A Comparative Analysis of Ceramics from Dholi Mangari and Maharaja Ki Kheri in South-eastern Rajasthan

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CERTIFICATE

This is to certify that this thesis entitled '**A Comparative Analysis of Ceramics from Dholi Mangari and Maharaja Ki Kheri in South-eastern Rajasthan**', submitted by **Meghali Roy** in fulfillment of the requirement for the degree of **Doctor Philosophy** is a bonafide work to the best of our knowledge, and may be placed before the examiners for their consideration.

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Declaration

I, Meghali Roy hereby declare that this thesis entitled 'A Comparative Analysis of Ceramics from Dholi Mangari and Maharaja Ki Kheri in South eastern Rajasthan , submitted by in fulfillment of the requirement for the degree of Doctor Philosophy is a bonafide work and has not been previously submitted to any other University or Published.

Meghali Roy

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter One

Introduction

Introduction

The present research work examines the archaeological landscape of an area comprising the present day administrative divisions of tehsil Mavli and Vallabhnagar in Udaipur district in South Eastern Rajasthan. The work attempts to understand the surface archaeology of the area by means of a systematic surface survey and artefact analysis with a primary focus on the archaeological sites of Dholi Mangari and Maharaja Ki Kheri. The thesis presents the results of a multi-seasonal systematic surface survey programme, during the first phase of which an attempt was made to re-visit the previously reported or documented archaeological sites in the area in order to study and document the sites in a more intensive and thorough manner as well as to explore the area of study for identifying or locating new archaeological sites. During the preliminary phase of the survey project, a total of 9 archaeological sites were surveyed and documented. Among the sites visited during the reconnaissance, the archaeological sites of Dholi Mangari and Maharaja Ki Kheri were taken up for the study by means of a systematic surface survey and documentation programme with an aim to understand the surface archaeology of the two sites in a more thorough and intensive manner. The systematic archaeological survey at the two sites was carried out over two seasons of extensive field work, the results of which have been discussed at a length in the following chapters of the thesis. The thesis also presents a detailed analysis of the ceramics collected from the two sites of Dholi Mangari and Maharaja Ki Kheri which helps to put the sites into proper chronological ordering by comparing the ceramics with the excavated sites in the region. The purpose of conducting the survey was to understand the surface archaeology of the two sites on the basis of material culture they share as well as to establish the inter-site connections or relationships. The thesis also attempts to draw parallels between the sites of Dholi Mangari and Maharaja Ki Kheri and other major archaeological settlements in the area such as Ahar and Balathal by comparing the ceramics from the sites.

1.1. Aims and Objectives of the Study

1) To analyse and understand the archaeological landscape of South Eastern Rajasthan, specifically the Mavli and Vallabhnagar tehsil, Udaipur by means of a reconnaissance survey.

2) To re-visit the previously documented sites as well as any new site that may be found.

3) To study and understand the archaeological sites of Dholi Mangari and Maharaja Ki Kheri by means of systematic archaeological survey and documentation Programme(Intra-site surface survey).

4) To classify and analyse the material (ceramic) collected from the two sites and to compare the ceramics with the excavated sites of Ahar and Balathal in order to determine the chronological sequence of the two sites as well as to establish inter-site relationships on the basis of the material culture they share.

1.2. The Study Area

Dholi Mangari (24° 41.411´ N, 74° 03.322´ E) is located in the Mavli tehsil and is an unprotected site. It first came to the notice of Sate Archaeology personnel in 2010 when the archaeological mound was being cut for the purpose of constructing a temple. In the process a host of archaeological material such as ceramics and bones were unearthed. Further destruction of the site was stopped and the construction continued some metres away from the site. Preliminary reconnaissance of the site indicated an archaeological potential for a survey.

Maharaja Ki Kheri (24° 38.646´ N, 73° 49.218´ E), is located in the Vallabhnagar tehsil and is part of an agricultural field. It was excavated in 2013 under the aegis of Delhi circle of Archaeological Survey of India. Archaeological potential of the site was apparent in the thick scatter of ceramics through the fields.

I had chosen the site of Dholi Mangri primarily to understand the settlement history of the site, how it might or might not have interacted with the site of Maharaja Ki Khedi in general and Ahar and Balthal specifically. A systematic survey of the site not only

generated information about the ceramic typology and wares but also the character of the site. The site Maharaja Ki Kheri was chosen for a survey so, that the material from both the sites can be compared to arrive at a better understanding of how human occupation marked the landscape.

This chapter has been divided into two broader themes. The first part engages with archaeological excavations and surveys in India with special reference to Rajasthan. In the second part of the chapter a brief discussion on ceramic analysis will be taken up. The scheme of the subsequent chapters is discussed at the end of this chapter.

1.3. Archaeological Survey: Method and Theory

This section on archaeological surveying traces briefly the history of how survey methods and theories were propounded and changed over a period of time in different parts of the world as well as the crucial pre survey essential factors that reflect the design and questions that the survey seeks to ask as well as to ensure successful and correct documentation of the survey material etc. Further questions related to the concept of site, siteless survey and so forth will also find a place in this discussion.

Archaeological survey includes a battery of methods used to detect, identify and document the material vestiges of past human behaviour (White and King 2007:1). Robert Braidwood (1937:1) defined survey as "the complete reconnaissance of a certain area to discover what, if anything, within that area is of archaeological interest. If possible, such a survey should record the names, geographical positions, and surface indications of antiquity of all mounds in the area". This initial inventory nature of survey in archaeology has over the course of centuries undergone theoretical and methodological changes. No longer is survey seen as a mere tool for creating inventory of sites and study of the distribution of ceramics. It has moved on to dealing with intense analyses of sites and their backdrop in relation to questions like population trends, settlement patterns, organizational complexity and so forth.

A primary problem faced by archaeologists is "how to find the full range of surviving evidence for past human activity or habitation within a great area, and how to do so in an

efficient and accurate manner" (Renfrew and Bhan 2005: 186). Survey helps the archaeologist to discover sites that they may wish to excavate, to examine aspects of past settlements and regional economies, ascertain potential damage to the archaeological resources from modern activities like road construction etc. Survey can be an informal exploration or can involve a detailed and explicit prospection or sampling strategy which enables maximized possibilities of detecting sites, or artefacts over a region or to provide representative samples of cultural materials. Survey cannot be and should not be treated as a substitute for archaeological excavation or a mere means for detecting sites. Survey in itself is a powerful tool which can provide answers to question that excavations alone will never answer. Regional surveys are capable of generating data that is required to investigate the prehistoric use of landscapes, settlement hierarchies and human behaviour that were spread in space and are not obvious in a concentrated manner in a particular site (Banning 2002: 1).

The results of any archaeological survey depend heavily on the objectives it was designed to achieve. Thus there is an inescapable relationship between the design of a survey and the results one can expect it to yield. Largely surveys are designed either to optimize recovery of specific kinds of archaeological material to allow an estimation of population on the basis of a sample or enable us to detect and identify sites (ibid: 27-38).

However caution must be exercised when we elevate the position of survey to an archaeological method that helps us understand and detect past human behaviour etc. There is an inherent assumption in archaeological surveys that the visible distribution of surface material detected represents to some extent the actual original settlement landscape. While it might be tempting to correlate past manifestations of archaeological record with present day surface distribution, it might not prove to be a faithful representation. Some of the problems which concern such an assumption are the displacement of surface material, recovery bias which encompasses factors like crew training, ability to accurately recognize and record the actual distribution of sites in an archaeological landscape and the "tyranny of the Tell", prominence given to larger sites which skews the data of the sampled area (Markofsky 2010: 65).

Fogelin (2003: 161) points that a decision on spacing must be based upon the goals of the survey. If the goal is only to find large settlements, larger intervals are appropriate. If the goal is to find small sites, a tight spacing is required. The second factor which he argues is equally important to take in to account is the visibility of the terrain. When conducting an archaeological survey, the visibility of the terrain must be accounted for in the spacing between surveyors. The third factor which he discusses is crew training. Fogelin rightly points out that for sites to be identified, all crew members must be familiarized with the types of remains of the area in which survey is conducted.

Dunnell and Dancey (1983: 280) contend that archaeological data recovery has failed to keep pace with the advances in theoretical and methodological spheres because of the premium put on the notion of site as well as the role accorded to excavation technique. Both are found lacking in matching the needs of regional scale investigation due to strong special implications which prove contrary to the systematic regional interest. They agree that these strategies do have an important role in general strategy but by large they prove to be supplementary and analytical devices rather than fundamental concepts around which field research is structured.

Dunnell and Dancey propose instead a systematic surface collection, feasible at regional level which negates the biases inherent in a site oriented scheme. There is an attempt to "determine the effect that the notion of site and the use of excavation have on our knowledge of the archaeological record and to propose an alternative strategy that avoids these problems" (ibid: 280). Further it has been suggested that traditional approaches may further be a cause of unnecessary destruction of the archaeological record by consuming more of it than is required by research and thereby leaving important aspects of it unmanaged and unprotected.

1.4. Major Archaeological Surveys

This section takes up as case study archaeological surveys which were considered as land marks of their time. The case studies included in the section have been discussed at length in order to show case the changing tone of questions that the archaeologists addressed when they undertook surveys. Continuing in the same vein some case studies

from the 21st century have also been included to further showcase how individualistic needs of survey area have shaped survey strategies as well the research question that they seek to answer.

Surveys have always been a part of archaeologies repertoire, ever since archaeologists began searching for sites. However the definite techniques of conduction surveys and asking archaeological questions of the landscape began in the 1950' and 1960's. Some of the pioneering works done during these two centuries include surveys conducted in coastal Peru (Willey 1953), the Near East (Adams 1965, 1981), Mesoamerica (Sanders, Parsons, and Stanley 1979). This section discusses the survey work done in the above mentioned areas in the light of evolving and changing methodologies and research questions. Further case studies on surveys conducted more recently in different parts of the world are included to mark the detailed transition of archaeological surveys.

