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## Living in the hinterland I: survey and excavations at Lohari Ragho 2015-2017

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### *Abstract*

This preliminary report presents an overview of the survey and excavation work at Lohari Ragho I in 2015 and 2017 that was carried out jointly by the Banaras Hindu University and University of Cambridge under the auspices of the *TwoRains* project. The site of Lohari Ragho I is situated c.9km to the west of Rakhigarhi, and based on surface collections appears to have been occupied in the Early, Mature and Late Harappan periods, as well as in the Early Historic period. The investigations that have been carried out include detailed surface mapping, systematic surface collection, excavation of vertical soundings and horizontal trenches, local-scale surface and subsurface landscape survey, and large-scale settlement location survey.

## Introduction

Several archaeological surveys have identified archaeological settlement sites near the village of Lohari Ragho. Sites were first recorded by D. Singh and C. Singh of the Department of Archaeology and Museums Haryana (IAR 1980-81: 16), and subsequent surveys were undertaken by T. Garge (2000; 2006), before the most recent surveys by the *Land, Water and Settlement* project (Singh et al. 2010a). As far as is known, the site referred to here as Lohari Ragho I was first recorded in the 2009 and 2014 seasons of the *Rakhigarhi Hinterland Survey*, which was carried out by *Land, Water and Settlement* project researchers under the direction of R.N. Singh and C.A. Petrie (Singh et al. 2010a). It was subsequently mentioned by Dangi in his PhD dissertation (2010).

The initial survey by Singh and Singh identified two Late Harappan period sites near Lohari Ragho, but did not specify their location nor their direction from the modern town (IAR 1980-81: 16). Garge (2000; 2006; also Nath et al. 2014) recorded three sites (LR 1: Early Harappan, Mature Harappan and Historic; LH 2: Mature Harappan and Historic; LH 3: Early Harappan, Mature Harappan and Historic) and stipulated their location in relation to the modern village, with all three being situated to the east. Garge was not able to establish whether these were the same sites discovered by Singh and Singh, and notably there is no correspondence between the periods of occupation identified at the sites found in each of these surveys, which may be a product of different approaches to the interpretation of the ceramic material.

The region around Lohari Ragho village was surveyed in 2009 and 2014 during the *Rakhigarhi Hinterland Survey*. In contrast to previous surveys, the *Rakhigarhi Hinterland Survey* and work carried out by the has used a robust and repeatable approach to locating archaeological sites (Singh et al. 2008, 2010a, 2011), which has been shown to be robust by revisiting some sites as part of the *TwoRains* project in 2017 (Singh et al., in press). The site survey data have been dated through comparison with material from known periods of occupation from local and more distant excavated assemblages from Masudpur I, Masudpur VII, Burj, Dabli vas Chugta, Bahola and Alamgirpur (Singh et al. 2009, 2010b, 2012a, 2012b, 2013a, 2013b, 2015a, 2015b, 2015c; Petrie et al. 2009, 2017), and material from other sites in the region. No sites with periods of occupation corresponding to those observed by Singh and Singh were identified during the *Rakhigarhi Hinterland Survey* and it proved difficult to find all three sites identified by Garge. However, by comparing his site location descriptions it appears that only one of his mounds was re-located - Garge's Lohari Ragho III appears to be the same as RHS Lohari Ragho II. We have mistakenly

referred to this mound as Lohari Ragho I in previous publications (e.g. Singh *et al.* 2016, 2017), but as published in Singh *et al.* (2010a), this site should henceforth be referred to as Lohari Ragho II. The spatial extent of the Rakhigarhi Hinterland Survey was significantly greater than that of the previous surveys, and this led to the identification of an additional settlement site in the area to the south-west of the modern village, which was labelled Lohari Ragho I (Singh *et al.* 2010a). We have also mistakenly referred to this mound as Lohari Ragho II in previous publications (e.g. Singh *et al.* 2016, 2017), but as published in Singh *et al.* (2010a), this site should henceforth be referred to as Lohari Ragho I. These naming conventions should be followed for all future publications.

When Lohari Ragho I was visited by the *Land, Water and Settlement* team in 2009, it showed evidence for Early, Mature and Late Harappan occupation on the surface. In March/April 2014, the *Land, Water and Settlement* project revisited all of the sites recorded in the Rakhigarhi Hinterland Survey in 2009. Unlike many of the settlement sites in the survey area, the site of Lohari Ragho I showed no signs of recent damage and disturbance, and it appeared to be the best-preserved Indus period settlement site in the hinterland of the major urban centre of Rakhigarhi. It was thus ideal for further investigation in order to understand the relationship between villages, towns and cities during the rise, flourish and decline of the nearby urban centre of Rakhigarhi.

