



STUDY OF CONSERVATION STRATEGIES FOR CULTURAL HERITAGE OF WORLD HERITAGE SITES

AT KHAJURAHO AND ANGKOR

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Abstract: Heritage refers to any inherited customs, traditions, cultures, or architectural structures from our ancestors, passing them down to the next generation. [1] Heritage consists of tangible and intangible assets that are inherited from the past. Tangible assets include buildings, monuments, landscapes, archive materials, artifacts, etc whereas intangible assets include traditions, cultures, languages, festivals, fairs & exhibitions, cuisine etc. The aim of this research paper is to critically analyze the conservation strategies adopted in two different cultural sites located in two different parts of the world. In this paper, two cultural sites, Group of monuments at Khajuraho, India and Angkor, Cambodia, have been selected based on their Outstanding Universal Values. The main objective for selecting these two sites is that both are religious sites, cultural sites, have a strong historical and architectural background, and are inscribed in World Heritage Sites.

Index Terms - Conservation, Cultural heritage, Outstanding Universal Value, World Heritage Site, UNESCO

1. INTRODUCTION –

A city is identified by the heritage and culture of that city which defines its image. Cultural heritage consists of tangible and intangible assets that are inherited from the past. Tangible assets include buildings, monuments, landscapes, archive materials, artifacts etc whereas intangible assets include traditions, cultures, language, festivals, fairs & exhibitions, cuisine etc. For sustainable development, cultural heritage should be safeguarded to improve the quality of life of communities, resulting in the city's social and economic development. Heritage and cultures depict or narrate the historical significance of a particular area that is inherited from the past. The two sites which have been categorized in the cultural category have historical, architectural and cultural value for the communities. The aim of this research paper is to analyze and compare two World Heritage Sites that are inscribed in World Heritage Sites list. The objectives of this research paper include

- To review literature from secondary sources and identify various parameters for critical analysis of two world heritage sites.
- To identify two world heritage sites for critical analysis one from India and other shall be global.
- To identify conservation strategies and policies used for two identified World Heritage Sites.

