IN HARMONY WITH NATURE AND HERITAGE - ECOTOURISM DEVELOPMENT AT SACRED SITE MADURAI AZHAGAR TEMPLE

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Abstract
Azhagar Temple is one of the most significant sacred sites at Madurai, Tamil Nadu, located at the foothills of the Azhagar Hills surrounded by verdant surroundings. While the tourism industry makes money, it also degrades the environment and natural features of major pilgrimage destinations. Over the period of time, this place may face issues due to increase in population due to transit developments and increasing number of pilgrims. Although it is still in its infancy, ecotourism has a lot of potential in Tamil Nadu. Eco-tourism architecture promotes sustainable tourism at sacred sites by conserving natural ecosystems, water, improving air quality, and reducing travel distances between tourists and the natural world. There is a need to protect the environment and improve the quality of tourism because of the rapid urbanization that is surrounding the temple, endangering the ecosystem and biodiversity and degrading the site.

The goal of this research is to strike a balance between promoting sustainable practices that enhance visitor experiences while safeguarding the local ecosystem, and maintaining the site's cultural and spiritual significance. It starts with a detailed study and understanding of the historical, geographical, cultural, religious, and economic significance of the site (including the architectural economic development surrounding temples), as well as methodological aspects (reconnaissance survey, field-based survey, case study, and analysis), with a focus on the necessity of development that maintains the temple's sacred nature and give sustainable architectural solutions. The study will include data collection, survey maps from various stakeholders (government and people), and an analysis of the site to identify needs and flaws.

In Sacred sites, ecotourism influences hospitality architecture, recreation and spatial design and in the same way sustainable architecture can reduce environmental impact and technology integration (like passive cooling techniques, local construction skills, and renewable energy effectively). This will redefine the pilgrimage spatial experience by establishing a close relationship between spiritual exploration and ecological responsibility in the sacred city, through the use of sustainable architecture, cultural preservation, and community participation in context at Azhagar temple, Madurai. Through the results, it can enhance building's aesthetics and also user's quality by creating connection with nature.

Keywords: Sacred site, Eco-tourism, Sustainability, Pilgrimage

Introduction

Pilgrimage tourism is a type of tourism that encourages moral and religious humans to visit pilgrim sites. There are several pilgrim sites of numerous religions in India which magnetize a massive range of tourists from all over the international to visit those sites and gain visual experience of the structure. However, the majority of pilgrim sites are in suburbs, together with small towns, villages, or terrain, and due to the excessive influx of travelers to these locations and the fast increase of urbanization, these locations are degrading due to lack of sources to hold up with the boom inside the range of travelers, putting excessive stress on the site and antique heritage, and so on. The tourism in Tamilnadu is also increasing drastically (except pandemic time). As a result, the holy vicinity should deal with an accelerated number of tourists that exceeds the maximum potential of a location without other special planning, infrastructure, or greater features. This must be completed using imposing vital solutions for providing sustainable improvement that can assist urban designers, planners, architects, etc.
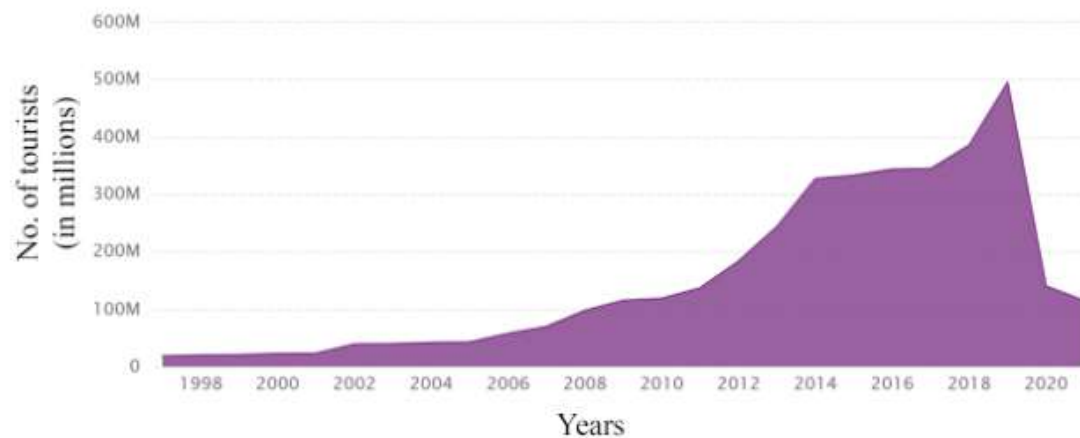

Fig 1.1 – Local tourist arrival in Tamil Nadu (from 1997 to 2022)
(source - https://www.ceicdata.com/en/india/resident-visits-by-states/visitor-arrivals-local-tamil-nadu)

Aim

The aim of this research is to preserve the sites and suggests sustainable architectural interventions for the ecotourism development of Madurai Azhagar Kovil, with the goal of balancing cultural, spiritual, and environmental factors.

