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Preliminary Studies on Exploration in Middle Reaches of Ghaggar River Basin

RESEARCH PAPER

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ABSTRACT

The Ghaggar river which is also known as ancient Sarasvati river is noted for her mysterious disappearance. The scholars from different field are studying the river channel since the 18th century. Archaeologists were intrigued by the Ghaggar river channel due to the presence of archaeological sites all along the river basin. Explorations in the past resulted in locating hundreds of archaeological sites, particularly Harappan culture sites. A large number of Harappan sites along Ghaggar banks is evidence that Harappan culture flourished richly on Ghaggar river than on Indus river. The present research focuses on the middle reaches of Ghaggar river where the author conducted a systematic exploration to revisit previously reported sites and report new sites in the process. The main objective of this research paper is to discuss the site distribution pattern of explored sites in the region and to come up with probable explanations for the distribution pattern of the sites.

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INTRODUCTION

The dried-up river bed of Ghaggar – Hakra, originates in the Shivalik Hills of the Himalaya, which by the traditional belief in its identity with the sacred Sarasvati River mentioned in Vedic literature is of special interest to scholars of various fields from History, archaeology to geology and with the more information spread regarding the river now, the common people have also started showing their interest. Since the end of the 18th century, the researchers have been attempting to point out the traces of dried up river channels that extend from the Shivalik and runs through the Punjab and Haryana States and then through the northern part of Rajasthan in district Hanumangarh and Sri Ganganagar, and via. Pilibangan, Rangmahal through Anupgarh, the river enters into Cholistan region of Pakistan and near Derawar buried under a thick layer of drift sand. (Rennell 1788; Burnes 1835; Tod 1832; C F Oldham 1874; R D Oldham 1886; Stein 1942; A Ghosh 1952 and R Mughal 1997). In the early decades of 19th century, Lt Col. James Todd (Todd 1832) explored this region during his stay in Rajasthan and mentioned about the river and antiquities discovered nearby the Ghaggar river. Along the bank of the river, many archaeological settlements were reported albeit without their cultural affiliation and period as due to lack of understanding of the archaeological culture then in the time, later on, these sites turned up as belonging to Pre/Early Harappan, Mature Harappan, PGW, Historical and Medieval period.

Archaeologists were fascinated by the Ghaggar river channel due to the presence of archaeological sites all along the river basin, belonging to the different cultural period from protohistoric periods to the Medieval period. At present, a wide range of human occupation in the river basin is known. The glimpses of developmental phase are present in the river basin from the early farming communities till late Medieval period. As far as Harappan studies are concerned, the Ghaggar river basin has more Harappan sites reported than the Indus river basin. Apart from Harappan culture, Painted Grey ware, Rangmahal/Historical, Medieval period also known from the region.

In the Sri Ganganagar district was selected study area for this research paper, systematic exploration has been conducted to locate previously reported sites and report new sites in the process. This research paper will focus on understanding the distribution of Harappan and other archaeological sites in this region.

STUDY AREA

The study area of this paper covers the tehsil of Vijaynagar and Anupgarh in District Sri Ganganagar, Rajasthan. Primarily along the flood plain of the Ghaggar- Hakra, albeit including the parts of the flanking dune fields, from Jetsar to Majnu border outpost (Indo-Pakistan border), The area lies between North 29°36' to 29°23' and East 73°70' to73°06'. It comprises of area approx 1012 sq. km. It is to be mention that outside of primary study area author also revisit all the sites which were reported by L.P. Tessitori (as mentioned in Aurel Stein's report), Sir Marc Aurel Stein, A Ghosh, Ketty Frenchman Dalal and K N Dixit. The mentioned study area was selected, for the reason that at the confluence of Ghaggar Chautang channels in the Marausthali near Rangmahal, the changes in settlement dynamics of ancient cultures were observed.

PHYSIOGRAPHY OF THE DISTRICT

Being a part of Thar Desert, Sri Ganga Nagar is covered by a thick layer of sand except for the northern part which is alluvium plains. The southern part is mostly affected by dunes with the height ranging from 5 to 50 m. Several natural depressions can also be seen in the said region.

As far as climate (CGWB 2013) is a concern, Arid type of climate prevails in major part of the district. It is characterized by hot summer and cold winter. Mean daily minimum temperature is 4.7°C in the winters and a mean daily maximum temperature is 42.1°C in the summers. Southwest monsoon season prevails from June to mid of September, which is followed by post-monsoon period till the end of November. The district on an average receives 293.2 mm of rainfall. The Normal average Annual Rainfall of the district during the period 1901–2008 has been 228.1 mm. The Average Annual Rainfall of the district during the last eleven years (2001 to 2011) was 255.09 mm and varied from 191.27 mm at Raisinghnagar to 361.91 mm at Sadulshahar.

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DRAINAGE

To properly understand the materials collected by the author in the study area, it is imperative to know about the entire drainage system of Ghaggar- Hakra right from the Shivalik to the outer sparse of the Cholistan desert. So, as to etch out the archaeological personality of the entire region. The Ghaggar river originates in the Shivalik Hills of the Himalayan mountain and runs through the Punjab and Haryana States and then through the northern part of Rajasthan in district Hanumangarh and Shri Ganganagar, and via. Pilibangan, Rangmahal through Anupgarh river enters into Cholistan region of Pakistan and southwest of Derawar the channel buried under drift sand. Hanumangarh from where downstream, the channel of Ghaggar or Sarasvati becomes quite distinct on hydrography map, satellite imagery near Kalibangan provides the visible width of channel roughly about 3 to 3.5 km. which, increased maximum to 7 km near Rangmahal and river runs toward Derawar via. Anupgarh width of the channel varies from 4 to 6 km. till it buried. The remnants of silted up watercourses indicate earlier flood plains. At present numerous sand dunes can be seen at the edge of flood plains.

PREVIOUS WORK

The first exploration in the search for antiquity was conducted by Dr L P Tessitori (1920) in 1917–1918 for commemorative stone slabs, bardic and historical records of Rajasthan. During his exploration in northern parts of then Bikaner state, he was able to locate many ancient mounds along the dried bed of Sarasvati River. Although Tessitroi's main objective was not the exploration of archaeological sites, he can be credited for presenting and identifying important proto-historic sites in and around Bikaner state, northern Rajasthan (British India). He laid out trial trenches during his survey in a few sites and collected archaeological material. He explored the sites of 'Kali Vanga' (Now, Kalibangan, District Hanumangrah), Baror, Rangmahal, Sardargarh, etc. from 1917–1918. During his trial trench at archaeological mounds, he discovered antiquities such as coins, beads, figurines, pottery, etc (Stein 1989). The result of Dr Tessitori exploration was so astonishing that the then Bikaner state decide to open a small archaeological museum in the Bikaner Fort. Unfortunately, before he could publish his detailed report, he died the following year.