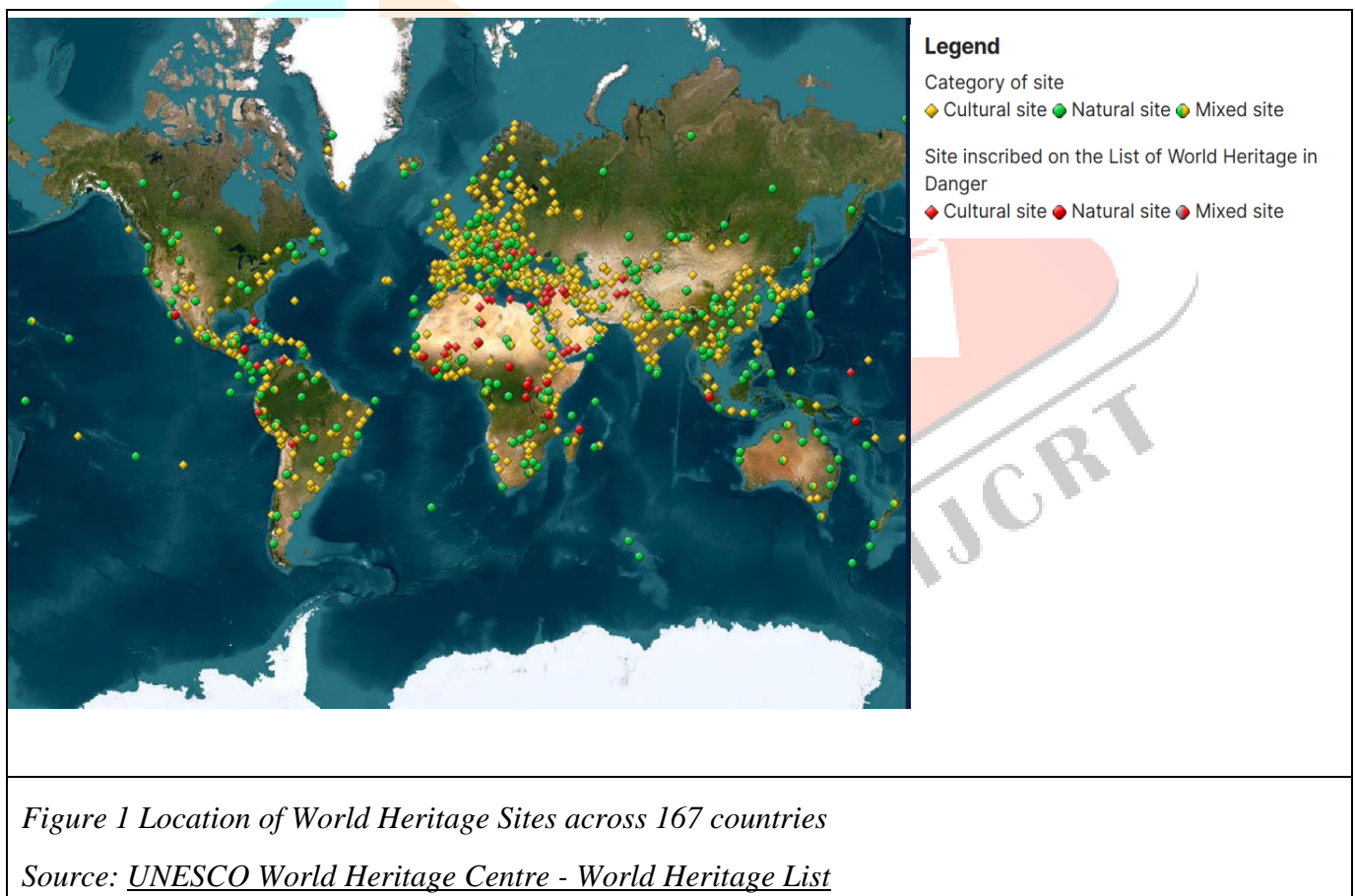
2. LITERATURE REVIEW

World Heritage Convention by UNESCO defines the type of sites, whether natural or cultural, to be included in the World Heritage List.

The nomination process for World Heritage Site to be included in the list includes five stages which are the tentative list, nomination file, advisory bodies, world heritage committee, and criteria for selection. Inventory list of natural and cultural sites should be prepared by State parties and should submit the report for inscribed sites. After making tentative list, state party can plan when to present a nomination file, World Heritage Centre provides advice and assistance to state party in preparing nomination file including necessary documents and maps. Then nominated property is independently evaluated by two advisory bodies which are ICOMOS (International Council on Monuments and Sites) and IUCN (International Union for Conservation of Nature) and then by third advisory body which is ICCROM, International Centre for the study of the Preservation and Restoration of Cultural property which provides Committee with advice on conservation of cultural sites as well as on training activities. World Heritage Committee makes the final decision that which site shall be inscribed in World Heritage List. Sites must be of Outstanding Universal Value and satisfy at least one of the ten selection criteria in order to be listed in World Heritage Sites. There are ten selection criteria in which criteria (i), (ii), (iii), (iv), (v), (vi) are cultural where as criteria (vii), (viii), (ix), (x) are natural which are explained in the Operational Guidelines for the Implementation of the World Heritage Convention.[2]

UNESCO classifies the World Heritage Sites into three categories which are cultural, natural, and mixed. There are currently 1157 World Heritage Sites inscribed as of January 2023, of which 900 are cultural, 218 are natural, and 39 are mixed among 167 nations worldwide.

In India, total 40 sites have been inscribed in world heritage list which are 32 as cultural, 7 as natural and 1 as mixed i.e. Khangchendzonga National Park which was inscribed in 2016. [2]



