CULTURAL LANDSCAPE MANAGEMENT AND ENVIRONMENTAL PROTECTION AT PLAOSAN TEMPLE

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ABSTRACT

Objective: Law Number 11/2010 on cultural heritage mandates the importance of the protection, utilization, and maintenance of cultural heritage. However, the challenges of residential development and tourism-based development often threaten cultural heritage sites, both based on the condition of cultural heritage and the historical values therein. Therefore, geospatial-based protection is needed to protect these cultural heritage sites. The protection of cultural heritage is an interesting topic as it relates to the idea of development and cultural context. Disputes between tourism development and cultural site protection often occur due to unclear zoning boundaries and delineation of cultural heritage area protection. One of the temples that experienced tourism development is Plaosan Temple located in Bugisan Village, Prambanan District, Klaten Regency, Central Java. The purpose of this study is to look at the cultural heritage landscape and conservation for preservation and development at Plaosan Temple.

Methods: The method used in Cultural Landscape Management and Environmental Protection at Plaosan Temple is a combined method between predictive model and zoning method. The process of cultural landscape management and environmental protection is carried out in a series: mapping Plaosan temple, determination of zones in Plaosan temple, validation of zones with experts, designation of cultural heritage zones.

Results: The results of landscape management and environmental protection research are in the form of a predictive map of the Plaosan Temple cultural heritage site model and a map of the Plaosan Temple integrated zone system which aims to preserve and utilize the land around the plaosan temple so that the landscape and environment can be maintained.

Keywords: Plaosan Temple, cultural protection management, cultural landscape management, environmental protection.

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RESUMO

Objetivo: A Lei nº 11/2010 sobre patrimônio cultural determina a importância da proteção, utilização e manutenção do patrimônio cultural. No entanto, os desafios do desenvolvimento residencial e do desenvolvimento baseado no turismo frequentemente ameaçam os locais de patrimônio cultural, com base na condição do patrimônio cultural e nos valores históricos nele contidos. Portanto, a proteção com base geoespacial é necessária para proteger esses locais de patrimônio cultural. A proteção do patrimônio cultural é um tópico interessante, pois está relacionado à ideia de desenvolvimento e contexto cultural. As disputas entre o desenvolvimento do turismo e a proteção de locais culturais geralmente ocorrem devido a limites de zoneamento pouco claros e à delimitação da proteção da área do patrimônio cultural. Um dos locais de patrimônio cultural que passou por desenvolvimento turístico é o Templo de Plaosan, localizado na Vila Bugisan, Distrito de Prambanan, Regência de Klaten, Java Central. O objetivo deste estudo é analisar a paisagem e a conservação do patrimônio cultural para preservação e desenvolvimento no Templo de Plaosan.

Métodos: O método usado no Gerenciamento da Paisagem Cultural e na Proteção Ambiental do Templo de Plaosan é um método combinado entre o modelo preditivo e o método de zoneamento. O processo de gestão da paisagem cultural e proteção ambiental é realizado em uma série: mapeamento do templo de Plaosan, determinação de zonas no templo de Plaosan, validação das zonas com especialistas, designação de zonas de patrimônio cultural.

Resultados: Os resultados da pesquisa de gerenciamento de paisagem e proteção ambiental estão na forma de um mapa preditivo do modelo de local de patrimônio cultural do Templo de Plaosan e um mapa do sistema de zonas integradas do Templo de Plaosan, que visa preservar e utilizar a terra ao redor do templo de Plaosan para que a paisagem e o ambiente possam ser mantidos.

Palavras-chave: Templo de Plaosan, gestão da proteção cultural, gestão da paisagem cultural, proteção ambiental.

