

# Settlement Pattern of Painted Grey Ware Sites of the Yamuna-Hindon Doab

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## Abstract

*A large number of ancient sites associated with the Painted Grey Ware (PGW) culture, a pre-urban Iron Age culture dated c.1200 to 600–500 BCE, has been identified in the Ghaggar-Hakra valley and the western Gangetic plain. Here we analyze the settlement pattern of the PGW sites of the Yamuna-Hindon doab, which is a vital part of the larger Ganga-Yamuna doab. Using exploration techniques and survey of existing studies, the present work suggests that settlement archaeology help in understanding the nature of ancient sites, their pattern of distribution, spacing of settlements and the role of ecological factors in shaping the settlement patterns over a period of time.*

**Keywords:** Archaeology, Doab, Ganga, Hindon, History, India, Yamuna

## Introduction

The earliest references of the Yamuna-Hindon doab and its neighbourhood are to be found in the famous Epic, the *Mahabharata*. Lal (1954-55) has recognized several sites that are referred in the *Mahabharata*. However, the historicity of the *Mahabharata* war is highly controversial. Nevertheless, the region is recognized for possessing a considerable number of sites representing Late Harappan culture, which may have persisted until at least c. 1000-900 BCE; Ochre Coloured Pottery (OCP) culture, which was contemporary of Late Harappans, and was rural and agricultural in nature; Painted Grey Ware culture (PGW), which is a pre-urban Iron Age culture of the western Gangetic plain and the Ghaggar-Hakra valley, and is dated c.1200 to 600–500 BCE; and Northern Black Polished Ware culture (NBPW), an urban Iron Age culture lasting c. 700–200 BCE. The region also possesses a large number of early historic, Gupta, Post-Gupta and Medieval sites. A significant case in point is the findings of the excavations conducted at the site of Sinauli in Baghpat by the Archaeological Survey of India (ASI) in 2003-04, 2005-06 and in 2018. Chariot burials and Copper Hoard Weapons were found at the site in 2018 (Manjul, Sanjay Kumar & Arvin Manjul 2018). In this background, an archaeological investigation of the Yamuna-Hindon doab occupies an important place. A study of settlement history of the Yamuna-Hindon doab is important because of very limited horizontal excavations in the region. As a result, we do not

have a clear picture of the pattern of distribution, spacing of settlements in different cultural periods and the role of ecological factors in shaping these aspects of cultures.

The concept of settlement pattern is basically derived from the geography. Makkhan Lal (1984) has pointed out that "...settlement pattern studies by and large have revolved around the tradition initiated by Gordon R. Willey. The emphasis is one extensive regional survey, within regions of several hundreds to several thousands sq. km. In order to define the extent of the system, delineate the broad problems like migration and diffusion, and formulate hypotheses regarding site function, demography and polity, which can be tested and redefined through subsequent intensified investigations. Inferences have been mainly drawn from the gross outlines of settlement configuration, from surface indications of different architectural complexity within and between sites, from site locations with features and form the changes in these variables through time." The settlement pattern studies also involve finding out the manner in which human settlement are arranged over the landscape in relation to the physiographic, geographic, and environment (Chang 1958). Over a period of time settlement pattern studies have further developed (Adams 1965, Chang 1962, Trigger 1968, Flannery 1972, Renfrew 1972, Clarke 1972). In India too, several significant studies on the settlement pattern have been undertaken (Dhavalikar and Possehl 1974; Bhan 1979; Possehl 1980; Paddayya 1982; Makkhan Lal 1984; Erodsky 1988; Paul 1999-2000).

In the present work, an extensive survey of the PGW sites of the Yamuna-Hindon doab has been taken up in an attempt to study the settlement pattern of this region. There are several limitations in this kind of work, as the hypotheses given are not absolute as they are not based on extensive horizontal excavations and the element of probability is always there. Nevertheless, as Makkhan Lal (1984 : 3) has aptly said, "such exercises have to be undertaken if we are to progress beyond a knowledge of material culture to the process underlying cultural change."

### **Chronology**

Archaeological evidences suggest that one is not justified in assigning a uniform date to PGW. Based on archaeological data from Hastinapur and the literary sources, Lal (1954-55 : 21-23) has placed PGW in a time bracket of 1100 B.C.E. to 800 B.C.E. The PGW at Bhagwanpura has been dated to 1400 B.C.E. to 1000 B.C.E. Roy (1983 : 123) after making a critical study of C-14 data argues that the sites like Hastinapur, Allahapur, Alamgirpur and Hulas, which do not give the evidence of any pre- PGW (BRW) phase, cannot be dated earlier than 7th to 6th centuries B.C.E. He further highlights that the C-14 dates from Hastinapur and Allahapur suggest that PGW continued up to 350 B.C.E. However, Makkhan Lal (1984 : 90), also after making a critical study of C-14 data places PGW between 1300 B.C.E. to 700 B.C.E.