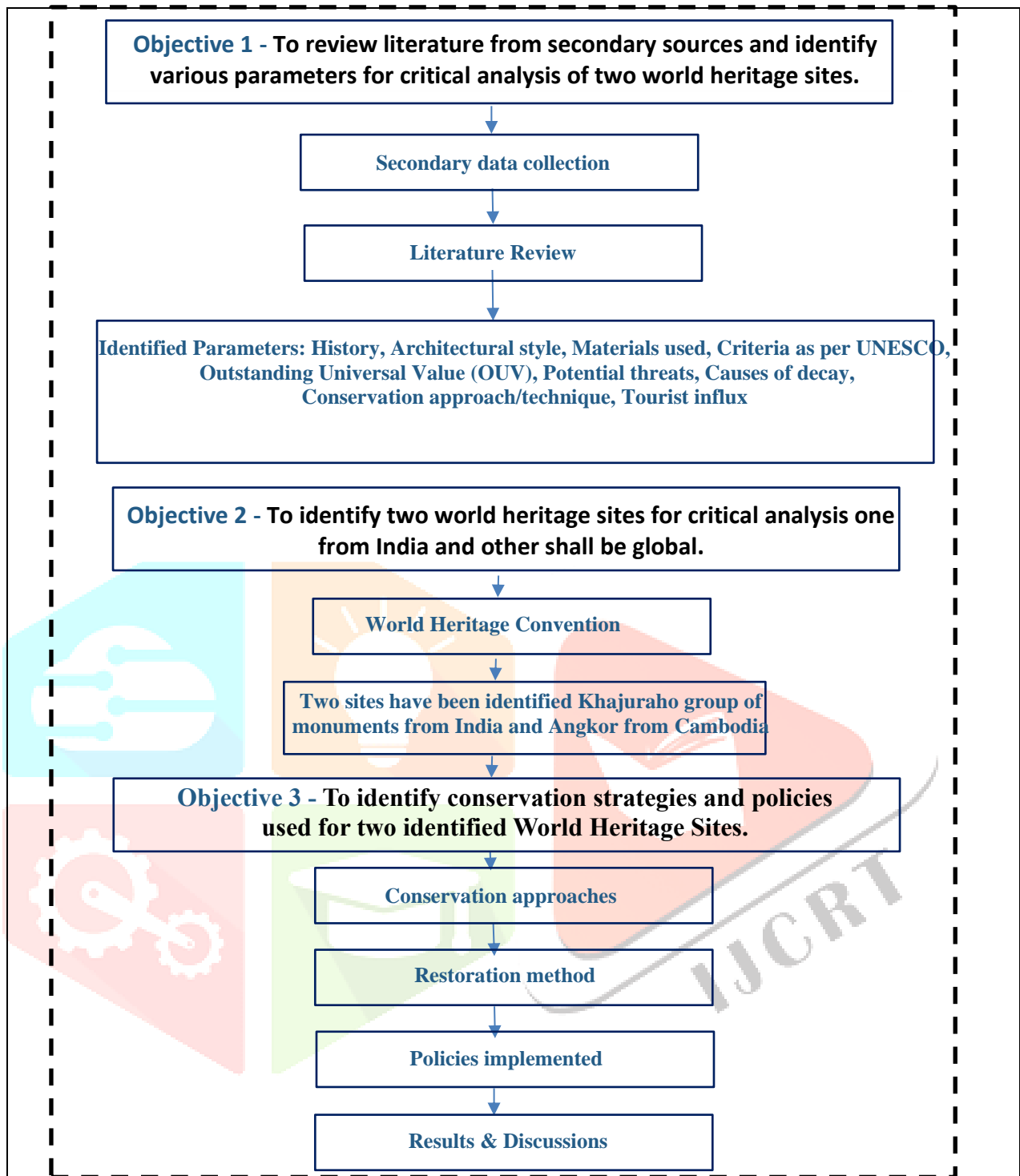
Conservation methods are used to conserve heritage sites such as preservation, consolidation, restoration, reconstruction, reproduction, and rehabilitation / adaptive reuse are all parts of the conservation process, which aims to preserve a structure's historical, architectural, aesthetic, and cultural significance.

Various parameters have been identified for the analysis of two World Heritage Sites which are history, architectural style, materials, criteria (UNESCO), outstanding universal value (OUV), potential threats, causes of decay, conservation approach / technique and tourist influx.

3. METHODOLOGY

This research paper is based on secondary data collection. The two world heritage sites have been identified and analysed based on various parameters. Conservation techniques used for both sites have been analysed,

and comparative analysis have also been done for both the sites. Based on the analysis, recommendations and results have been concluded.



To fulfil objectives of a research paper, methodology adopted are

Figure 2 Methodology

4. STUDY AREA

Two World Heritage Sites which are cultural has been selected for analysis and comparison. One site is from India i.e., Khajuraho Group of Monuments and other one is global i.e., Angkor.