GESTIÓN DEL PAISAJE CULTURAL Y PROTECCIÓN MEDIOAMBIENTAL EN EL TEMPLO DE PLAOSAN

RESUMEN

Objetivo: La Ley número 11/2010 sobre patrimonio cultural establece la importancia de la protección, la utilización y el mantenimiento del patrimonio cultural. Sin embargo, los desafíos del desarrollo residencial y el desarrollo basado en el turismo a menudo amenazan los sitios del patrimonio cultural, tanto por el estado del patrimonio cultural como por los valores históricos que contiene. Por lo tanto, es necesaria una protección basada en la geoespacial para proteger estos sitios del patrimonio cultural. La protección del patrimonio cultural es un tema interesante por su relación con la idea de desarrollo y contexto cultural. A menudo se producen conflictos entre el desarrollo turístico y la protección de los sitios culturales debido a la falta de claridad de los límites de la zonificación y la delimitación de la protección de las zonas del patrimonio cultural. Uno de los templos que ha experimentado el desarrollo turístico es el Templo de Plaosan, situado en la aldea de Bugisan, distrito de Prambanan, regencia de Klaten, Java Central. El objetivo de este estudio es examinar el paisaje del patrimonio cultural y la conservación para la preservación y el desarrollo del templo de Plaosan.

Métodos: El método utilizado en la gestión del paisaje cultural y la protección del medio ambiente en el templo de Plaosan es un método combinado entre el modelo predictivo y el método de zonificación. El proceso de gestión del paisaje cultural y protección medioambiental se lleva a cabo en una serie: cartografía del templo de Plaosan, determinación de zonas en el
templo de Plaosan, validación de zonas con expertos, designación de zonas de patrimonio cultural.

**Resultados:** Los resultados de la investigación sobre la gestión del paisaje y la protección del medio ambiente adoptan la forma de un mapa predictivo del modelo del sitio del patrimonio cultural del templo de Plaosan y de un mapa del sistema integrado de zonas del templo de Plaosan, cuyo objetivo es preservar y utilizar el terreno que rodea el templo de Plaosan para poder mantener el paisaje y el medio ambiente.

**Palabras Clave:** templo plaosan, gestión de la protección cultural, gestión del paisaje cultural, protección del medio ambiente.

### 1 INTRODUCTION

Cultural heritage is the nation's cultural wealth as a form of thought and behavior of human life in an area. This means that cultural heritage is one form of understanding and development of history, science, and culture in the life of society, nation, and state so that it needs to be preserved and managed appropriately through protection, development, and utilization efforts in order to advance national culture for the greatest prosperity of the people. In an effort to preserve cultural heritage, the state is responsible for regulating the protection, development, and utilization of cultural heritage in the form of objects, buildings, structures, sites, and areas. The cultural heritage needs to be managed by the government and local governments by increasing community participation to protect, develop, and utilize cultural heritage. There is a paradigm shift in the preservation of cultural heritage, which requires a balance of ideological, academic, ecological, and economic aspects in order to improve the welfare of the people (Law No. 11/2010 on Cultural Heritage).

Article 1 paragraph 23 of Law No. 11/2010 on cultural heritage states that in an effort to preserve cultural heritage, protection is needed to prevent and overcome damage, destruction, or destruction by means of rescue, security, zoning, maintenance, and restoration of cultural heritage. Zoning is the determination of the spatial boundaries of cultural heritage sites and cultural heritage areas as needed (Law No. 11/2010 on cultural heritage).

Cultural heritage protection is an interesting topic as it relates to the idea of development and cultural context. Disputes between development and protection often occur due to unclear zoning boundaries and delineation of protection of cultural heritage areas. Other threats such as armed conflict and war, earthquakes and other natural
disasters, pollution, poaching, uncontrolled urbanization and uncontrolled tourist development pose major problems for cultural heritage sites. Danger here refers to a specific and evident immediate, or potential, threat when a site is confronted with threats that can have a negative effect on cultural heritage values (UNESCO).

The passing of law No. 11 of 2010 on cultural heritage brought about the implementation of what it means to protect, utilize, and maintain cultural heritage. The authority to regulate the protection and development of cultural heritage is also described in it. It is also stated that the requirements in the development of cultural heritage are to increase the potential value, information, and promotion of cultural heritage and its utilization through research, revitalization, and adaptation in a sustainable manner and not contrary to the purpose of preservation.