Tessitori's work was followed by that of Sir Aurel Stein in 1940 (Stein 1942), credited with the systematic exploration, focused mainly on identifying archaeological sites. He understood the connection between the present-day river system of Ghaggar-Hakra with that of the ancient river Sarasvati. His pioneering work provides valuable information regarding the distribution and location of the archaeological sites. Stein observed the distribution of mounds or 'Theri' along with the Ghaggar-Hakra river systems and explored then Bikaner in Rajputana and Bhawalpur State now in Sindh Pakistan.

Stein correctly identified the sites in the Bahawalpur region as pre historic/protohistoric or Harappan, he make a mistake in identifying the sites in the Bikaner State, including the now famous site of Kalibangan, as Early Historic. However, what was even more important is that Stein identified the completely dried-up Ghaggar-Hakra river with the Sarasvati of the Rigveda (Stein 1942). His explorations brought to light important archaeological sites such as Sandhanwala, Binjor, Baror, Mathula Ther, Kharuwala Ther, Jaurinwala Ther, Suwaiki, Bhaironpura Munda, Sohankot, and Rangmahal (***Table 1***). Artefacts collected from these sites, mainly pottery, which helped him in identifying the cultural periods of the sites. Stein carried out pottery analysis using morphological and stylistic variations and then he compared that pottery to other known Harappan pottery which at the end helped him to identify sites of different periods that are now understood as Pre/Early Harappan, Mature Harappan, Painted Grey Ware and Rangmahal/Historical ware cultures.

After the partition, A Ghosh (Ghosh 1952, 1953) conducted an extensive exploration in the northern part of Bikaner state along the river Sarasvati and Drishadvati. He was able to found around a hundred sites during his find exploration in the region in north Bikaner and east Punjab (present-day Haryana). Ghosh not only explored and rediscovered sites previously reported by Sir Aurel Stein and others but also tried to understand the geology of these river systems and conducted preliminary excavations at the sites located along with the Sarasvati and Drishadvati river systems (Ghosh 1952; Dalal 1980).

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He made the very important observation like the most of the Harappan mounds on Sarasvati are small settlements and yielded the same type of pottery and other objects as those of further west in Bahawalpur, Sind and Baluchistan (Ghosh 1953: 31–33). He classified the earliest group of sites as Harappan and belonging to the same period as the site of Mohenjo Daro and Harappa in Pakistan. The 25 sites belonging to the period were located and reported by Ghosh (Ghosh 1952: 37), major ones include Kalibangan, Tarkhanewala Dera, Binjor-1, Binjor-3, Bugian, Chak 11, Chak 21, Chak 50, Chak 72/3, Chak 75, Chak 80 and Chak 88 (***Table 1***). chronologically the next group of 20 important sites (***Table 1***) include Chak 15/4, Chak 40, Chak 59, Chak 72/1, Chak 86, Chak 87, Rer, Rer Tibba, Binjor-2, Binjor- 4, Daulatabad- 1, Daulatabad- 2, Jhandewala and Jhandewala Tibba were identified as Painted Grey Ware, which he dates them to 1000 BCE. These sites are mainly located in the Sarasvati valley, i.e. north Bikaner region, with one in the Drishadvati valley (Ghosh 1952). The pottery of these sites was compared to that of Hastinapura and he also noted regional variations between the potteries of the western Uttar Pradesh and Rajasthan. After the analysis of the cultural material as well as the structural remains, Ghosh attributed the culture to be dated around 600 BCE. He observed that the culture was primitive in comparison to Harappan culture in terms of urbanization.

Next group accounts for a very large number of sites, some of them especially near Suratgarh of very large dimensions he mentioned and identified them as Rangmahal culture. According to Ghosh (1952), some of the Rangmahal mounds are, as high as 35 to 40 feet representing the accumulation of several centuries, and he also identified few cultural materials related to the Gupta period. Ghosh conducted preliminary excavations at the sites (***Table 1***) located along with the Sarasvati, namely, Tarkhanwala Dera, Chak 86, Sothi, Rer and Chak 40 to check the cultural sequence. After limited excavations at Tarkanwala Dera and Chak 86, one of the most important observations made by Ghosh was the different locations of PGW sites than that of the Harappan sites and concluded that the two cultures never coincided (Ghosh 1952: 37). This helps to understand the settlement and migration patterns of these ancient people in different periods. For the sequence of PGW and Rangmahal culture, two sites have been excavated Rer and Chak 40 revealed successive layers of PGW culture occupation superimposed or latterly occupied by the Rangmahal culture.

Following explorations of Ghosh in 1951–52, the Archaeological Survey of India conducted excavations at Kalibangan for 9 field seasons (1960–1969) under the supervision of B B Lal, B K Thapar and J P Joshi (Lal *et al.* 2003). B K Thapar studied pottery in detail from Early Harappan levels and classified it into *six fabrics – A, B, C, D, E and F* (IAR 1965: 20–31). The excavation has brought to light a two-fold cultural sequence. The earlier period is called Kalibangan-1 or Pre Harappan antecedent of Harappan and also called Proto Harappa and the latter Kalibangan 2 known as Harappan.

The Swedish Archaeological Expedition to India under Hanna Rydh (Rydh 1959) excavated Rangmahal, near Suratgah, Ganganagar District, between 1952 and 1954 for two seasons. Typical evidence related to the material of the Kushana period is presented by the Rangmahal type site, and most of the Rangmahal or Kushana sites are on and around the river bed.

Henry Field (Field 1959) explored from Dera Nawab Sahib to Fort Derawar and then turned eastwards to Fort Abbas and beyond up to the Indian border in 1955. Among many other things, he reported Harappan material from eleven sites and a few other early historical sites.

The next major exploration was conducted in Rajasthan was done by Katy Feroze Dalal née Frenchman (Dalal 1972, 1980). She explored the region for two seasons in 1967 and 1970, the exploration was mainly aimed at re-exploring sites of Stein and Ghosh. She succeeded in exploring many of the sites (***Table 1***) as her predecessors, these sites included ranging from Pre-Harappan, Harappan, PGW and Rangmahal. Important Pre-Harappan sites are Nohar, Sothi, Kalibangan, Binjor 1–4. The cultural material at Sothi and Kalibangan I type pottery was considered as the yardstick to determine the Pre-Harappan sites. Dalal mentioned about important site of Harappan period included Kalibangan, Tarkhanwala Dera, Binjor, and PGW period explored was G B 67. She took trial trench at Binjor 1, Binjor 3 and GB 67(Dalal 1972) Ghosh identified it as Chak 72/1. Majority of the sites around Suratgrah were of Rangmahal culture, The Important Rangmahal sites explored were Sutharawalla 43 PBN, Rangmahal, Chak Sohan. These were the largest Rangmahal sites explored.

In 1967–1970 Surajbhan (Bhan 1972) carried exploration along the dried bed of Ghaggar and Chautang in Haryana and reported 97 protohistoric sites. Small scale excavation conducted by him at the site of Mitathal, Daulatpur and Siswal and on the base of the exploration and

excavation established a chronological sequence from Kalibanagan I culture to Late Harappa culture (1972: 315) of the protohistoric settlements of this region. The same region was further explored in 1977 by Suraj Bhan and Jim G. Shaffer (Bhan *et al*.1978).