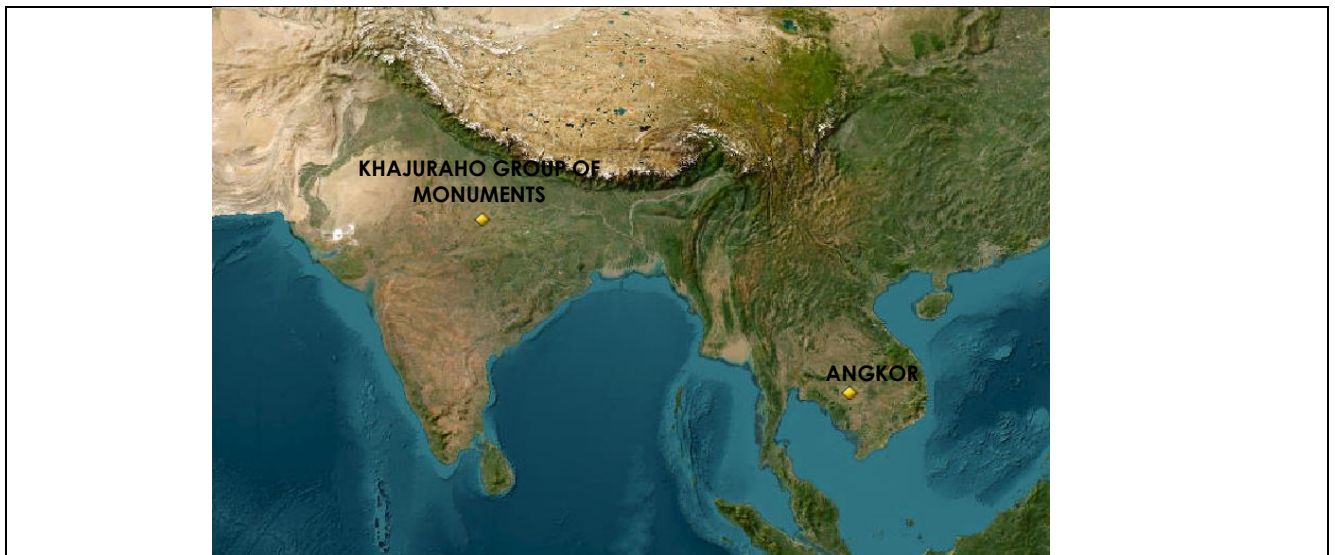


Figure 3 Location of Two World Heritage Sites selected for study area

Source: [Khajuraho Group of Monuments - UNESCO World Heritage Centre](#), [Angkor - UNESCO World Heritage Centre](#)

The Chandella dynasty, which was between 950 and 1050, was the time the temples at Khajuraho were constructed. There are presently approximately 20 temples left, which are separated into three different groups and follow two different religions, Jainism and Hinduism. They attain the ideal balance between sculpture and architecture. The Temple of Kandariya is embellished with numerous sculptures, many of which are considered the greatest masterpieces of Indian art.



Figure 4 Angkor Wat

Source: [Angkor - Gallery - UNESCO World Heritage Centre](#)

One of the most prominent archaeological sites in South-East Asia is Angkor. The magnificent remains of numerous Khmer Empire cities from the ninth to the fifteenth century may be seen in Angkor Archaeological Park, which has a 400 square kilometre area and contains a forest. They include the renowned Angkor Wat Temple and the innumerable sculpture-decorated Bayon Temple in Angkor Thom.



Figure 5 Khajuraho Group of Monuments

Source: Khajuraho Group of Monuments - Gallery - UNESCO World Heritage Centre

5. CRITICAL ANALYSIS OF STUDY AREAS

The two sites that are selected for critical analysis have been done on various parameters:

5.1 HISTORY

In the past, Khajuraho was known as Kharjuravahaka, a historic city in Madhya Pradesh. The Chandela Dynasty constructed it in the Middle Ages. It is one of the major historical sites in the nation, the city is known for its complex sculptures and magnificent temples. Khajuraho is one of the most well-liked tourist destinations in Madhya Pradesh due to the majesty of the statues and temples. The majority of Khajuraho's monuments were constructed between 950 and 1050 AD by the Chandela dynasty and serve as excellent examples of relationships, spiritual lessons, and meditation through exquisite art. The Eastern, Western, and Southern Khajuraho group of monuments are the three distinct clusters into which the temples are grouped. These last few groups of temples serve as a testament to the excellence and creativity of Nagara-style construction. The Kandariya Mahadeo temple is the biggest and most well-known of the 20 extant temples. The temple, which honours Lord Shiva, was constructed in the first half of the eleventh century. It contains an incredible number of towers, commonly referred to as "shikharas," and is a three-dimensional construction. 226 figurines have been found inside this temple's interior, and 646 figures can be found outside. The majority of these statues are of Hindu deities including Brahma, Ganesha, and Vishnu. There are also statues of a number of celestial maidens called "sarasundaris" and lovers called "mithuna." The figures in the sexual sculptures on the temple's south wall are carved in a variety of acrobatic stances. This temple is seen as fortunate because its goal is to symbolise joy and fertility.