The Viru Valley plan 1946 was laid down by Dr. Wendell C. Bennett, of Yale University; William Duncan Strong, of Columbia University; Julian H. Steward, of the Institute of Social Anthropology of the Smithsonian Institution; and Gordon R. Willey, of the Bureau of American Ethnology of the Smithsonian Institution, Together they became the Viru Committee of the Institute of Andean Research, and the project was planned, and eventually undertaken, under the patronage of the Institute.

Prehistoric Settlement Patterns in the Viru Valley, Peru is the fourth report resulting from this project. This volume was preceded by the monographs of Ford on the cultural dating of sites investigated, Bennett on the Gallinazo period and Strong and Evans on the Formative and Florescent epoch (Wiley 1953: xviii).

The objectives of the Viru Valley settlement study were:

a) To describe a series of Prehistoric sites with reference to geographic and chronologic period.

b) To outline a developmental reconstruction of these prehistoric settlements with relation to function as well as sequence

c) To reconstruct cultural institutions insofar as these may be reflected in settlement configurations.

d) To compare the settlement story of Viru with other regions of Peru (Wiley 1953: 1).

The field work consisted of the investigation of a large sample of surface exposed sites in Viru Valley. Wiley estimates that the 300 sites which were documented represent only a one fourth fraction of all prehistoric sites in the valley. Project's surface survey was essentially collaboration between Ford and Willey. After preliminary survey and mapping with the help of aerial photographs, Ford and Willey visited each of the catalogued sites for more intensive study. Ford was engaged in the task of cultural dating the sites through his technique of seriational analysis of pottery collection from the surface. Willey on the other hand concentrated on settlement pattern and other habitation and architectural features. The present volume by Willey discusses in detail architectural and settlement data supplemented by summary characterisation of each successive culture in the valleys archaeological sequence.

The introductory chapter discusses the methodology of the settlement pattern study. He provides a detailed description of the intensive use of aerial photography by him and Ford in general orientation, location and mapping of sites. In the course of four months of survey data is compiled as notes, maps and photographs.

Willey begins the survey with general function based classification of the sites in Viru valley. Which are Living sites, Community or Ceremonial structures, Fortified strongholds or places of refuge and cemeteries (1953: 7). However in the course of conducting survey further sub groups are also created in order to catalogue the sites visited. Wiley admits that though theoretically the survey sites were selected at random. However certain factors skewed the sample. Since sites of Upper drainage offered better possibilities of mapping, more sites from Upper rather than Lower region were included. Also proportionally bigger sites were given better coverage than smaller ones. The cultural identification of the sites was exclusively dependent on the associated ceramic surface collection analyses of Ford (Willey 1953: xviii-xix). It is quite significant that though the survey was grounded in the study of settlement pattern through investigation

of architectural and settlement features, the dating of the sites was heavily dependent on ceramic analyses.

A seven month single reconnaissance/ survey of the Diyala Basin was undertaken in 1957-58 by Robert McCormick Adams. The Diyala Basin Archaeological Project seemed to combine the textual investigations regarding the various aspects of agricultural history of ancient Mesopotamia as well as the archaeological field investigations of the remains of early settlement and irrigation in a particular area. This study draws upon a previous survey done by Thorkid Jacobson in 1936-37. Jacobson's work provided two cardinal starting points for Adams survey i.e. "(1) that since ancient sites necessarily lay in close proximity to the watercourses upon which they were dependent, the approximate courses of now-vanished streams and canals could be plotted from the positions or ruins adjoining them; and (2) that the periods of occupation of the ancient sites-and thus also of the watercourses connecting them-could be determined from an examination of their surface remains" (Adams 1965: 119).

Most of the sites were detected with the help of aerial maps or if observed as of eminence during the reconnaissance. Sites were documented by triangulating their location and a small sample consisting of a bag or two of ceramics was collected. The 867 sites were dated on the basis of the "observation of the ceramic "index fossils", easily distinguishable diagnostic features of vessel form, surface treatment or decorative embellishment" (1965: 120). The ceramic study was done in such a manner so as to detect presence or absence in a significant amount so as to unambiguously fit into the sixteen major phases of history into which the region was divided into. The later criterion put the onus of justifying this presupposition on features which could be identified in and dated by published material.

A hallmark of Adams work is the extensive surveys that he undertook in order to understand the land use and settlement patterns in areas near the Euphrates and Tigris. In order to do so he undertook surveys ; which involved covering huge expanses of land by taking the help of aerial photography, soil survey, ethnography, and textual evidence. However the survey was hampered by inaccessibility of the levee areas and thus they had

to be visited by a land rover in many instances and moreover the sheer amount of area covered in the survey meant that the sites with little archaeological surface evidence were not given due attention. The method of dating the sites was based on a sample which was too little and specific which did not and could not accounted for other kinds of information that the site may have yielded.

The Heartland of Cities is based on the fieldwork undertaken by Adams between November 1968 and December 1975. It continues and completes his earlier survey work, such as the survey of ancient Akkad undertaken with Vaughn Crawford in 1956-57 and his survey of the Diyala region in 1957-58 (1981: xiii). The study is primarily concerned with the major features of infrastructure i.e. primarily the patterns of agricultural land use in Mesopotamian civilization and the hierarchical array of communities in which people lived.

The book divided into six chapters, begins with a careful enunciation of the changing character and location of major water-courses, local climate and vegetation as well as the effects of the millennia of agriculture on land. The subsequent chapter outlines the methods used to trace the pattern of ancient settlement and irrigation on which it depended. The next three chapters deal with the different dynastic eras and traces out the urban origins of Mesopotamian civilization, the factionalism of successive dynasties and the culmination and subsequent collapse of an agrarian base and urban super structure. The final chapter rounds up the entire discussion by cogently putting together the different lines of evidence to point out the relative importance of irrigation and urbanisation in determining the character of ancient Mesopotamian society.

The surveys done by Adams were extensive operations covering vast areas, but at a later stage some kind of sampling strategy was employed, by surveying 1 km squares (Adams 1981: 40). Intensive survey and sampling techniques had not been adopted there. Adams himself recognizes the fact that smaller and less obvious sites can be helpful to understand the settlement patterning in the region.

Adams surveys primarily revolve round a question: what factors led to the rise of first complex societies in the alluvial plains of Mesopotamia. Archaeological sites were

located by ground inspection, aerial photographs and by using time to time previous site reports such as that of Ur. The basic strategy adopted in the Mesopotamian surveys is an extensive rather than intensive one. Priority is given to the broad, comprehensive coverage of a region with no systematic attempt to recover information on site function. Potsherds were collected from the surface of all the sites visited and the stratigraphy of the site in terms of the occupation history was traced by dating the ceramics.

This technique heavily presupposes that the vertical occupation in a site would find representative evidence on the surface. Irrigational channels another major area of archaeological survey were reconstructed from traces visible on aerial and satellite photographs. In the absence of excavations these were again dated by their association to sites dated on the basis of ceramic studies. He combines the archaeological data and ethnographic evidence with an array of ecological, historical and ethnographic data to explain variability over time in settlement patterning and land-use over time.

Sixteen hundred archaeological sites and extensive associated irrigational features covering an extensive area of the central alluvial plain of the Euphrates are documented during the course of Adams survey. On the basis of the evidence gathered from the survey he traces developments over a span of 6000 years well into the middle of 13th century CE. However despite the huge effort on the part of Adams and his colleagues in traversing this huge area in a bid to understand the processes of urbanism are marked by a lack of looking beyond the political aegis which controlled irrigation. Environmental factors, technological innovations do not find any place in this discussion on how land-use and settlement patterns were not only dictated by how much the state maximised its control on the sources of irrigation but was underlined by other factors as well. Further in the absence of excavations and a more comprehensive set of archaeological evidence, the original settings of Mesopotamian history and the story of the rise of cities is filled with gaps.

Sanders initiated the Teotihuacan Valley Project in 1960 and envisaged it as a series of regional surveys of what he called the Central Mexican Symbiotic Region that was a core area for the development of early cities and states. The Teotihuacan Valley Project was

designed in such a manner that it would ultimately be treated as an application of cultural ecology to explain the evolution of pre–Hispanic civilizations in Central Mexico, and as a test of the settlement pattern methodology. In order to gain a better insight into the site layouts and architecture as well as strengthen the ceramic dating sequence for the sites surveyed, the project initially focussed on excavations between 1961-62 and then survey was carried out between 1963-64. The methods adopted while the surveys were being carried out were shaped by trial and error of the field experience.

At the start of the project in 1960, there were four main goals:

(a) To trace the development of agriculture,

(b) To trace the development of different settlement types,

(c) To construct a population profile, and

(d) To explore the processes contributing to cultural evolution in the Valley of Mexico.

Early work, which included both excavations and a general survey, was carried out in the Teotihuacan Valley on the northeast side of the Basin. Subsequent work on the mapping of the urban centre of Teotihuacan itself would be done by Millon and co-workers as part of a separate project (Millon 1973: 79). Aerial photographs was used facilitated survey coverage, and by 1967 Parson had developed a method which made it feasible to record directly on photo- graphs a constant flow of information on the density and period of pottery observed on the surface of the landscape. The problem of defining sites and their boundaries which survey work encounters every time was dealt with in this manner. The survey prioritised collecting comprehensive information on the location of the sites over large areas instead of an intensive attempt at collecting information on sites size and function or surface material. It was recognised while adopting this method of extensive survey that the long-term goal of trying to cover most of the region will be achieved, but it would limit the development of a settlement typology. Sites were classified primarily on the basis of their size. On the basis of density of surface refuse at a site the population size was estimated. This controversial endeavour is marked by a lack of understanding that "while it is reasonable to expect some relationship between sherd densities and

occupation densities to hold at sites, other factors such as duration of occupation and the thickness of overburden at a site will act to make this relationship far from a simple one" (Tolstoy et al 1975: 137). It is at the best useful for reconstructing possibly a rough index of demographic trends using surface densities of pottery.