Rafique Mughal (Mughal 1997) conducted systematic exploration in Cholistan region of Pakistan for four seasons from 1974 to 1977 beginning from the Indian border at Fort abbas to Fort Derawar and reported 424 sites. Mughal noticed that the sites are generally located on or close to the former flood plain of the Hakra River all along its 300 miles (483 km) long course in Bahawalpur. The highest concentration is noticeable around Derawar, where the Hakra played a significant role. The Derawar area, having been fed by a channel from the Sutlej, remained habitable for a very long time from at least the fourth to the second millennia B.C. as archaeological evidence demonstrates. The site reported by Mughal during his exploration are as follows, Hakra Wares- 99, Early Harappan-40, Mature Harappan-174, Painted Grey Wares-14, Early Historical, Medieval First to (Islamic) and later- 37 and Unidentified 10.

In 1977–78, K N Dixit (Dixit 1977, 1984; IAR 1980) revisited the sites explored earlier by A. Ghosh from Bhadra to Anupgarh in District- Ganganagar, Rajasthan and discovered Sherpura between Bhadra and Siswal which yielded Pre-Harappan fabrics. He took trial trenches at Nohar and Sothi to check the cultural sequence and material, where the Pre-Harappan deposit is 1–1.30 meter thick was reported. From Kalibangan to Anupgarh, Harappan sites revisited during his exploration was 94 GB, 93 GB, 80 GB, 87 GB, 72 GB, 43 GB and 25 GB (***Table 1***).

R.C Thakran (Thakran 2006–2007) explored the region along the Ghaggar river in Rajasthan and reported 2 Hakra, 14 Early Harappan, 09 Mature Harappan, 04 Late Harappan/OCP, 11 PGW, 49 Rangmahal, 24 Medieval sites.

Vikas Pawar (Pawar *et al*. 2013) conducted the village-to-village survey in District Hanumangarh in Rajasthan where he reported 574 sites out of which 71 Early Harappan, 15 Mature Harappan and 7 Late Harappan sites, 8 PGW sites, 466 Historical sites, 187 medieval sites. Exploration revealed many sites in the region of Early Harappan, Mature Harappan, and particularly late Harappan which was not reported earlier in the region.

Samunder and Vivek Dangi (Samunder *et al*. 2014) explored the areas of Suratgrah Tehsil in Sri Ganganagar district, northern Rajasthan. During the field investigation, seventy-nine sites were explored in the proposed area of which sixty-nine are newly discovered sites, 4 Hakra, 4 Early Harappan, 1 Mature Harappan, 3 Late Harappan, 11 PGW and BRW, 78 Rangmahal, 5 Medieval sites have been reported.

RESEARCH METHODOLOGY

The present research is based on data, collected through systematic archaeological exploration conducted by walking transects at set distance and ground in the middle reaches of the Ghaggar River Basin from Jetsar to Majnu border outpost (Indo-Pakistan border) in Tehsil Vijay Nagar and Anupgarh in Sri Ganga Nagar district, Rajasthan. The previous exploration maps made by different scholars, toposheets were studied into great detail to understand the landscape. Detail explorations and excavations articles and report both published and unpublished were studied to get a better understanding of cultural development in the region. Besides these thematic maps like Digital elevation model, Drainage system, Geomorphological landforms were made in GIS software to get insight into geographical and topographical features of the study area and to understand the distribution and settlement pattern of protohistoric cultures in the given study area. During the field exploration along with toposheet, google earth have been used comprehensively to get a Satellite view of the area on the field during exploration, which, was very helpful in the field to locate the sites and to comprehend the surrounding landform.

PRESENT EXPLORATION

In the present study area, the Ghaggar and Chautang channels, running from Indo Gangetic divide enter into the Thar Desert and make confluence near Suratgarh and move to the south-western direction towards Anupgarh. However, from Suratgarh onwards the sand dune size and density increase further on in the arid region and the geographical condition and the environment become harsher for human settlements. According to Aurel Stein, to the west of Suratgarh down

the Ghaggar, the number of mounds diminishes (Stein 1942: 179), but at the same time, he reported some significant sites like Kalibangan, Baror, Mathula Ther, Binjor, Kharuwala Ther, etc. Later on, Ghosh (Ghosh 1952) revisited and confirmed them as Harappan sites. In the region, geographical and environmental conditions become hostile for human settlement, yet discoveries of some important sites show the coarsened importance of the area in the past.

Apart from exploration in the present study area, District Hanumangarh and Suratgarh tehsil of District Sri Ganganagar were explored to revisit previously reported site, particularly which belongs to the protohistoric period, along with and around the river Ghaggar and Chautang in Rajasthan. So, this data further helps to understand the distribution pattern in connection with the landscape in the study area. During exploration sites revisited are Nohar, Sothi, Karoti, Kalibagan, Fatehpur, Dabali, Pilibangan, Khodawala, Surewala, Peer Kamania, Salemgarh Masani, Suratgarh, Rangmahal, Swarupsar, and Sardargarh-4 (***Table 1***). In Suratgarh tehsil particularly tried to locate the earlier reported Harappan sites Suwaiki, Bhaironpura (Stein 1942: 179), Bhagwansar-3, Bhagwansar-4 and Sardargarh- 2 (Ghosh 1989: 64,397) but due to modern intervention these sites are completely raged.

As, Suratgarh Tehsil, earlier in 2014, was explored by Samunder and Vivek Dangi but a further region in Distt. Sri Ganganagar remained unexplored in recent times. So, the area along the Ghaggar river basin from Jetsar to Anupgarh till Indo-Pak border, Distt. Sri Ganganagar, Rajasthan, systematic archaeological exploration was conducted to locate the previously explored sites and report new sites in the process. An attempt was made to understand the landform changes after the confluence of Ghaggar and Chautang River and how it affects distribution and settlement pattern of the Harappan and other archaeological sites in the region During exploration in the said region, author travelled about 2000 kilometres and around fifty sites (***Table 1***) belonging to different periods were documented. Out of them, ten sites are newly discovered/reported sites belonging to various culture viz. Pre/Early Harappan, Mature Harappan, Painted Grey Ware, and Rangmahal.

The previously excavated sites in the Ghagghar River system were considered as a marker to understand the pottery and related material found during exploration. The cultural material at Sothi, Kalibangan I, Kunal, Bhirrana, Banawali-I, Binjor-I, Baror-I, Baror-II and Rakhigarhi -I type pottery was considered as the yardstick to determine the Pre/ Early Harappan sites. Kalibangan-II, Rakhigarhi- II, Banawali- II, Mithathal, Farmana, Baror- III, and Binjor-III type pottery was considered as the yardstick to determine the Mature Harappan sites. Ropar, Bara, Sanghol, Hulas, Alamgirpur was considered as the yardstick to determine the Late/Post Harappan sites.