Objectives
- To investigate the temple's historical background, architectural structures, and cultural values to show the significance of the sacred site.
- To examine the site's present tourism impact, including tourist numbers, challenges to the environment and infrastructure.
- To find the issues of the tourist facilities that are available in the research area.

- To recommend sustainable ideas and strategies that can enhance the cultural and spiritual importance.

Research Methodology

The study is generally exploratory in nature and used both primary and secondary data source to meet the objectives of the study. Most significantly the study used secondary data sources such as previous studies i.e. books, journals, reports, magazines and online data sources. This study has been conducted by tourist survey (primary data) using questionnaires for different set of people (Visitors, vendors & Local residents). The data analysis will address infrastructural problems, problem identification, and visitor interpretation for the purpose of developing ecotourism at the Azhagar Temple. Recommendations to help in the formulation of strategies are provided following the assessment of issues and possible sites for the temple.
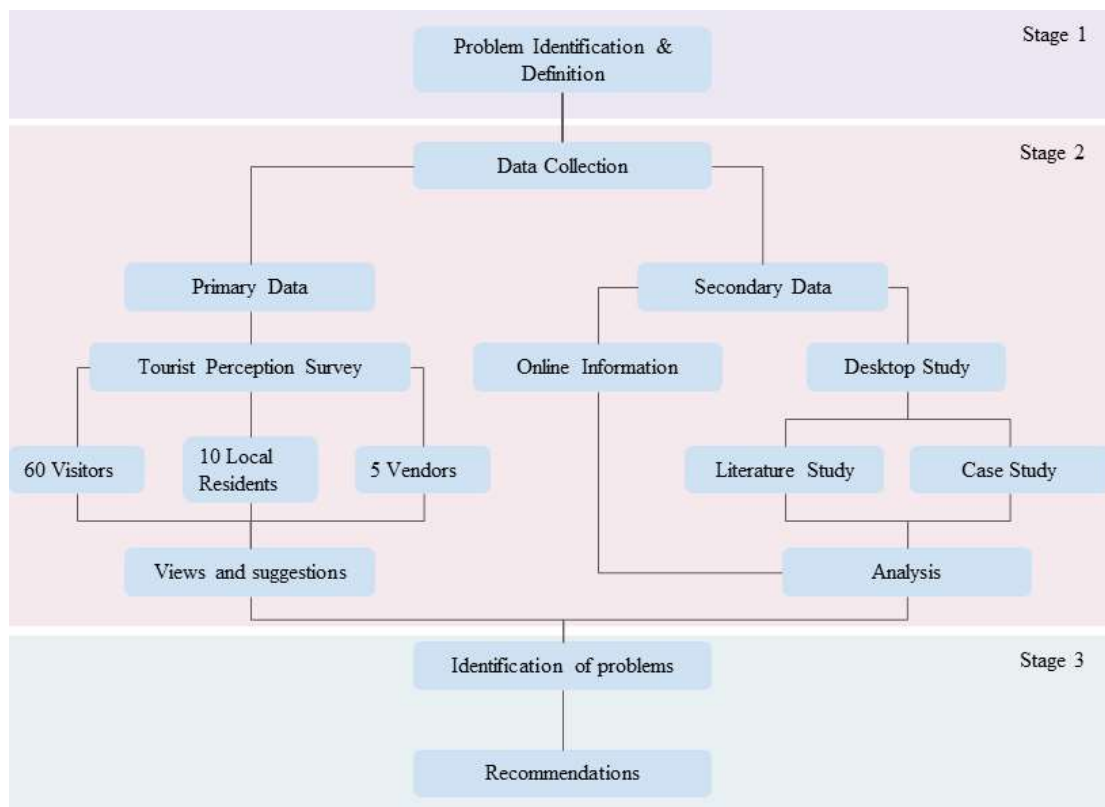
Research methodology (Fig 2.1)

Literature Review

Eco-tourism Development

Sustainable development is a complex relationship between architecture and three other departments (Social, economic & environment) and general concepts in human ecology with sustainable development economy on the simultaneously. Environmental sustainability prevents harmful and irreversible effects on the environment by the efficient use of natural resources,

encouraging renewable resources, as well as protecting the soil, water and air from contamination. (et al, Hole, 2015)