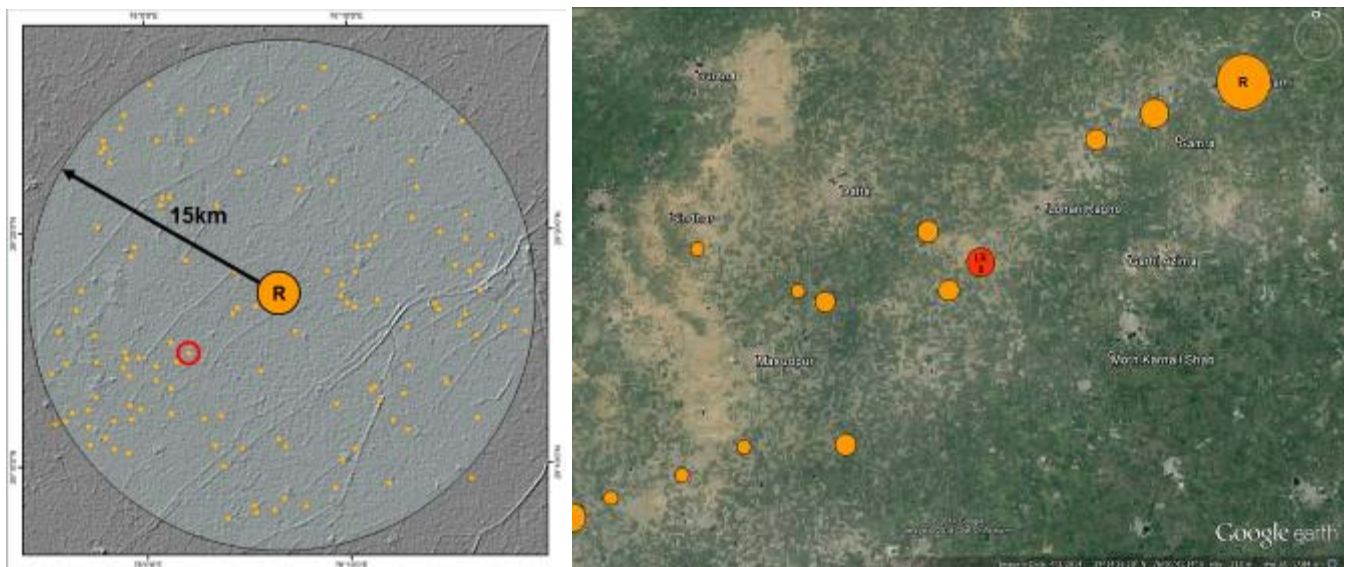


Figure 1a/b. Location of Lohari Ragho I (circled and in red) in relation to Rakhigarhi (R) and other settlements to the SW of the urban site. The location of modern villages are also indicated.

This report reviews three seasons of work at Lohari Ragho I (March-April 2015, March 2017, September-October 2017). The initial season set out to:

- carry out detailed surface mapping of the site (*Fig. 2*),
- initiate the systematic analysis of the distribution of cultural material on the surface of the site using a stratified surface collection strategy that involved collection from 2 m diameter circles around points on a 20 x 20 m site grid, and
- conduct preliminary excavations to assess the quality and level of preservation of the archaeological deposits.

The second season focussed on:

- excavating soundings in different locations on the site to identify areas of good preservation that would benefit from larger scale horizontal exposure.

The third season focussed on:

- conducting horizontal excavations aiming to reveal structural remains and their associated occupation deposits, which will enable the characterisation of lifeways during the Mature Harappan period.

## *Survey and excavations in 2015*

### **Detailed surface mapping**

Starting on March 17<sup>th</sup>, 2015, a topographic survey of the Lohari Ragho I mound was undertaken using a Leica Systems 1200 Differential GPS sensor (DGPS), which is capable of with sub-centimetre accuracy that is more than sufficient for most archaeological applications. In total, a 650 x 550 m area was surveyed, which enabled the production of a digital elevation model (DEM) of the settlement and the landscape in the neighbouring area (*Fig. 2*).

The DEM demonstrated that substantial parts of the mound site have been levelled for agriculture, creating a terraced mound (flattened areas in *Fig. 2*). It also confirmed that there are significant areas of the site that appear to be relatively undisturbed by modern cultivation, particularly the areas at the north and west of the site (areas showing natural slope in *Fig. 2*). In fact, in these

particular areas, some of the natural topography is preserved, with damage being limited to ploughing of the modern ground surface.

Overall, the mound rises to a height of approximately 2.5-3m above the surrounding plain. The surviving mounded area is approximately 8.6 hectares in extent, and appears to be situated at the distal end of an area of raised land, which is perhaps a relic rise within a braided floodplain. This landscape context suggests that Lohari Ragho I sits in a broadly similar context to a number of other sites in the area including Masupur I (Petrie *et al.* 2009; Neogi *et al.* in press).