King Suryavarman II erected the Angkor Wat temple complex in the 12th century at Simréab, Cambodia. The immense religious complex of Angkor Wat, one of the great cultural wonders of the world, has more than a thousand temples. The total area of Angkor Wat is 400 acres and is the largest sacred sites in the world and the pinnacle of Khmer design. One of the biggest, wealthiest, and most advanced kingdoms in Southeast Asian history was ruled by a dynasty of Khmer rulers from the city of Angkor. There were many construction projects carried out between the end of the 9th century and the beginning of the 13th century, with Angkor Wat being the most prominent. It was created by Suryavarman II as a huge burial temple for the interment of his bones. It is thought that almost three decades were spent on construction. The temple was devoted to the gods Vishnu, Shiva and Brahma, and the religious themes originated from Hinduism. According to Hindu mythology, Mount Meru, symbolised by Angkor Wat's five central towers, is home to the gods. The mountain is supposed to be surrounded by an ocean, and the complex's expansive moat alludes to the oceans at the other end of the world. [3]

5.2 TOURIST INFLUX

The inbound and domestic tourists have been included for both the sites. As per given bar chart, tourist footfall for Angkor and Khajuraho group of monuments is increasing gradually from 2017 to 2019 by 6.6 % & 6.5 % then in 2020 it decreased by 37.5 % & 58 % due to covid and again it increased by 63 % & 4 % [4] [5]

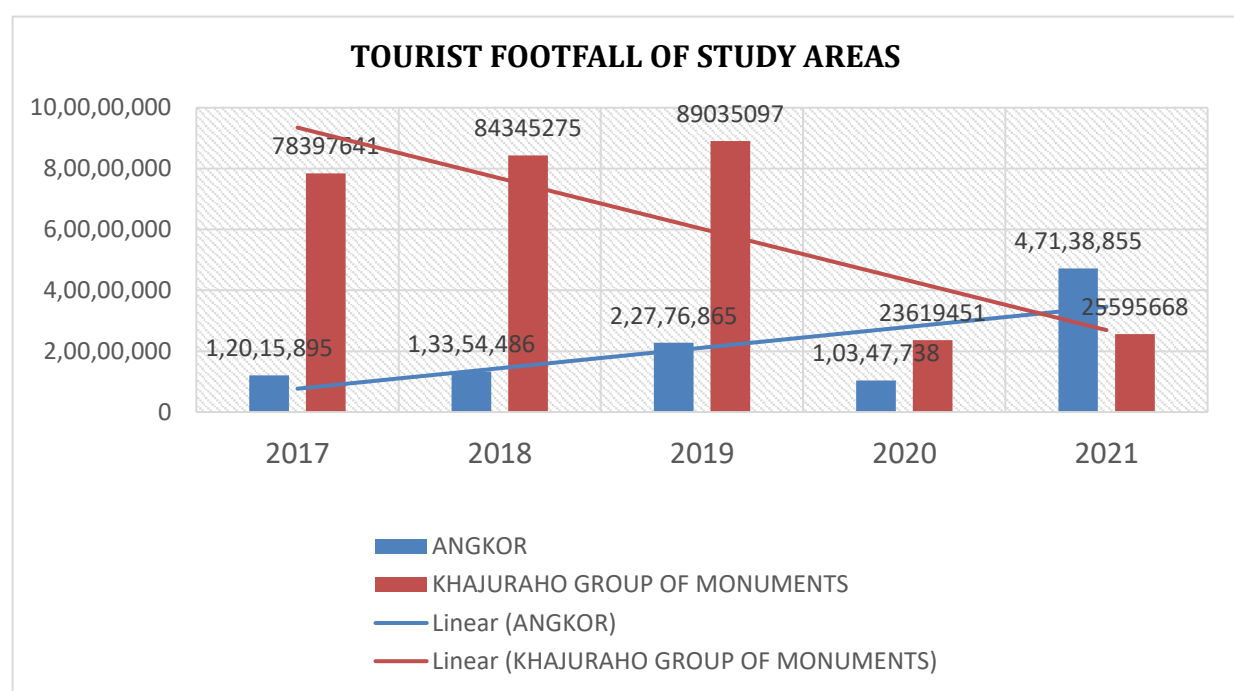


Figure 6 Tourist footfall of Study Areas

Source: India tourism statistics report 2018, 2019, 2020, 2021, 2022 & Cambodia Tourism Statistics report 2017, 2018, 2019, 2020, 2021

5.3 ARCHITECTURAL STYLE

Khajuraho group of monuments represent Northern-Indo-style, Nagara style temple architecture whereas Angkor represents Architecture Khmer art.