Pilgrimage tourism

According to Pilgrimage Statistics, (2019), around 140 million pilgrims travelled (year 2019) to 32 Religious destinations. 300 to 330 million tourists visit key sites every year and approximately 600 million inbound and outbound religious tourists are visiting every year. Out of which 40% of them are taking place in Europe (UNWTO, 2014; Pilgrims, 2019). Religious tourism is playing a key role in tourism. To lodge in Tamil Nadu pilgrimage site we have only few Dharmashala that is why the lodging problem is increasing per pilgrims. To increase the numbers of Dharmashala by the side of pilgrimage sites. The hotels, Lodges should be available in large number but room rate is very high. The temporary living facilities should be available at around pilgrimage sites. (et al, Vijayanand, 2019)

Place-making and reclaiming of site

Design concepts like reinterpreting archetypal images, creating a landscape structure from ritual methods, enhancing memory traces, and integrating symbolic and ecological values are all options to reclaim sacred landscapes based on myth and history. This strategy has the power to revitalize communal memory and reinforce cultural tales can preserve the value of the sacred place (et al, Sinha, 2006). Plots in narratives, which are composed of a temporal sequence of events arranged into spatial patterns, give form to sensory experiences (et al, Potteiger & Purinton, 1998). Regeneration of natural systems will be a step towards promoting United Nations Sustainable Goals adopted by India, in particular rejuvenation of water bodies, restoration of water related ecosystems including mountains and forests, efficient management of storm water runoff, mitigation of urban flooding, and building climate resilient infrastructure.

Inference

From the literature study, most research studies have emphasized the importance of sustainable development in tourism. However, many didn't mention particularly the necessity for such expansion in pilgrimage tourism. On the other side, there is relatively little information in the literature that depicts the challenges linked with pilgrimage tourism, particularly in terms of environmental concerns in terms of design. Furthermore, the relationship between pilgrimage tourism and sustainable development has not been thoroughly examined in previous research studies, this shows another possible gap noted in the literature. This research will try to address it.

Case studies
Venkateswara Temple
This place has a smooth and secure pilgrimage experience, crowd control systems, queue management, and security measures are implemented here. The temple prioritizes providing for the comfort and welfare of visitors, including places to stay. The use of technology like E-cars, online service booking, and other amenities shows how traditional religious organizations can

accept modernity without sacrificing their basic principles. The surrounding area is significantly impacted by the economy of the temple. Considering its hilltop location, this temple has taken steps to preserve the environment, such as managing waste and planting trees. These actions serve as a model for other pilgrimage sites and highlight the significance of responsible tourism. In conclusion, the Tirumala temple of Sri Venkateswara provides insightful information about social responsibility, preserving culture, and managing pilgrimages in an efficient manner. These experiences can be used as inspiration by other religious and cultural organizations to improve their operations and provide better services to the communities they serve.

Akshardham Temple

Pilgrims and visitors are important to the sanctuary system and the tourist industry. Even-though, this temple is not related to Azhagar temple contextual as well as culture. This case study shows Eco-friendly usage of materials and organization of the temple complex. Maintaining and sustaining a trip depends largely on the travelers. Any tourism industry that wants to grow must provide modern facilities to attract more visitors. The lack of such activities makes it difficult for tourists to stay longer in the area, which has a marginal impact on the local economy More tourist attractions should be created in and around the temple for tourists to stay longer and they spend a lot of money.

About the sacred site
Location

Azhagar temple is about 21 kilometers from Madurai and 60 kilometers from Dindigul. It is located 900 feet above sea level, at latitude 10.051 and longitude 78.042. Many small hills surround Azhagar Malai, including Aaliyur Malai, Kandha Malai, and Naththa Malai. Total Area of the temple complex is 100 acres and has 50 acres in azhagar Malai hill reserve to access Rakkayi Amman temple and Palamuthircholai temple. Approximately 4 km above the ground, on the same hill, is Palamuthircholai. Above this lies Noopura Gangai, a natural spring where pilgrims bath in Rakkayi Amman temple. The vegetation is two-layered, in that ground vegetation is poor. The canopy is made up of open, dry deciduous, or evergreen vegetation. Total covered area in temple complex - 26,300 sq.m. Total open space in temple complex - 3,39,988 sq.m.