Most of these sites have a thick cultural deposit but, at present, are highly disturbed due to modern activities like agriculture, construction and brick kilns. A large number of pottery and other antiquities have been identified and recorded from the surface and exposed section. During the exploration, the main objective was to identify and locate the site of the different cultural period based on available material culture. The size of the sites has been assessed based on the distribution of pottery on the surface during the exploration, a total of forty-four Proto-historic sites have been documented. The present work is primarily based on the archaeological investigations, carried out with systematic exploration in the region, use of previously published archaeological exploration, excavation data and study of previous maps and thematic maps made on GIS software.

SR.NO.	NAME OF THE SITE	GPS COORDINATES	REFERENCE	CULTURAL SEQUENCE	AREA OF THE SITE (APPROX)	THE PRESENT CONDITION OF SITES
1	Bugian	**29°20'40.4"N 73°38'41.3"E**	Reported by Ghosh (1989: 86) as Bugian	P/EH, MH	5.74 hectares	Partially damaged
2	6 GB	**29°19'48.38"N 73°41'24.15"E**	Reported by Ghosh (1989: 117) as Daulatabad-1	PGW, RM	5.70 hectares	Site Intact
3	5 GB	**29°19'37.7"N 73°41'16.0"E**	Reported by Ghosh (1989: 117) as Daulatabad-2	PGW (few shreds), RM (few shreds)	2.54 hectares	Site Raged

(Contd.)

Table 1 Details of Sites explored by the author.

S.No 1 to 25 (Table 1) Tehsil Vijaynagar, District Sri Ganganagar, Rajasthan.

S.No 26 to 50 (Table 1) Tehsil Anupgarh, District Sri Ganganagar, Rajasthan.

Abbreviations: P/EH-Pre/ Early Harappan, MH-Mature Harappan, PGW-Painted Grey Ware pottery, RM-Rangmahal, H-Historical.

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SR.NO.	NAME OF THE SITE	GPS COORDINATES	REFERENCE	CULTURAL SEQUENCE	AREA OF THE SITE (APPROX)	THE PRESENT CONDITION OF SITES
4	11 GB	**29°18'14.2"N 73°36'41.0"E**	Reported by Ghosh (1989: 91) as Chak 11	P/EH, MH	3.59 hectares	Partially Raged
5	15/1 GB	**29°18'22.4"N 73°34'28.4"E**	Reported by Ghosh (1989: 91) as Chak 15/1	RM	4.50 hectares	Site Raged
6	15/4 GB	**29°18'15.5"N 73°35'27.9"E**	Reported by Ghosh (1989: 91) as Chak 15/4	P/EH, PGW	4.49 hectares	Site Raged
7	18 GB	**29°17'31.9"N 73°33'03.5"E**	**Newly Reported**	P/EH, PGW	0.98 hectares	Largely Raged
8	23 GB	**29°16'04.2"N 73°33'57.2"E**	Reported by Stein (1995: 37) as Jaurinwala Ther and by Ghosh (1989: 91) as Chak 21	MH	4.99 hectares	Partially damaged
9	28 GB	**29°14'27.4"N 73°32'30.0"E**	Reported by Stein (1995: 36) and Ghosh (1989: 91) as MathulaTheri	P/EH, MH	3.59 hectares	Partially damaged
10	39/1 GB	**29°13'32.47"N 73°27'19.50"E**	Reported by Ghosh (1989: 91) as Chak 39/1	PGW, RM	0.87 hectares	Partially damaged
11	39/2 GB	**29°13'34.6"N 73°27'31.2"E**	Reported by Ghosh (1989: 91) as Chak 39/2	PGW (few shreds), RM (few shreds)	0.42 hectares	Site Raged
12	Balochia-1	**29°14'22.9"N 73°27'41.2"E**	Reported by Ghosh (1989: 44) as Balochia-1	P/EH, MH, PGW, RM	01.55 hectares	Partially damaged
13	Balochia-2	**29°14'38.0"N 73°27'04.9"E**	Reported by Ghosh (1989: 44) as Balochia-2	MH (few shreds), PGW, H	2.07 hectares	Partially damaged
14	Dabjaal	**29°14'41.2"N 73°24'45.1"E**	**Newly Reported**	H	0.98 hectares	Largely Raged
15	40 GB	**29°12'54.17"N 73°26'31.02"E**	Reported by Ghosh (1989: 91) as Chak 40	P/EH, PGW, RM	2.99 hectares	Site Raged
16	43 GB	**29°11'21.4"N 73°28'37.6"E**	Reported by Stein (1995: 36) as Kharuwala Theri and by Ghosh (1989: 91) as Chak 43	MH	5.49 hectares	Partially damaged
17	Motasar Tibba-1 (Yadavo ki Dhani)	**29°09'56.6"N 73°27'30.9"E**	Reported by Ghosh (1989: 293) as Motasar Tibba-1	MH (few shreds), H	0.93 hectares	Site Raged
18	Motasar Tibba-2 (Thakuro Ki Dhani)	**29°10'02.5"N 73°27'18.2"E**	Reported by Ghosh (1989: 293) as Motasar Tibba-2	P/EH, MH	2.07 hectares	Site Intact
19	9AS	**29°09'37.5"N 73°27'12.6"E**	**Newly Reported**	MH (few shreds), H	0.87 hectares	Largely Raged
20	9BS	**29°09'04.8"N 73°26'03.4"E**	Reported by Ghosh (1989: 141) as Gama ki Dhani	MH (few shreds), RM,	1.79 hectares	Partially damaged

(Contd.)