Plaosan Temple is located in Bugisan Village, Prambanan District, Klaten Regency, Central Java. According to experts, it was built during the reign of Rakai Pikatan of the Hindu Mataram kingdom, in the early 9th century. One of the experts who supports this opinion is De Casparis who relies on the contents of the Cri Kahulunan Inscription (842 AD). The inscription states that Plaosan Temple was built by Queen Sri Kahulunan with the support of her husband. According to De Casparis, Sri Kahulunan was the title of Pramodhawardani, the daughter of King Samarattungga of the Syailendra Dynasty. The princess, who embraced Buddhism, married Rakai Pikatan of the Sanjaya Dynasty, who embraced Hinduism, which is supported by a study of stone inscriptions on a Perwara Temple in the Plaosan Temple complex (BIG, 2015).

Plaosan Temple proves that the power of love can unite the barriers of difference and the true meaning of tolerance. Differences are not to eliminate the love that has grown, but love should be able to unite differences and perhaps that is what Rakai Pikatan held firmly. Plaosan temple is not only a sign of the unity of two great dynasties, Syailendra and Sanjaya, but also a clear proof of religious tolerance.

Changes in civilization from the 9th century until now have also changed the land use around Plaosan Temple, such as residential development and uncontrolled tourism development that threatens the existence of the Plaosan Temple cultural heritage site. So that protection is needed to protect the Plaosan Temple cultural heritage site, one of which is geospatial protection which aims to protect the Plaosan Temple from development pressures that can threaten so that the landscape and environment of Plaosan Temple can be maintained.
2 METHODS

This research uses the predictive model method and the zoning method. Predictive model is a technique that at least attempts to predict the location of archaeological sites or materials in an area based on a sample of that area or on fundamental ideas concerning human behavior (Kohler & Parker, 1986). The zoning method itself is one of the alternative methods contained in Presidential Regulation No. 11/2010 on Cultural Heritage. The zoning method is a protection that is carried out by setting the boundaries of its extent with the utilization of space based on the results of the study. Zone utilization in cultural heritage can be implemented for recreational, educational, appreciative, and or religious purposes. The zoning system regulates the function of space in cultural heritage, both vertically and horizontally. Research is conducted on each development plan to gather information and reveal, deepen, and explain cultural values. Research as intended for scientific development, or practical purposes is applicable as an environmental impact assessment or stands alone.

Cultural Landscape Management and Environmental Protection at Plaosan Temple can be used as recommendations for the Regional Government and the Central Java Cultural Heritage Preservation Center (BPCB) for tourism development and efforts to preserve the Plaosan Temple cultural heritage site. Planning spatial boundaries in regulating the protection of Plaosan Temple cultural heritage using remote sensing data in the form of Spot-6 High Resolution Imagery, 1:50.00 scale Digital Map of Indonesia, Map of Prambanan Cultural Heritage Area, aerial photography processing results and the results of observations of archaeological remains either on the surface or suspected to be in the ground.

3 RESULTS AND DISCUSSION

3.1 PREDICTIVE MODEL

The predictive model is based on the assumption that the location of archaeological sites is not random, but is associated with specific characteristics of the environment, nature and factors related to human activities and human behavioral norms in the past. By identifying causal relationships between specific environments,
geographic characteristics, and recurring patterns, it is possible to identify and create statistical models that can be applied to unknown areas to identify new sites by the same people (Verhagen, 2007).

**Figure 1**
*Aerial photo of the distribution of Plaosan Temple cultural heritage*

Mapping of Plaosan Temple using predictive model using natural landscape and cultural landscape parameters. The natural landscape includes river flow, while the cultural landscape includes the distribution of archaeological artifacts obtained from field observation data and research reports.
The mapping of Plaosan Temple cultural heritage site does not use land use data such as roads, settlements, and rice fields because the current land use has undergone many changes and is different from the land use in the early mass of the temple (in the 9th century). The changes that occurred in the past few centuries have caused serious land conversion, so that land use cannot be used as identification material for mapping the Plaosan Temple cultural heritage site.
Figure 3

Plaosan Kidul temple and Plaosan Lor temple.