Nature layer:
Geology Rock and Soil:
- The rock underneath in most of the forests belong to Archean System main rock types Encountered fall into group, charkoilte and Khoda
- Red soil is found in major of the Division developing form parent material there are Ferruginous in nature with high iron contents.
- The soil on lower slopes is of residual types, stony, boulder and supporting poor growth.
- Alluvial soil is mostly founded in sheltered valleys and along the streams.
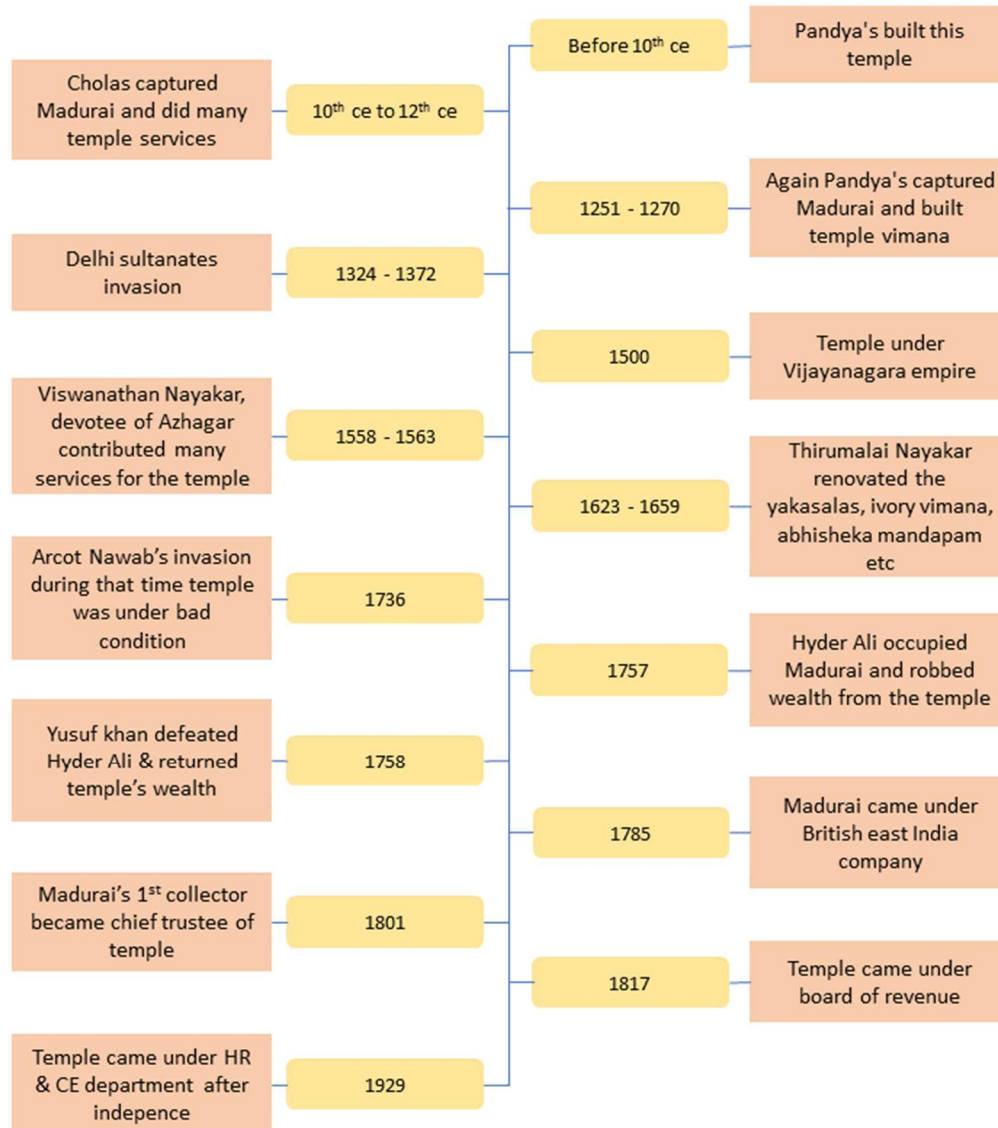
Flora and Fauna:

The Azhagar Hills has a tropical forest cover which extend from Azhagar Kovil in the south to Natham in the north. The Tamil nadu state forest department has been maintaining a herbal garden on the hills.The entrance to the garden is restricted to siddha research scholars. The garden is irrigated by a natural spring locally known as the devi theertham. There are nearly 167 plant species in that 111 plants are categorized under medicinal value.

A total of 108 species (77 resident birds, and 22 migrants) were recorded, including the Dark-fronted Babbler Rhopocichla atriceps. The hills hold significant populations of Forest Wagtail Dendronanthus indicus, Blue-throated Flycatcher Cyornis rubeculoides, Brown-breasted Flycatcher Muscicapa muttui, and Black-naped Oriole Oriolus chinensis during winter. White-rumped Vulture (Gyps bengalensis), and Redheaded Vulture (Sarcogyps calvus) are witnessed during 1990's in this hills.

A rich animal life including threatened animals such as the Monkeys, slender loris, gaur, sambar deer, sloth bear, Asian palm civet, Indian hare, jungle cat and Indian pangolin are to be seen in this region. Lizards such as the Bengal monitor, the Indian chameleon, the flying lizard, common green forest lizard, Lacerta and Cnemaspis geckoes are to be seen here. Then Snakes & small repetiles etc also seen here.