SR.NO.	NAME OF THE SITE	GPS COORDINATES	REFERENCE	CULTURAL SEQUENCE	AREA OF THE SITE (APPROX)	THE PRESENT CONDITION OF SITES
21	Rer 48 GB	**29°11'12.90"N 73°23'57.87"E**	Reported by Ghosh (1989: 375) as Rer	PGW, RM	9.27 hectares	Partially damaged
22	48 GB	**29°11'43.8"N 73°25'09.1"E**	Reported by Ghosh (1989: 91) as Chak 50	P/EH, MH	1.14 hectares	Largely Raged
23	59 GB	**29°10'40.68"N 73°21'30.81"E**	Reported by Ghosh (1989: 91) as Chak 59	P/EH, PGW	1.75 hectares	Largely Raged
24	Ramsinghpur Tibba	**29°11'03.8"N 73°22'48.9"E**	Reported by Ghosh (1989: 368) as Ramsinghpur Tibba	Redware undeciphered	1.19 hectares	Largely Raged
25	58/3 GB	**29°11'07.5"N 73°22'28.1"E**	Reported by Ghosh (1989: 91) as Chak 58/3	Redware undeciphered	0.89 hectares	Largely Raged
26	68/2 GB	**29°11'41.3"N 73°16'06.6"E**	Reported by Ghosh (1989: 91) as Chak 75	P/EH, MH	2.37 hectares	Largely Raged
27	Baror	**29°10'06.5"N 73°18'50.2"E**	Reported by Tessitori (Stein1995: 35) as Varoravalitheri, Stein (1995: 35) and by Ghosh (1989: 55) as Baror	P/EH, MH	9.35 hectares	Site Intact
28	71T/1 GB	**29°13'24.9"N 73°17'32.5"E**	Reported by Ghosh (1989: 91) as Chak 71Tibba	P/EH, MH, PGW, RM	1.19 hectares	Partially damaged
29	71T/2 GB	**29°13'29.1"N 73°17'34.5"E**	**Newly Reported**	P/EH, MH, PGW	1.55 hectares	Partially damaged
30	71T/3 GB	**29°13'41.9"N 73°17'36.3"E**	**Newly Reported**	H	1.31 hectares.	Partially damaged
31	71 GB	**29°13'41.3"N 73°17'21.2"E**	Reported by Ghosh (1989: 91) as Chak 71	MH (few shreds)	1.55 hectares	Largely Raged
32	5 UDM (Jogiyawala)	**29°13'54.5"N 73°17'15.5"E**	**Newly Reported**	P/EH, MH	7.49 hectares	Partially damaged
33	72/1 GB	**29°12'11.17"N 73°18'43.01"E**	Reported by Ghosh (1989: 91) as Chak 72/1	PGW	4.24 hectares	Partially damaged
34	72/2 GB	**29°12'33.01"N 73°18'19.00"E**	Reported by Ghosh (1989: 91) as Chak 72/2	PGW	3.14 hectares	Partially damaged
35	74/1 GB	**29°12'47.4"N 73°18'03.1"E**	**Newly Reported**	Red ware un deciphered	2.39 hectares	Site Raged
36	74/2 GB	**29°13'17.4"N 73°17'13.7"E**	Reported by Ghosh (1989: 91) as Chak 74	P/EH, PGW	1.91 hectares	Site Raged
37	76/1 GB	**29°13'34.1"N 73°15'56.6"E**	**Newly Reported**	P/EH, MH, PGW	5.94 hectares	Largely Raged
38	76/2 GB	**29°13'25.8"N 73°16'07.6"E**	**Newly Reported**	P/EH, MH, PGW	4.59 hectares	Largely Raged
39	76/3 GB	**29°13'09.9"N 73°15'56.1"E**	**Newly Reported**	MH	7.49 hectares	Site Raged

(Contd.)

SR.NO.	NAME OF THE SITE	GPS COORDINATES	REFERENCE	CULTURAL SEQUENCE	AREA OF THE SITE (APPROX)	THE PRESENT CONDITION OF SITES
40	77 GB	**29°14'53.3"N 73°15'34.1"E**	Reported by Ghosh (1989: 92) as Chak 77	P/EH, MH, PGW	3.03 hectares	Site Raged
41	Rao peer 80 GB	**29°11'59.46"N 73°12'54.42"E**	Reported by Ghosh as Chak 80-G	P/EH, MH, PGW	4.99 hectares	Site Raged
42	Tarkhanwala Dera	**29°14'15.6"N 73°13'25.6"E**	Reported by Ghosh (1989: 433) as Tarkhanwala Dera	MH	3.23 hectares	Site Raged
43	86 GB	**29°14'11.79"N 73°13'44.81"E**	Reported by Ghosh (1989: 92) as Chak 86	PGW	2.87 hectares	Site Intact
44	6 APM	**29°13'57.5"N 73°12'03.6"E**	Reported by Ghosh (Dalal 1980: 26) as Chak 88	MH	2.09 hectares	Site Raged
45	87 GB	**29°13'37.43"N 73°13'6.76"E**	Reported by Ghosh (1989: 92) as Chak 87	PGW	2.15 hectares	Partially damaged
46	89 GB	**29°13'16.45"N 73°10'52.95"E**	Reported by Ghosh (1989: 78) as Binjor -4	PGW	4.39 hectares	Partially damaged
47	Binjor -3 (4 MSR)	**29°12'51.6"N 73°09'24.6"E**	Reported by Ghosh (1989: 78) as Binjor -3	P/EH, MH	2.87 hectares	Partially damaged
48	Binjor -1 (30A)	**29°12'25.5"N 73°06'01.1"E**	Reported by Ghosh (1989: 78) as Binjor-1	P/EH, MH	2.87 hectares	Site Raged
49	Laila Majnu ki Mazar	**29°13'25.44"N 73°7'38.87"E**	Reported by Ghosh as Binjor-G & Dalal (1980: 36) as Laila Majnu mound	PGW	1.80 hectares	Site Raged
50.	Indo-Pak boundary Site	**29°13'22.4"N 73°05'18.4"E**	Reported by Dalal (1980: 34) as Indo-Pak boundary site	MH	3.05 hectares	Largely Raged

PRE/EARLY HARAPPAN PERIOD

The known earliest inhabitant of the region were early farming communities identified as Pre/Early Harappan culture, they occupied this region during the fourth millennium BCE. The area located around major Pre/Early Harappan cultural sites belongs to Hakra, Sothi and Kot Diji. During exploration twenty-two, Pre/Early Harappan Period sites (***Figure 1***) were explored in the study area out of which eight are previously reported site, six are newly discovered/reported and at the eight sites, Pre/Early Harappan level is reported for the first time by an author namely 15/4 GB, 28 GB, Balochia-I, Motasar Tibba-2, 40 GB, 48 GB, 68/2 GB, and 74/2 GB (***Table 2***).

Field investigation shows that 28.57% of sites are in the proximity of the river. Rest all sites are located approx 2 to 5 km. away from the river. One more significant observation is around 85% of the Pre/Early Harappan sites are located on the right bank of the river.

The 75% of sites are located on the alluvium plain of Ghaggar flood belt and 25% sites located on the settled sand dunes. The material culture recovered from these sites has been studied in details. At these sites, Sothi/Kalinangan-I pottery is retrieved more in number and is the

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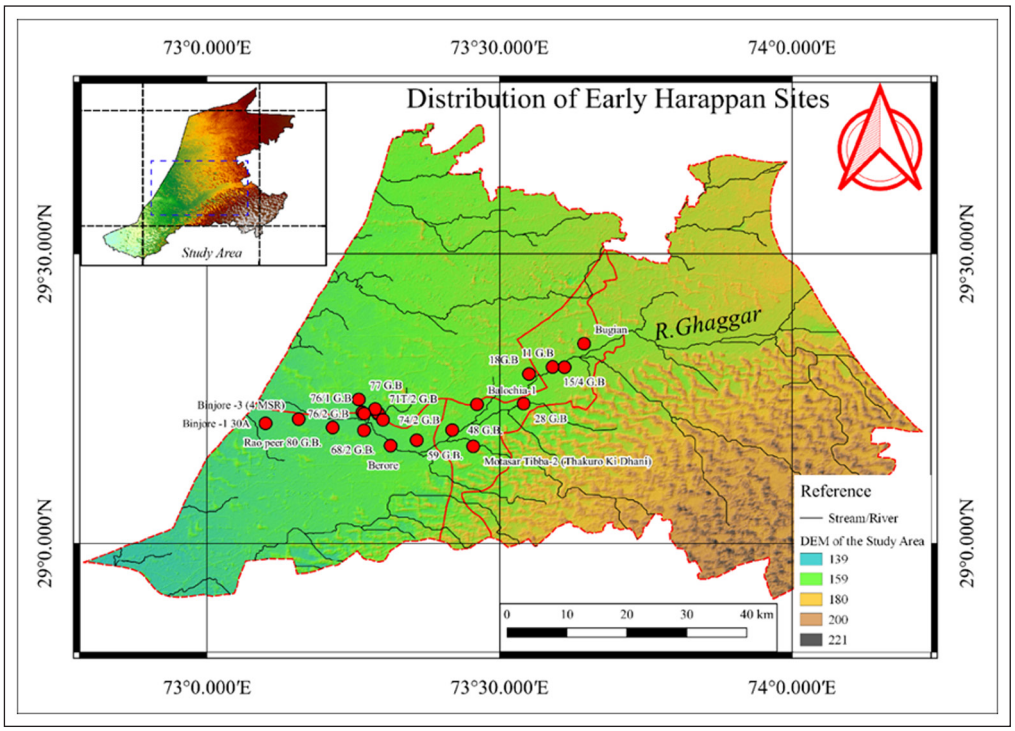