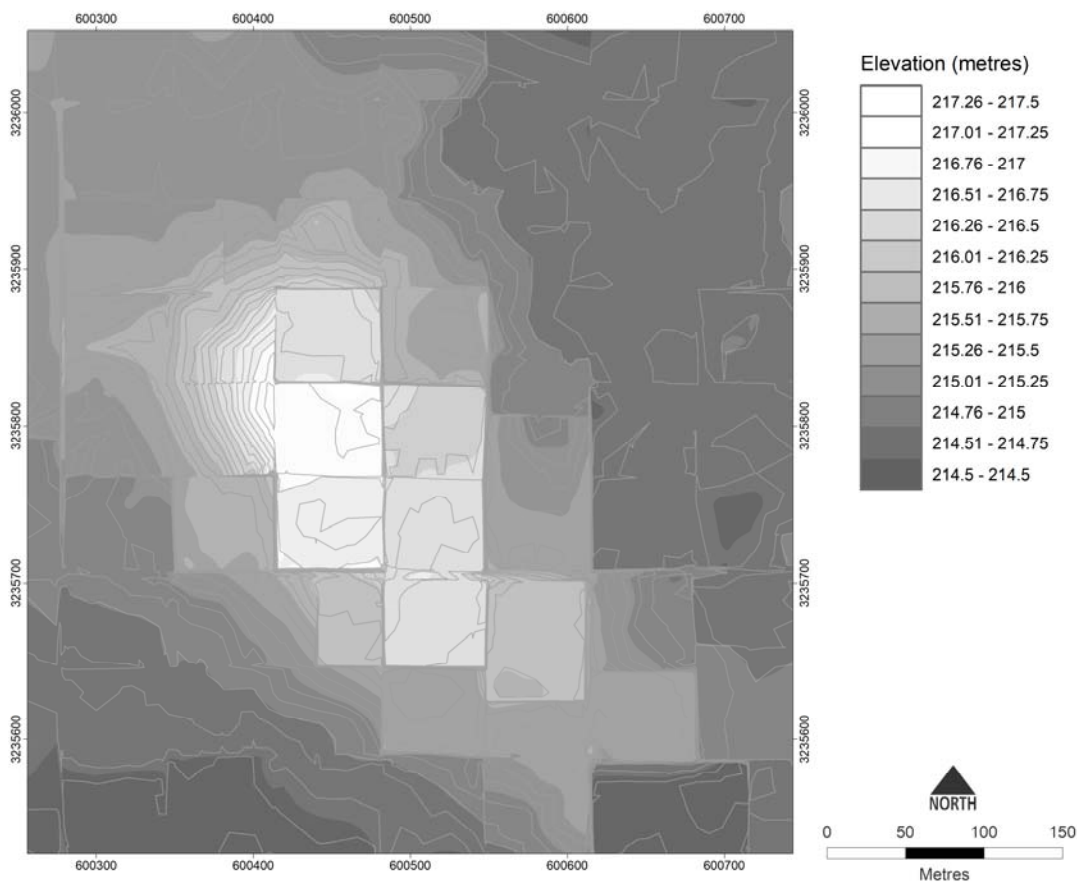


Figure 2. Digital elevation model of Lohari Ragho I based on surface mapping carried out in 2015.

## Systematic surface survey

In conjunction with the topographic survey of the mound, a systematic surface collection was also carried out, which utilised the DGPS to lay out a site grid of 20 x 20 m squares marked with labelled 1 m high bamboo poles. With the assistance of students from MD University Rohtak<sup>1</sup>, a systematic collection of cultural material from within 2 m diameter circles around each point on the 20 x 20 m site grid was undertaken. In total, the grid covered an area of 440 x 440 m, and included 23 grid lines in both N-S and E-W directions.

Students from MD University Rohtak worked in pairs to mark out sampling areas and collect material from a total of 529 grid point locations. This material was then collected into appropriately sized clear plastic bags containing a label showing the co-ordinates of the collection point, which was in turn put inside a small zip-lock bag to ensure its preservation. The material collected from each point was washed, dried, sorted, and then counted and weighed by category (e.g. ceramics, brick fragments, and small-find artefacts). Diagnostic material from each point was then assessed separately and attributed to individual chronological periods.

This approach to processing the surface collection meant that it was possible to plot the distribution of different categories of cultural material across the surface of the site both spatially and chronologically. Similar approaches have been used to good effect in the investigation of the surface of Indus settlements during the Beas Landscape and Settlement Survey, particularly the site of Vainiwal (Wright *et al.* 2005; Wright 2010: 127ff). Examples of the results from the surface collection, showing the distribution of bone and ceramics, by both count and weight are shown below (Figs 3-6). The full results of this surface survey are in preparation (Redhouse *et al.* in prep).

The systematic surface survey demonstrated that Lohari Ragho I was occupied in the *Early, Mature* and *Late Harappan* periods, as previously recorded, but also that it was occupied in the Early Historic period, which had not been noted previously. Further analysis of the distribution of the material on the surface makes it possible to illustrate the distribution of material from different periods of occupation (Redhouse *et al.* in prep), and thus helped guide the selection of areas for further excavation.

