

Astro-Tourism in India: A Sustainable Livelihood Approach

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ABSTRACT

Tourism is a key catalyst through which rural development can be achieved in a sustainable way. After COVID pandemic, 'Nature-Based Tourism' or 'Special Interest Tourism' emerge rapidly. As a combination of these two, Astro-tourism offers immense roles to create social, economic and environmental benefits in remote areas. Astro-tourism is an emerging type of sustainable community-based tourism which attracts people travelling to destinations where they can enjoy the dark sky with free of light and air pollution. India is the potent prime destination of astro-tourism due to its favourable social, economic and environmental factors. Despite seeing a strong growth in recent years, astro-tourism is the lesser-known sector in India. In this backdrop, *the study aims to analyse, how astro-tourism will be the strong sustainable livelihood option in Indian context.* The study is descriptive in nature and based on secondary data, which were collected from various websites and research articles. The study reveals that supporting astro-tourism in India will not only appeal more and more tourists but will also increase the employment opportunity, particularly in rural areas. Astro-tourism is a balanced option by which India's unemployment and pollution problem can be mitigated simultaneously.

Keywords: *Astro-tourism, Sustainability, Nature-Based Tourism, Special Interest Tourism*

Tourism is one of the world's fastest and largest expanding sectors. It is a potent driver for economic prosperity due to its forward and backward economic linkages. In a study, India, Indonesia and Brazil found that tourism-related forward and backward linkages were exceptionally strong compared to other sectors. Such strong economical nexuses create synergical effect on employment generation and poverty reduction. Indian tourism sector is anticipated to generate 78 jobs opportunities per million in compare to 45 jobs in the production sector. Tourism has also been acclaimed for its role to sustainable development. It is explicitly featured in Sustainable Development Goals (SDGs) 8, 12 and 14 (https://spb.kerala.gov.in/economic-review/ER2016/chapter09_01.php, 28-10-2025).

After COVID pandemic, 'Nature-Based Tourism' or 'Special Interest Tourism' emerge rapidly. As a combination of these two, Astro-tourism offers immense roles to create social, economic and environmental benefits in remote areas. Astro-tourism is a niche or community-based tourism where tourists can experience with astronomical events such as

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night sky watching and astrophotography (Soleimani et al., 2019). The most significant appeal of astro-tourism is rediscovering the cosmic events which are lost within the light and air pollution (Oksuzl et al., 2025). Astro tourism has some related sub-specialities, such as it boosts cultural tourism, countryside tourism, environment tourism and eco-tourism etc. According to the Statista, the world astro-tourism sector was assessed at on or about 250 million dollars in 2023 and is anticipated to grow significantly at CAGR of 10% CAGR by 2030. The South Asia and Middle East are considered as major potent destinations of astro-tourism. In India, the culture of Astro tourism is a latest boom. Darkness with free of light and air pollution is the prime prerequisite for the astro- tourism. But light and air pollution are the main obstacles for astro-tourism. Our environment is over lightened than its essential requirements. Presently, earth surface is occupied by 80% of light pollution and specially 99% of the skies in America and Europe. Due to the galloping increasing pollution of cities and semi urban areas in India also, gazing at stars appears impossible. So, India develops a great number of locations that provide to see most beautiful cosmic events like stars, planets, Milky Way and meteor showers.

REVIEW OF LITERATURES

A study of the relevant literatures is given below:

Year	Author(s)	Essence of the study
2016	Faid <i>et al.</i>	Analyzed the status of light pollution and its negative effect on cosmic events in bare eye in selected areas in Malaysia.
2019	Jacobs <i>et al.</i>	Described how astro tourism can be recognised as feasible mechanism to achieve sustainable development in a rural context.
2021	Khan and Guleria	Studied to identifying and developing astro destinations all over India and providing a roadmap for basic infrastructure requirements at these destinations.
2022	Khetrapal and Bhatia	Suggested that astro tourism serves as a viable means of re-establishing the relationship between human and nature. The study based on historic monuments on Khajuraho in India.
2024	Sharma and Chinu	Explored the importance of astro-tourism business to promote the sustainability, which has lower management costs, enhance visitor experiences and improve tourist experiences.
2025	Oksuzl <i>et al.</i>	Found out that astro-tourism is an important engine for sustainable socio-economic development.