Khajuraho group of monuments represent Nagara style temple architecture is placed on a high platform with stairs leading up to it. Four smaller temples are located in the corners, and all of the towers, or shikharas, rise tall and upward in a curved pyramidal pattern to emphasise the temple's vertical thrust, which ends in a horizontal fluted disc known as an amalak that is topped with a kalash or vase. [6]

The main temple building at Angkor Wat is composed of sandstone blocks and is a multi-layered pyramid with four pillars at each corners and a huge central obelisk. Each floor of the temple has galleries that display decorative depictions of Hindu mythology. [7]

5.4 MATERIALS USED

Khajuraho group of monuments built in sandstone with a granite foundation whereas Angkor built in brick, sand stone and laterite.

The Khajuraho temples are made up of sandstone, with a nearly undetectable granite foundation. The stones were joined using mortise and tenon joints, and gravity held them in place, rather than mortar, which the builders often utilise.

Brick, sandstone, laterite, and wood were the building materials employed by the Angkorian builders. The wood components of the ruins are no longer present due to corrosion and other corrosive processes; now, the structures comprise elements of brick, sandstone, and laterite.

5.5 OUTSTANDING UNIVERSAL VALUE (OUV)

Outstanding Universal Value refers to cultural and/or natural significance that is so extraordinary that it surpasses national boundaries and is of common relevance to all human beings, both today and in the future. The three 'pillars' which comprised OUV are: meeting the criteria; integrity and authenticity; and protection and management. [8]

MEETING THE CRITERIA

Sites must be of Outstanding Universal Value and satisfy at least one of the ten selection criteria in order to be inscribed in the World Heritage List. In the Operational Guidelines for the Implementation of the World Heritage Convention these criteria are explained. On World Heritage, convention is the main working tool. The Committee frequently upgrades these standards. Six cultural and four natural criterion were used to determine World Heritage sites. Criteria (i), (ii), (iii), (iv), (v), (vi) comes under cultural criteria whereas Criteria (vii), (viii), (ix), (x) come under natural criteria. Khajuraho group of monuments comes under criteria (i) & (iii) whereas Angkor comes under criteria (i), (ii), (iii) & (iv) which represents cultural sites.

As per Criteria (i), World Heritage Site must represent a masterpiece of human creative genius.

Criteria (ii), to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, or landscape design.

Criteria (iii), to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.

Criteria (iv), to be an outstanding example of a type of a building, architectural or technological ensemble or landscape which illustrates a significant stage (s) in human history. [9]

INTEGRITY AND AUTHENTICITY

KHAJURAHU GROUP OF MONUMENTS - The Khajuraho Group of Monuments is made up of 23 temples that collectively show the originality and high quality obtained in northern Indian Nagara-style temple architecture. It also contains all the features required to indicate its Outstanding Universal Value. The property does not suffer from the negative effects of development and/or neglect and is of a suitable size to ensure the thorough display of the features and processes that reflect the significance of the property.

The western, eastern, and southern groups are all gated in order to protect the temples within their natural landscape setting. That determines the protected boundaries. This prevents settlements that were formerly a part of the Chandella Empire from spreading farther. The neighbouring Khajuraho Airport has been noted as a potential threat to the property's integrity because of potential vibrations, an increase in dust volume, etc.

Regarding its environment, forms, designs, materials, and substance, the property is entirely authentic. It still stands where it was historically. One of the characteristics of the mature form of northern Indian temple architecture is the combination of saptaratha plan topped by a shikhara design was a unique feature to the Nagara style that is truly illustrated by the forms, designs, and materials. These temples, which are situated in a beautiful setting, exhibit the celebration of Chandella power and tradition.

ANGKOR-

The authenticity of the monuments that make up the Angkor complex and the overall impact of individual monuments were not significantly impacted by previous conservation and restoration efforts at Angkor between 1907 and 1992, particularly by the École Française d'Extrême-Orient (EFEO), the Archaeological Survey of India, the Polish conservation organisation PKZ, and the World Monuments Fund.

