

# Adapting Kendi Reliefs for Ceramic Design Developments: Insights from the Morangan Temple, Indonesia

Novita Wahyuningsih

Fine Art Department, Universitas Sebelas Maret, Surakarta, Indonesia

Email: novita\_vey@staff.uns.ac.id

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## Abstract

Morangan Temple is an Indonesian Hindu temple that has been in existence since the 9th century AD. This temple has kendi carvings carved into the reliefs of the temple walls. This paper reports a research that created a replica kendi product design as a decorative and useful element by adapting the ornamentation on the Morangan Temple.

This is an exploratory study conducted in July and August of 2023. The sample of this study consisted of two informants chosen using a purposive sampling technique. The two informants were pottery craftsmen and managers of Morangan Temple. The data obtained is then analyzed and used as a reference in the making of the replicas.

According to the findings of this study, there are two types of kendi on the reliefs of Morangan Temple: kendi with a spout and without a spout. Spouted kendi consists of Boho kendi and Labu Kendi, while non-spouted kendi is shaped like pottery. The design of the replica kendi was made according to the original image on the relief of Morangan Temple. The process of making replica kendi consists of seven stages, namely refining the material, moistening the material, forming the pottery, drying the pottery, perfecting the shape of the pottery, perfecting the shape of the pottery, applying letoh, and smoothing the pottery. The replica kendi shapes consist of Boho kendi, Labu kendi, and pottery. Each kendi serves as both a water storage container and a medium for religious rites, as well as a decorative feature. Aside from boosting production value, creating this replica contributes to cultural preservation by highlighting local knowledge in Morangan Hamlet.

**Keywords:** design innovation, creativity, culture, traditional crafts, kendi

## Introduction

Morangan Temple is a Hindu temple that has a wanua status (village-level temple) and is thought to have been built in the 9th century AD when the Ancient Mataram Kingdom ruled in the Yogyakarta area (Nugroho, 2000). This temple is assumed to have been buried by cold lava or volcanic ash from Mount Merapi's eruption about a thousand years ago. Thus, when it was discovered in 1884, it simply was in ruins (Yogyakarta Special Region Cultural Service, 2022). However, in 1965, after excavations were carried out, archaeologists have found the remains of a stone temple measuring 750 cm x 750 cm as well as the Morangan Temple complex which consists of two temple foundation structures, namely a main temple foundation structure facing the West, and a foundation structure of the perwara temple (companion temple) which is opposite the main temple facing the East (Mundardjito, 2000). During the Hindu

period, the Kedu-Prambanan axis as the Morangan Temple area complex has been one of the centers of government of the Ancient Mataram Kingdom (Masyhudi, 2004). Thus, Morangan Temple has been one of the most important temples at the time because it was located in the Ancient Mataram Kingdom's central administrative area and likely in the same underbow as the Prambanan Temple (Kempers, 1959). This is supported by the discovery of three yoni and a niche with an Agastya sculpture (Jayanti et al., 2012). Architecturally, it is assumed to date from the old classical period because the decoration of the Morangan Temple Complex is comparable to that of temples from the old classical period (Degroot, 2010).

The Morangan Temple complex is unique because the reliefs displayed depict animal stories in the form of deer, goats, rabbits, monkeys, elephants, chickens, birds, and lions (Ramelan, 2013). Animal-themed reliefs are frequently seen in the Buddhist temples and are referred to as Jataka Avadana (Kramrisch, 1946). However, one relief shows an antique kendi as conventional equipment utilized during the period (Kempers, 1959). Archaeologists have a strong hypothesis that the kendi relief fragments at Morangan Temple are the same as those at Borobudur Temple and other temples in Central Java (Mustaqin & Wahyuningsih, 2015). The kendi at Morangan Temple may be the same shape as the kundika on the Borobudur Temple relief, namely a relief of a woman fetching water in a round, short-necked vessel (Mustaqin & Wahyuningsih, 2015). The shape of the water container, like the relief from Borobudur Temple, is still used to collect water by residents in the Yogyakarta and Solo City areas, but the container has a circular, oval body called klenting (Adhyatman, 1987). In general, a kendi is a place to store water and is also used in certain events and rituals (Miksic, 2003). Kendi is supposed to have originated in India and moved to Southeast Asia and China through traders and religious leaders during the early years of the Christian era (Rooney, 1987). The kundika or kendi appears in Hindu iconography as one of the attributes of Brahma and Brahmanical Sakti, as well as Sarasvati (Goddess of Teaching) (Sullivan, 1957). But in other narratives, it is said that kundika is also an attribute of God Shiva (Mustaqin & Wahyuningsih, 2015).