After reviewing the relevant literatures, it is found that very few researches have been conducted on the topic of astro- tourism in India. Almost no study has been conducted on identifying the issues and challenges involved for successful implementation of astro-tourism in India. The present study is trying fulfil the research gap.

Objective

The study thrives to analyse how astro-tourism will be the sustainable livelihood option in India.

The specific objectives are as under:

- To highlights the present status astro- tourism in India.
- To find out the issues and challenges of Indian astro-tourism sector.
- To make a roadmap for successful implementation of astro- tourism in India.

METHODOLOGY

This study adopts descriptive approach, utilising descriptive statistics to analyse the data. The source of the data is secondary, which were collected from the various websites.

ANALYSIS

Astro-tourism in India

Astro-tourism is growing tourism sector in India because it has offers incredible cosmic events. The Indian Astronomical Observatory at Hanle in Ladakh is one of the world's highest locations for cosmic experiences with the help of telescopes. This area was designated as a first Dark Sky Reserve in India in 2022. Various Indian corporate players are also contributing to the growth of astro-tourism. The Starscapes was established in 2015, offers astronomical experiences across various locations in India. It also provides scientific learning of cosmic matters to the visitors. World's most popular astro-tourism event, named "Nakshatra Sabha", has been organized by the Starscapes each year in collaboration with the Uttarakhand Tourism Development Board. The main purpose of each edition of "Nakshatra Sabha" is to explore astronomical wonders side by side experienced with cultural significance and regional natural beauty (<https://www.starscapes.zone/nakshatra-sabha>, 10-11-2025).

Analogously, Astrostays and other numerous private entities encourage local residents to be an astronomy guides, resulting in sustainable livelihoods as well as preserving cultural legacy. According to the trial pilot projects, organized by Astrostays near Pangong lake in Ladhak in 2019, 6 newly build astro home could accommodate 670 travelers, generated 3200 dollar revenue and had an impact 45 family indirectly (<https://www.youtube.com/live/hcwvlgOj1to?si=cOYHWSGvqWZGmYDT>, 11-11-2025). Hanle Dark Sky Reserve in Ladakh has witnessed a substantial increase rise of visitors from 500 in 2019 to more than 5,000 in 2023, which directly benefitting homestays and small businesses in this region. The overall expansion of Astro-tourism sector in India is illustrated in the figure 1 below.

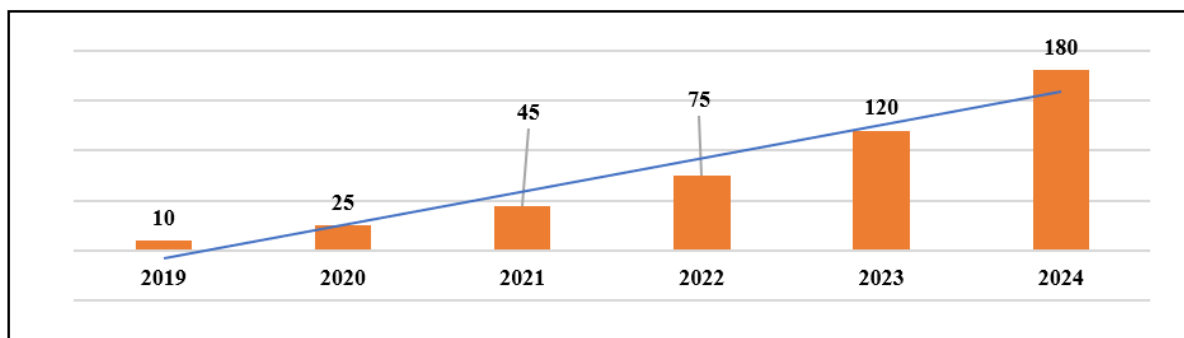


Figure 1: Growth of Astro-tourism in India (in thousands of visitors)

(Source: <https://www.equentis.com/blog/astrotourism-a-multi-billion-dollar-opportunity-in-the-night-sky>, 10-05-2025)

In India, there is a vast opportunity for astro-tourism. Its geographic multiplicity makes it perfect for astro-tourism. Here are some of the best places for astro-tourism in India are reflected briefly as under:

Table 1: Astro-tourism sites in India

Sites	State/Union Territory
Chamoli	Uttarakhand
Matheran	Maharashtra
Nubra Valley	Ladakh
Lake Shirotra	Maharashtra
Sundarbans	West Bengal
Sandakfu	West Bengal
Jaisalmer and Bikaner	Uttarakhand
Kuari Pass	Uttarakhand
Yercaud	Tamil Nadu
Nainital	Uttarakhand
Andaman and Nicobar	Andaman and Nicobar
Rann of Katch	Gujrat
Spilt Valley	Himachal Pradesh
Sonmerg	Jammu and Kashmir
Coorg	Karnataka

(Source: Khan and Guleria, 2021)

Important issues

The notable issues associated with astro-tourism in India are discussed below:

- Astro-tourism is mainly community led rural based tourism. So, it promotes employment opportunities specially for women in the remote areas of India.
- Clean-pollution free atmosphere is the prime pre-condition for any astro tourism destination. Because of this, this type of tourism endorses environmental sustainability in India.
- High altitude Himalayan region and wide spread uninhabited terrain of India make it environmentally and geographically significant place of astro-tourism.
- Most of infrastructural requirements of astro-tourism are inexpensive and available in-build conditions, like homestay, telescope etc. Thus, setting up an astro tourism destination is not huge financial challenge in Indian context.
- Astro-tourism directly fulfills the various objectives of Sustainable Development Goals (SDGs) specially for Indian context. The features of astro-tourism and their aligned SDGs are shown in the table 2 below:

Table2: Alignment of Astro-tourism with SDGs

SDG	Feature of Astro-tourism
1: No poverty	livelihood creation
2: Quality Education	Promote scientific culture about astronomy within the rural Indian society
5: Gender equality	Women empowerment
8: Decent Work	Boost local economy through creation of local employment.
17: Partner for the goals	Multi stake holder approach

(Source: Authors` construction)

Challenges

Some serious challenges are associated with success of astro-tourism are as follows:

- Light pollution is the main obstacle of astro-tourism. Rapid urbanization in India, will totally jeopardize the natural favourable situation of astro-tourism.
- In India, light pollution has no any legal status. So, fighting against light pollution is very difficult at present scenario.
- Astro-tourism is totally based on night time. Therefore, law and order issue is the serious concern for this tourism sector.
- Astro-tourism in India is still unnoticed sector. Therefore, this sector has been suffering lack of skilled personnel.

Roadmap for astro-tourism

Some effective measures have to be taken for astro-tourism to be a successfully establishment in India, these are:

Collaboration: Collaboration with scientific institutions and private sector to develop relevant infrastructure for astro-tourist places in India.

Training and cultural integration

- To make 'Dark-Sky Watch Club' in the potent astro-tourist places.
- School students and teachers are to be volunteer in 'Dark Sky Watch Club' club and they will be properly trained. The training and certification will be imparted and proper registration should be needed by the tourism department.
- Astro-tourism should be integrated with local history and cultural narratives, which provides a holistic approach that portrays the unique heritage of any particular area.

Business, environmental and social integration

- Focus of astro-tourism will be on sustainability and environmental responsibility over profit making. So, astro-tourism activities do not damage the natural environment, local ecosystems, local culture and local customs.
- Most of the wild species are nocturnal. Their survival basically depends on night time environment. So astro tourism activities should not be hampered their natural habituated and movement during night time.
- Ensure that local people should be benefited from astro-tourism economically and culturally.

Marketing strategy

Government should promote publicity initiatives and comprehensive marketing strategies about astro-tourism to raise awareness among the travellers.

- **Legal framework**
Use of lights in night time should become under legal framework for minimizing light pollution, which are very much essential for astro-tourism.
- Government should make a proper guidelines and regulations to secure law and order situation in the astro-tourist areas in night time.
- **Land policy:** Government should take initiative to find out more astro-tourist places and ensure that selected places shall not be used for other purposes.

CONCLUSION

The astro-tourism concept is still in its beginning stage. Its boost will not only fascinate more and more tourists but will also increase the employment particularly in rural areas. India is a big and highly population country can knock the potential of Astro Tourism.

Astro-tourism is a typical form tourism sector in India by which rural employment opportunities can be generated by the sustainable way. Providing basic infrastructures at astro destinations will obviously attract the tourists from all over the world.

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Conflict of Interest

The author(s) declared no conflict of interest.

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