Figure 1 Distribution of Pre/ Early Harappan Period sites.

S.NO.	CULTURAL PERIOD	NUMBER OF SITES
1.	Pre/Early Harappan	22
2.	Mature Harappan	28
3.	Painted Grey Ware	24
4.	Rangmahal/Historical	15

Table 2 Number of sites from the different cultural periods.

most dominant pottery type during this period in the region. Earliest dated pottery retrieved from exploration was Hakra ware in which mud applique and incised ware are retrieved from 3 sites Binjor-1, Bugian and Motasar Tibba–2, (***Table 1***) along with other pottery types of Pre/ Early Harappan Period made on the slow wheel and handmade comprising red to dull red, medium to coarse fabric, vases with featureless, outturned rims with typical monochrome and bichrome painting and a few polychrome sherds were recovered. Similar pottery types were found from Pre-Harappan deposit at Kalibangan. Black horizontal bands were noticed on the rim of many potsherds. Later Phase of Early Harappan Pottery was made on the fast-rotating wheel with bichrome painting (***Figure 2***). The surface is red to dull red, on which painting was done with black and white colour. The design comprises horizontal bands, loops, wavy, lines and concentric arches. Incised ware was also found during exploration (***Figure 3***). The main shapes recovered during exploration are the vase, basin, bowls, goblet, the main shape of bichrome ware pottery include vases, and these were decorated with geometrical and floral motifs (***Figure 2***).

Figure 2 Early Harappan Pottery. Site- 68/2 GB.

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Figure 3 Incised ware. Site-Bugian.

MATURE HARAPPAN PERIOD

The succeeding phase of cultural evolution in the region is marked by the advent of Mature Harappan culture. Study of Excavated material at Baror, Tarkhanwala Dera and Binjor (4MSR) shows the presence of Classical Harappan element with the rich cultural deposit in the region. Twenty-eight Mature Harappan sites (***Table 2***) have been reported during present exploration (***Figure 4***) of which six are newly discovered- 5 UDM, 76/1 GB, 76/2 GB, 76/3 GB, 9 AS, and 71T/2 (***Table 1***). Six Harappan sites – Chak 15/3, Chak 41, Mallawala Tibba, Chak 58/1, Chak 72/3 and Chak 80 (***Table 1***) which were reported by A. Ghosh could not be located due to destruction caused by intensive cultivation and cutting of settled dunes in the region. The local villagers also confirmed that there used to be 'Ther' mounds in these villages but years back they removed these mounds and levelled the fields for cultivation. Sites like Binjor-I (30A), 68/2 GB, 40 GB, and 48 GB (***Table 1***) are few examples of sites where mounds are completely destroyed and fields levelled for cultivation purpose.

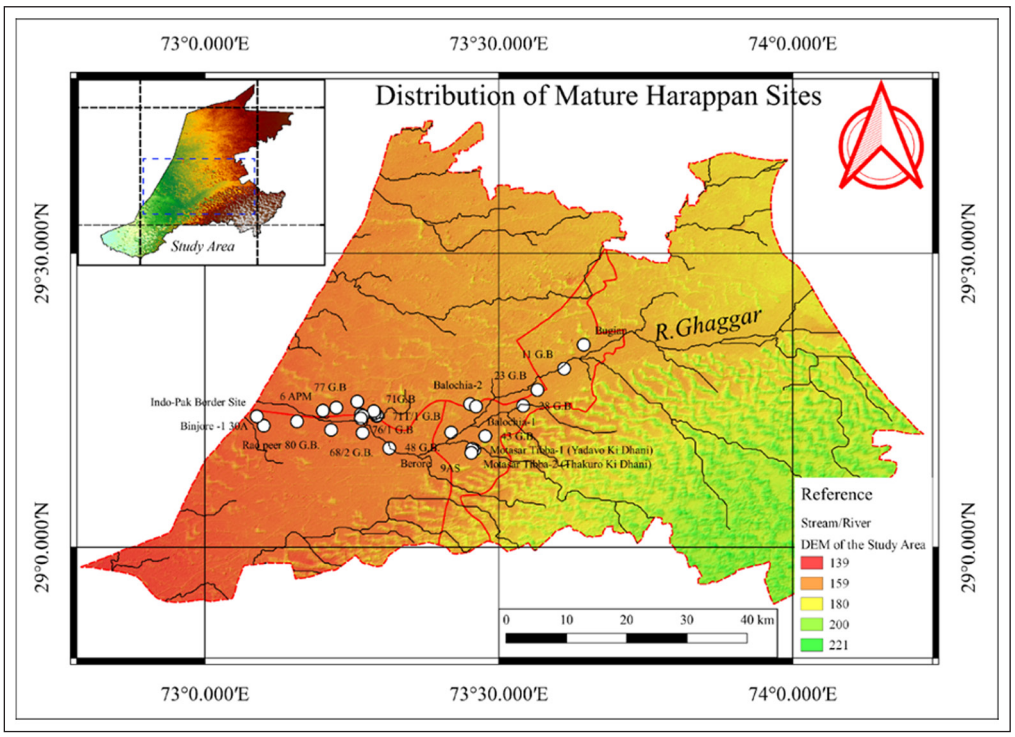

Figure 4 Distribution of Mature Harappan sites.

67.86% sites are located on the alluvium plain of Ghaggar flood belt and 32.14% sites located on the settled sand dunes. From the material recovered from exploration and observation made on the field, it appears that 25% of the sites are campsite located on a settled sand dune. Data from field investigation shows that 75% of sites located on the right bank of the river. The distance from the river is more or less similar to Pre/Early Harappan culture sites located 2 to 5 km.