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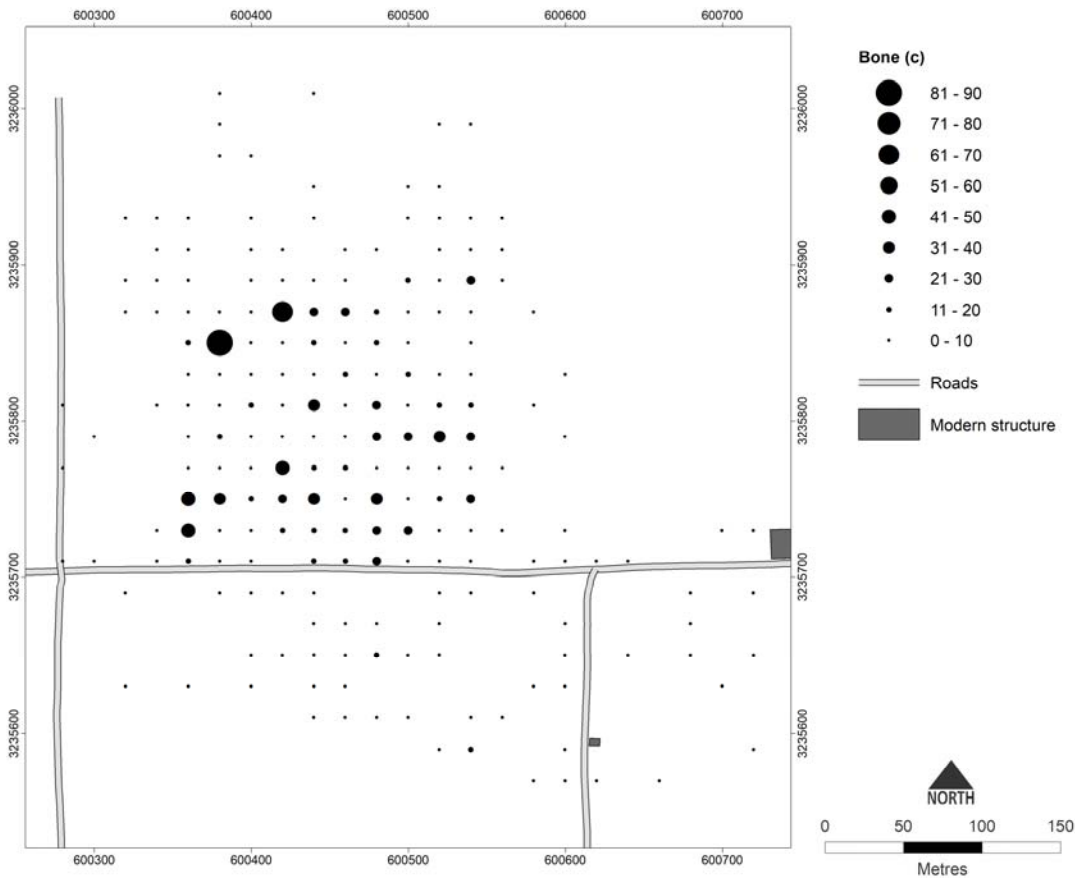


Figure 3. Distribution of bone in the surface collection, differentiated by count of fragments

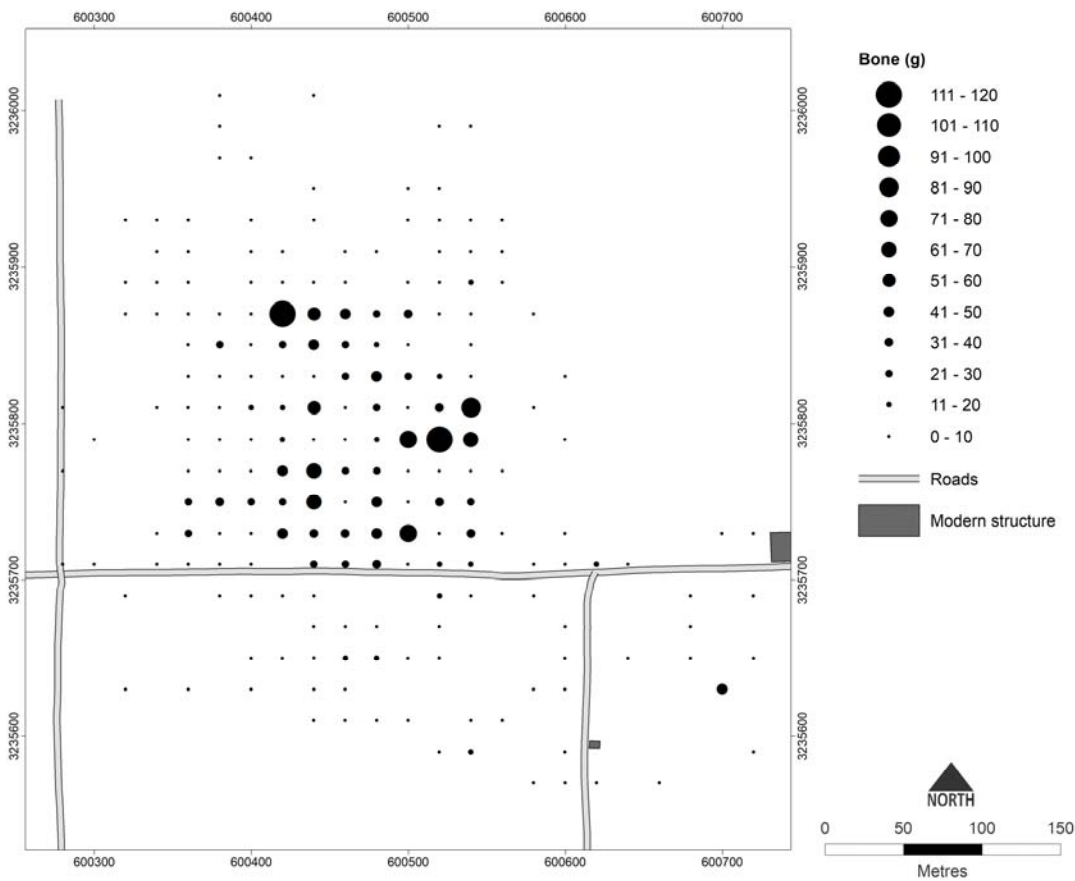


Figure 4. Distribution of bone in the surface collection, differentiated by weight of fragments