History of the Temple

The Alagar Kovil temple is dedicated to Lord Paramasamy, with the processional idol being Lord Alagar, brother of Goddess Meenakshi. The temple also houses a shrine for Kalyana Sundaravalli, consort of Lord Alagar, and separate shrines for Andal, Sudarshana, and Yoga Narasimha. The temple's glory is mentioned in 123 hymns in Hindu scriptures, including the epic Silappathikaram. Alvars like Thirumangai Alvar, Peri Alvar, Nammalvar, Bhoothathalvar, Peyalwar, and Andal also mention its glorious history in their songs. The Alagar Hills, a significant site in Hindu religion, is linked to Jainism and has historical significance. It was once a residence for Jain monks in 1 B.C., and some caves contain Brahmin script inscriptions, indicating their presence during ancient times. This temple, a significant location during the Pandyan reign, is believed to have been the site of the Lord's revelation for King Malayadwaja Pandyan and Dharma Devashai, as well as inscriptions dating back to King Ashoka rule, and is said to have housed great Jain monk Ajjanandi and his disciples.

		Before 10th ce — Pandya's built this temple
Cholas captured Madurai and did many temple services — 10th ce to 12th ce		
		1251 - 1270 — Again Pandya's captured Madurai and built temple vimana
Delhi sultanates invasion — 1324 - 1372		
		1500 — Temple under Vijayanagara empire
Viswanathan Nayakar, devotee of Azhagar contributed many services for the temple — 1558 - 1563		
		1623 - 1659 — Thirumalai Nayakar renovated the yakasalas, ivory vimana, abhisheka mandapam etc
Arcot Nawab's invasion during that time temple was under bad condition — 1736		
		1757 — Hyder Ali occupied Madurai and robbed wealth from the temple
Yusuf khan defeated Hyder Ali & returned temple's wealth — 1758		
		1785 — Madurai came under British east India company
Madurai's 1st collector became chief trustee of temple — 1801		
		1817 — Temple came under board of revenue
Temple came under HR & CE department after indepence — 1929		

Architecture of the Temple

Alagar Kovil Temple was built in the Dravidian architectural style. The first King to take care of this temple was said to be King Malayadwaja Pandya of the Pandyan era. The architectural development of this temple is reported to have been greatly influenced by the Pandyan kingdom. For example, the vimana of the temple's sanctum sanctorum was embellished with gold plates during the reign of King Jatavarman Sundara Pandyan (1251-1270 A.D.). The enormous tower seen at the temple's entrance was also built during the rule of the Pandyan Empire. There is beautiful sculpting depicting stories from numerous epics. There are five tiers in the gopuram (gateway tower) of about two acres (0.81 hectares) of Kallazhagar Temple. The temple is surrounded by massive granite walls in a rectangular courtyard. The temple's kalyan mandapam showcases Nayaka art. The temple's idols are likewise outstanding examples of craftsmanship. The temple houses several rare Vijayanagara sculptures similar to those found in Thadikombu

Soundararaja Perumal Temple, Krishnapuram Venkatachalapathy Temple, Srivilliputhur Divya Desam, and Vellore Jalakandeswarar Temple.

Festival

The Chithirai Festival, which takes place in April or May, is one of the most significant times to visit this temple. At this time, a large number of devotees travel from all over the nation to receive darshan. Lord Azhagar travels to Madurai at this time to witness the heavenly marriage of Lord Sundareswarar and Goddess Meenakshi. There is a colorful procession from Azhagar Kovil to Madurai, in which devotees carry Lord Alagar as Sundararajan. He travels 21 km in horse and human form from his home to Madurai, where he spends a week touring about 1000 mandapams, accepting offerings from various groups, and giving darshan to thousands of people.

Fig 4.3 & 4.4 Images of the festival

Existing Infrastructure

- The water required for the temple comes from a natural spring called Nupuragangai Theertham on the hill, but on behalf of the temple administration, a well is constructed in a town called Kallandri at a cost of three and a half crore rupees and water is brought through a giant pipe.
- Madurai Main Bus Stand is approximately 23 kilometers away, Madurai Airport is approximately 38 kilometers away, and Madurai Railway Station is approximately 22 kilometers away. Melur-Azhagar kovil road is connecting with the temple's Main Entrance.
- All the wastes and garbage are collected in bins and transported by carts to the nearest landfill and burnt and destroy