The majority of these "barays" and canals still remain today, and the Angkor complex includes all significant Khmer-era structures and hydrological engineering systems. The site's overall integrity is demonstrated by how each particular feature vividly recalls the opulence of the former metropolis. However, the site integrity is subject to two kinds of pressure:

Exogenous: connected to the close proximity of Siem Reap, the provincial capital and a major tourist destination; Endogenous: exerted by the more than 100,000 residents spread throughout 112 historic communities dispersed around the site.

PROTECTION AND MANAGEMENT

KHAJURAHU GROUP OF MONUMENTS - AMASR Act of 1958 (Ancient Monuments and Archaeological Sites and Remains) and its Rules which comes in 1959, amendment in 1992, Amendment and Validation Act of 2010 govern the management of the Khajuraho Group of Monuments, which are held by the Government of India. The AMASR Acts additionally delineate restricted and regulated zones that are separated by designated monuments by 100 m and 200 m, respectively. The Archaeological Survey of India

and the Revenue official (i.e., District Collector, State government of Madhya Pradesh) work together to manage the land that abuts the monuments, with the latter being in charge of final permissions.

The Madhya Pradesh Bhumi Vikas Rules (1984), which can regulate and protect heritage sites, are utilised to manage the rural environment by the Nagar panchayat (town-level government), in addition to the designations for protection previously mentioned. The Madhya Pradesh Panchayati Rajya Adhiniyam Act (1993) contains a provision for the protection and upkeep of monuments in Clause 17 of Section 49.

It will be necessary to keep the property's immediate surroundings secure and under control, as well as to keep an eye on the situation at the nearby airport in order to spot and resolve any potential threats to the property's worth, integrity, or authenticity.

ANGKOR- The Royal Decree on the Zoning of the Region of Siem Reap/Angkor, which was adopted on May 28, 1994, the Law on the Protection of the Natural and Cultural Heritage, which was promulgated on January 25, 1996, and the Royal Decree on the Creation of the APSARA National Authority (Authority for the Protection of the Site and the Management of the Angkor Region), which was adopted on February 19, 1995, all provide legal protection for the property. The ICC-Angkor (International Coordinating Committee for the Safeguard and Development of the Historic Site of Angkor), established on October 13, 1993, monitored the APSARA National Authority's successful conservation efforts, which were crowned by the property's removal from the World Heritage List in danger in 2004.

In order to work towards sustainable development and the eradication of poverty, the administration of the inhabited Angkor Site also considers the residents by linking them to the expansion of the tourist industry. The following two factors significantly aid the APSARA National Authority in this regard: The Angkor Management Plan (AMP) and the Community Development Participation Project (CDPP), a cooperation between the governments of New Zealand. In order to increase the income of the villagers living in the protected zones, the CDPP prepares the land use map with the experimental participation of the communities and supports small projects related to tourist development, while the AMP helps the APSARA National Authority to reorganise and strengthen the institutional aspects; The Heritage Management Framework, a multilateral partnership between the governments of Australia and UNESCO, consists of a Tourism Management Plan and a Risk Map on Monuments and Natural Resources. The management strategy's preliminary analytical and planning work will take into account the need to preserve the unique environment of Angkor. Every choice must guarantee physical, spiritual, and emotional accessibility to the site for the visitors.

5.6 CAUSES OF DECAY

There are many factors that are responsible for the deterioration of historical structures. It is important to understand the causes of the deterioration of structure in order to take proper measures of conservation. The most common causes of decay for any structure could be external (diverse climate and environmental effects), biological and botanical, natural disaster and man-made, etc. [10]

The main causes of decay for the Khajuraho group of monuments are air pollution and man-made cause. As the Khajuraho group of monuments is situated near the airport therefore due to vibrations and increased volume caused by airplanes is the major cause of decay and also the pollution of the city which affects the Khajuraho's structure.

The causes of decay for Angkor include botanical cause, climatic cause, and efflorescence. Angkor's major cause of decay is erosion which was neglected in past years.

5.7 POTENTIAL THREATS

Khajuraho group of monuments is situated nearby Khajuraho Airport which results in the deterioration of this heritage site in the form of possible vibrations, increased volume of dust particles, forces of nature, and unplanned growth.