1.4.1. New Approach: Case Studies

This section takes the discussion further on the various methods adopted in the course of conducting archaeological surveys. The case studies included here indicate that the systematised archaeological methods often found in the large body of literature discussing various issues concerning theories and methods of archaeological surveying undergo certain strategical changes which further the cause of generating pertinent information about the surveyed area.

The Sydney Cyprus Survey project (hereafter SCSP) is one of the few archaeological studies in Cyprus which for the first time applied archaeological methods of systematically record metallurgical sites as well including for the first time evidences such as slag, furnace fragments and other archaeo-metallurgical waste in the archaeological assemblage recorded during survey. The survey enabled the recording of not only different types of archeo-metallurgical sites, but also traces their relationship with other settlements which presumably housed the work force (Kassianidou 2004).

This study was able to move away from the previous methods of dating single pieces of slag without giving information about the provenance it was taken from thus making it difficult to understand how ancient the site was. Neither did the earlier sites try to draw a connection between the metallurgical sites and the archaeological sites situated in the vicinity. Thus there was a lacuna in the understanding of the copper industry that thrived in this area. The Sydney Cyprus Survey conducted intensive block survey in the units around the mines and slag heaps. Over the course of four field seasons major slag heaps were documented, section drawings were made and samples of slag, charcoal and pottery were collected. In addition to diagnostic pottery and metal objects, slag ores, fluxes and non-diagnostic material for each unit was recorded.

The evidence collected by the SCSP reveals that there were diverse factors involved in the mergence and development of an early industrial landscape in the Central Troödos region of Cyprus. The author however resists from making tall claims in the face of the fact that there is no evidence regarding whether earlier workshops lie below or within the enormous hard slag heaps. However the evidence from the survey supports the observation that was a certain differentiation in the workshops Vis-a Vis mines and ores, fuel and water during different times periods (ibid: 95-104).

A major problem to be traced in all surveys, wherever they take place, is the fact that the occurrence of artefacts over the surface of the landscape is not limited to discrete neatly defined packages i.e. those entities called sites. Recent work has demonstrated clearly that the surface archaeological record of a region should be thought of as a variable distribution of residue from past cultural activities in some places dense, in others less so. The traditional emphasis on high density concentrations alone ignores much potentiality of useful information which can be recovered through survey.

To focus on a site alone is to ignore problems of site definition. Since artefacts are to be found virtually everywhere in the landscape, the size of any high density concentration of artefacts can be measured objectively in relation to overall density of artefacts in its vicinity or throughout the region as a whole.

The essential feature of the method of survey is the examination of many individual "tracts" natural or arbitrary areas of relatively uniform vegetation, land use and visibility, no more than 1 or 2 ha in size. By team members walking across them at 15m intervals in parallel transects. Tracts are described in terms of their p resent day use, soil type and vegetation cover.

Second phase of operation involved returning to the selected parts of the landscape for more detailed studies, usually including the collection of additional artefacts. The details of the research strategy employed at the second stage are determined by problems to be investigated. Information on the size of the artefact concentration, on the chronological range of surface materials and on the nature and variety of activities carried out at the location.

The survey method applied in order to gain a better understanding of the metallurgical industry of the area is site specific. However there is conscious attempt at trying draw a complete picture of the landscape and try to tie up the activities of smelting etc. with the sites were resources were obtained with the settlements were the working forms supposedly lived.

Sullivan et al. (2007) evaluate the assumption that intensive survey yields reliable representation of regional archaeological variability by analysing the results of two intensive surveys of the same terrain in the Upper Basin, a heavily forested upland ecosystem located south of Grand Canyon National Park in Kaibab National Forest, northern Arizona. By juxtaposing the results of site based surveys with those of mapping unit based surveys the authors try to demonstrate that units of observation have profound effect on how archaeological landscapes and their variability are characterized and interpreted.

The Upper Basin sustained two pedestrian surveys, the first refers to the sample survey undertaken in 1979 and consisted of two phases:

1) A randomly oriented transect that was 1 mile long and 50 yards wide.

2) A block that originated from the transect.

The second survey was conducted by the Upper Basin Archaeological Research Project (hereafter UBARP) in 1999, 2002 and 2006 and examined 22 hectares of the sample survey's block (ibid 2007: 324).

In terms of research design attributes and field method both the surveys were highly comparable. The transect and the 22 ha block investigated roughly with the same intensity of 15-20 m and 10-15m inter-surveyor intervals for the sample and UBARP surveys respectively. Further same set of conventional south western archaeological site types were employed by both the teams.

Despite the above mentioned similarities in design and methodology the two surveys rather markedly in their findings. Compared to the sample survey, the UBARP survey

logged 3.33 times and 8.33 times as many archaeological phenomena in the areas covered by transect respectively. The variation in density estimates of different types of archaeological phenomena based on sample survey projections under Sample Projections and actual field observations under UBARP data cannot be thus reconciled.

This variation is the result of the difference in the manner which information was acquired. UBARP used Mapping unit in order to register the extent of anthropogenic impacts on the Upper Basin's metachronous landscape. In contrast to the site concept which relies on density thresh hold. MU has no such predestined disposition for density thresh hold instead it distinguishes the background terrain by the virtue of anomalous arrangement of matter or attributes of matter whose origins cannot be attributed to natural processes (2007: 326). Further four analyses of survey data show that the archaeological resource inventories created by the application of two different units of observation cannot be reconciled.

Survey in archaeology is designed in such a manner as to eliminate bias by tightly controlling the variation in visibility, accessibility and intensity on the discovered probabilities of archaeological phenomena. However characterisation of archaeological record and its variation are clearly undermined in Upper Basin. Sullivan et all suggest that some units of observation might be more appropriate for certain problems and different kinds of surface archaeological records, additional studies of the effect of units of observation characterizing the archaeological content of the same terrain needs to be prioritised in archaeological survey. Otherwise the identification of archaeological areas at risk of disappearing due to natural and modern interventions will be seriously undermined.

In a preliminary report first four seasons' work of archaeological survey in Boetia, central Greece have been documented (Bintliff and Snograss 1985). The article begins with a brief description of the survey strategies and proceeds to discuss the specific conditions of the sample area chosen in the western Boetia, Beginning with an account of the preliminary reconnaissance 1978, it gives a full description of the initial field procedure adopted and the subsequent changes brought to the survey design in the subsequent field

seasons. The findings are based on the 21.5 sq. km covered in the course of the four seasons of survey and are reported period by period.

Beginning with a reconnaissance in 1978, an exploratory study of Boetia was undertaken with the primary aim of visiting the most important sites and in doing so to get an idea as to the viability of an intensive survey in that particular landscape. The 1979 season was based on judgement rather than probabilistic means whether random or systematized. A stratified sample of a kind, within which a diversity of land types, as far as possible in proportion to their incidence in Boetia as a whole would be guaranteed.

The survey design involved laying over the geological and soil maps of Boetia a grid of large 100 sq. mile units, in order to ensure that the sample area should overlap one of the squares as well as include substantial sectors of each major oil and rock type. It was assumed that in a large area like Boetia a single block would provide a substantial sample of the entire full range of Boetian land types. The aim was 100 percent coverage of the sample block with 5m spacing between individuals. The sampling technique thus adopted was aimed at delimiting the size of the sites and assessing their density, date and function by the means of probabilistic sampling (Bintliff et al 1985: 130). In the subsequent seasons though the survey continued with the 5m interval between survey team members but the interval was increased on the conditions of visibility. However in 1981 it was decided that the distance between survey team members walking the block would be increased to 15m.

Site survey projects undertaken by Tennessee Division of Archaeology since 1977 are discussed by Samuel Smith in the article entitled "Site Survey as a Method for Determining Historic Site Significance". These include thematic (archaeological sites only); cultural resource (archaeological sites, standing buildings and other remains related to a common theme); state owned areas (sites only) and representative county (sites only) (Smith 1990: 34). Each of these survey types is then discussed in terms of their contribution to determining the historic significance of sites and further Smith agrees that where applicable these methods were found to produce substantial information for assessing individual site significance. However Smith propounds that in

the view of the existence of vast number of sites with diverse Historic significance county as community approach perhaps can aid in assessing the importance of individual sites by viewing them within a conceptual model which is smaller than an entire state or region. Further he suggests that the sample county survey can provide the beginnings of a means to deal with the problem of archaeological site significance concerning the large number of sites which do not fit into a watertight thematic category (ibid: 40).

1.3. Archaeology of Rajasthan: Chalcolithic/Iron Age/Early Historic Periods

This section is briefly touches upon the important archaeological discoveries associated with Chalcolithic, Iron Age and Early Historic periods. The discussion briefly describes the locational details of the sites, when were they excavated and the kind of ceramics discovered relevant to the above mentioned time periods.

The excavations at Ahar, District Udaipur, Rajasthan by R.C. Agrawal (1954-55) brought to light an archaeological culture whose moorings were not known earlier. It revealed the existence of an 'indigenous rural' culture in Eastern Rajasthan. The site was re-excavated by the Department of Archaeology and Museums, Government of Rajasthan and Deccan College, Pune in 1961-62. This culture was termed as Ahar culture. Since then a large number of sites of this culture have been reported during subsequent explorations in the Banas valley of Rajasthan. During the third-second millennium BCE. This culture had spread in a large area of Rajasthan and Madhya Pradesh. Subsequently, Gilund, Balathal and Ojiyana were explored and excavated, providing contrasting but different aspects of the Ahar culture. Since then numerous sites have been reported by the archaeologists of the Archaeological Survey of India, Rajasthan State Archaeological Department as well as others like V.N. Misra and Reema Hooja. Much of this work has been reported in various issues of the *IAR* and other journals like *Ancient India, Puratattva,* and *Pragdhara.* However, so far the information contained in these journals regarding excavated or explored sites is very limited and provides very brief information about chronology, diagnostic artefacts and architecture. Some of the earliest surveys remain unpublished and those which are reported are presented in a gazetteer format, providing minimal information regarding the site often with a fleeting mention of ceramics. These survey reports tend to exclude vital information and details such as exact location, site

size, nature of these sites within a larger area or region, their spatial patterning and distribution and relationship to the landscape and environment. The absence of these details make these reports insufficient as they do not provide the reader with the very basic details and one has to remain content with the small notes that have been published, which in turn limits our knowledge and creates problems in understanding the distribution of sites across the region.