### **Stratigraphic Position of PGW**

In the Yamuna-Hindon doab and its neighbourhood, PGW is found in four stratigraphical contexts:

#### **PGW Preceded by Late Harappan Culture**

At Alamgirpur, Hulas and Mandoli, it is preceded by Late Harappan culture but with a gap between the two cultures.

#### **PGW Preceded by the OCP Culture**

At Kaseri, Hastinapur and Ahichchhatra, it is preceded by OCP culture. At Hastinapur and Ahichchhatra, there is break between OCP and PGW cultures. However, in the excavation report on Kaseri (IAR : 1969-70 : 43) it is not specified whether there was a gap between OCP and PGW cultures.

#### **PGW having an Interlocking Phase with the Late Harappan Culture**

At Bhagwanpura in Haryana, and Daheri, Kathpalon and Nagar in Punjab, the PGW has an interlocking phase with the Late Harappan culture.

#### **PGW is Preceded by the BRW Culture**

At Atranjikhera in Uttar Pradesh and Noh and Jodhpura in Rajasthan, the PGW is preceded by the BRW culture with a break in between the two cultures.

Joshi (1993 : 24) explains the causes for a break between the Late Harappan culture and the PGW culture at sites, such as Alamgirpur and reasons for an interlocking phase between the two cultures at sites, such as Bhagwanpura. He argues that the Late Harappan culture at Alamgirpur was earlier than the Late Harappan culture at Bhagwanpura and the PGW culture at the former site was later than the PGW culture of Bhagwanpura IB. Thus, while there remained a gap at Alamgirpur, the same was bridged at Bhagwanpura. It is interesting to note that the PGW overlaps with the NBPW culture in almost all sites.

#### **Settlement Pattern of PGW Sites**

At macro level, it appears that the Late Harappan settlements in the Yamuna-Hindon doab were established by way of migration from the adjoining Haryana and Punjab regions where the Harappan settlements had been established from a much earlier period (Dikshit 1985 : 58). The Harappan culture complex at Alamgirpur and Baragaon were found more influenced by the material remains of Sutlej Valley, whereas Hulas appears to have its mooring in the Sraswati-Drishadvati complex of Haryana (Dikshit 1985 : 57). Thus, in the Yamuna-Hindon doab both these cultural waves are present and it appears that in the doab only late mature phase entered and survived.

The PGW culture in western Uttar Pradesh, is younger than PGW culture of Haryana, Punjab and Jammu. Thus, there seems to be an eastward movement of PGW people from neighbouring areas of Haryana, Punjab and probably Jammu into the Yamuna-Hindon doab. The PGW sites are generally located on rivers banks. The average distance between two sites in the region is about 10-12 km and in favourable ecological zones it is even 5 km. It is interesting to note that the average distance between Mandoli, Loni,

Mandaula, Katha, and Baghpat on the Yamuna is about 8-9 km, whereas the average distance between Kaseri, Khurd Banhera, Garhi-Kalanjari. Mukari and Pashuram ka khera along the Hindon River is 6-7 km. The field surveys reveal that the PGW sites along the Hindon river are more closely spaced as compared to the settlements along the Yamuna. However, the settlements along the Yamuna are bigger in size than those along the Hindon and other tributaries of the Yamuna.

The habitations are basically small villages with average size of 1 to 4 hectare. The population of these villages was also moderate. However, as the villages grew up on banks of rivers, particularly those along the bigger river, the Yamuna, for various natural advantages, the need of fortification to safeguard against floods and attacks of enemies was becoming more pressing. An increase in population would have led to more settlements both along the rivers and away from them.

As per the spread of PGW, it must be mentioned here that the stratigraphic evidence show that PGW in western Uttar Pradesh is younger than PGW culture of Haryana, Punjab and Jammu. Thus, there seems to be an eastward movement of PGW people from neighbouring areas of Haryana, Punjab and probably Jammu into the Yamuna-Hindon doab. In spite of being extensive, PGW in Western Uttar Pradesh is homogenous and has got its own individuality. During this period a considerable portion of the country was on the threshold of urbanization.

The empires and the invaders of the past were aware of the fertile land of the doab and its prosperity, and hence this area witnessed frequent attempts by these forces to control the doab. O.H.K. Spate and A.T.A. Learnonms (1963) also state that in the past defence played an important part in defining the settlement pattern of a village, especially in the areas open to constant disturbance, such as the Sutlej-Yamuna and the Yamuna-Ganga doabs. Villages are severally grouped around a petty fort. Moreover, the sites along the Hindon were away from the main trunk route and the Hindon was not as suitable for long distance navigation as the Yamuna was. Therefore, these sites remain a rural settlement.