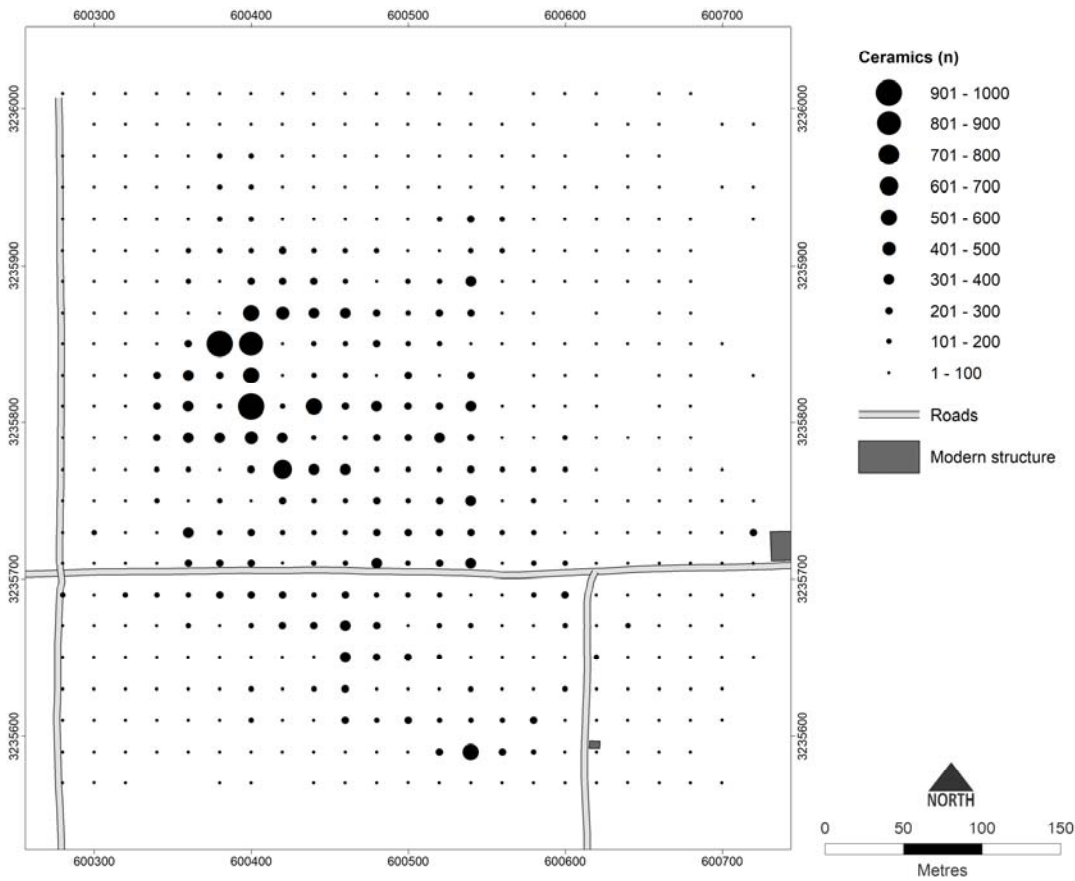


Figure 5. Distribution of ceramics in the surface collection, differentiated by count of fragments

