







# Grogol Village: Majapahit Settlement in Trowulan

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**Abstract.** Talking about Trowulan, we are generally faced with two problems: Trowulan as a city and as a settlement. Grogol, located on the Trowulan site, is one of the residential areas at the “village” level that existed during the Majapahit Era. The site, which covers an area of approximately 10 hectares, has excellent potential for archaeological remains that can describe the Majapahit people’s settlement patterns in the past. By using archaeological excavations and comparative data through manuscripts and reliefs, this research can provide an overview of the past settlement pattern of the Majapahit community. The community life by observing the remnants of past activities left by its inhabitants. The situation and condition of the natural environment, landscaping related to the layout of the settlement, residential buildings or house buildings, and the living equipment of the people who lived there in the past. It can be concluded that the Grogol Site is a residential area. Based on the size of the house and the artifact found, it can be concluded that the occupants came from an elite group, possibly the royal Majapahit aristocracy, even though their residence was located quite far from the city center. Unfortunately, the Grogol Site has disappeared due to intensive brick-making at this location. Eliminate the remnants of archaeological remains in Grogol village that once existed during the Majapahit era.

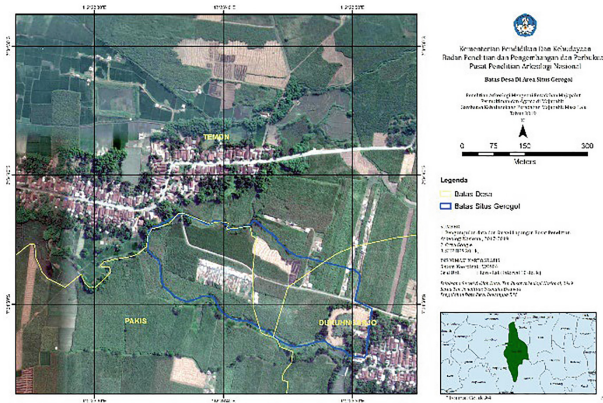
**Keywords:** Trowulan Site · Grogol Site · Permukiman · Grogol Village

## 1 Introduction

Trowulan is an Archaeological site area identified as the former city of Majapahit around the 14<sup>th</sup> to 15<sup>th</sup> centuries AD. Based on the archaeological research conducted from 1976 to 2019, it is estimated that around 150 archaeological remains show settlement characteristics, and one of them is the Grogol Site.

Topographically, the Grogol Site is a relatively east-west measuring 600 × 200 m. The site is flanked by the Kepiting River, which flows from the southeast, originating from the forest of Ngarjo Village, and then merges with the Grogol Rivers to the south of the site. These two rivers are small rivers that are thought to have been larger in the past based on field observations.

The Grogol Site is located 1.5 km east of the Troloyo Cemetery complex and 1.3 km southwest of Tikus Temple. In an area of 10 hectares, the site’s land is used by society



**Fig. 1.** The Location of the Grogol Site (Source: National Research Center for Archaeology, Author, 2019)

nowadays for sugarcane plantations and brick-making excavation sites. On this land, many ceramic shards, pottery, pebbles, and the remains of building structures show the characteristics of former Majapahit settlement areas.

The western part of the Grogol Site is bordered by the Temon River, which flows from the north and then meets the Grogol River in the south of the site. On the west side of the river are residents of the Crab Village, Trowulan District. The site's east side is bounded by the Temon River, which flows from the north and south (Fig. 1).

## 2 The Rationale of the Study

Many experts interpret the remaining findings as a “former” settlement site of a city that once existed during the Majapahit era, which is around the 13<sup>th</sup> to 15<sup>th</sup> centuries AD. The findings of the remnants of massive settlements that continue to emerge in the Trowulan area make it necessary to continue archaeological research on settlements at this site to obtain a more comprehensive conclusion regarding the past urban settlements of Majapahit. Talking about a settlement has a broad meaning, including systems that are not only local in nature but include systems within the division of economic, religious, socio-political, and public areas. This will provide a complete picture of a cultural landscape.