Along the Yamuna, the distance between Loni and Mandaula is 8 km, between Mandaula and Katha is 8 km and between Katha and Baghpat is 6 km. However, along

the Hindon, the distance between Banhera and Siti is 2 km, between Siti and Hateva is 1.5 km, between Hateva and Garhi Kalanjari is 2 km, between Garhi Kalanjari and Mukari is 13 km. However, if we include the smaller sites, then the gap between Garhi Kalanjari and Mukari is filled by sites, such as Singauli, Gauna, Shahbanpur, Laliyana, Chamrawal and Haresia. And, the average spacing between all these villages is 1.5—2 km. Thus, the sites along the Hindon are more closely spaced than the sites along the Yamuna.

### Structural Remains

Some of the structural remains unearthed from the PGW sites in and around the Yamuna-Hindon doab include:

1. Alamgirpur: large lumps of clay, sometimes burnt, with red impressions, suggested that the houses had been built of reeds plastered over with a thick layer of clay.
2. Allahapur: closed and open-mouthed hearths, mud floors with post-holes and burnt reed- impressed mud plaster were noticed.
3. Mandoli: houses of rammed-mud floors and post-holes, suggesting that it was a village settlement, were noticed.
4. Kaseri: as structural remains, only an oval-shaped hearth was located.

The archaeological evidences, such as post-holes at Mandoli and Allahapur, suggest that during the PGW period the houses were made by using wooden or bamboo screens. Also, as suggested by the remains of lumps clay, bearing reed or bamboo impressions from Alamgirpur, Allahapur and Hastinapur, the houses were plastered with mud. The archaeological evidences from Hastinapur suggest that husk of rice was used to reinforce the mud or mud walls with plaster. As observed at Mandoli, the floors were made of rammed floor. It is pertinent to note that the roof may have had a wattle-cum-thatch base (Roy 1983 : 137) because the rains are expected to be heavy in the region, mud could not be relied upon for roof.

Historically, the PGW Period is pre-Mauryan and is pre-urban in nature. Presence of a large number of Late Harappan sites and OCP sites in the region, particularly at Saharanpur, Muzaffarnagar, Bulandshahr, Meerut and Ghaziabad districts, suggests that even without iron the occupation of the Ganga-Yamuna doab was possible.

However, introduction of iron seems to have brought changes in the all round promotion of the civic life in PGW culture, which provided the base that ultimately ushered in the second urbanisation.

### Geo-Ecological Settings

The relief of the Yamuna-Hindon doab exhibits Bangar land rising upto 15-60 metres above the adjoining floodplains, the Khadar. This relief would have enabled settlers to make dwelling settlements on the higher land zones, while the adjoining floodplains, rich in alluvium, is ideal for any economy based on agricultural activity. Most of the settlements are situated on the top of the high banks of the Yamuna and the Hindon. Though on the banks of the Hindon, land zones of even average height were also selected for settlements, as its floods were less threatening than the floods of the Yamuna. Two settlements, Baragaon and Khatta Pahladpur, are away from the river-banks but these have been settled only towards the early centuries of Christian era, when increasing population pressure forced people to settle in the ecologically less favourable zones.

In summers, the melting of the snow and heavy rainfall causes considerable rise in the river; the stream is then very deep and strong, and in time of heavy flood the rivers approach close to the outskirts of the settlements. But they do little damages because the rivers are fairly regular in habits. On the other hand, the small areas of lowland on its banks are actually benefited by the alluvial deposits brought down by the rivers. The Gazetteer of Meerut (1922) reports that the land inundated by the rivers is occasionally cultivated for the rabi crops, and the harvests are of excellent quality.

The climate is sub-humid, the annual rainfall is between 80-100 cm and the plains are rich in alluvium. Consequently, the region is ideal for cultivation. Such soil types and the fertility of the soil are important factors determining the location of human settlements, especially in the case of agricultural communities.

Riverine setting plays an important role in the choice of the settlements. As Possehl has aptly said (1980 : 85), an obvious advantage to a riverine location is, reliable supply of water for human and animal consumption as well as for general domestic use. Further, it also afforded a potential for irrigation. There are also other significant sources of water

that play a crucial role in the agricultural economy of the region and thereby influence the settlement pattern: wells (as the water table of the region is very high) and the annual rainfall between 80-100 cm. Gazetteer of Meerut, 1922, highlights the importance of wells as source of irrigation in the region. Panini mentions that villages depended for their water supply on wells (kupas) to which were attached water trough (nipanas) from which the cattle would drink (Agrawal 1953 : 141). Also, the famous legend of Lakkhi banjarra (a nomad) shows that it was easy to dig up well as the water level was very high.