Pottery at this stage is marked by red ware, red slipped ware, made of well-levigated clay and characterized by typical painted design with black (***Figure 5***). The painting is done on a carefully prepared red ground. Pottery is turned on the fast wheel and generally well fired. As regard to surface treatment, a red slip of fine quality is normally applied on the surface and painted potsherds are depicted with animal, floral and geometrical motifs (***Figure 6***). On bases of typological features, pottery has been classified in various shapes which include Dish-on-Stand, Bowls, Handle cups, cups, storage jar, ledged jars, dishes, Ring stand or Jar stands, Lids or Storage and jar covers Along with pottery several other artefacts like broken stone objects, Terracotta cake, Mustika, copper fragments, beads, Terracotta bangles and wedge shape Harappan bricks were also found on the surface.

Figure 5 Mature Harappan pottery. Site- 11 GB.

Figure 6 Mature Harappan pottery. Site- 11 GB.

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PAINTED GREY WARE

After the Harappans region was re-occupied by the Painted Grey Ware using people whose remains have been reported from about twenty-four sites (***Table 2***) in the study area (***Figure 7***). Four sites were reported for the first time by authors ~~are~~ namely 18 GB, 71T/2 GB, 76/1 GB, and 76/2 GB (***Table 1***). Five Painted Grey Ware sites (***Table 1***) including Jetsar, Binjor – 2, Jhandewala, Jandewala Tibba, and Rer Tibba were reported by Ghosh (Ghosh 1952) could not be located due to destruction of sites caused by intensive cultivation and cutting of settled sand dunes in the region. Rer Tibba and 71 Tibba (***Table 1***) are the examples of dune sites demolished by the local people to level the ground as they know that below these dunes the alluvium soil is available and which is very good for cultivation. In this process, these sites are partially or completely damaged. Except for two sites, located on the left bank of the river, rest all sites are located on the Right bank on the river and average distance of the site from the river is approx 3 to 5 km.

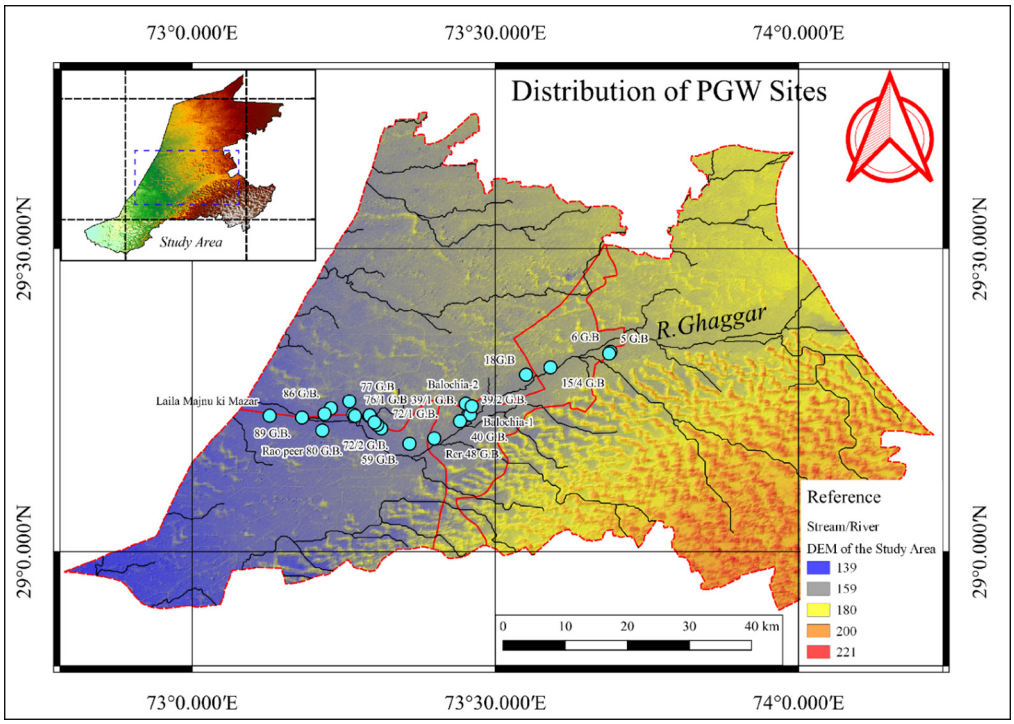

Figure 7 Distribution of PGW sites.

Material retrieved from these sites points out good evidence of PGW culture which is marked by the presence of painted grey ware pottery along with associated wares such as black and redware, black ware, grey ware and redware with appliqué, impressed/stamped designs and linear and geometrical paintings (***Figure 8***). Shapes include Globular pots, jars, bowls, dishes, basins etc.

During the field investigations and study of published excavated records, it was observed that these people were living in temporary structures made of wattle and daub (Manjul *et al.* 2018). Post holes, mud plaster floor are the common features. Published C14 date available from two sites like Chak 86 (***Table 1***) shows date around 650 ± 130BCE and 215 ± 130 BCE (Trivedi 2009) and 72 GB indicates a date around 262 B.C.E to 967 BCE (Manjul *et al.* 2018). Though many of copper artefacts were noticed during exploration no Iron was reported, not even during the excavation in above said two sites.

DISCUSSION AND CONCLUSION

The study area of this paper includes the work in two tehsils of District Sri Ganganagar, Rajasthan, viz. Vijayanagar and Anupgarh. practically the exploration is spread over the area from town Jetsar (North 29°36' to 29°23'.) and Majnu BOP (East 73°70' to73°06'.) international boundary. The effort was made to revisit all the previously reported sites by Tessitori, Stein, Ghosh and Dalal. While Tessitori did mentions archaeological sites but did not provide any cultural affiliation, obviously owing to the then prevailing status of archaeology. Aurel Stein did visit the known sites but added more in the entire Ghaggar- Hakra river belt, now divided between India and Pakistan after partition. Strangely enough, he failed to identify any Harappan or prehistoric as he mentioned, on

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Figure 8 Painted Grey ware pottery.

the side which now apportioned to India, albeit he did recognize many sites as bearing prehistoric pottery bearing resemblance to that of Mohenjo Daro in Sindh, Harappa in Punjab, in Baluchistan and Makran, short of declaring them to be Indus. The irony was that Stein could not recognize even the Harappan material at Kalibangan which to him was a waste of historical kilns.

Ghosh's was the most comprehensive and fruitful exploration in the river basin of Ghaggar and Chautang in District Sri Ganganagar in Rajputana (now Rajasthan). Credit goes to him that did recognize, for the first time the presence of the Harappan civilization settlement on this side of the border. Further, the credit goes to him for the discovery of PGW sites in addition to historical sites. However, sometime in the absence of a proper cultural sequence mistake can occur may be seeing in Ghosh's reporting on erroneous assessment can happen is seen glaring in his trial dig to Sothi where he designated the whole material as degenerated Harappan, although subsequent excavation at Kalibangan emphatically demonstrated that Sothi was, in fact, Pre/Early Harappan, not certainly degenerated Harappan.