The cultural landscape itself is related to the relationship between humans and nature, where the relationship between nature and settlements is managed by humans, which is reflected in patterns of spatial use and distribution of human work in a wide-scale geographical environment and has meaning for life. Therefore research on cultural landscapes, including the people who inhabit them, must pay attention to these two elements, which are the results of human culture embodied in the remains of human activity and changes in space and the natural environment [1]. Therefore, research on the Grogol Site settlement will closely relate to its environmental landscape to obtain comprehensive results about their position in the Majapahit society.

### 3 Method

The method uses library data collection and field surveys to collect the data. The literature study process includes a search for literature and similar research that has been carried out in the Trowulan area and a search for ancient texts and reliefs that can be used as comparative data. The field survey was conducted by surveying the natural environment (geomorphological and vegetation) and other archaeological remains around the site. The excavation was carried out on the site. Archaeological artifact findings from surveys and excavations will be analyzed further to provide information about the type of artifact remainings, its function, period, and its relationship to the structural findings at the Grogol Archaeological site.

## 4 Data and Interpretation

### 4.1 Grogol Site Settlement

**Situation and Grogol Site Natural Environment.** The site's landscape consists of two morphological units: plain morphological units (0–2%) and weak wavy morphological units. The surface drainage pattern of the rivers is to the north and follows the shape of the landscape of the research location. These rivers are included in the river group with old-mature and old river stadiums, periodic or permanent rivers, and Episodic or Intermittent rivers. Constituent rocks in the research area include alluvial plains and old Anjasmara Volcanic Rocks (volcanic breccias, lava, tuff, and andesitic-basaltic fractures) whose age is thought to be Early Pleistocene – Middle Pleistocene, and alluvial plans (Holocene).

The study area's geological structure and surrounding area are lineament trending north-northwest to the north. Based on the situation and geological conditions of the Grogol Site area and its surroundings, it can be concluded that the Grogol Site location meets the requirements for a settlement. This area is supported by abundant natural resources needed by the people of Grogol, such as clean water, the land slope below 10°, land for agriculture, rock and alluvial materials, and the availability of water transportation routes.

Regarding topography, the Grogol Site has a higher elevation than the river on both sides, making the site relatively safer from flooding due to river overflow. The depth of the groundwater table in the Grogol Site is more profound than the average groundwater in Trowulan. Digging about 6–7 m from the ground surface is necessary to get groundwater. This condition is thought to cause undiscovered *jobong* (well) around the site. The people at the Grogol Site are believed to prefer using river water as a water source, evidenced by the discovery of large vessels at a large number.

**Landscape and Settlement Layout.** Based on the excavation findings, the layout and settlement layout of the Grogol Site follows the flow of the Grogol River on the south side. The settlements are oriented east-west, forming a linear settlement arrangement along the east-west axis. The remains of a brick structure show the presence of a fence around the perimeter between the yard. The houses are bounded by a fence, which is

estimated to have a size of  $9 \times 9$  m. The rest of the perimeter wall can still be found oriented north-south with a thickness of 7–8 layers of brick.

Excavation data showing the division of walls between houses, dividing walls between rooms, the wall between buildings, and walls between house boundaries are similar to the spatial and settlement descriptions shown in the reliefs of Menakjingga Temple (Fig. 2).

**The Overview of Grogol Settlement Houses and Buildings.** The description of the house building on this site was identified based on findings of structures resulting from excavations which were thought to be part of the remaining structure of the foundation, floors, and walls. Based on indications of the remaining structures, it is suspected that there are several types of buildings with rectangular shapes of various sizes, starting from the *Batur* measuring  $1.5 \times 1.5$  m, rectangular building structures with dimensions  $4 \times 2$  m,  $3.8 \times 4$  m,  $6 \times 4$  m, up to most enormous measuring  $12 \times 6$  m.

The finding of a large specimen of roof tile fragment that has a large size ( $16 \times 26$  cm) around the structure indicates that there was a large building. In Order to get a complete picture of the construction of the house, a comparison was made with relief data on the Majapahit period temples, Nagarakertagama manuscripts, Ma Huan Chinese news, and miniature house artifacts. Based on the information contained in the Nagarakertagama inscription, it is known that the Majapahit houses have several characteristics, such as houses made of decorated brick, some places with woven walls and roofs with leaves. Some houses are decorated with terracotta made by Majapahit potters [2].