The economic and ecological factors also affected the size and spacing of the settlements. The average size of an inhabited area is about 200 metres in length and 150 metres in breadth. The average spacing between two settlements is from 8 to 12 km. Though in the Saharanpur district it is between 5 to 8 km.

### Resource Potential

As far as economic resource potential is concerned, none of the objects, such as copper and iron ores, and semiprecious stones like agate, jasper, carnelian, chalcedony and lapis lazuli are found in the Yamuna-Hindon doab. Yet these artefacts have been reported from the region, suggesting occurrence of trade in the area.

The settlements on the Yamuna, which is better suited for transport and commerce, were perhaps mainly involved in this trade and were probably served and fed by a group of small village settlements on the peripheries of these settlements. For example, evidences from Allahapur suggest presence of a bone and antler industry. This industry could well have been a part of the local trade, in which probably apart from Hastinapur, Loni, Manduala and Katha also played an important role.

Archaeological data from Hastinapur (Lal 1954-55 : 123) and Atranjikhhera (Chowdhury et. al. 1977 : 63) suggests that rice (*Oryza sativa*), wheat (*Triticum compactum*), barley (*Hordeum vulgare*), peas and some other legumes were cultivated by the PGW people. However, it is to be noted only rice was found at Hastinapur while at Atranjikhhera more quantity of rice was found than wheat and barley. This indicates that perhaps rice dominated the staple diet of the PGW people.

Bones of goat, deer, horse, bull and pig have been found at Allahapur, Hastinapur and Atranjikhera suggesting the role of animal husbandry in their economy. Spearheads and arrowheads found at sites, such as Alamgirpur and Allahapur indicate towards animal hunting. Similarly, fishing could also well have been a part of the subsistence economy. Fish-hooks were found at several PGW sites, such as Atranjikhera. Bones have also been found from Mandaula, Katha, Mukari and Loni. However, their exact cultural context cannot be derived at. Though the bones from Katha were found from the layer that had PGW potteries.

### Conclusions

The PGW culture in western Uttar Pradesh, is younger than PGW culture of Haryana, Punjab and Jammu. This suggests an eastward movement of PGW people from neighbouring areas of Haryana, Punjab and probably Jammu into the Yamuna-Hindon doab. The settlements in the Yamuna-Hindon doab are generally located on the higher banks of the rivers and are small in size. The settlements depended upon the nature of soil and easy availability of water for irrigation and domestic use, and rich vegetation.

The presence of the varied species in the region and the fact that in the past the area had a much richer vegetation shows that the region, the Yamuna-Hindon doab, was easy attraction for human settlements. The rich vegetation together with rich agriculture, facilitated by the fertile alluvium soil and the perennial sources of water from the Yamuna and the Hindon, would have easily met the food requirements of the people. The comparative vicinity of the mountains and the high altitude combine to render the region one of the healthiest parts of the plains of India. The economic and ecological factors also affected the size and spacing of the settlements. The average size of an inhabited area is about 200 metres in length and 150 metres in breadth. The average spacing between two settlements is from 8 to 12 km. Though in the Saharanpur district it is between 5 to 8 km. The duration of these settlements must be short as evident from the limited thickness (between 1-2 m) of occupational deposit. The average size of the settlements (200 metres in length and 150 metres in breadth) shows that the inhabitations belonged to small

cluster of families. One can notice both the linear and circular pattern of settlement.

The settlements of the PGW culture are generally located on rivers banks. The average distance between two sites is about 10-12 km and in favourable ecological zones it is even 5 km. The settlements along the Hindon are more closely spaced as compared to the settlements along the Yamuna. However, the settlements along the Yamuna are bigger in size than those along the Hindon and other tributaries of the Yamuna. The habitations are basically small villages with average size of 1 to 4 hectare. Iron was introduced during the PGW period but copper remained the chief metal. PGW people cultivated wheat, rice, barley, gram, urad and pea and practised animal husbandry, hunting and fishing.

In the Yamuna-Hindon doab in the absence of large settlements, the cultural complex cannot be viewed from the point of urban network. However, being a fertile zone, drained by Yamuna and Hindon, it provided favorable geo-ecological settings for human settlements. Agriculture was their main source of livelihood in the region. Over a period of time, favorable geo-ecological settings seem to have facilitated generation of an economic surplus, which in turn led urbanization in the region and its neighborhood. As a result, the number of settlements gradually increased over a period of time, and even sites away from rivers were occupied. Among themselves, the settlers worked out the relationship of core and periphery, though the essential of basic self-sufficiency in rural areas remained, yet there was never a closed society. These necessitated developments in the social, political and economic structures too, and the region and its neighbourhood was on the threshold of urbanization. By 600 B.C.E., one notices second urbanization in India with monetary economy and political institutions, such as republics, kingdoms, and empires.

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