with protected natural areas.

Scope of Astro tourism in India:

The Rig Veda makes mention of astronomy-related subjects. This demonstrates unequivocally that astronomy had its beginnings in India long before the Vedic era. The Vedas make multiple references to astronomy. For the following a thousand years or so, there are no particular records of the development of astronomy in India after Vedang Jyotish (Mohan, 2016). According to Kautaliya's Arthshastra, which was written around 300 B.C., astronomy had not made much progress from the state it was in when Vedang Jyotish was written. There is a book about astronomy that was composed about a hundred years after Arthashastra. This book explains the universe's structure as it is mentioned in sacred texts. The astronomical information in the book is comparable to that in Vedang Jyotish. Even after that work, we do not have records of any significant astronomical works for another hundred years until the year 499 A.D., when Aryabhata's book "Aryabhatiya," which is still in print today, appeared. The Mughal Empire experienced a confluence of Islamic and Hindu astronomy in the seventeenth century. Hindu computational methods were blended with Islamic observational tools. Muslim and Hindu astronomers in India continued to make significant strides in observational astronomy and published roughly one hundred works known as Zij Astronomy while there appears to have been considerable scepticism of the planetary hypothesis. In Delhi, Himayun had erected a private observatory. In actuality, he passed away as he sprinted down the stairs from his observatory, which was perched on the roof of his Delhi fort. He heard the call to prayer from the Mosque and hurried to be in time to offer his evening prayers.

Shah Jahan and Jahangir also wanted to construct observatories but were unable to do so. Jai Singh II of Amber attempted to revive both Hindu and Islamic traditions of astronomy as the Mughal Empire was coming to an end. While the computational methods used in his observatories were derived from Hindu astronomy, the apparatus he built in them were influenced by Islamic astronomy.

In recent times, Astro Tourism has also become more popular in India. The Ministry of Tourism has taken another initiative to examine and investigate "Nature-based Tourism." Through its "Dekho Apna Desh" webinar series, the ministry promoted the idea. It is anticipated that rural areas would become major destinations for Astro Tourism. One of the first Astro-villages in India will be built in the Chamoli District of Uttarakhand, which is 2,600 metres above sea level. Ladakh will soon become home to India's first night sky sanctuary, which aims to increase astronomy travel to the nation and draw foreign academics to the area to use its high-altitude telescopes. The Changthang Wildlife Sanctuary in Ladakh's Hanle will include the projected Dark Sky Reserve, which will be established by the Department of Science and Technology. This will increase astronomy tourism in India because it will be one of the highest-located optical, infrared, and gamma-ray telescope locations in the world. According to the State Department of Art and Culture, Astro-parks are also being built in Mandu, Madhya Pradesh, and Jaipur. Technically, all you require are clear, night time sky devoid of light pollution coming from the cities.

As of now, there are no astrophotography courses available in India. India has a vast potential for astrophotography. There are a number of places in India where these activities can be promoted.

For astrophotography, a strong passion is essential. The various pieces of equipment required for astrophotography are as under:

1. Camera (DSLR or Mirrorless)
2. Lens (Kit Lens or Wide-angle lens)
3. Tripod.
4. Remote Release.
5. Intervalometer (required only for star trails)
6. When viewing the night sky, a red spotlight is invaluable.
7. A sky map app on your smartphone, or a physical star chart if you're old-fashioned.
8. A beginner-friendly refractor telescope or a more sophisticated Dobsonian telescope.
9. A power tank to meet all of your needs for rechargeable batteries.
10. A comfortable sleeping bag, a backpack filled with necessary snacks, and a tent.

With a little bit of knowledge, you can enjoy the night sky without having to go out and buy equipment. As follows:

1. Use a map to familiarise yourself with the night sky so you know what to gaze at.
2. Select a location that is free of light pollution and high enough to provide you with unrestricted views.
3. Wait for your eyes to acclimatise to the darkness. It's crucial that you don't look at your phone or turn on a flashlight during this period of acclimatisation.

In India there is a vast scope for astrophotography. There are numerous places in India where one can do astrophotography. Some of the best places for astrophotography in India are discussed briefly as under:

1. Chamoli (Uttarakhand):

In Uttarakhand, the Benital area in the Chamoli district is the best location for astronomy visitors. It is situated at a height of 2500 metres.

2. Matheran (Maharashtra):

With no automobiles permitted inside the town boundaries, Matheran is one of India's most environmentally protected regions, therefore the sky should be clear and lovely. It is quite a sight to see at night when the unpolluted sky lights up.

3. Nubra Valley (Ladakh):

One of the best locations in India for stargazing is Ladakh. Nubra Valley in Ladakh offers unmatched vistas of the night sky, allowing you to realise your astrophotography aspirations. Your mornings full of captivating lakes and breath-taking vistas, and your nights full of starry skies.