**Fig. 2.** An illustration of the shape of a group of houses surrounded by walls with a landscape of a river on one side. Relief panel of Menakjingga Temple, Trowulan (Source: Author, 2019)



**Fig. 3.** Settlement remains in Grogol Site (Source: Author, 2019)



**Fig. 4.** An illustration of the form of residential buildings on the temple relief in Trowulan (Source: Author, 2019)

Analysis of excavation structure data and comparative data regarding the description of residential houses during the Majapahit period produced the following characteristic: The plan of the house dominated by a square or rectangular plan with floors composed of horizontal bricks or patterned cobblestones; Cobblestones or gravels that are arranged apart from functioning as the outer floor of the building are used as roads that connect the buildings; The building is designed with a drainage system of brickwork; There is a settlement boundary as evidenced by a circumferential wall on the south side of the site; Other artifacts found were in the form of complementary building components such as pillar casing, ukel, ridges (*bumbungan*) which made the building on the Grogol Site use the building's attributes [3].

**Utilization of Biological Resources for Residents of Grogol Village.** Based on the research results, the Grogol Site is a dense settlement. The community is thought to live from agriculture, as evidenced by the finding of quite a large number of stone mortars (*lumpang*) and various sizes as well as large crock with a significant number which are thought to be used not only for storing water but also for storing crops. The use of flora and fauna cannot be separated from human life, both as a source of food and as other supporting materials. As supporting data, ornaments relief with flora and fauna motifs show their use patterns in everyday life.

The findings of the remains of buffalo, goat, and chicken bones at this site provide an overview of the fauna consumed by the people of Grogol at that time. In the *Nagarakertagama* manuscript, several types of animals, such as chickens, ducks, goats, and horses, are mentioned as pets. Meanwhile, several plants are used as building materials in some types of buildings. At the Grogol site, bamboo was suspected of being used as building materials for pillars, roofs, etc. The data found on the structure of the building shows that it is possible to use bamboo as a material for building roofs, as seen in the miniature figures of houses. The ancient Majapahit community was proven to have technology that was adaptive to the surrounding environment.

## 4.2 Community Life and Living Equipment

**Pottery and Terracotta at the Grogol Settlement Site.** The Pottery and terracotta artifacts found primarily functioned as necessities for daily use and could be categorized as household utensils such as bowls, plates, urns, crock, pots, braziers, and others. The diversity of fine and coarse baked clay objects around Trowulan shows the Majapahit potter (*anjun*)'s ability to produce the various needs of its inhabitants, both for practical matters, daily necessities, symbolic necessities matters, as well as economic [4]. The

findings of pottery and terracotta remaining at the Grogol Site show how the pioneers had mastered advanced burning technology and were creative in producing distinctive forms of Majapahit art, which became the identity of their time [5]. Meanwhile, the discovery of terracotta in the form of roofs with ukel and fragments of house decorations indicates the presence of large and ornate permanent buildings. Meanwhile, the discovery of a large container shows that the occupants are able to equip the house with the means to store materials for their daily needs.

**Foreign Ceramics at the Grogol Settlements Site.** The ceramic findings in significant quantities and with various forms of variation indicate that the Grogol Site settlement is relatively large and not isolated. Residents of this site are familiar with ceramic utensils in the form of containers such as bowls, jars, bowls, plates, cups, urns, crock, bottles, and incense burners.

The most dominant ceramic findings come from China, dating from the 10<sup>th</sup> century AD, 11-13<sup>th</sup> AD, 13-14<sup>th</sup> AD, and 14-15<sup>th</sup> AD. Other ceramics originating from Vietnam date from the 13<sup>th</sup>-14<sup>th</sup> centuries AD, 14<sup>th</sup>-15<sup>th</sup> AD, and 15<sup>th</sup> century AD. Meanwhile, Thai ceramics from the Grogol Site date from the 14<sup>th</sup>-15<sup>th</sup> century AD and 15<sup>th</sup> century AD. The ceramic findings can be used as a basis for relative dating which shows that the Grogol Site has been inhabited for at least 600 years, from the 10<sup>th</sup> to 15<sup>th</sup> centuries AD.