Data collection and Analysis

Temple precinct plan
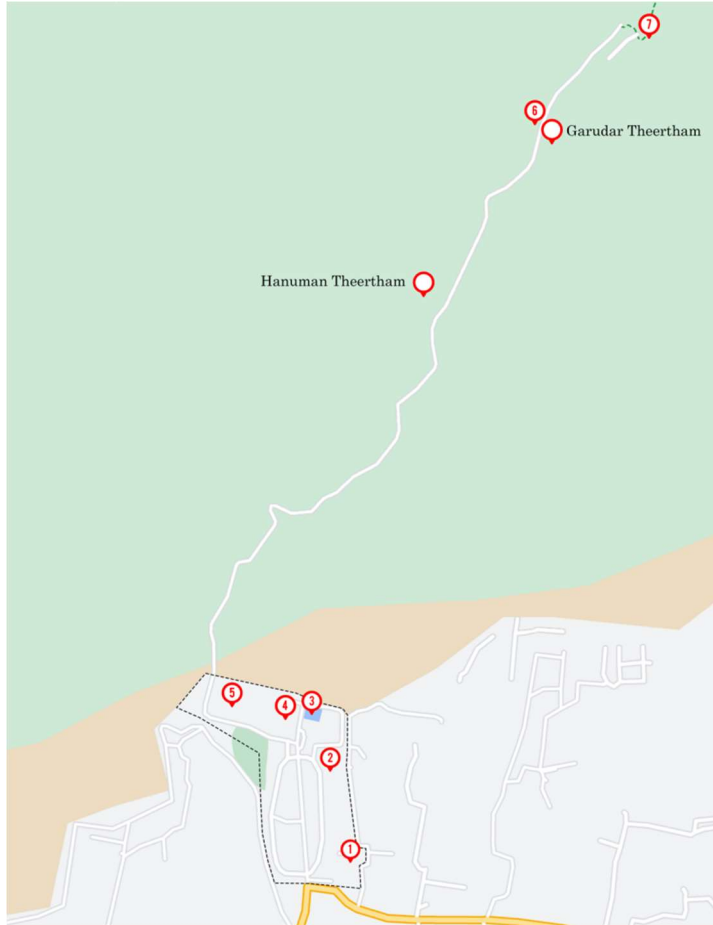
Temple (Fig 3.1)

1 - Moolavavi (Fig 3.2)

2 - Arulmigu Sundararasaa Higher Secondary Temple (Fig 3.3)

3 - Pavithra Pushkarni (Fig 3.4)

4 - Pathinettam Padi Karuppu Temple (Fig 3.5)

5 - Arulmigu Kallazhagar Temple (Fig 3.6)

6 - Palamuthircholai Temple (Fig 3.7)

7 - Rakkayi Amman Temple (Fig 3.8)

Survey Analysis

Survey was conducted in the temple and the surroundings. Asked questions from 75 people including visitors (60), vendors (5) and local residents (10)

Residents who live around the temple for more than 15 years have seen medium level changes in that region, whereas residents who lives around 5 years saw very smaller number of changes. Most of the local residents visit the temple daily or weekly thrice. All the local respondents are agreeing that they can witness lot of crowds to visit temples in recent times at the same time they didn't face any disturbance during season time. Road facilities are fine for them

Even vendors working for more than 10 years notices medium level changes in temple. Vendors having no issues with the current set up of the shops but they also prefer to modify things, if possible.

Visitors are likely to stay inside temple minimum from 1 hr. to spending whole day here. Almost all the visitors enjoy the atmosphere of the surroundings but has some disappointments with facilities available over there. More than 70% of the visitors from outside Madurai are staying in hotels away from the temple. It shows the surroundings of the temple lacks lodge and accommodation facilities. Respondents are accompanied minimum with 2 people and maximum of 20 people to visit the temple
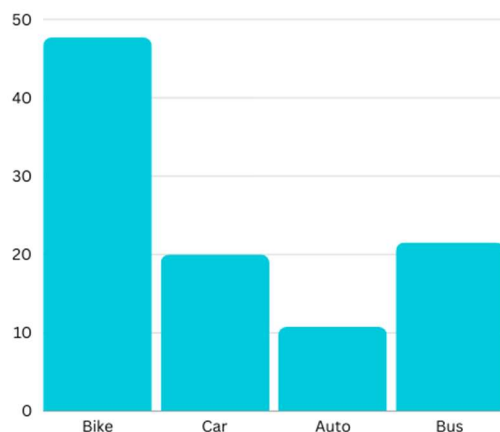
Fig 4.1 shows percentage of the visitor's mode of transportation, where two wheelers are used in larger numbers