There have been several previous studies discussing the innovation of a pottery craft, one of which is the research by Adiputra et al. (2018) on the innovation of I Wayan Kuturan pottery in the Pejaten village, Kediri district, Tabanan regency, Bali province. In this study, innovation was conducted on Balinese pottery by creating new distinctive forms and enhancing the functional and aesthetic value to elevate the pottery's role as a decorative object. Amboro (2011) also discussed the design innovation of Bayat pottery in Pagerjuran hamlet, Melikan village, Wedi district, Klaten regency, Central Java province. Additionally, Suwarsi et al. (2021) explored product innovation by potters in the Jetis hamlet, Panjangrejo, Pundong, Bantul, Yogyakarta. Many previous studies have addressed pottery craft innovation based on specific ideas or locations. However, none have discussed the innovation of developing crafts inspired by a temple or other historical heritage. Therefore, this research focuses on Candi Morangan, using it as an inspiration for developing ceramic design. The objective of this study is to create a replica of a water jug design as a decorative element by modifying the ornamentation of the water jug found at Candi Morangan.

## Theoretical Framework

In the discussion on the preservation of cultural heritage, Mochtar (2013) highlights the complexity and depth of the role of craft reliefs commonly found in historical buildings. Relief is not merely a decorative element that adds visual beauty to a structure; rather, it goes beyond that. In this context, a relief can be viewed as a narrative medium that opens a window into history, allowing us to delve into and appreciate the stories that shape a civilization. Exploring reliefs is not just an exploration of visual art but also a digging into the social, cultural, and historical aspects that form the identity of a society in the past. Therefore, the integration of relief elements in ceramic design is not only about aesthetics but also about immersing oneself in and respecting the historical values contained in each stroke.

In this discourse, Ponimin et al. (2019) proceed by emphasizing the essence of aesthetic and economic values in the production of earthenware ceramic products. Aesthetic value goes beyond mere visual aspects, involving deep artistic experience and interpretation. Meanwhile, economic value becomes increasingly relevant in the face of modern market dynamics. Ceramic products must be able to meet consumer needs while maintaining the aesthetic integrity that distinguishes them. Therefore, the discussion of ceramic design is not limited to the dimensions of artistic creativity but also involves strategic policies that consider sustainability and economic growth in the pottery craft industry. By combining these perspectives, the development of Kendi Relief-based ceramic design at Candi Morangan becomes even more interesting and substantial. Utilizing relief as a medium to imbibe and celebrate historical heritage, this ceramic design not only creates captivating visual objects but also provides a profound and meaningful experience. Beyond just a product, this ceramic design reflects cultural values rooted in history while still responding to the needs of the modern market.

### Literature Review

Many have examined Kendis. To begin with, Winata (2020) points out that "kendi" (a traditional water jug) has emerged since the Majapahit era and has become a significant aspect of ceramic design development. Parfenov et al. (2022) show that replicas or reconstruction of historical decorations and cultural artifacts is an essential tool in the effort to preserve history and cultural heritage, especially in the face of environmental damage and the threat of irresponsible attacks. Echavarria et al. (2016) show that reconstruction serves not only as a form of preservation but also as a means to map patterns and ornaments used in buildings of the past. A reconstruction can provide in-depth insights into the architectural styles applied in a particular era, including Islamic, Hindu, Buddhist, or Renaissance styles. In the current digital era, Virtual Reality (VR), Augmented Reality (AR), and Extended Reality (XR) technologies have become crucial instruments in reconstructing historical ornaments and objects (Chow & Chan, 2009). Implementation of these technologies enables not only clearer 3D views of objects to be replicated but also opens up new opportunities in interactive art experiences by leveraging 3D photorealistic technology.

Rooney (2003) shows that kendis are found not only in Indonesia but also distributed across various Southeast Asian countries (Suartini & Koriawan, 2014). Kendis, often crafted from high-quality materials such as gold, bronze, and clay, are considered predecessors to the kundika of India. Over time, communities have developed at least two types of kendis: those with spouts and those without. Apart from being functional objects, they hold spiritual and ritual dimensions in the daily lives of the people (Mustaqin & Wahyuningsih, 2015). Looking at karmawibhanga reliefs in various temples on Java Island, Widayat and Studyanto (2022) unearth the finely carved history of kendis. They show that Kendis have become part of the household items in rural communities, and ongoing innovations continually reshape the form and ornamentation of them, creating profound aesthetic impressions (Suranny, 2017).