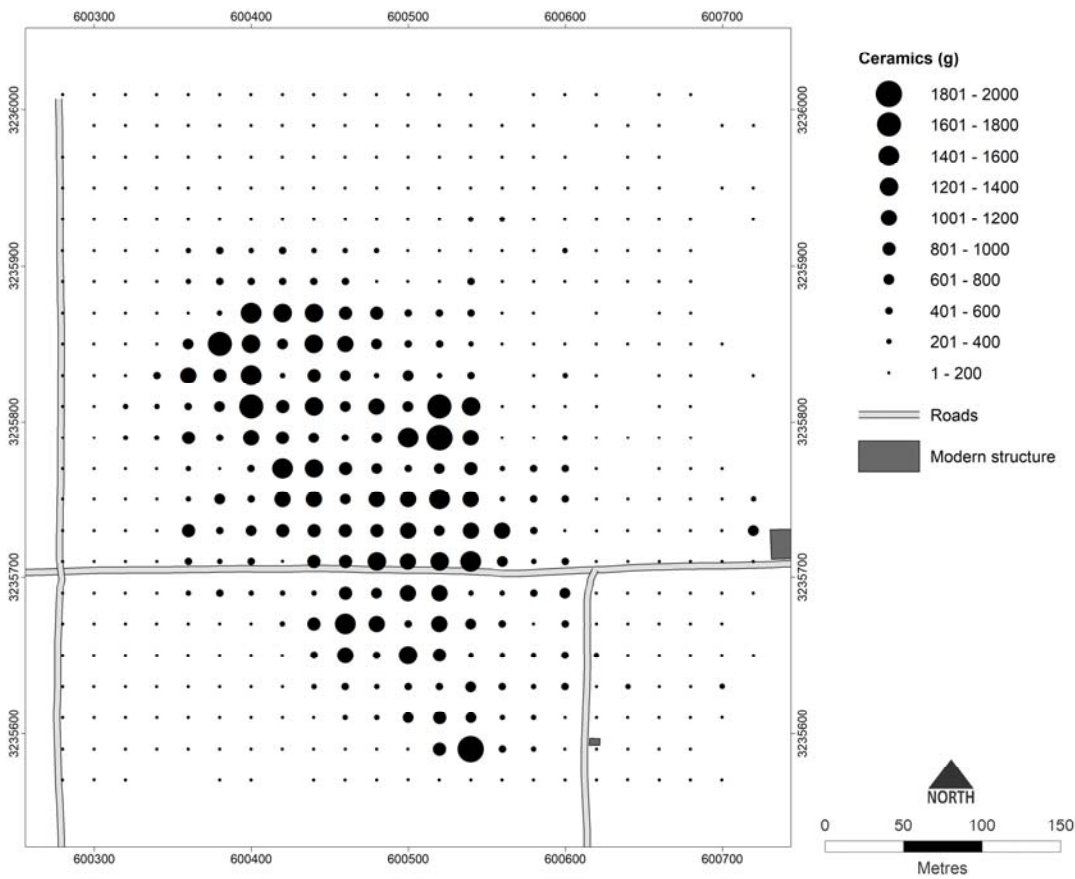


Figure 6. Distribution of ceramics in the surface collection, differentiated by weight of fragments



## Preliminary excavations

In conjunction with the systematic surface mapping and collection, preliminary excavations were carried out in two areas to assess the quality and level of preservation of the archaeological deposits: a 2 x 2 m sounding excavated at the high point in the NW quadrant of the mound (Trench A), and a 5 x 2 m sounding adjacent to a standing section (Trench B) (Fig. 7).

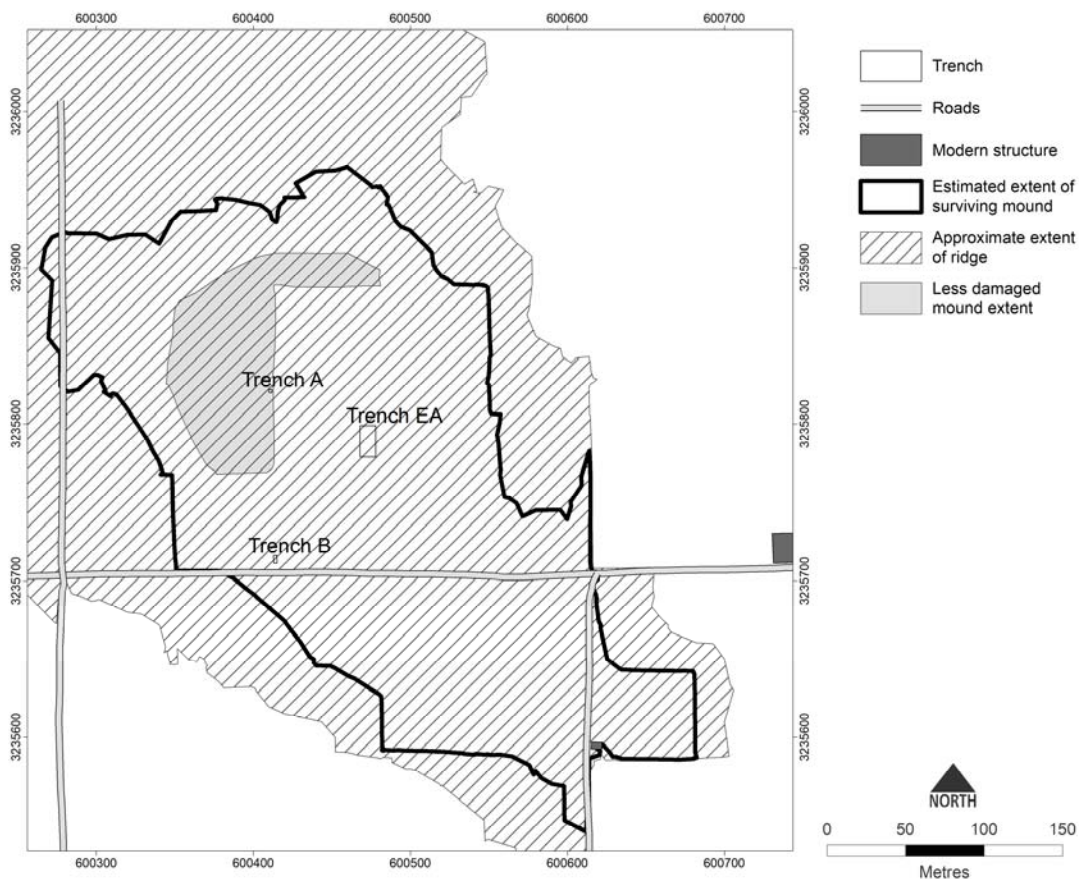


Figure 7. Digital elevation model of Lohari Ragho I based on surface mapping carried out in 2015.

### LHR Trench A

This small 2 x 2 m sounding was excavated to establish the level of preservation in the NW part of the site, which appears to be undisturbed by ploughing, and also to ascertain the distribution of specific phases of occupation at the site (Figure 8). A total of 28 separate contexts were excavated, and these appear to have been primarily related to one major phase of occupation dating to the *Early* or *early Mature Harappan* period. The excavations revealed two fire installations, with the larger of these showing signs of multiple stages of rebuilding (Figure 8). These features were

overlain by substantial deposits of mud-brick collapse, which suggests that this part of the site was abandoned rather than destroyed in a conflagration, though this will need to be demonstrated through further excavations.