![Plaosan Kidul temple and Plaosan Lor temple](image_url)

Source: Aerial photo by Eko Prayogo, 2019

Plaosan Temple itself has two main temples, namely Plaosan Lor Temple (North Plaosan Temple) and Plaosan Kidul Temple (South Plaosan Temple). Plaosan Lor Temple itself is about 100 meters from Plaosan Kidul Temple. The security of Plaosan Lor Temple and Plaosan Kidul Temple is surrounded by iron fences and wire fences, but it turns out that outside the fence of Plaosan Lor Temple and Plaosan Kidul Temple there are several open trench structures with rock foundations that have the same type of rock as the rocks found in Plaosan Lor Temple and Plaosan Kidul Temple. The findings of the ditch structure when viewed from remote sensing data and field data findings turned out to have a spatial pattern surrounding Plaosan Lor Temple and Plaosan Kidul Temple, and the presence of rivers to the north and east of the temple is one indication that the ditch is a ditch to drain the flow of water to support activities in the temple in the past.

Informant 1 provided information that Plaosan Lor Temple and Plaosan Kidul Temple are one temple based on the findings of a loose ditch outside the temple, but the shape of the temple cannot be revealed.
Figure 4

*The moat structure east of Plaosan Lor Temple.*

Source: Aerial photo by Eko Prayogo, 2019

The finding of perimeter ditches in Plaosan Lor Temple and Plaosan Kidul Temple was confirmed by the Cultural Heritage Preservation Agency (BPCB), Central Java as resource person 2. Resource person 2 said that according to the Kitab Silpasasstra, temples should be made in the area around the mountain because the past people thought that the higher their place of worship (in the mountain area), the more their prayers would be heard by the gods. So, what if the location of their residence was far from a high place (mountain)? Then they will choose the location of the place of worship close to the water, then make a stream of water so that the gods will be able to swim in the water and the gods are happy to come to that place. The Central Java BPCB has also excavated part of the moat structure and found the shape of the water channel that was released into the river east of the temple, but from which side the water was put into the moat has not yet been found.
When the weather is clear, to the north of Plaosan Temple will be seen Mount Merapi and to the east if a straight line is drawn, Plaosan Temple will face to Pawirta (Mount Penanggungan) which is believed to be a sacred place and the peak of Mahameru which was moved from India to balance the island of Java, so the relationship (cause-and-effect) because the mountain is far from their location causes them to make a ditch to drain the water surrounding Plaosan Lor Temple and Plaosan Kidul Temple so that the gods will come and listen to their prayers. The existence of the surrounding ditch is one indication of the existence of activities related to water in order to purify the temple or as a supporter of religious rituals in the past.
Figure 6

Predictive model of Plaosan Temple

Source: Aerial photo by Eko Prayogo, field observation April 11, 2019 and model predictive analysis

Plaosan Lor Temple itself is a temple consisting of two main temples, the North main temple that tells the story of a female character and the South main temple that tells the story of a male character. While Plaosan Kidul Temple consists of ancillary temples and a setupa centered on the main temple, but the shape of the main temple at Plaosan Kidul Temple cannot be known.

Plaosan Lor Temple and Plaosan Kidul Temple are separated by roads and residents' yards, according to one archaeologist from BPCB Central Java argues that it is possible between Plaosan Lor Temple and Plaosan Kidul Temple there is a mandapa building. The mandapa building is a building that functions as a place for ritual preparation. The existence of the mandapa building has not been proven by excavation. However, according to him, this opinion is based on Plaosan Lor Temple which consists of two main temples as a place of worship for the gods and can also be assumed as a picture of King Rakai Pikatan and Pramodhawardani, then the mandapa building in the north of the two temples functioned as a place of ritual preparation. Plaosan Kidul Temple is an ancillary temple and stupa centered on one main temple but judging from the soil condition, Plaosan Kidul Temple has a lower soil condition of about 0.5 to 1 meter when compared to Plaosan Lor Temple. Therefore, Plaosan Lor Temple and Plaosan Kidul...
Temple may have different positions and functions, then if Plaosan Lor Temple has mandapa buildings in the north of the two main temples, does Plaosan Kidul Temple also have mandapa buildings in the north of the main temple center? This basis is one indication of the alleged existence of a mandapa building between Plaosan Lor Temple and Plaosan Kidul Temple.