Rajasthan has two major Chalcolithic traditions of the early 4th millennium BCE, Ahar culture identified at the site of Ahar in 1954-55 (*IAR* 1954-55: 14-15, Sankalia et al. 1969) and the Ganeshwar Jodhpura culture identified at the site of Jodhpura (Agarwala and Kumar 1982; Rizvi 2007). The Ahar culture is the earliest farming based culture in Rajasthan and dates to the Chalcolithic period, i.e. *c.* 3600 BCE 1800 BCE. The total number of sites recognised as Ahar culture sites is 111, distributed in the district of Chittaurgarh, Bhilwara, Udaipur, Dungarpur, Tonk, Ajmer, Jaipur and Dhaulpur. Over 80% of the sites are concentrated in the three districts of Chittaurgarh, Bhilwara and Udaipur which form the core of Mewar (Misra 2007: 155). Our information about the culture comes from the principally excavated sites of Ahar (*IAR* 1954-55: 14; 1955-56: 11; Sankalia 1969), Gilund (*IAR* 1957-58: 45 *IAR* 1959-60: 41-46; Possehl and Shinde 2004; Shinde 2000; Shinde et al. 2002; Shinde et al. 2005), Balathal (Misra et al. 1995, 1997; Misra 1997; Sinha 1999; Misra and Mohanty 2001; Misra 2007; Mishra 2008) and Ojiyana (Meena and Tripathy 2000, 2001) Purani Marmi (*IAR* 1957-58: 45, Mohanty et al. 2000). There is a glaring gap in the amount of detail that we know about Early Historic sites when compared to the details known about Chalcolithic sites. While the ceramic studies have engaged quite fruitfully with the Chalcolithic assemblage from various excavated sites. The same cannot be said about the Early Historic site, many of which find mention only in *IAR* and no further details especially about the ceramic assemblage from the site or their illustrations are found. The Early Historic period is marked by the presence of the presence of Painted Grey Ware, Northern Black Polished ware, Black and Red Ware.

Ahar

The site of Ahar also known as Tambavati and Dhulkot is located on the right bank of river Ahad, a tributary of the river Banas, about 3 km east of the Udaipur city. The mound has been cut by a road into two parts-northern (Mound A) and southern (Mound B). The site is spread over an area of about 500m×275m and the thickness of the cultural deposit is about 12.8m. The site has been excavated twice; the first phase was carried out by State Department of Archaeology and Museum under the aegis of R.C. Agrawala in 1952-53, 1954-55 and 1955-56 (*IAR* 1954-55:14-15, *IAR* 1955-56:11; Sankalia et al. 1969). The cultural sequence established after three seasons was Period I and II (Chalcolithic) and period III (Early Historic).

Period I: Microliths (blades, fluted cores) were found along with a variety of white painted Black and Red Ware, Sturdy Brown ware, Coarse Red Ware and host of painted pottery with black designs executed on a whitish or yellowish surface and plain coarse Grey Ware. Other important finds included copper objects and etched carnelian beads; as well as houses constructed of mud bricks.

Period II: This period was distinguished by the arrival of a different pottery type i.e. Black and Cream Ware painted with whitish dotted lines and a Black on Red or Black on Cream Ware (Sankalia et al 1969: 18-29).

The second phase of excavation was carried out jointly by the Department of Archaeology, Deccan College, Pune and State Department of Archaeology and Museum, Rajasthan in 1961-62. Excavations were conducted by H.D. Sankalia, S.B. Deo and Z.D. Ansari of the Department of Archaeology, Deccan college, Pune and the objectives of the excavation were "to understand the life of the ancient Aharians, and with this knowledge to trace if possible, the route or routes by which Iranian or western Asiatic influences had reached Malwa" (Sankalia et al. 1969: 216). Two cultural periods were defined.

Period I: The Chalcolithic period has been further subdivided into three phases i.e. Ia, Ib and Ic on the basis of pottery (ibid: 5) as follows:

Phase Ia: The ceramic assemblage of this phase consists of this phase constitutes Black and Red, Buff, Tan Slipped Chocolate Slipped, Red and Grey Wares. The diagnostic characteristics of wares are convex sided bowls in Black and Red Ware, absence of sharply carinated bowls and absence of Jorwe globular vessels, *lota*, bowls and stands.

Phase Ib: Absence of Buff and Buff Slipped Wares; Gray Ware in increased number; introduction of cut ware and Perforated Ware; ribs and corrugation made on the jars of Thick Red Slipped, Grey and Tan Slipped Wares; miniature pots and occurrence of copper celts and conspicuous characteristics of this phase.

Phase Ic: Sharply carinated bowls in Black and Red Ware; absence of Sturdy Metallic wares; occurrence of Lustrous Red Ware akin to that of Rangpur and absence of dishes on stand and copper celts distinguish this period from the other (Sankalia et al. 1969: 19-24).

The excavation report of Ahar is without any question exhaustive in its attempt to document information. The ceramic classification is how ever divided into too many types on the basis of minute differences. Moreover all the qualifications given for diving the ceramic sample into different types is not accompanied by quantification. Quantitative representation helps in understanding the sample size which was examined to reach a conclusion on ware type and so forth. In the absence of such data, it becomes hard to envisage probability rates of pottery being fired, used or discarded. Moreover, classification of ceramics did not follow any particular systematic procedure and the attributes for different classes were also not specified. Thus quantification and information on the metamorphosis of different wares in relation to time and space are required to draw a larger picture of pottery used at the site of Ahar.

The Chalcolithic period (I) is followed by Early Historic period (II) at the site of Ahar. The Early Historic period is also divided into three phases, a, b and c. The pottery from Early Historic period consists mainly of Red ware, Grey ware, and Black and Red ware (Sankalia et al. 1969: 19-24).

Balathal

The site of Balathal was discovered by V.N.Misra in 1964. It stands on the eastern fringe of the village Balathal near Vallabhnagar town in district Udaipur in Rajasthan. The site is located 40 km northeast of the city of Udaipur along the Udaipur-Chittaurgarh highway and 6 km northwest of Vallabhnagar, a small town. The site which originally extended over an area of 2 hectares has been cut, levelled and brought under cultivation. Only the central part, approximately less than a hectare with a habitation deposit measuring 7 m was left intact prior to the excavations taking place[1].

The site of Balathal was excavated jointly by the Institue of Rajasthan Studies, Udaipur and Department of Archaeology, Deccan College, Pune, under the aegis of V.N.Misra for seven consecutive seasons between 1994 and 2000 (Misra et al.1995; 1997 and Misra 1997). The objective of the excavation was to throw more light on the Ahar Culture.

The classification of Balathal pottery has been done in two stages: first at the site and later in the laboratory. Fabric, forms and their attributes have been given importance while classifying them. The attributes of pottery are based on the manufacturing technology and physical properties of the wares, for instance, the preparation of clay, potting method, surface treatment, surface finishing and firing technology.

Cearmic assemblage of Balathal has been classified into two broad groups, Fine and Coarse Ware. These groups were further divided into sub-groups on the basis of surface treatment and finishing. The fine group comprises Black and Red, Thick Red/Chocolate Slipped, Buff, Reserved Slip and Perforated Wares. The coarse group consists of Thick Red Slipped, Gray and Coarse Red Wares (Unslipped). These wares are classified into a number of shapes and forms based on attributes of different parts, such as rim, neck, shoulder, body, waist and base.

Further on the basis of technology , the vesssels have been divided into three categories,

[1] During the course of the preliminary survey done in December 2013; the site of Balathal was visited. It was found that a substantial portion of the mound which had excavated houses and other archaeological material in it were leveled and cultivated. This happened despite the fact that the site comes under the purview of protected sites under the control of the Central Branch of Archaeological Survey of India.

a) Wheel Thrown

b) Partly wheel thrown and partly hand moulded

c) Completely hand moulded

"There are some vessels, which are made in two or three parts and then assembled to form complete vessels. These are called composite vessels.The bowls of Thin Red Ware, dish-on-stand of Tan/Chocolate Slipped, Gray, Thick Red Slipped and Reserved Slip Wares are of such kinds. Most of the shapes in Coarse Red ware are completely hand-moulded" (Mishra 2008: 46-47).

The classification further has been problematised by minutely documenting different aspects of the vessel.The classification took into account the structure, size, formal, stylistic and functional attributes of the vessel. Thin section analysis was taken up to provide a more indepth and clear picture of the site in relation to ceramics in its temporal and spatial setting.

The Early Historic ceramic assemblage at Balathal can be classified into four categories Red ware, Grey ware, Black and Red ware and Black ware. The pots found from this period include shapes such as Jars, bowls, pots, basins etc. (Dhandekar 2012: 310, Mishra 2008: 41-42).

Gilund

The site of Gilund also known as Bhagwanpura (IAR 1959-60: 41) is located around 100 kilometres northeast of Udaipur and around 1.5 km north east of village Gilund on the right bank of the river Banas, in Rajasmand district. The site was first excavated under the aegis of Archaeological Survey of India and B.B.Lal in 1959-60 and then was re-excavated in a joint venture between Deccan College and the Universiy of Pennsylvania in 1999-2003. The chalcolithic pottery of Gilund classification of Gilund has been classified into four broad groups of Red Ware, Grey/Black Ware, Black and Red Ware (BRW) and Buff ware based on her ethnographic study of the traditional potters in southeast Rajasthan (Sarkar 2011).

On the basis of the study Sarkar has divided the pottery into four phases:

Phase I: The early phases of Chalcolithic period were marked by the presence of bowls, cooking vessels and globular pots. Decorations mainly consisted of incised designs in geometric pattern and few paintings on Black and Red ware.

Phase II: The transition period from early to mature Chalcolithic period witnessed the appearance of small convex bowls, small to medium in size they were applied with slip and burnished as well.