The stages of making a water jug, as proposed by Helmi (2017), involve a complex process, starting from shaping to the application of motifs at the end. The composition of materials is also diverse, with common mixture ratios typically including 50% clay, 25% sand, and 25% sawdust (Noviani, 2017). Additional ornaments such as strings add variety to the pottery decoration (Nugroho, 2020). It is important to note that the development of ceramic designs based on Relief Water Jugs at Morangan Temple not only involves the creation of aesthetically pleasing visual objects but also explores cultural, historical, and spiritual values. Continuity and innovation in jug-making provide opportunities to develop ceramic designs that not only reflect cultural richness but also respond to the needs of the modern society.



Morangan Temple is located at the foot of Mount Merapi, precisely in Morangan Hamlet, Sindumartani, Ngemplak, Sleman Regency, Yogyakarta. Morangan Temple is in the middle of a residential area with a height of around 347 meters above sea level and is located in the lowlands with a relatively flat slope (Chawari, 2005). Morangan Temple is close to the Gendol River to the east, approximately 100 meters away, which means the ground consists of rocks and sand due to the volcanic activity of Mount Merapi. The findings from this part of Morangan Temple include notched temple stones, antefic, umpak, and lock stones (Figure 1). There are two temples at Morangan Temple, namely the main temple and the ancillary temple which face each other. The main temple faces West with one room with a square plan measuring 7.95 m x 7.95 m (Kemenparekraf, 2020). The main temple consists of the legs, body, and roof of the temple, in Hinduism this symbolizes the three realms, namely bhurloka (life in the mortal world), bhuvraloka (the stage of cleansing the soul), and svarloka (the burial place of kings and the place of worship of gods). Meanwhile, the perwara temple faces the east and measures 4x4 m. Morangan Temple has a hall with a width of 90 m. The profile of Morangan Temple consists of bell sides, rattan splits, a square frame, and double horns (BPCB DIY, 2021).



**Fig. 2:** Views of the Morangan Temple  
Source: Sesaratan,2018

Morangan Temple includes five readable reliefs (Figure 2). The first relief shows two men flanked by flowers. This relief is said to show one of the procedures of a Hindu religious ceremony. The second relief shows a woman flanking a large kendi with a tiny kendi. The ancient people's kendi was a container for holy water, which was thought to wash away sins. The third relief depicts two women riding elephants. Elephants were regarded as a sign of regal majesty and honor in ancient times, hence they were only held by a select few. The appearance of three sages bearing palm leaves and blue lotus blossoms is the fourth relief. Suharno explained that this relief reflects the beauty and grandeur of Hindu religious ceremonies that are still preserved to this day (personal communication, July 20, 2023). The fifth relief is a rooster supported by Gana. According to Hindu belief, Gana is a small creature that always accompanies God Shiva and roosters are always used as sacrificial animals (Sircar, 2022). Another relief at Morangan Temple is the sculpture of variously shaped kendi. The relief-carved kendi depicts the scene or action in progress. One of the kendi activities involves two ladies carrying kendi, with a larger kendi in the middle; each kendi has a different shape.



**Fig. 3:** Reliefs of the Morangan Temple  
Source: Sesoratan,2018

## Findings

### Kendi Product Sketch Motif Design

There are two kinds of kendi in Morangan Temple reliefs: plain kendi and patterned kendi. Plain kendi are manufactured without any patterns or decorations, whereas patterned kendi are made with the same shape but with embellishments or patterns added. In the reliefs of Morangan Temple, there are two primary types of kendi: jars and cylinders. Suharno mentioned that strong evidence has been found regarding two main types of water vessels, which are reflected in the reliefs of the temple (personal communication, July 20, 2023). The kendi sculptures on the reliefs of Morangan Temple demonstrate that it was used as a receptacle for water as part of the ritual or ceremony.

The kendi sketch motif design was created manually on paper before being digitized. The paper size is 1:1. It took 5 hours to make a sketch. There are three kendi sketch motif designs in this research. The design sketch for the first motif is shown in Figure 3 where the kendi design has a round body shape that tapers downwards. On the neck, it has the shape of a short, plain tube with three round, stacked flanges, of which the other two flanges have a larger shape and have a conical kendi mouth. The kendi's mouth serves as a water-filling hole, and the flange serves as a handle to keep the kendi from falling apart. The spout on this kendi is in the shape of a short tube with a huge aperture and a flower-shaped flange at the foot of the spout. This kendi has a ring-shaped base that gives it an attractive appearance. The kendi in Figure 3 is carved with flowers around it in the Morangan Temple relief. Floral motifs, according to Hindu beliefs, are closely associated with religious ceremonies or rituals.