*Figure 8.* Trench A during excavation, showing two fire installations, with the one at the lower right being the earliest phase of construction of this the larger of the two structures.

#### LHR Trench B

A larger 5 x 2 m sounding was excavated to make a quick assessment of the archaeological sequence in an area with a high exposed section. Unfortunately, this exposed section appears to have been produced by earlier levelling of the archaeological mound, and almost all of the deposits exposed showed signs of disturbance. This finding was particularly disappointing as this area proved to be relatively rich in artefact finds.

## Discussion

The surface mapping, surface survey and preliminary excavations at Lohari Ragho I in 2015 demonstrated that this is one of the most significant settlement sites in the hinterland of the Indus urban site of Rakhigarhi, both in terms of its size and its cultural sequence, and also on the basis of the artefact material that has been recovered from its surface. It thus has enormous potential for providing insight into the lifeways of rural and town-based populations living in the hinterland of an urban settlement. The ceramic material recovered from the surface collection and the limited excavations demonstrated that the site was inhabited during the *Early, Mature* and *Late Harappan* periods, and also the Early Historic period. Given the paucity of *Classic Harappan* black on red-slipped pottery, there is some likelihood that the majority of the ceramic vessels in use at the site were either produced at the site itself or close by, potentially at one of the other sites in the vicinity where evidence for ceramic production was discovered during the Rakhigarhi Hinterland Survey (e.g. MSD V; Singh *et al.* 2010a). As discussed below, the diversity of grinding stone fragments recovered from the surface demonstrate that the inhabitants were also connected to what might be described as mid- and long range interaction networks stretching into northern Rajasthan, the Himalayan foothills, and also as far to the west as the Sulaiman Ranges.

### *Survey and excavations in 2017*

Excavations in 2017 were carried out in two seasons, the first in March and April, and the second in September, with some final documentation occurring in October. During the March season, three soundings were opened to identify areas that would be suitable for open area excavation. During the September/October season, one of these areas was selected for a larger exposure.

### **Soundings excavated in March**

Lohari Ragho I was revisited in late March 2017, and although agricultural activities at the site have continued since 2015, no major levelling appears to have taken place. Three small soundings were excavated to ascertain the level of preservation in different parts of the mound.

## LHR Trench EA

A 2 x 2 m trench was opened on the highest preserved part of the site, adjacent to mud bricks visible at the edge of a field. Beneath a layer of plough soil, archaeological deposits were encountered containing *Mature Harappan* ceramics. Traces of a mud structure or platform were encountered at a depth of approximately 45 cm below the modern ground surface (*Fig. 9*), and excavation was halted pending expanded excavations in September-October.



*Figure 9.* Mud structure exposed in Trench EA

## LHR Trench EB

A 2 x 2 m trench was opened on the eastern part of the main mound. Beneath a layer of plough soil, mixed/disturbed archaeological deposits were encountered containing limited cultural material, and clear evidence for site levelling in the form of plastic and modern brick fragments. From 50cm below the modern ground surface, compacted deposits containing archaeological material were encountered, but few pottery fragments were recovered. Kankar was encountered from 150 cm below the modern ground surface, and natural soil at a depth of 175 cm (*Fig. 10*).





*Figure 10.* north section of Trench EB

#### LHR Trench NA1

In the field to the north of Trench EA, another 2 x 2 m trench was excavated – Trench NA1. Beneath a layer of plough soil, clearly differentiated archaeological deposits were encountered, containing ceramics, bone and brick fragments. At a depth of around 65 cm below the modern ground surface, traces of a mud-brick structure were revealed, comprised of two walls (*Fig. 11*). Excavation was not continued.



*Figure 11.* Trench NA1, mud brick structure

#### Trench YA1

A 2 x 2 m trench was also excavated on the southern parts of the site to help with the training of MA students from MD University Rohtak. The archaeological deposits below the ploughsoil appear to be characterised by a substantial pit or dumping deposit.

#### **Open area excavations in September/October**

Following the excavation of soundings in March and April, the area around Trench EA was selected as the ideal location for open-area excavations, aimed at exposing household structures and working areas relating to the different periods of occupation at the settlement. These excavations commenced with a standard excavation approach focussed on 5 x 5 m trenches, but this was converted to an open-area excavation once structures were encountered. Single context recording methods were used throughout to document the deposits large horizontal areas.

## LHR Trench EA

Excavations and documentation were carried out over five weeks between 08/09/2017 – 12/10/2017. Work focussed on an area immediately adjacent to Trench EA, and although an area of 20 x 10 m was cleared, detailed excavations were only conducted across an area of 10 x 10 m (Fig. 12). A total of 97 distinct stratigraphic contexts were exposed, relating to at least three phases of occupation – which span both the *Early* and *Mature Harappan* phases. The deposits revealed include structural remains, a number of distinct activity areas, and clear evidence of structural collapse (Figs 13-15).



Figure 12. Architecture exposed in Trench EA.



*Figure 13.* Excavated area in Trench EA during excavations.



*Figure 14.* Excavated area in Trench EA at the end of excavations.





*Figure 15.* Sounding within Trench EA to reach natural soil.