These ceramic findings can also provide an approximate picture of the development period for the Grogol Site. It is estimated that there were two development periods, the period before the Majapahit (*pre-Mahajapahit*) around the 10 to 12<sup>th</sup> century AD and the second period around the 13<sup>th</sup>-15<sup>th</sup> century AD. In terms of quality, the Chinese ceramic found at Grogol Site was in the high-quality category with the discovery of ceramics made by Yue, Jingdezhen, and Longquan (Yue ware, Jingdezhen, and Longquan ware), apart from those goods from Dehua – Fujian (Fujian Ware) which were no less quality than Guandong goods (Guandong Ware) of good quality until now (Fig. 5).

**Stone and Metal Equipment at Grogol Settlement Site.** The use of andesite stone tools at the Grogol Site provides an overview of community activities related to food processing, such as *pipisan*, *gandik*, and *stone mortars*. The equipment is used as a spice grinder and others. Another type of stone artifact found was a wooden doorpost support called a *dorpel*. The *dorpel* has a hole around 10–12 cm in diameter. This case shows that the house on the Grogol Site uses a wooden door that actively opens and closes. Another stone artifact is a stone pedestal which functions as a pedestal for the wooden structure above it (Fig. 6).



**Fig. 5.** Ceramic fragment from Grogol Site (Source: Author, 2019)



**Fig. 6.** Lumpang and Pipisan from Grogol Site (Source: Author, 2019)

Many bronze metal coins were found at the Grogol Site as an indication of trade relations with other countries. They use Chinese kepeng coins to “buy” their daily needs. The findings of Chinese kepeng coins date from the Northern Song and Southern Song to the Ming Dynasty. Based on the inscription data, those Chinese coins are used to exchange food ingredients such as cassava and fruits. It is also used in religious ceremonies. Based on the Sukawana AI inscription dated 882 AD, it states that Kepeng currency is not only for payment commodities but also has a significant means of religious ceremonies [6].

### 4.3 Residential Village of Grogol

#### Selection and Land Formation of Grogol Residential Land.

Each dwelling or settlement has a different “geographical setting” and “human effort”, especially in traditional settlements of the past such as Grogol. The growth and development of a settlement are determined by geographical elements such as location, climate, soil, and water supply [7]. According to the observation of the remaining structures, the Grogol Site is thought to have been built in three different periods.

The first dwellings used cobblestone and boulders as the primary materials, especially building foundations, room floors, courtyards, and road pavements. The geographical conditions of the Grogol Site, fed by a river, have sandy soil characteristics with good cobblestones to support the weight of the buildings on it. The use of bricks in the construction of the lower part of the building combined with woven bamboo walls is very likely to be a feature of this period. Chronologically, the data is supported by ceramic findings from the 10<sup>th</sup>-12<sup>th</sup> century AD.

The second settlement period at the Grogol Site is estimated to have originated from around the 13<sup>th</sup>-14<sup>th</sup> century AD. It is marked by the development of taller buildings compared to the previous period. The room floor is higher than the courtyard floor, and the rooms are built on the *batur*. The brick used for the *batur* foundation is not solid bricks, while the inside is filled with soil mixed with gravel. At this time, the buildings already used tiled roofs, and several places had large crocks to store water or food. The chronology of this period relates to the findings of small jars from the Song-Yuan Dynasty dated 13<sup>th</sup> AD, small bowls from the Southern Song Dynasty dated 12<sup>th</sup>-13<sup>th</sup> AD, and *jarlet* from the Yuan Dynasty dated 13<sup>th</sup>-14<sup>th</sup> AD found in the remains of the buildings, allegedly in the form of “pendeman” ritual. “Pendeman” is an object intentionally planted as part of a building construction ritual. In addition, this layer is related to the discovery of a tombstone dated 1319 saka or 1397 AD in the cemetery complex near the site.