Phase III: The convex bowls represent al present in the Mature Chalcolithic period. They were accompanied by the appearance of large storage Jars which had broad mouths with their ornamented top and coarse rusticated lower portion. The appliqué designs on the top of these jars are also an introduction in this phase. Ledged basin also appears for the first time in this period.

Phase IV: The late Chalcolithic/ Transition period is marked by the disappearance of small to medium convex bowls, the wide mouthed rusticated jars of mature phase as well as the ledged basins. There is however a marked increase in the number of plates and platters in the late phase of Gilund (Sarkar 2011: 61-73).

Ojiyana

The site also known as Ojiyanana is located on a hill slope of Aravalli, northwest of the village of Ojiyana. Located around 30 kilometres southwest of Beawar and 11 km north of Badnar in the hilly region of Bhilwara district. A tributary of River Banas, River Khari flows about 14 km south of the site. Excavations in 2000-03 revealed a single cultural deposit of 7.5 metres. The entire deposit was divided into three phases on the basis of pottery and structural evidence.

Phase I: White Painted Black and Red ware, Black slipped ware, Thick Red Ware, Coarse Red ware and Grey ware constituted the ceramic assemblage of this phase.

Phase II: The Balck and Red ware was representde by straight sided bowls and narrow, high necked globular pots. Both painted and unpainted varieties were present. Thick Red

warre included big jars decorated with applique designs. Other wares included Black Slipped ware, Coarse ware, Red Slipped ware, Tan ware, Burnished and Unburnished Grey ware. The pots were decorated with paintings, incised, pinching and applique designs.

Phase III: Ceramics over all witnessed a decline in this period with fewer number of Black and Red ware which were primarily carinated shallow bowls (IAR 1999-2000: 128-132, Meena and Triparthi 2000: 67-73, 2001: 73-77, 2001-02: 45-66).

Purani Marmi

The archaeological site of Purani Marmi is located on the right bank of river Berach in tehsil Resin, Chittorgarh district of Rajasthan. It first came to light in the 1950's under the aegis of Dr N.K.Puri when the valley of Banas and its affluents Berach and Kothari were being explored bringing to light several ancient sites (*IAR* 1957-58: 43-45). In 2000, it was discovered that a part of the mound had been bulldozed and turned into agricultural land. The north-eastern part of the mound remained untouched since it housed the cemetery. The salvage excavation involved taking section scrapings in order to understand the size of the cultural deposit at the site and its contents. A cultural deposit of 15m to 1.7m was divided into five layers. The top layer belonged to the Early Historic period while the rest of the layers belonged to the Chalcolithic period (Mohanty et al. 2000: 132-41). The Chalcolithic ceramics have been classified into two major groups on the basis of the texture of the fabric, (a) medium fine/coarse and (b) coarse.

Ganeshwar-Jodhpura culture is considered the second Chalcolithic culture in Rajasthan. However, when we compare it to Ahar culture the existing knowledge about this culture is limited by the fact that only two sites have been excavated that too on a small scale.

Ganeshwar

The site of Ganeshwar is located on the bank of the river Kantali. Excavations were carried out for several seasons by the Department of Archaeology and Museums, Government of Rajasthan, under the direction of V.K.Kumar (*IAR* 1981-82:61, 1983-84:71), R.C. Agrawal and V.Kumar (1993:128) and P.L.Chakravarti and V.K.Kumar

(*IAR* 1987-88:101-102). The site has a deposit of over four metres belonging to three periods, namely Mesolithic, Chalcolithic and Iron Age.

Pottery from the Chalcolithic period has been divided into two groups. The group one comprised of pink to Buff coloured thin walled, soft-fired light wares including shapes such as medium sized vases, jars, ring bases etc. Group pottery consisted of a finer bright red ware painted in black with common forms of ware including dishes on stand, basins, jars, etc.

Jodhpura

The site of Jodhpura, is located on the right bank of Sabi River in Kot Putli tehsil, Udaipur. It was first excavated in 1972. A five-period cultural sequence has been constructed on the basis of the excavation. Period one has been deemed as belonging to the Chalcolithic period. The pottery recovered from the site associated with the Chalcolithic period is characterised by potsherds with orange to deep red surface colour and shapes such as bowl, vase, knobbed lid and dish on stand (*IAR 1972-73:* 29-30).

Period III at the site of Jodhpura is marked by the presence of the PGW culture and is followed by periods IV and V of Early Historic age. The ceramic assemblage belonging to Period IV includes Northern Black Polished ware and unslipped red ware. Red Ware belonging to the Sunga-Kushana period makes its appearance Period V.

Noh

The site of Noh is situated 6.43 km west of Bharatpur on the Agra road. The site was excavated under the directions of R.C. Agrawal in collaboration with the Art Department, University of California headed by J.L. Roy Davidson in 1963-67 (*IAR*1963-64:28, *IAR* 1964-65:34, *IAR* 1965-66:38, *IAR* 1966-67:30).

The excavations revealed a fivefold cultural sequence and pottery assemblage included Ochre-coloured pottery associated with period I, unpainted Black and Red ware in Period II, Painted Grey ware, Black slipped ware and Black and Red ware in period III, period

IV saw a continuum of the presence of Northern Black Polished ware, period V ate the site belongs to the Sunga and Kushana period (Ghosh 1989).

Sunari

The archaeological mound of Sunari in the Khetri tehsil is located at a distance of around 150 km from Jaipur. The excavation of the site was undertaken by R.C.Agarwal and Vijai Kumar with a view of locating PGW and other cultural levels if any in the stratigraphy. The excavations revealed three periods of Culture. Period I is marked by the presence of Grey ware which is often painted in black pigment. Shape of vessels excavated from the site includes straight sided bowls and dishes with incurved sides. Unpainted Black and Red ware as well as Black slipped ware was found in significant numbers from the site. Period II is represented by the presence of unslipped ware, with the appearance of few examples of Northern Black polished ware. The ceramic assemblage belonging to Sunga-Kushana period has been assigned to Period III (*IAR 1980-81*: 50-56).

Lachhura

The village of Lacchura is situated at a distance of 55 km from Bhilwara. The archaeological mound is situated half a kilometre to the north of the present village, on the bank of seasonal rivulet. The excavations were undertaken under the directorship of B.R.Meena. Period I (c.700-500 BCE) is marked by the presence fine Black and Red ware dishes with featureless rim and slightly incurved sides. A few examples of grey ware and black slipped were also found. Period II has been dated to a time period between c.500-300 BCE. Red unslipped ware with vessel shapes such as bowls, vase, and storage jar were found. The presence of some small sherds of grey ware and black slipped ware indicate a possible continuity, however their numbers are miniscule to remark further. Period III (c. 300-100 BCE) ceramic assemblage mainly consists of pots of coarse red ware, although few examples of fine red slipped ware have also been found. Bowls, vase, basin and storage jar continue to occur (IAR 1998-99: 138-141).

Rang Mahal

There are 124 Rang Mahal sites known from Rajasthan. They are distributed in a the four districts in the Northern part of state as follows- Ganganagar – Hanumangarh- 71, Jhunjhun - 28, Alwar - 18 and Sikar – 7 (cf. Misra 2007:268-269). The site of Rang Mahal was first explored by Aurel Stein in 1941-42 and then by A.Ghosh in 1951-52. Subsequently the site was excavated by the Swedish archaeologist, Hanna Rydh in 1952 – 54 (c.f. Misra 2007: 305-306).

1.4.1. Archaeological Surveys in South Asia

In India, the initial surveys were undertaken by British officials and antiquarians and do amount a massive generation of information. It is only with individuals like Alexander Cunningham, Aurel Stein that survey as an archaeological tool began to be used.

Since then many more surveys have been undertaken which have moved from mere explorations to more in-depth investigations of the sites and landscape. The case studies included in this section mark that journey. Beginning with the search for settlements in Gangetic Valley (Possehl 1980, Lal 1984, Erdosy 1988), followed by surveys in Central Tapi Basin (Shinde 1998), Vijayanagara Metropolitan survey by Carla Sinopoli and Kathleen Morrison (1995), survey of Kaundinyapura and Sisupalgarh by Monica Smith (2000), Sanchi survey by Julia Shaw (2007) and Lars Fogelin's survey of Thotlakonda (2003, 2006) Deepak Nair's (2014) survey of Muzaffar Nagar and Saharanpur Districts and Aadil Zubair's (2016) survey of the area comprising the doab (interfluve) of Kali Nadi and Ganges River. These particular case studies were chosen for a quick dipstick understanding of the evolving nature of archaeological surveys in India as well as the research questions which drive these surveys.

The survey conducted by Gregory L.Possehl in the Ghelo and Kalubhar Valleys of Bhavnagar district was designed to generate information about the Mature and Post urban Harappan phases in Gujarat. The site limits were demarcated on the basis of surface scatter (ibid: 37). Further, the study area of 12 km x 15 km was stratified into sampled geographical zones on the basis of "Nearness to Water and Soil and Settlement". We now

know through various new settlement pattern studies that numerous factors influence the occupation of a site in the past. The fact that the size or extent of a site is decided on the extent of the surface scatter negates the possibility that a site can experience shrinkage or increase in its size throughout its occupation and evidences of the same may not be visible on the surface at all due to numerous factors.

In the course of three summers and one winter seasons between 1977 and 1979 Lal (1984) conducted a village to village survey of the Kanpur district in the Ganga –Yamuna Doab. The total area explored during the survey was 5100 sq. km and in the process 150 sites were located, including 27 sites earlier. The extent of distribution of the diagnostic pottery types of different periods was seen to reflect the size of settlements during different cultural periods and also of the present extent of the mound. Lal then contextualises his study in the general archaeological approach to the study of settlement patterns and systems. He points out that his study is focused on the zonal pattern with its main concentration on the ecological and demographic aspects of cultures. He arranged the sites according to river basins and offers detailed size estimate period by period which further led to estimate of period wise size hierarchy and an estimate of population per site in each period.