Opinions about the facilities in temple complex
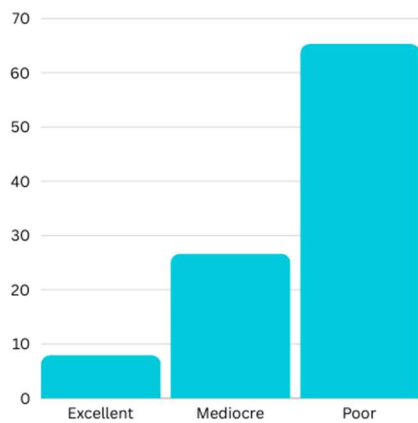
Fig 4.2 reveals that nearly 49 out of 75 people didn't like the rest room facilities as it is not maintained properly
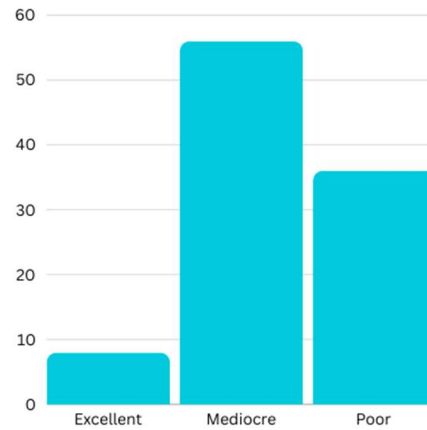

Fig 4.3 reveals that most of the people (42 out of 75) feels that Road facility in temple is not satisfactory
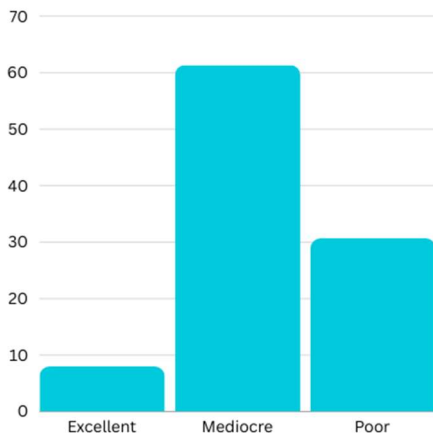

Fig 4.4 reveals that most of the people (46 out of 75) feels that cleanliness of the temple is not good enough.
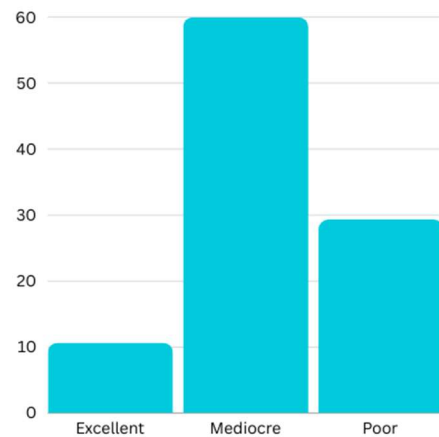

Fig 4.5 reveals that 45 out of 75 feels that drinking water facility is quite average
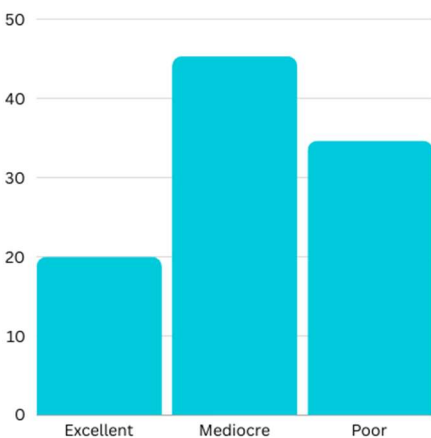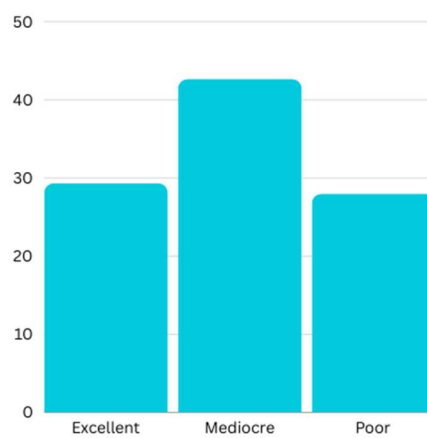

Fig 4.6 reveals that most of the people (46 out of 75) feels that cleanliness of the temple is not good enough.