The excavated deposits were systematically sieved and/or hand-sorted, resulting in the recovery of 27,500+ pottery sherd fragments, weighing 359 kg, and 242 small find antiquities. The ceramic material was processed in the field, and registration and drawing was subsequently carried out at Banaras Hindu University. Analysis of technological characteristics and organic residues extracted from selected samples is currently in process.

Animal bones and samples for flotation and phytolith analysis were systematically collected. Flotation was carried out using a recycled flotation system with a pump that prevented excessive water usage, and in general 100 litres were collected from every sampled deposit. Around 4000 litres of soil was floated overall. Phytolith samples were collected from structural remains and several floor surfaces to investigate variation in the distribution of phytoliths in different features and areas. We also recovered samples for OSL dating from the deposits immediately below the occupation layers in an area that was excavated through to the natural soil (*Fig. 15*).

## **Work in the hinterland of Lohari Ragho I**

In addition to the work on-site, a coring survey was carried out in the surrounds of Lohari Ragho I to identify sub-surface features. This involved systematic coring of a 4km<sup>2</sup> area around the mound, with transects extending approximately 1km in each direction. Each core's sedimentological sequence was fully described with attention paid to the colour, composition, and humicity of units; any inclusions found within a unit; and, depth of transitions between sedimentological units. The sampling strategy allowed for initial mapping of various sub-surface palaeo-environments, which was used for the identification of locations for high-resolution sampling and OSL dating.

More wide-ranging settlement survey was also carried out to ascertain the identify the correct locations for previously identified archaeological sites, establish whether features visible on historic maps and remote sensing imagery are actually archaeological sites, and ascertain the degree of archaeological site preservation in the greater region (Singh *et al.* in press). The survey was carried out by assessing a database of thousands of previously reported or potential sites, and investigating locations within a regional grid of 100 square kilometer hexagons, which was projected over the project study region. The survey re-visited and re-documented previously recorded site locations in each of the sampled regional grid units, updating and confirming the location of at least 26 previously reported sites. A total of 413 locations were visited, but the previously reported archaeological sites were either not present, or the feature visible in the historic maps was not an archaeological site. However, 88 visited locations were archaeological sites, and many of these may have been previously unreported.

The settlement survey was accompanied by a wide-ranging collection of soil samples that will be used to establish a Strontium baseline for the region around Lohari Ragho I. Sampling of modern pottery and clay was also carried out, and this will be used to support a variety of analyses, including isotope and technological analysis. In addition, sampling for palaeoclimate analysis was also carried out, including the collection of water samples from various locations, and gypsum and sediment samples from a number of palaeolakes. These samples will similarly help provide an isotopic baseline for the region and further expand our knowledge of its paleoclimate.

## *Cultural Material*

A range of cultural material was recovered from the surface and the excavations, and the analysis of this material is ongoing. As noted above, the ceramic material from the surface of the site ranged in date from the *Early, Mature and Late Harappan* periods, and also included Early Historic material. The ceramics from the excavated areas included both *Early* and early *Mature Harappan* vessel forms (Fig. 16). A small number of fragments of *Classic Harappan* black paint on red-slip pottery were collected from the surface and the excavations, reinforcing the impression that this particular ware is rare outside of urban centres during the *Mature Harappan* period. The ceramic material has clear parallels with material from sites in Masudpur VII, Girawad and Farmana.



Figure 16. Pottery vessels excavated from Lohari Ragho I (photo: Alessandro Ceccarelli).

Small-find artefacts collected from the surface and excavations included a range of material types, particularly grinding stone fragments and beads, with the latter including a diverse range of fired steatite examples (Fig. 17). Perhaps the most interesting discovery during the surface survey and collection was the recovery of approximately 240 fragments of grinding stones, including querns, mortars, mullers, pestles, whetstones and hammer stones (Fig. 18). A small number of fragments of such items were recovered during the excavations. Many of the grinding stones from the surface were preserved to such an extent that it was possible to see typological similarities to examples that have been recovered from Rakhigarhi (e.g. Nath *et al.* 2014: Plate 6). Although no formal attempt at identification has yet taken place, the stone raw material used to make these grinding stones appears to be predominantly red/pink Delhi quartzite from the Kalia Hills. However, examples of what appear to be granite from Tosham, Pab sandstone from the Sulaiman Range in Pakistan, rounded cobbles possibly of Himalayan origin, and other stone types discussed by Law (2011: 103-123; also Nath *et al.* 2014: 95-96) were also attested. Further analysis is clearly warranted.

The frequency of these grinding stones on the surface of the site suggests that intensive crop processing was being carried out at the settlement, though it is not yet possible to establish which period or periods this activity was concentrated in. Unlike the other cultural material, the distribution of these grinding stones was not particularly informative, as almost all of them were recovered from field boundaries, where they have either been deposited deliberately by farmers, or as a result of ploughing. The diversity of their geological origin is significant and appears to match that seen at Rakhigarhi, suggesting that the inhabitants of Lohari Ragho I were integrated into the same raw material acquisition networks that were open to the inhabitants of the urban centre situated 10 km to the east.



*Figure 17.* Carnelian, faience and steatite beads from Lohari Ragho I (photo: Barun Sinha).



*Figure 18.* Grinding stones collected from the surface of Lohari Ragho I during the surface survey (photo: Cameron Petrie).

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