As the exploration was based on moving from one village to the other and took full account of the local information, it was claimed that the possibility of missing sites was marginal. However since then, multiple surveys references have located a number of sites in the same survey area where Lal undertook his work. Further the attempt to measure the size of each multi-period site on the basis of the extent of the scatter of diagnostic sherds on the surface does not take into account factors that affect the extent of the scatter on the surface of the site. He tries to offer a generalised pattern of site catchment areas on the basis of assuming in one of his concluding tables that lists the land requirements of each settlement during different periods again on the basis of ceramic scatter. This creates a disproportionate picture of not only the size of the sites but also the average spacing between sites.

Urbanisation in Early Historic India was published in 1988 and was based on Erdosy's field study of the settlement history of Allahabad district from c.1000 BCE to 300 CE. 72 sites were catalogued along with their brief descriptions and geographical coordinates. On the basis of the maximum extent of diagnostic types of pottery of each pottery of each period on the surface, estimation was made of the settlement sizes in different periods. A general agricultural background of the district was discussed. Kausambi, a major site of the region was divided into a number of period wise segments culminating in the available overall spread of the site in the early centuries CE. The size hierarchy of sites was the central issue in his study of settlement typology. The continuity of the settlement pattern was also emphasized: "the average size of these (i.e. village) sites-1.72 hectares – suggests that the pattern of large, nucleated villages, which today characterises the Ganga Valley, was established from the beginning " (Erdosy 1988: 45). Erdosy depends like Lal on the maximum extent of diagnostic potsherds of various periods on the surface of a multi period site to estimate the size of the site during those periods. Further his theory that the fortified area of Kausambi can be divided into period wise segments is problematic because if the total extent of the site was accomplished in the later centuries CE then the assumption that fortification of the present area was a constructed as early as 600 BCE is not possible.

Vasant Shinde's 1998 site distribution studies in the Tapi basin of Maharashtra covers a huge area. His work titled '*Early Settlements in the Central Tapi Basin*' deals with settlement and subsistence patterns of the early farming community in the northern Maharashtra. Following into the footsteps of Lal and Erdosy, Shinde attempts to study various determining factors responsible for the establishment of early settlements in the Tapi basin. The study however is limited by a lack of clarity on several issues such as the fact that though the region is known for several cultural period, that has not been taken into account when the size and location of the sites is discussed. Neither does Shinde give any indication whether the sites witness continuous occupation or are some sites abandoned. The size of the sites also raises a problem, though a table (ibid: 72) has been provided with a frequency in hectares, it is not accompanied by any rationale or statistical explanation as to how did Shinde decided to jump from 3-4 hectares to 9-10 hectares.

A ten-year region survey project called the Vijayanagara Metropolitan Survey (hereafter VMS) was undertaken to explore the hinterland or "metropolitan region" of the 14th to 16th century South Indian Imperial capital of Vijayanagara (Sinopoli and Morrison 1997). The surveys which began in 1980's are perhaps Asia's one of the most well-documented surveys and documented archaeological remains across 650sq.kms. The project which went on for ten years documented all known archaeological sites and features. The information produced from the surveys contributed to a better understanding of the settlement patterns including issues, for instance, the nature and role of local ecology and its interactions with human subsistence, the organisation of political, economic and craft production organisation of Vijayanagara. Focussing on are of total 450sq km surrounded the city of Vijayanagara, VMS combined an extension regional reconnaissance with intensive systematic survey. Preliminary reconnaissance of the survey area had indicated high density of archaeological remains which hindered smooth movement of the survey team while traversing the terrain.

Further, it was realised that as one moved away from the urban core the number of sites decreased. Therefore instead of dividing the terrain according to topographic features or environmental reasons, arbitrary blocks of the Fritz and Mitchell grid system (Morisson 2010: 48) was adopted as primary units of coverage reference. In the event, the terrain slowed down movement only twenty percent of the transect was covered and samples collected and features documented. The Documentation took into account minute details of the sites and features. Due to the adoption of this sampling strategy, a number of sites were discovered covering long spans of different time periods. Further it also promoted a better understanding of the land use of this vast terrain with features like tanks which feature prominently in understanding the various trajectories of the Vijayanagara Empire and also further back in time.

The site of Kaundinyapura is located about 100 kilometres west of Nagpur. The site had earlier been excavated in 1962 and 1964 by M.G. Diksit (1968). However, the excavations were confined to only the two prominent mounds. As a result of the excavation, enough information on the material and cultural characteristics of the site were known. However it was felt that a more close scrutiny of the site going beyond the

excavated portions was required. Smith designed the survey plan in such a manner so as to examine the "regional exchange from the point of view of a medium size trading site, to assess how trade goods were distributed and what the inhabitants produced to finance their consumption" (Smith 2000: 75-76). In order to study intra site local and economic patterns of the Early Historic period an intensive surface survey and artefact recording at town and village sized sites was undertaken (ibid: 75). The survey was conducted in the months of October to December 1994 and September to December 1995. The site of Kaundinyapura consisted of four distinct mounds with different levels of vegetation, consisting of cultural material on the natural elevation of an alluvial terrace paralleling on the Wardha River. Due to unpredictable levels of visibility, survey and recovering strategy were adjusted accordingly for maximum collection of data. In portions where ground visibility was high, a grid based sampling and collection strategy was applied. 20×20 m grid with sampling unit of 2×2m was randomly selected using systematic non-aligned sampling strategy (ibid: 78). In thickly vegetated areas, strips of vegetation were removed and contiguous groups of sampling units were laid for even coverage of the site (ibid: 79). Furthermore, in order to locate other remains and to investigate whether non-mounded artefacts were the results of modern activity such as manuring, systematic investigation of the area beyond the mounded portions was partaken. In order to do so systematic pedestrian transects were walked at 10 m intervals within the 100 m of the modern village and of each archaeological mound. The principal aim of fieldwork at the site was to collect a representation of the whole site and not maximal recovery of a specific type of archaeological remains for example houses, streets or trash dumps (ibid: 78) . At Kaundinyapura the survey strategy not only provided information about the distribution of artefacts and production debris but also enabled an understanding of economic activities related to production and consumption of goods which in turn brought forth the various social linkages maintained across the landscape. At intra-site level the survey indicated that non local goods was well as production debris were widespread, indicative of the fact that such decisions regarding economic activities could well have been taken at the household level. The survey indicated that the presence of similar goods at the sites of Kaundinyapura and smaller settlements of Dhamantri attests to the presence of economic links between sites. At regional level the site can be seen as

one of the many sites in the Vidharba region which were engaged in trading activities with areas to the east (ibid: 85).

Sisupalgarh is an Early Historic site located on the south-eastern edge of modern Bhubaneswar. Smith (2003: 297-98) undertook a survey project from 2000 to 2003, designed to assess how an ancient south Asian city like Sisupalgarh was built and utilized by different types of people in the formation of a fully urban sphere. Through a systematic surface survey as well as mapping the distribution of artefacts and remains were recorded. The collection programme at the site typically used collection areas of 5×5m in size, spaced every 50 m throughout the site. Instead of using a regular grid which possibly exaggerate or negate the underlying archaeological regularities, the units were placed using a systematic, nonaligned random sample procedure.

The survey indicated that the sites archaeological remains are of an overwhelmingly local character with no indication of exchanges from distance beyond 10 km from the site. Further, Smith rightly points out that perhaps it is time that the focus from exotic and foreign goods should turn to the possibilities of local developments and circumstances that made city life viable and necessary for large numbers of people (Smith 2003: 297, 304).

The Sanchi survey project was undertaken between 1998 and 2000 was aimed at situating the Sanchi complex within its wider archaeological context in order to address problems around the social, religious and economic background of Buddhism in the late centuries BCE. The survey led to the systematic recording of 35 additional Buddhist sites, 145 habitational settlements, over hundred sculptures, numerous painted rock shelters and 17 dams reference. This information has prompted a better comprehension of how Buddhism spread in new regions and immersed itself in the social texture by being an observer to the key procedures of urbanization, state arrangement and development of new agrarian frameworks. Shaw's (2007) work includes the outcomes and inferences drawn from a combination of multi stage archaeological survey, art and architectural history and debates generated within religious studies and ancient Indian history (ibid: 20). The survey kept Sanchi at the centre, and the sites of Satdhara, Morel Khurd, Andher and

Sonari[2] as its peripheral boundaries to Sanchi. The primary aim of the survey is to situate the monuments at Sanchi within their broader cultural and archaeological landscape in order to study the relationship between the spread of new religions, urbanisation, state formation and agrarian change during the early centuries CE. Her research went beyond the tendency to focus on the iconographical study of important religious sites to their wider archaeological or cultural settings (ibid: 18). The introduction points to the lacunae in Indian archaeology, that which has failed to recognize the recent theoretical shifts that attempt to see such sites in terms of topography, local settlement patterns. Shaw believes that due to a lack of synchronisation between archaeological research and textual analysis, it has led to a static model of understanding of Buddhist history (ibid: 18).

Investigating the political, social and economic motivations behind such processes, she traced how and when the monasteries infused the social fabric of central India, which not only lead to a deeper social consciousness but also give rise to trade exchange network setups being established with the local population. One of the primary arguments of Shaw's work is that sites do not exist in isolation from each other, but they form integrated components of a series of archaeological complexes. A combination of systematic transects and non- systematic exploration was adopted for exploration of Sanchi and the four sites of Satdhara, Morel Khurd, Andher and Sonari. A village to village survey was initiated for the rest of the study area approximately 750 km sq with modern villages being the foci. The survey drew heavily on local information in and around the village itself (Shaw 2007: 67). The mechanics of a village to village survey are shown in Shaw's as well as the possibility of striking a balance between extensive /unsystematic surveys and intensive /systematic surveys. The survey design moved away from the traditional focus on a site during extensive surveys instead a stratified survey strategy was followed keeping the survey area small for maximum coverage as well as incorporating the modern perception of the landscape into the survey design. Thereby creating a regional method, that effectively showcased spatial and temporal relationships over a broad region defined by cultural boundaries. Successfully tackling the biases associated with extensive surveys (Shaw 2007: 72-77).