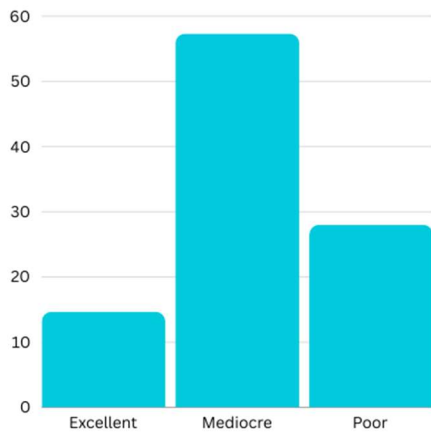Fig 4.7 reveals that people having mixed feelings over the lighting facilities of the temple

Fig 4.8 reveals that 43 out of 75 people feels that safety and security is in average level, it needs more improvement
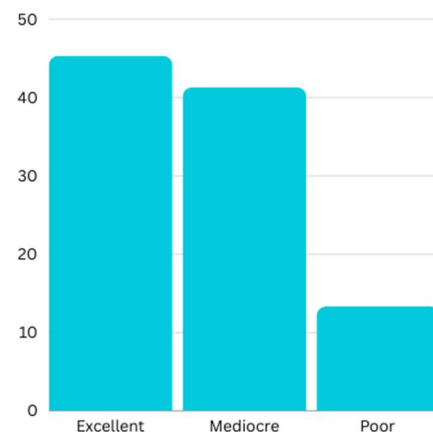

Fig 4.9 reveals that currently navigation and signages are very legible and good enough

So, from overall survey it is understandable that current facilities of the temple are average in condition. To satisfy the visitors need, still more improvements are needed.

Issues

People going to rakkayi Amman temple or Palamuthir Cholai in hill area are finding difficulties, while walking in pedestrian pathway, so they preferring vehicular way. This causes congestion during peak season times. Vavi around the temple is not maintained properly and abandoned. Poor solid waste management, sanitized toilets are disappointing the pilgrims. Cooking for ritual purposes in open spaces causing pollution in the temple. Heavy traffic in-front of bus stop due to improper parking and vehicular movement.

Fig 5.1 - Inactive Pavithra pushkarni

Fig 5.2 - Inactive moolavavi

Fig 5.3 - Inactive Narayanavavi Pond

Fig 5.4 - Single bin for all kind of waste

Fig 5.5 - Cooking in-front of pathinettam padi karuppu temple

Fig 5.6 - Cooking in random Open spaces available inside complex

Fig 5.7 - Vehicular and pedestrian ways are not divided properly

Fig 5.8 - Unhygienic Toilets

Fig 5.9 - Redundant open space

Fig 5.10 - Improper vehicular movement near bus stop

Recommendations

Natural layer:

1. **Water bodies**

Pushkarni and vavis can be renovated, it has high potential to attract people as well as for ecological balance.

2. **Open space**

The unused open spaces can be converted into a narrative landscape which depicts the history and mythological story of the temple, these preserves both environment as well as culture of the temple.

3. **Flora and fauna**

Conserving ponds and springs are important in order to preserve flora and fauna of the hill region.

Man-made layers:

4. **Social & Economic**
- Shop placements can be organized properly so people can roam freely without any disturbance and have their leisure time, this also helps in increase of economy of the temple.
- Temple management wants to educate the visitors about Eco-friendly practices. So, it can prevent from degradation of the environment.
- Pilgrim facilitation centers can be placed at the various corners of the temple so as to ensure the immediate assistance for the tourists.
- A museum can be constructed inside the complex which explains about the culture and history of the temple, which can entertain pilgrims and attract people.
- To attract foreign visitors, it is recommended that extensive advertising be run on both domestic and international television networks.

5. **Technology**

Including AI technologies for fire detection, crowd control and VR to explain the significance of the temple for the people from outside.

6. **Traffic**
- Pedestrian pathways can be improved without disturbing the surroundings so everyone can use the trail.
- Vehicular movement should be restricted inside the kallazhagar temple. So, it will be pedestrian friendly.
- Parking lots should be arranged properly to avoid traffic and congestion near bus stop as well as near mandapas.
- Dividers should be placed in between Road and Pedestrian pathways to avoid risk of accidents.

7. **Waste management**
- Single bins can be replaced with two (recyclable and non-recyclable), so waste treatment can be properly done.

- Placement of the bins should be in certain intervals; it helps pilgrims to put waste inside bin instead of throwing litters in open spaces.

8. Sanitation

Rest rooms should be sanitized and maintain properly. So this can prevent from discomfort of the pilgrims.

9. Law

Policy wise regulations should be applied for the restricted development in these areas like adding more buffer zones and planning of the place surrounding the temple to prevent the harmfulness of urbanization

Conclusion

As days moved on, the popularity of this temple increased. To develop tourism here, the government constructed large roads and tried to fulfill the basic needs to accommodate all the visitors. Likewise expanding facilities can leads to the imbalance of the culture and nature over there. Following above recommendations can help to preserve the current culture as it is despite of the increasing population. The Azhagar Temple is a popular tourist destination with sufficient potential to establish itself as a pilgrimage site. To compete in today's market, Azhagar Temple needs to give sustainability a greater priority. With the above research, the results can lead to sustainable development of the temple and cherish the ancestral knowledge and spiritual values of India.

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