**Fig. 4:** The Kendi Sketch of Morangan Temple 1  
Source: Authors

The second kendi motif design sketch was made by replicating the shape of a kendi from the past which was used for worship. The shape of the kendi motif design in Figure 4 has a spout as a place for the water to come out with a squat spout type. The characteristic of a squat spout is that it is short, large, and faces upwards. The kendi's body is round and tapers at the bottom, and there is a kendi base that is somewhat smaller than the kendi's body. The kendi's base is circular and long. This base serves as a stand, ensuring the kendi's stability. The kendi's neck is long, and there is a rounded flange beneath the kendi's mouth. A circle-shaped design is located near the kendi neck at the top of the kendi body. Meanwhile, the design of the kendi is tilted in the sketch in Figure 4 because the kendi is used as a container for holy water carried by people riding elephants and the position of the kendi tends to be tilted in front of the elephant. This shows the scene of a ritual or ceremony.



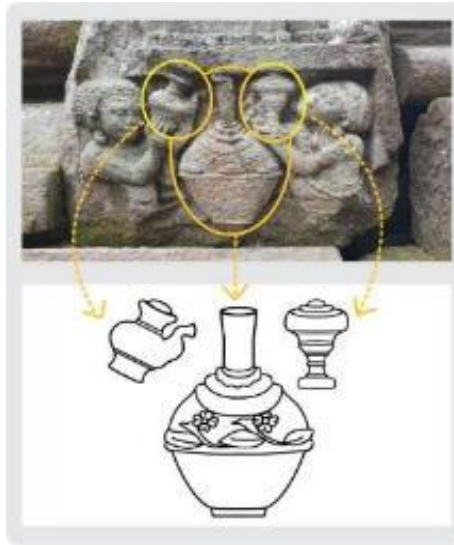
**Fig. 5:** The Kendi Sketch of Morangan Temple 2  
Source: Authors

The following kendi motif design includes a kendi with a spout and two kendi without a spout (see Figure 5). The first kendi on the left is spherical like a pumpkin, with a large kendi mouth and the kendi's lips open facing upwards, and it has a circular lid at the kendi's mouth. The neck of this kendi is quite short, with a flange at the base. The kendi's spout is designed to look like a kundika, with the bottom bulging and the tip formed like a tube with a large hole. The base of this kendi is a long cylinder and the top of the base has a ring as a boundary between the body and the base of the kendi.

The second kendi motif's design concept (middle of the image) features a round, oval shape with a flat, round kendi base. The kendi has a long, plain spherical neck with a huge hole. Because this kendi lacks a spout, you must fill or dispense water through the kendi's mouth. Floral motifs like as stacked flowers and circles are used to embellish the kendi from the middle of the body to the base of the neck. The third kendi motif design sketch (right side of the image) incorporates a bowl-shaped sort of pottery. This pottery is designed in the shape of an inverted cone, with a little round ceramic neck that borders the body and base of the pottery. This neck can be used as a handle while transporting ceramics. The earthenware base is sturdy and circular. This pottery has a spherical lid with a circle in the center that serves as a handle for opening the container. Meanwhile, as is typical of pottery, there are many flanges on the body of the pottery.

Based on the relief carvings of kendi and pottery in Figure 5, two women surround a large kendi, each carrying a different shape of kendi. The kendi that the woman is carrying is parallel to her head, as though she were lifting it. Aside from that, the posture of the kendi that the woman was carrying was inclined towards the middle kendi, implying that the kendi held holy water, which was subsequently collected in a larger kendi. This is one of the rituals or

ceremonies carried out by ancient people, where it was believed that collecting holy water from different springs would bring goodness to the people who used it.



**Fig. 6:** The Kendi Sketch of Morangan Temple 3  
Source: Authors

### Replica of the Morangan Temple Kendi Kendi Making Process

The Morangan Temple kendi replica begins with sketching a picture of the kendi and its motif based on the original shape and ornamentation of the Morangan Temple kendi relief. Aside from that, the projection image depicts various kendi shapes based on the relief conditions of Morangan Temple, including a kendi with a tapering body shape (see Figure 3), a kendi with a squat spout (Figure 4), a kendi with a spout, and two kendi without streaking (Figure 5). The pictures depict the kendi that will be made. Next, working drawings are made based on visual reconstruction, then the drawings are accompanied by notes regarding the dimensions and materials used.