[2] Documented for the first time in Alexander Cunningham's (1854) monograph "The Bhilsa Topes"

The site of Thotlakonda is situated on a hill near Bheemunipatanam , 15 km from Vishakhapatnam, Andra Pradesh. Fogelin conducted an archaeological survey for six months between November 2000 and March 2002, in the area surrounding Thotlakonda. In total 7.3 square kilometres were surveyed and 134 archaeological features, many of which were created through the activities of lay Buddhists were documented. The survey design, Fogelin (2003) admits is heavily influenced by the work of Sinopoli and Morrison in the Vijayanagara Metropolitan Survey. Thus the field method involved intensive survey, with 20 metre intervals between surveyors and a careful documentation of small sites. Where Fogelin's survey method made a break from the method adopted in VMS survey was the decision to conduct a full coverage survey in order to determine spatial patterning between sites. The survey area was defined by a combination of geographic features and modern constructions. In the course of the survey small cains constructed of unmodified boulders, walls, reservoirs, cisterns, mortars, sheetrocks, postholes, stone columns, stone circles, circular depression, ceramic scatter and a stupa were documented.

A village to village survey in Upper Ganga plains in the districts of Muzaffarnagar and Saharanpur and an intensive systematic survey followed by an excavation of the site of Rohana Khurd form the core of Deepak Nair's doctoral work (2014). Since this section deals with case studies on archaeological surveys and related research questions I am outlining the crux of the survey work and not going into the details of the excavation. The central aim of the two surveys was to understand the variability of pottery from the sites surveyed in the preliminary survey and to create a systematic ceramic classification from the survey (ibid: 1). The study also grapples with theoretical issues such as the consequences of classification of potsherds on the basis of a single attribute. This he believes often leads to inflated number of sites associated with a dominant archaeological tradition. It is one of the few intra site surveys that have ever been conducted in the region with the intention of locating patterns in spatial distribution.

In the months of September and October in 2011 and in the summers of 2012, 2013 and 2014 a multi stage survey in the area comprising the doab (interfluve) of Kali Nadi and Ganges River was conducted by Aadil Zubair (2016). The purpose of the survey was to explore and understand the patterning and distribution of archaeological settlements in

the area and more explicitly, the relationship between them as well as to assess the use of landscape by the inhabitants in the past. The first stage was a reconnaissance survey of the sites previously reported in the Upper Ganga plains. In the process, 16 sites were visited and from amongst them the site of Ahar was taken up for an intensive survey. This is one of the first systematic surveys conducted in this area and helped in establishing a definite chronology of the site of Ahar on the basis of ceramic analysis. Except in the case of Lal Qila which is an excavated site, no other archaeological site's ceramic assemblage in this area has been properly documented. Through this survey and ceramic analysis, an idea of the ceramic types and sub- types present at the archaeological sites has been brought forth.

Survey designs and the questions that drive the surveys have both undergone a sea of change. It is apparent that the discussion has gone far beyond merely discussing the merits of intensive survey vis-a-vis extensive survey it has moved on to recognising the fact that each archaeological site is unique and requires a survey design specially formulated for it which will give achievable results and answer questions successfully.

1.5. Archaeological Surveys in Rajasthan

Continuing in the vein from the previous section, the discussion on archaeological survey is further discussed with the help of some case studies from Rajasthan.

Cunningham (1973: 242-49) can be credited with the earliest archaeological explorations in Rajasthan. He explored the site of Bairat a small town in Daosa district, in 1864-65. It is located approximately 66 km north of Jaipur along the road to Delhi. Cunningham's account of the geography and archaeological remains is descriptive but limited by its nature as diary entries.

In 1871-73, A.C.L Carlleyle (1978: 13-15), assistant of Cunningham also explored parts of Rajasthan. He discovered megalithic structures at Khera and Satmas, machari and at Daosa. He opened a few of the cairns and discovered fragmentary bones mixed with ash, pieces of charred wood and earth in natural or manmade cavity in the centre of the base.

He also explored the Early Historic sites of Bairat, Nagari on the Berach River and Nagra or Karkota Nagar in Jaipur district.

In 1940-41 Aurel Stein (1942) reference explored the dry bed of the Ghaggar in Bikaner and Hakra in Bahawalpur State (now in Pakistan). He found over 40 sites in Bikaner and a similar number of sites in Bahawalpur. One of these sites later became famous as Kalibangan which was subsequently excavated by Archaeological survey of India. Stein believed that all these sites belonged to the Early Historic period and identified the Ghaggar-Hakra with the Rigvedic Saraswati. It however now been established quite clearly specially in the case of Kalibangan that the temporal association of these sites is with the Indus Valley/Harappan 'Civilization'.

Post-Independence, A. Ghosh, the Director General of Archaeological Survey of India during 1951-52 conducted the first major explorations in Rajasthan. Following into the footsteps of Tessatori and Stein, Ghosh (cf. Misra 2007: 61) explored the lower part of the Drishadvati Valley and beyond that the Ghaggar formed by the merger of the Drishadvati and the Saraswati rivers up to the border with Pakistan. In this area he discovered more than hundred sites belonging to Harappan, Painted Grey Ware and Kushan periods.

The Archaeological Survey of India in the subsequent years has been actively involved in exploration work in Rajasthan, the details of which can be found can be found in *Indian Archaeology- A Review* and include a host of discoveries regarding Lower Palaeolithic, Middle Palaeolithic, Harappan, Painted Grey Ware, Historical sites and so forth. However it must be pointed here that the details mentioned in *IAR* are often plagued by the absence of pertinent information regarding the sites such as their geo-coordinates and so forth. This makes it difficult to locate the sites and is often accompanied by misleading information regarding the surface material found on the sites. The history of survey in Rajasthan discussed till now were primarily village to village surveys geared towards getting quick size, archaeological assemblage, and temporal assessment of the sites. Following are some new studies which have adopted targeted methods of survey to ask

larger questions of settlement patterns, site interactions and use of Pre historic and Historic Landscape.

Rima Hooja in 1988 published her study of 'Settlements and Frontiers of Mesolithic and Early Agricultural sites in South-Eastern Rajasthan'. One of the primary objectives of this study was to collect information on the Ahar culture. In the process a number sites were reported and site details including coordinates were recorded. The datasets from Ahar and Gilund, the only two sites of the Ahar culture which had been excavated till the 1990's were discussed and further the information from these two sites was integrated into the general physiographic setting of the south eastern Rajasthan. The field survey was geared towards judgment sampling on the basis of what she considered representative. She was not interested in the particularities of site catchment analysis and her general descriptions range from the site being near, under or along a mile, of modern habitation sites. This settlement pattern suggests according to her the possibility that there is a similarity in selection of terrain by past communities with possibly similar economic units. Her second major objective was to investigate the issue of contemporaneity of Mesolithic sites of the region with the Ahar culture. Hooja had proposed "an alternative, present day, model of interactions between two distinct patterns of economic subsistence and associated sub-systems, which may aid the elucidation of some aspects of prehistoric phenomena" (Hooja 1988:145).

This model is applied to understand the example of the interactions between hunting-gathering Bhils and other tribes and the tribal agricultural communities region. The nature of the interaction between the agricultural and the Mesolithic hunting gathering communities of south eastern Rajasthan is shaped by the above mentioned case study, frontier concept and other models. Hooja's focus is on suggesting that the modern tribe-peasant interactions in southeast Rajasthan may offer insight into the nature of interactions between prehistoric interactions between settled agriculturalists of the Ahar and contemporary 'mesolithic' hunter gatherers of the same region. She further attempts to collate the data of Ahar culture in the context of a detailed settlement analysis of the period. Though she draws attention to the fact that continuities can be discerned in the settlement histories of the region, however no effort is put to examine what were the

factors for the location of the sites or land use and so forth. As a result the long term settlement history of the areas that Hooja chose to survey is missing.

A recent study by Teresa P. Raczek (2007) examines the relationship between two contemporaneous sites in south eastern Rajasthan i.e. Gilund a permanent settlement of agro- pastoralists and Bagor a temporary camp site employing mixed subsistence strategy. Gilund and Bagor are located 30 km apart in an area known as the Ahar-Banas cultural complex (3000-1700 BCE). In order to ascertain the nature of the relationship/interaction between the two sites, lithics were selected for analysis due to their being found in abundance at both sites.

The project employed three avenues of research:

1) Evidence for the presence of overlapping material landscapes was sought by examining raw material. A targeted field survey of chert and chalcedony sources identified potential sources and was paired with a visual raw material analysis of samples and artefacts.

2) Technological practices were examined using standard typologies and attribute analysis.

3) Presence of a shared technological skill set was identified through a detailed analysis of core production.

Previous explanations described two separate groups that were loosely linked through exchange. However this study points out that even though the inhabitants of these sites i.e. Gilund and Bagor engaged in distinct daily practices and raw material procurement patterns, these two communities shared a common skill set.

The field survey focussed on specific locations identified from the examination of geological maps or in consultation with area geologists. In addition, select limestone outcrops outside and inside a 25 sq. km radius were field checked. The field survey was conducted with the intention of locating potential chert and chalcedony sources for lithics in Gilund and Bagor (Raczek 2007: 264).

Each area visited was field checked in three ways:

1) Informal walk and quick assessment of the area was undertaken in order to determine whether or not any stone raw materials or artefacts were visible.

2) All tier one and two tier sites with visible chert or chalcedony were divided into transects spaced either 10 or 20 m apart. The length of each transect was determined by the size of the stone outcrop.

3) Each transect was walked and the presence and density of raw material or artefacts were noted. After completing the transects , a series of 1×1 m collection units were set up at each locale in order to collect raw material samples and artefacts.

Collections were targeted, not random and systematic, since they were meant to provide a quick estimation of the presence of cultural materiality and not variety of material. The method of conducting the survey in order to answer the research question was clearly tackled at both the micro and macro level. In the process the area under survey is not only investigated for long term interactions of human activity marking the landscape but also provides a better understanding of the sites as well.