3. Lake Shirotra (Maharashtra): -

Due to its proximity to Mumbai and Pune, as well as its lush forest cover and lovely bankside, Lake Shirotra is a convenient location for stargazing. Its banks serve as a camp site for Fort Rajmachi. It's a unique area, free of pollution, and perfect for stargazing in India.

4. Sunderbans (West Bengal):

The Sunderbans, which are less well-known even among astronomy enthusiasts, not only provide clear sky for stargazing with shooting stars supposedly visible every ten minutes, but also water with bioluminescent bacteria that gives the water a distinctive shine.

5. Jaisalmer and Bikaner (Rajasthan):

Desert stargazing is always unique. untouched by any concrete barriers. You won't regret it if you ask for a safari the next time which includes a night in the desert.

6. Kuari Pass (Uttarakhand):

Five rivers may be found in Kuari Pass, Uttarakhand, which is also known as the Curzon Trail. When the sun and moon are out, it provides an amazing perspective of the Himalayas. Even during his downtime, the trekker has breathlessness due to the Himalayan peaks' emphasis at night.

7. Yercaud (Tamil Nadu):

Yercaud in the south of India, one of the country's underappreciated hill regions, also provides stunning opportunities for astronomy. It is known as the Jewel of the South and is surrounded by trees, possibly due to the strings of stars that show at night.

8. Nainital (Uttarakhand):

The Himalayan Belt of the Indian state of Uttarakhand is home to Nainital, commonly referred to as the "Lake District of India." It is frequently known to as "The Lake of Three Sages" or

the "Tri-Rishi-Sarovar" because it is located within the Kumaon Hills. Tourists love it because of the picturesque scenery and tranquil environs. P. Barron, a British businessman who was mesmerised by the area's beauty and who founded a British colony here in 1839, is thought to have made Nainital renowned. The Aryabhata research observatory, the oldest observatory in India, is a must-see for space aficionados. The observatory features the biggest telescope in India, enabling you to see Jupiter's rings right here in India.

9. Andaman and Nicobar:

Nicobar and Andaman Man has always craved solitude; examples include vacations at warm, tropical beaches. Whether it's the beaches of Ibiza or the Brazilian Amazon, solitude transports travellers to a level of tranquilly that very few travel destinations in today's congested world can provide. You can find the solitude you're looking for on the Andaman and Nicobar Islands. While the region's numerous beaches draw visitors from far and wide, one of these islands' lesser-known features is the opportunity it provides for stargazers. All you have to do is either lie down under the starry sky or look up at the clear night sky, which is illuminated by millions of stars.

10. Rann of Kutch (Gujrat):

One of the best places in the nation for stargazing is the vast salt desert of the Rann of Kutch. This stunning environment, which is well-liked by astronomers and astro-photographers, is equally peaceful and lovely. Given the size of this geographical phenomenon, stargazing with the naked eye is simple in this location.

11. Spiti Valley (Himachal Pradesh):

The Spiti Valley is an uninhabited, high-altitude, chilly mountain desert that is mostly always covered in snow. Kibber Village in the valley is notable for excellent stargazing opportunities during the summer.

12. Sonmarg (Jammu & Kashmir):

Sonmarg is a campground in a lovely meadow in the high Himalayas. Despite being well-liked by tourists, the area is uninhabited, which, together with its high elevation, accounts for why is favourite stargazing destination.

13. Coorg (Karnataka):

Tucked away in the Western Ghats, Coorg is renowned for its enticing fauna, emerald highlands, and fragrance coffee plantations. Choose a homestay in a little village in the region's interior, far from bigger cities like Madikeri, to improve your experience stargazing.

Discussion:

As far as the definition of the term Astro Tourism is concerned, there is no consensus. Previous researchers have shown that tourist sites rely more on their distinctive items to draw tourists than basic products like lodging and transportation (Benur & Bramwell, 2015). The significance of the sky in giving visitors a memorable experience has, however, mostly been

overlooked in tourism studies (Collison & Poe, 2013). By integrating destination earth elements and sky features, the study can be used to establish astro-tourism as a new media in conceptualising tourism destination picture. Targeting. One of the new chances to provide distinctive tourism goods is to mix the sky aspects of a destination with the earthly facilities to draw guests.

Besides the above-mentioned famous stargazing sites, there are other end number of sites present in India for the said activity. The state should provide all kind of basic facilities at these sites for success of the said tourism. India should not only identify the Astro destinations but also promote them at national and international levels with its SWOT analysis. This will certainly add in tourism boost particularly in Rural tourism.

Conclusion:

The Astro tourism concept is still in its infancy stage. Its promotion will not only attract more and more tourists but will also boost the employment particularly in rural areas. India being a vast country area and population wise can tap the potential of Astro Tourism. Providing basic facilities at Astro destinations will attract the tourists from all over the globe. Luxury resorts all around India are very interested in including Astro-experiences in their menu of services for visitors. The emergence of dark sky parks, the astronomical equivalent of national parks and other dark sky locations prepared to serve this demand will be the driving force behind this.

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