Angkor site has been deteriorating by endogenous and exogenous factors. Endogenous factors: the site has a home of 1,00,000 inhabitants distributed over 112 historic settlements and it keeps on increasing. Exogenous variables include the town of Siem Reap's proximity since it serves as the provincial capital and a major tourist destination.

5.8 CONSERVATION APPROACH/TECHNIQUE

Conservation is a process to retain a structure's historical, aesthetical, cultural, and architectural significance and includes its maintenance, preservation, reconstruction, restoration, and adoption or combination of more than one of these. Various conservation techniques have been used in the past which include direct conservation, preservation, consolidation, restoration, rehabilitation/adaptive reuse, reproduction, and reconstruction approach. For both the selected sites, the restoration technique is used for conservation along with the preservation and consolidation method.



For the Khajuraho group of monuments, various steps were taken by the government, including integrated heritage management, sustainable tourism development, and integrated community development. Development control and regulatory mechanism have been used to improve the immediate environment around the site. Restoring method has been used to conserve unique landscape character, archaeological mounds, temples, century gardens, and traditional settlements. Sustainable tourism development suggested the improvement of air, rail, and road transport system, and the upgradation of tourist facilities and heritage walks. Detailed proposals on land and water management has been done by Integrated community development. [13]

For Angkor, implementation of stabilization measures has been taken which was neglected due to erosion. Corners have been repaired and create protection for waterproofing material that will not allow water to go to eros. Repairing structural damage caused by seepage during decades of neglect. First of all, temple ancient sandstone blocks have been disassembled in order to install a watertight membrane and then reassemble the components. Mantling, documentation, and consolidation of the stone block have been used.

6. RESULTS AND DISCUSSIONS

Both the sites have historical significance and value as they represent ornamental depiction of hindu mythology and are one of the most well-liked tourist destinations. Tourist footfall is very high in Khajuraho group of Monuments and for Angkor its almost double. The architectural style of Khajuraho represents Northern-Indo-style, Nagara style temple architecture whereas Angkor represents Architecture Khmer art. Both sites have cultural as well as natural significance for the society, therefore needs to be conserved.

Table 1 Comparative analysis of study areas

S. NO.	PARAMETERS	KHAJURAHO GROUP OF MONUMENTS	ANGKOR
1.	Site area	6 Sq.km.	400 Sq.km.
2.	Location	Chhatarpur district, Madhya Pradesh	Krong Siem Reap, Cambodia
3.	Special Feature	Perfect balance between architecture and sculptor, sculptures with minute details, represent expressiveness and symbolism of ancient Indian art	Structure made of sand stone, multi layered pyramid with central obelisk, ornamental depiction of hindu mythology
4.	Tourist influx, 2021 (Domestic & Inbound tourist)	2,55,95,668	4,71,38,855
5.	Architectural style	Northern-Indo-style, Nagara style temple architecture	Architecture Khmer art.
6.	Material used	sandstone	brick and stone
7.	Criteria as per UNESCO	(i) & (iii)	(i), (ii), (iii) & (iv)
8.	Causes of Decay	Air pollution, Man made cause	Botanical cause, climatic cause, efflorescence
9.	Potential threat	Nearby Khajuraho Airport, Air pollution	Settlement Growth outside the territory, Erosion
10.	Conservation Technique	Restoration & preservation	Restoration & consolidation
11.	Government Authority for Protection and management of Sites	AMASR Act of 1958 (Ancient Monuments and Archaeological Sites and Remains) and its Rules which comes in 1959, amendment in 1992, Amendment and Validation Act of 2010, Madhya Pradesh Bhumi Vikas Rules (1984), Madhya Pradesh Panchayati Rajya Adhinyam Act (1993)	APSARA National Authority which manages and protect the Angkor region, ICC-Angkor (International Coordinating Committee) safeguard and see the development of Angkor site

7. CONCLUSION

From this paper, we conclude that Khajuraho Group of Monuments and Angkor Wat are important sites both at the local and global levels; both sites are associated with and have significance for the community. Both sites have the potential to attract a huge number of tourists, have social and religious significance, and therefore need to be taken care of. For the conservation of both sites, the restoration method along with preservation and consolidation methods are used. For the Khajuraho group of Monuments, restoration and preservation methods are used in order to avoid further decay of the site, which is happening due to the vibration of the airport and air pollution. For Angkor Wat, restoration and consolidation methods are used in order to protect the structure's durability from erosion. As these sites are major tourist destinations, they contribute to the economic development of the country.

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