After reconstructing the components, the kendi replica was created. Melikan kendi is made from clay with a blend of ladu sand, which has a softer texture and may be found on river banks, whereas Mayong Jepara artisans add ash from straw or rice husks. Sumilih explained that the making of a kendi typically involves clay and river sand, with a ratio of 10:1 (personal communication, August 18, 2023). A furnace, a tilting tool, a plastic net, and wire are required to produce a kendi. This kendi copy was created in partnership with potters from Melikan Klaten and Mayong, Jepara. Melikan and Mayong pottery craftsmen were picked since they are widely known for their quality in other countries. Furthermore, Melikan and Mayong pottery craftsmen were recruited to facilitate oversight of the rebuilding and ensure that the resulting kendi conformed to the sketch.

In the process of forming a pottery kendi, there are several stages, including (1) smoothing the material using a mixing machine; (2) moistening the ingredients through ngeplok (mixing the ingredients by rotating and pressing the ball-shaped clay); (3) forming ceramics using a traditional ceramic maker's tilting tool; (4) keep ceramics dry; (5) perfecting the shape of the ceramic through a finishing process using several tools that have been prepared previously; (6) apply lethoh (red soil that has been left for one day) to the ceramic body using a brush; and (7) smoothing ceramics. Sumilih explained several machines needed in the making of pitchers, such as a molen machine for mechanically mixing the soil, a rotating tool for shaping the pitcher, bamboo blades for smoothing the pitcher's body, brushes for applying

lethoh/engobe to the pitcher's body, and a firing kiln for baking the pitcher (personal communication, August 18, 2023). The body of the kendi is the first thing to build while making a kendi, followed by the neck of the kendi, and finally the spout of the kendi. The kendi's body is created first as a guideline for the size of the kendi to be constructed. After all of the kendi's parts have been created, the following step is to merge the kendi's parts until they generate the perfect shape. The lethoh is then applied to the kendi's surface by brushing it on. When the kendi is finished, it is aired until half dry (magel). The kendi is dried by airing it in a shady place. Drying is not done directly under sunlight to avoid changes in the shape of the kendi which is not symmetrical and causes the kendi to crack. After the magel process is complete, the next step is to polish the kendi object with the help of a rotary tool. The polishing process (ngeros) follows the next stage. To give the pottery that has been smeared with lethoh a shining appearance, the rolling stage is carried out utilizing tools in the form of wire beads and fragments of discarded lotion containers. Meanwhile, to speed up the process of wiping (glossing) the kendi, a mosquito net made of synthetic plastic is used.

The combustion process is the following step. Burning is an important step in creating an artistic impression in the kendi. Because the burning process might generate color changes that affect the kendi's aesthetic level. According to Sumilih, the combustion process involves arranging the pitchers inside the furnace, then igniting them with a small flame for 2 hours. After that, a large flame is applied for about 5 hours, followed by another small flame for 2 hours. Finally, smoking is done (personal communication, August 18, 2023). The color of the burning kendi is undoubtedly affected by its position throughout the burning process. This is possible because the position of the kendi has a distinct response to heated temperatures, thus the kendi at the bottom is quite likely to be reddish, but the pottery at the top will be black. The type of fuel used in the combustion process influences the reduction in kendi yield. Melikan Klaten burns kendi with a reduction from wet leaves (munggur leaves), which results in a chemical interaction between the smoke and the burner, resulting in naturally colored and lustrous kendi. Meanwhile, the burning in Mayong Jepara employs reduced straw that is placed in the furnace after it has been extinguished, resulting in a kendi with a shiny black color, but the kendi from Melikan Klaten is shinier. The chemical makeup of the soil and the various combustion components have an impact on the final result.