The third period is the cultural layer, which is 160 cm above the second period and stands on a dark brown layer of soil. However, not many remains of the brick structures became the remains of the cultural layers of this period. The site's dating shows that the Grogol Site has been inhabited for approximately 500 years. This location was chosen because of the excellent quality of soil conditions for building construction and its location close to water sources.

The stream of the Crab River, which is thought to be connected to the Temon reservoir and the canals in the Trowulan city center, provides a water transportation route from the city center to the Grogol settlement. This site is thought to be included in the Majapahit urban system. Grogol's fertile environment provides abundant timber resources for development needs. This fertile land was also a source of food for energy to the people in the past. The Trowulan landscape consisting of mountains, alluvial fans, and plains, produces lateritic soils needed as raw materials for making terracotta and pottery [8]. The location of Grogol, relatively close to natural resources and far from disasters, and high accessibility made this settlement inhabited for a long time. It becomes an elite dense settlement in the south of Majapahit city.

**Abandones Residential Grogol.** The Trowulan area as a residential area is supported by environmental conditions that have the resources needed to establish settlements. Access to accessible sources of materials and availability of water and food have made this area a large residential area. Even repeated occupancy was found in several locations affected by the disaster. However, in several places in Trowulan, there are no traces of settlement after the 16<sup>th</sup> century AD. It is suspected that the Trowulan Area was only repopulated in the 19<sup>th</sup> or 20<sup>th</sup> century by the Dutch East Indies government as teak and sugar cane plantations.

It is estimated that the Trowulan area in the 16<sup>th</sup> to 19<sup>th</sup> centuries AD was only in the form of small villages (*dukuh*). At the same time, the big powers like Majapahit in the previous era no longer existed so no power could unite the small villages (*dukuh*). At this time, the center of power in Java moved to Demak, and the center of the economy shifted to the coast, such as Surabaya, Gresik, Sedayu, Tuban, and the north shore, the Java sea. The vacancy of power in the Trowulan area also impacts the Grogol area, where the reciprocal relationship between the city center in Trowulan and the Grogol area is lost.

Relationships between different spaces or regions, for example, can occur in conditions of differences in the availability and affordability of resources. Interaction relationships are the result of geographical, social, political, and cultural manifestation in an area, especially between villages and cities, because of the need to interact in order to meet the necessities of life, not only limited to food needs but can relate to economic activities, transportation, labour, information to technology [9]. Under these conditions, the Grogol Site, located south of Trowulan, can be said to be a buffer zone for the center of Trowulan city. As a buffer zone with fertile land conditions, it has abundant natural resources derived from agricultural and plantation businesses. It is suspected that Grogol is a critical area as a supplier of food needs for the city center. As a reciprocal, the Grogol area gets supplies of daily living equipment from the city center, which collects the product of the handicraft industry throughout the Trowulan area. The relationship between the city center and the village itself is written in the Nagarakertagama manuscript at



canto 89: 2, which explains that the relationship between the state and the village must be maintained because if the village is damaged, the country will be short of food and do not have an army to protect the country from the invader [10]. Because of that, with the collapse of Majapahit power in the center of Trowulan city, the settlements in the Grogol Site area were abandoned because they were unable to meet the needs of their inhabitants.

## 5 Conclusion

Based on the results of relative dating analysis obtained from ceramic findings at the Grogol Site, it gives an idea if these settlements were inhabited over a long period of time, approximately around 500 years starting from the 10<sup>th</sup> to 15<sup>th</sup> centuries AD, if it is juxtaposed with the period of development from the Hindu-Buddhist period of Indonesia culture, the residential period of The Grogol Site lasted from Ancient Mataram period, Kediri-Singosari Kingdom, to the Majapahit period.

With the artifact and the existing remaining structure of Grogol village, we can conclude that the settlement inhabiting the Grogol Site area is massive and dense settlements. Based on the description of the settlement landscape of the Grogol Site, it is composed of buildings with parapets of houses, buildings equipped with floors consisting of brick and stone arrangements, and homes decorated with complementary ornaments made of terracotta. The terracotta ornaments and daily life tools in the form of pottery are also an indication that middle and upper-class people inhabit the Grogol Site area. The findings of good quality ceramic fragments such as those made from Yue ware, Jingdezhen ware, and Longquan ware are also good quality goods from Dehua-Fujian ware and Guangdong ware also provide evidence regarding the status of the elite society that inhabits this area. In relation to pottery on this site, there were also many findings of *celupak* which indicate that the people who inhabited the Grogol Site in the past used *celupak* as a medium for lighting at night.