The opinion about the existence of a mandapa building between Plaosan Lor Temple and Plaosan Kidul Temple was also expressed by informant 3 who argued that, "Plaosan Lor Temple and Plaosan Kidul Temple are one temple with a perimeter ditch as an indication, but I still don't know what is between Plaosan Lor Temple and Plaosan Kidul Temple which is now covered by the road". The message allows the existence of something between Plaosan Lor Temple and Plaosan Kidul Temple, whether it is a mandapa building or something else.

The existence of mandapa buildings or others between Plaosan Lor Temple and Plaosan Kidul Temple cannot be known, but the allegations need to be considered in preservation and development efforts so that their sustainability can be maintained because the preservation of cultural heritage regulates the function of vertical and horizontal space so that cultural heritage that is still in the ground has not been excavated or the alleged existence of cultural heritage that has not yet been found must also be considered.

3.2 INTEGRATED ZONE SYSTEM OF PLAOSAN TEMPLE

The integrated zone system of Plaosan Temple is a system to carry out conservation efforts of the Plaosan Temple cultural heritage site by providing spatial boundaries (zones) both vertically and horizontally with each space having different functions in efforts to preserve and develop the Plaosan Temple cultural heritage site. The division of zones in the integrated zone system of Plaosan Temple has three zones as follows:
3.2.1 Sanctuary Zone

The sanctuary zone is a zone that is useful for preventing and protecting physical monuments of cultural heritage from damage with an area of 3.5 Ha. This zone is a zone with high historical value so that its existence is very important for science and customs. The sanctuary zone is a zone that must be maintained in its authenticity as the temple functioned in the past.

The determination of the sanctuary zone uses several parameters, namely: the distribution of archaeological artifacts, cultural landscape, and cultural cosmology. The existence of dwarapala statues in front of the two main temples of Plaosan Lor is one indication of the boundaries of the sanctuary area, the dwarapala statue itself is a statue that is believed to be the guardian of the sacred building. When going to the main temple of Plaosan Lor and passing the dwarapala statue for approximately 1 m, there will be a stacked stone structure with a difference in ground height of about 30 cm from the ground level condition where the dwarapala statue is located. The difference in soil conditions
and the dwarapala statue is one indication that the place is a sanctuary zone that must be protected.

**Figure 8**

*Plaosan Temple sanctuary zone*

Source: Aerial photo by Eko Prayogo, field observation April 11, 2019 and sanctuary zone analysis

The shape of the sanctuary zone is not precise due to Plaosan Lor Temple and Plaosan Kidul Temple which have different concepts. Plaosan Lor Temple is a temple centered on two main temples, while Plaosan Kidul Temple is a temple centered on one main temple. The difference in the form and concept of Plaosan Lor Temple and Plaosan Kidul Temple is possible because the temples have different functions in worshiping the gods.
Preservation in the sanctuary zone is carried out by means of land acquisition so that the surrounding community cannot damage the physical monuments of cultural heritage or carry out land conversion such as housing construction in the sanctuary area. In addition to land acquisition, damage to objects, structures, and buildings of cultural heritage monuments must be restored in order to restore cultural heritage monuments to their original condition. Restoration itself is an effort to restore the physical condition of damaged objects, buildings, and structures of cultural heritage in accordance with the authenticity of the materials, shape, layout, and or technical workmanship to extend the life (Article 1, paragraph 28, Law No. 11 of 2010 concerning Cultural Heritage).