### **Replica Design of the Morangan Temple Kendi**

The craftsman designed the kendi replica based on the shape of the kendi in the Morangan Temple sculpture. In the Morangan Temple reliefs, there are two sorts of kendi designs: kendi designs with spouts and kendi designs without spouts. The creation of a replica design of a kendi with a spout with a larger body to hold water. In this project, the replica kendi design consisted of two types: Boho kendi and Labu kendi. A Boho kendi has the general shape of a kendi, with a straight neck, a body that tapers downwards, a circular mouth, and a spout with a central bubble. Decoration and various ornamentation are put to the body of the boho kendi to enhance its beauty. The existence of ring-shaped flowers encircling the spout of the kendi, similar to those found in relief carvings, is a particularly distinctive decorative adornment that is not found on other ancient kendi. Other spouted kendi are nicknamed pumpkin kendi because they have a form that resembles a pumpkin. Meanwhile, the kendi without a spout has a straight design and a lidless head. The Morangan Temple kendi which is not discolored is decorated with a flowery motif that embodies the symbols of beauty and ceremony in Hinduism. Another unmarked kendi design from the Morangan Temple relief is meant to look almost like pottery, with the kendi body enclosed by a ring that creates the illusion of fullness on the body and neck of the kendi. The spouted kendi is given an anti-slip hand handle, making it easier for users to pour water, and the design of the kendi replica also focuses on ergonomic factors. Meanwhile, the kendi lacks a spout, and the kendi handle is situated on the neck. The kendi neck design, on the other hand, is intended to be as comfortable as possible while including ergonomic aspects.



**Fig. 7:** Kendi Design Development  
Source: Author

### Functions and Forms of Kendi

The kendori replica on the Morangan Temple relief serves multiple functions. The kendori replica's first function is as a water storage container. A kendori with this function is often large in shape to store more water (as shown in Figure 3). Some of these kendori have a spout, whereas others do not. Kendori are also employed as a medium for religious rites; for example, in Hinduism, kendori are utilized as containers for sacred water carried by Brahmins. According to Sumilih, Kendori can also be used in other events such as traditional ceremonies, ceremonial bathing, weddings, funerals, house construction, inauguration ceremonies, etc. (personal communication, August 18, 2023). Figure 4 shows the shape of a kendori for religious rites, with the mouth of the kendori having a lid with a broad spout opening. Meanwhile, other types of kendori are used as decorative elements in the interior design of a room. As a decorative element, the kendori has decorative ornaments to support the aesthetics, as in Figure 5.

### Evaluation

The kendori relief at Morangan Temple is one of the wisdom of the people of Morangan Village that has existed since ancient times. Kendori was utilized as water containers as well as media for religious rites and cultural ceremonies in ancient times. However, kendori is becoming increasingly scarce in Morangan Village. Only a few households still use kendori to store water; the majority have moved on to more practical and appropriate products, such as teapots and dispensers. As a result, a kendori duplicate was created to preserve the kendori's existence. Of course, the development of replicas is based not only on utilitarian criteria but also on cultural and aesthetic values, so that the shape of the kendori can adapt to changing periods.

According to Adiputra et al. (2018), kendori innovation can bring added value to products. Meanwhile, the originality in replica kendori designs is minor because this research primarily focuses on recreating (replicating) the kendori in Morangan Temple reliefs. As a result, the decorations utilized are similar to those seen on the Morangan Temple reliefs, such as floral motif ornaments. Floral motif ornaments on the body of the kendori and floral ornaments shaped like circular rings on the spout of the kendori. The ornaments and shapes created try to display the original shape of ancient kendori engraved on the reliefs at Morangan Temple but with a modern touch. Apart from adding ornaments, the kendori design is also made more flexible with a more dynamic handle design. It is hoped that innovation in making kendori can revive the use of kendori as traditional water containers which have been replaced by modern water storage products.

### Conclusions

The reliefs in Morangan Temple, like those in other temples, have historical and unique value because they were constructed by carving kendori as traditional objects. Kendori is now uncommon as a traditional object. Kendori replicas are a new approach to preserving traditional Javanese history and culture. The Morangan Temple relief artwork was used in the creation of the kendori replica. In terms of function, the Morangan Temple kendori replica not only serves as

a container for holding water and religious rites, but it may also be a decorative piece with aesthetic value. Aside from boosting production value, creating this replica contributes to cultural preservation by exposing local knowledge in Morangan Hamlet. A replica is used as a water container and decoration as it should function.

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**Ethical Considerations:** All informants were adults and engaged voluntarily. Verbal informed consent was obtained prior to interviews, with clear explanation of the study's objectives. No identifying information has been disclosed, and pseudonyms were used in reporting. The study involved non-vulnerable populations and non-invasive methods; therefore, formal Institutional Review Board (IRB) clearance was not required as per institutional policy.

**Data Availability:** The data can be provided upon a formal request to the corresponding author.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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