There was no evidence that suggests that the Grogol Site area had ever been hit by a natural disaster which caused settlements in this area to be abandoned for a long time. The damage seen in the remains structure shows the damage that occurs naturally as a result of being left by its inhabitants. The hypothesis that this settlement was abandoned in the past is due to a power shift in the center of Trowulan city which caused this site to lose its function as a buffer zone or supporting communities to the city center of Majapahit. After this area was abandoned later, it is estimated that the ground and cover buried the existing buildings with bushes. As described in the report presented by H.G. Jourdan, who was an official from the Wirasaba Mojoagung district, revealed that the area that was allegedly the center of the ancient kingdom of Majapahit, East Java, is in the Wirosobo area, which is surrounded by bamboo forest but still has remnants of buildings in the past that reflect Hindu-style construction buildings [11].

## 6 Recommendation

The existence of this site can be used as a reference to reveal the characteristics of settlements in the past, especially during the Majapahit era, even in earlier times. Settlement characteristics and findings around the Grogol Site can help reveal Majapahit city

urban boundaries or the boundaries of areas considered part of the core city of Majapahit Trowulan. Evidence of settlement at the Grogol Site has been damaged due to brick-making activities around the site. It is unfortunate, considering the potential remains at the Grogol Site are enormous and come over a long period of time. There are still many similar sites around the Trowulan area that are threatened by damage. We need to work together to maintain the sustainability of these sites so that similar things don't happen again in the times to come.

**Acknowledgement.** The authors are grateful for the funding provided by the National Research Center has provided for Archaeology, The Ministry of Education, Culture, Research, and Technology, Republic of Indonesia, for three years of research funding from 2017 to 2019.

## References

1. K. F. Anschuets, R. H. Wilshusen, and C. L. Scheick, "An Archaeology of Landscapes: Perspectives and Directions," *Journal of Archaeological Research*, vol. 9, no. 2, pp. 157–211, Jun. 2001.
2. T. G. T. Pigeud, *Java in the 14th Century*. The Hague: Martinus Nijhoff, 1960.
3. Nugroho, D.: *Bangunan Hunian Situs Grogol*. In: Majapahit, G.K., yang Sirna, J.S. Atmodjo, (Ed.) Pusat Penelitian Arkeologi Nasional Bekerjasama dengan Yayasan Pustaka, pp. 91–117. Obor Indonesia, Jakarta (2021)
4. Muller, H.R.A., Terracottas, J.: *Terra Incognita*. Tijdstroom, Lochem, USA (1978)
5. D. A. Rachman, "Majapahit Terracotta Figurines: Social Environment and Life," *Humaniora*, vol. 7, no. 1, pp. 29–36, 2016.
6. N. K. A. Astiti, "Uang Kepeng sepanjang Masa: Perspektif Arkeologi dan Ekonomi Kreatif di Provinsi Bali," *Forum Arkeologi*, vol. 27, no. 1, pp. 45–56, 2014.
7. Daldjoeni, N.: *Geografi Kota dan Desa*. PT. Alumni, Bandung (2003)
8. Eriawati, Y.: *Pemanfaatan Tanah dan Batuan dalam Pembuatan Artefak di Situs Trowulan*. In: *Analisis Hasil Penelitian Arkeologi II*, pp. 165–79 (1991)
9. Bintarto, R.: *Interaksi Desa-Kota*. Ghalia Indonesia, Jakarta (1983)
10. S. Robson, *Desawarnana (Nagarakrtagama)*. Leiden: KITLV Press, 1995.
11. Gomperts, A. Haag, and P. Carey, "Mapping Majapahit: Wardenaar's Archaeological Survey at Trowulan in 1815," *Indonesia*, vol. 93, pp. 177–196, 2012.

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