The next archaeologist was Dalal who explored the Sarasvati Drisadvati area in Rajasthan comprehensively but confined herself to Anupgarh area. Where her work was remarkable in that she recognizes Sothi/Kalibangan-I horizon underneath the Harappan deposit at Binjor-1 and Binjor -3 (***Table 1***) and put a trial trench at GB 67 approx 1.90 meter., where the cultural deposit was 1.90 meter in thick. Subsequently, K N Dixit also put some trenches at Sothi and confirm the presence of Kalibangan-I.

The primary observation by authors is on Ghosh's report of 59 sites (***Table 1***) in the study area of which 39 were duly re-ascertained, along with one site reported by Dalal, but 20 could not be traced because of complete destruction for varying reasons, for example, PGW and Rangmahal bearing of Rer Tibba were erased to the natural ground for cultivation were the overlying material appears to be carted away for filling purpose somewhere else, the same was the fate with the Harappan sites (***Table 1***) of Chak 15\3, Chak 41, Mallawala Tibba, Chak 58/1, Chak 72/3 and Chak 80 and PGW sites of Binjor-2, Jetsar, Jhandewala, and Jhandewala Tibba. Likewise, so many Rangmahal sites met with the same fate.

The second observation is that authors could recognize the presence of Pre/Early Harappan horizon underneath PGW one, contrary to the belief of Ghosh that painted grey ware people did not occupy the Harappan or say proto historic mound. Such sites are 5 in number 15/4 GB, 18 GB, 40 GB (***Figure 13***), 59 GB and 74/2 GB (***Table 1***). There are few sites in which along with Pre/ Early Harappan and Mature Harappan material PGW pottery were also found such sites are 7 in number (***Table 1***), further investigation or small dig are required to check the to confirm the stratigraphical deposition.

The third is that there is a serious issue of nomenclature, for example, Daulatabad 1 and 2 was reported by Ghosh but during present exploration site, it was found that there is no village existed as the name of Daulatabad and based on the study of Ghosh published and unpublished material and maps we can locate the site and they are at present identified as 5 GB and 6 GB. Another site was Chak 50 reported by Ghosh but at present, they come under the jurisdiction of 48 GB (***Table 1***), hence site is named after the present name of the village. Similarly, Mathula is presently known as 28 GB (***Table 1***). Also, most of the small mounds have been completely raged examples being Chak-88 presently known as 6APM (***Table 1***). One more flaw which was found in previous explorations was the approach towards naming the sites as most of these sites are located in between vast agricultural fields surrounded by many small villages. If an explorer started exploring these sites from a particular village, he/she named these sites by the name of the same village via which he/she approached the site, as the site lies on the edges of the villages and some portion of the mound belongs to both the villages. Such an example can be seen in sites like Chak-72/1 (Ghosh 1952), Katy Dalal identified it as 67 GB (***Table 1***). Similarly, Jhuriyanwala reported by Aurel Stein, A. Ghosh identifies it as Chak-21 (Ghosh 1952), and R.C. Thakran identifies it as Chak 23 (***Table 1***).

Most glaring is Binjor where there is identification gallop. Binjor 1(***Figure 9***) also completely erased but many classical pottery forms duly found including one large quartzite stone (***Figure 10***) in a form of a saddle but a sufficiently deep circular depression in the middle clearly used for grinding purpose. Another important observation was the retrieval of some pottery pieces which were close to Hakra ware in fabric. The authors opine to seek a trial trench therein order to confirm or otherwise of a Hakra or Pre Harappan cultural horizon. In the same vein, it is suggested that Bugian and Motasar-2 (***Table 1***) (***Figure 11***) deserve an investigation, at least a trial trenching because same Hakra ware type materials were picked up from these sites as well. If proven so, it will be a continuation of that culture on this side of the border because Mughal has already documented as many as 99 sites (Mughal 1997) across the border.

Figure 9 Site- Binjor- 1 (Site Raged).

A close observation of Bugian shows that it bears twin mound one of them is seriously damaged, on the section entirely cut by the villagers the "well" made of wedge shape burnt brick (***Figure 14***), having a diameter of around 1-meter which is partially damaged is visible to the naked eye, also some kind of industrial activity in form of the relic of kilns observed in a section. Similar industrial activity was also observed at Mathula (28 GB) (***Table 1***) (***Figure 12***), yielding both Pre/Early Harappan and Mature Harappan material, interestingly site was visited by previous explorers. In this connection it will be some interest to record the statement of Aurel stein – "*A curious*

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Figure 10 Site- Binjor- 1 (Grinding stone).

Figure 11 Motasar Tibba-2 (Site Intact).

Figure 12 28 GB- Mathula their (Site Partially destroyed).

local legend takes the Mathula sand hills for the place where boats starting from the sandy ridge on the opposite northern edge of the Ghaggar bed, nearly 4 miles away in a straight line, used to land. That ridge is now known as Juhanzwala ("the boatsman,s place")." Whether possibly some "popular etymology", connected with an early form of that name, or the appearance only be a legend, authors were unable to say. In any case, it affords interesting proof how much alive in local belief is the notion of a large river had once flowed down the dry bed of Ghaggar (1995: 36–37). The account is very interesting but Stein is confusing Mallawala with Mathula. Jahazwala seems to have buried in the drifting sand with no available trace on the surface, nor the local people are in a position to confirm this old lore any way the statement is interesting.

Before closing we must place on record the following two observation will regard to the settlement pattern of different cultural phase:

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Figure 13 Site- 40 GB (Site Raged).

Figure 14 Well – Harappan Period. Site-Bugian.

85% of the Pre/Early Harappan sites, 75% of the Mature Harappan sites and 91.67% of PGW sites are located on the right bank of the river. Interestingly the sites of Pre/Early Harappan and Mature Harappan are located in only two pockets on the left bank of the river near Motasar Tibba and Near Binjor, Anupgah, and in PGW periods site located only in one pocket near Binjor, Anupgah.

The region provides very rich Pre/Early Harappan, Mature Harappan and PGW settlements, most of the sites Pre/Early Harappan 75%, Mature Harappan 67.86% and PGW 83.34% are settled on the flood plain and rest are settled on the dunes. Sites maintained a very safe distance from the river varies from approx two to five kilometres. Very few proto-historic sites are located in close proximity of the river in certain areas depends on the height, slope or elevation of the area. The sites located on dunes include both habitational settlements and campsites.

No post-urban settlements were found in the study area, according to Pawar (Pawar *et al.* 2013), these sites were present up to in tehsil Hanumangarh of District Hanumangarh, Rajasthan. It may not far from the truth because many such sites have been found in adjacent Haryana, but so far, the assertion of Samunder (Samunder *et al.* 2014) is a concern, that they found post-urban Harappan settlement in Tehsil Suratgah, but it needs rechecking. Such post-urban sites to us are conspicuous by their absence from Suratgarh to Marot.

So, far Rangmahal culture is concern it is almost omnipresent all along Ghaggar and Chautang, also that no late Medieval settlements are seeing in the exploration except for the chain of live villages all along to course as observed by the British surveyors.

COMPETING INTERESTS

The authors have no competing interests to declare.

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