### 3.2.2 Archaeological Park Zone

The archaeological park zone is a park area that serves to protect the sanctuary area from the threat of development of cultural heritage areas with an area of 9Ha. The determination of the archaeological park zone uses several parameters including: cultural cosmology, cultural landscape, and archaeological views. The boundaries of the archaeological park are indicated based on the dwarapala statue findings and the moat.
structure surrounding Plaosan Temple. The dwarapala statue which is a statue that functions as a guardian of the sacred building is an indication of the inner archaeological park boundary, while the existence of the surrounding moat which is an important part of the temple in religious ceremonies in the past becomes the outer boundary. The existence of the moat structure is one of the aspects that support religion because it is believed that the presence of water in the moat is useful for the gods to come to the temple and the water becomes a ceremonial purification in the temple area.

**Figure 10**

*Plaosan Temple archaeological park zone*

![Map of Plaosan Temple archaeological park zone](image)

Source: Aerial photo by Eko Prayogo, field observation April 11, 2019 and zone analysis of the archaeological park.

The archaeological park is an area for preserving the sanctuary area, the archaeological park can be developed with special and limited provisions in tourism development efforts. The development of public facilities such as guard posts, retribution posts, toilets, gazebos, museums, information centers, and tourist parking areas can be developed in this area with special provisions. Special provisions in the development of this area are developments that are carried out without threatening or reducing the historical values of the Plaosan Temple cultural heritage.

Development in the archaeological park area can refer to article 1 paragraph 29 of law No. 11 of 2010 concerning cultural heritage, namely development to increase the
potential, value, information, promotion of cultural heritage and its utilization through research, revitalization, and adaptation in a sustainable manner and development with the aim of preservation. The development of the archaeological park area is carried out by gradually acquiring land owned by the community for development by the local government, BPCB Central Java and together with all levels of society around Plaosan Temple.

3.2.3 Buffer Zone

The buffer zone is an area to protect the archaeological park area, as well as to control development and settlement development so that the environmental and historical preservation of the Plaosan Temple cultural heritage can be maintained. The buffer zone has an area of 14 hectares. The area in the buffer zone can be developed by the community around the temple provided that it follows the preservation and development plan of the Plaosan Temple cultural heritage site.

Figure 11

*Plaosan Temple buffer zone*

Source: Aerial photo by Eko Prayogo, field observation April 11, 2019 and buffer zone analysis
The determination of the buffer zone uses several parameters including: cultural landscape and archaeological view. The existence of a perimeter ditch structure indicates that water enters the ditch to support activities carried out in the Plaosan Temple area, then where does the ditch water enter and exit. It turns out that the existence of rivers in the north and east of Plaosan Temple is one of the answers to how people in the past used water in activities at the temple. In an effort to protect the environment and the historical values contained in Plaosan Temple, the river flow in the north and east of Plaosan Temple becomes the boundaries of the buffer so that when the community changes land use, there are limits that must be obeyed so that the environment and historical values of Plaosan Temple are maintained. The boundaries of the western and southern buffer zones use physical boundaries in the form of roads and rice fields, this is done because there are indications of archaeological artifacts that have not yet been found.

The buffer zone is an area that can be utilized by all levels of society by adhering to article 1 paragraph 33 of law no. 11 of 2010 concerning cultural heritage which says utilization is the use of cultural heritage for the benefit of the greatest welfare of the people while maintaining its sustainability.

Land utilization by the community in this area will be supervised by the local government and BPCB Central Java, and if in a certain time found structures, objects, and cultural heritage buildings then the BPCB Central Java as a responsible party in cultural heritage preservation efforts entitled and can do security and further research with related parties.

**4 CONCLUSIONS**

The cultural heritage sites of Plaosan Lor Temple and Plaosan Kidul Temple are one temple, this is based on several findings of open ditch structures and predictive mapping models that indicate the existence of a ditch structure surrounding Plaosan Lor Temple and Plaosan Kidul Temple.

The conservation model of Plaosan Temple cultural heritage site forms an integrated zone system consisting of three zones, namely: sanctuary zone, archaeological park zone, and buffer zone with the provision that each zone has different functions in the preservation and development of the Plaosan Temple cultural heritage site.
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