Another study by Praveena Gullapali (2005) has been undertaken on the organisation of iron production in Early Historic South Eastern Rajasthan. She investigates the relationship between social arenas of technological and political organisation.

She argues that the organisation of iron production varied across northern and north western India during this period so that it can best be understood apart of local social variation rather than as a part of centralized or homogenised production system. The evidence available supports a model in which production is less centralized and more widespread across the landscape of Early historic northern India indicating that the locus of control over production may have been the crafts workers rather than political administrators.

Importantly, Gullapalli emphasises that the focus is not on addressing the development of metal technologies over time. Rather the prime concern is a synchronic assessment of the

organisation of iron production during the late first millennium BCE and the ways in which the archaeological evidence for production conforms to or differs from models proposed in the archaeological literature.

She points out that most of the archaeological investigation in India that has dealt with metal technologies has focused on the development of copper and iron technologies over time. Emphasis is put on their initial appearance and their subsequent technical improvements.

In order to move away from the above mentioned trend, Gullapalli specifically talks about three inter related goals around which the research was designed.

1) To conduct a road based survey of Banas river valley in parts of Rajasmand and Chittaurgarh districts in order to identify Early Historic settlement.

2) To identify the locations within the survey area involved in aspects of metal (especially iron) production through surface evidence.

3) To understand the organisation of Early Historic iron production, specifically to locate production areas in relation to each other and to possible regional centres of consumption and production (2005: 203).

Gullapalli states clearly that the primary focus of the research was to record the patterning of evidence across the landscape, rather than to engage in a technical analysis of metallurgical artefacts. The area of field work was centred on the site of Gilund, in Rajsamand district. The survey combined road based survey and field walking based on the information garnered from the locals regarding the presence of old pottery, coins and structures. In the course of the survey thirty sites were visited which involved three components.

1) The extent of the site was determined by the outlines of the mound or the extent of sherd scatter, or both. The extent of the site as best could be determined by pacing and coordinates were determined using hand held GPS unit.

2) The second component of the survey involved the identification of metallurgical remains from each of the sites visited. This was done through waling the entire site surface wherever possible.

3) The third component of each visit was the collection of diagnostic pottery. Samples of the ceramic styles were collected, with an emphasis on the chronological markers of the Chalcolithic and Early Historic assemblages.

The archaeological survey focuses on identifying the focal point of production across a landscape in order to investigate how widespread aspects of iron production were across the Early Historic Landscape in south eastern Rajasthan and whether these differences could possibly highlight the distinction between aspects of iron production, namely smelting and smithing.

Rizvi, through the GJCC (Ganeswar Jodhpura Cultural Complex) project attempted to reconceptualise the Ganeswar Jodhpura Cultural Complex, located in north eastern Rajasthan as a collection of Chalcolithic settlements bound together by a shared cultural language that encompass similarities in material culture, production of copper tools and geographic proximity to copper mines. She provides primary documentation of sites recorded during an archaeological survey conducted in north-eastern Rajasthan and analyses that data in terms of settlement patterns and economic activity to reconstruct possible political and economic systems in place during third millennium BCE (2007: X). Community based crafts and copper working during the Chalcolithic period is brought into light through this project.

As part of the survey, Rizvi covered 34,000 square kilometres within the duration of six months in 2003. The survey revealed four types of sites. The typology is based on the material culture documented during the survey. Each of the four different site types provided evidence of different specialized activity or resource. The typology includes settlement sites, vitrified metal waste material sites, raw material processing sites and mining sites. Situated mostly near water resources these sites reflect the necessity of being located in such areas due the technological requirement of water in the process of metal production.

The site Balathal was chosen for a site catchment analysis by Astha Dibyopama (2009) because extensive excavations had already been done at the site. In order to get a better understanding of the Chalcolithic economy and its trading pattern with its satellite settlements, five km as catchment area of the site was considered. "The area was divided into North, North West, North North-West, North West West, West, South West, West South, South South West, South, South East, East East North, Northeast and North North East. The entire areas along these lines were surveyed with the help of Toposheets and Village-to-Village survey method" (ibid: 51).

The analysis showed that comparatively during Chalcolithic phase there were less satellite settlements compared to the Early Historic phase, and also some of the settlements such as Taravat, Karanpura and Maharaj Ki Kheri though located at a distance might have played an important role in the Balathal economy or might have been supportive settlements for economic exchange (ibid: 54).

The case studies discussed in the above section showcase the gradual changes that the archaeological survey as a tool has undergone. From merely used as a method of locating sites, now the information generated by surveys is deemed important enough to be used to talk about for instance about the material culture of a site.

1.6. Ceramic Analysis: A Historiography

Ceramic vessels are tools - objects used in specific activities to serve specific ends (Braun 1983: 107). The final form of vessels is affected in a number of ways due to the end purpose it is meant to serve. For instance the type and kind of temper used for a vessel meant to be used for cooking might differ from those used for water storage vessels. Ceramic use when approached from an archaeological point of view can be considered in several ways. The first approach involves the direct examination of the vessel materials and their constituents and evidence for uses, including wear and tear, chemical residues in porous ceramic bodies. Another interpretation of ceramic use is the examination of vessel shapes. Further the spatial distribution of different classes of ceramics within and between sites is an equally important avenue of assessing ceramic use and spatial distribution of activities (Sinopoli 1991: 83-84). This section of the chapter has been

divided into two parts. The first part discusses in general the various with issues with which scholars grapple when they work with ceramics. The second part discuss some of the ceramic studies which have been taken up in India to showcase the kinds of questions that are being asked and answered thereof.

Ceramic Classification: theories and methods.

"Every pot was used or made at a certain time. They were made at a certain place. They were used for a certain purpose or purposes." (Orton et. al. 1993: 23) These suppositions fuel the archaeological studies of pottery because of their sensitivity to spatial as well as temporal changes. Most of these studies can be categorized into three broad approaches that seek to answer a specific research question.

A) Classificatory studies of pottery form that club together types or groups of sherds together to represent a particular culture at a particular time. These groupings form the basis for archaeological dating and can be traced back to the first attempt at dating in the 19th century by Flinders Petrie in Egypt.

B) Study of the decorative motifs and styles of pottery, whether expressed in painting or in plastic decoration, provides a peek into the lifeways of a people as well as their aesthetic perceptions and ideological systems.

C) Increasingly archaeologists are also seeking answers regarding technology and production techniques in the paste or the composition of the ceramic. They are now looking at firing techniques and the manufacturing of the clay (Rice 1987: 25-26).

Any study on pottery begins at the elementary level of classifying the pottery into different groups based on detailed observation and description morphological attributes of the ceramic assemblage such as colour, surface treatment, degree of coarseness or fineness of ware etc.

Sinopoli rightly points out, the act of "Classification may vary considerably, both in how they are generated and in their levels of specificity. They can significantly differ, both in how they are generated and in their level of specificity. Bowl versus Jar or Plain versus

decorated are simple binary typologies that provide one way of ordering the ceramic assemblage" (1991: 43).

Ceramic Typologies

According to Ford and Steward (1954: 52) the concept of 'type' is a device used to examine the minutest fragments of a culture. This tool is designed for the reconstruction of history in time and space. Further he believes that this is merely the beginning and not the end of the archaeologists' responsibility. After culture history has been outlined various other methods of classification become possible and may be designed to measure different facets of the culture history. It is then up to the archaeologists to decide whether for instance a classification based on morphology or function should be imposed.

Before attempting to bring any semblance to any archaeological assemblage Adams (2008:1) believes one must first conceptually be clear that classification and typology are not two interchangeable terms. According to him, classification is any set of formal categories into which particular field of data is divided. Typology, on the other hand, is a meticulous categorisation of a set of data into categories that are all determined in accordance to the same set of criteria which are reciprocally exclusive. Broadly four kinds of artefact classifications are possible all which fall within the purview of analytical classification are as follows:

A) Purely morphological typologies based on the overall form of objects: stylistic typology which specially emphasises stylistic features.

B) Functional classifications according to their presumed use

C) "emic" classifications, in which objects re classified according to criteria believed to have been important to the makers

D) Distributional typologies, in which objects are classified according to their distribution in space and time (Adams 2008: 2).

Sinopoli (1991: 44) has however pointed out there cannot be a "single formula governing the definition and identification of traits relevant to constructing a typology of a

particular set of data". She divides the different approaches to ceramic typology into broadly three:

Intuitive typology refers to the practice of sorting sherds using definite criteria for example on the basis of the colour of the sherd. This process depends on our ability to distinguish patterns even if one cannot define the variables which defined the sorting in the first place.

The type-variety typology framework refers to "type" refers to broad class of ceramics defined on the basis of a small number of diagnostic traits. Varieties differ from the broader type to which they are related in one or more minor details.

Quantitative typologies are constructed and evaluated using techniques in the analysis of two or more variables. The most important step in quantitative typology is variable selection. The variable chosen can be measured on qualitative scale or a quantitative one. These variables may include for instance rim diameter, vessel height or technological variables such as raw materials, production and firing techniques and so forth (ibid: 49-56).

While there is definitely a practical need to organize pots/potsherds in some manner to deal with often due to the sheer quantity of material remains. However Read (2007:87) makes a pertinent point that all objects created by the potter are not instances of types and conversely not all instances of types are necessarily without significant variation. Further potsherds may or may not adhere to the "ceramic idea" and does not rule out the potter making objects that do not hold fast to this condition.

Role of Ceramics in devising chronology sequence

Pottery is the most commonly found artefact type or material and is inextricably linked with the dating or establishing chronological frameworks (Orton and Hughes 2013: 219). The abundance of pottery and its multiplicity of form, fabric and decoration makes pottery an ideal medium for carrying chronological information. "The basis of chronology in archaeology as in geology, is what is called the Law of Superposition that is the essential truth that deposits that are older are buried by deposits of later date etc.

For the archaeologist, no less than a geologist this means he must analyse and understand the order and nature of the stratification within a site. From such stratification it is possible to determine the changes which occurred through time, as represented by study of fossils or objects contained in such ordered starta" (Allchin 1998:24). This apropos is a methodology which is well accepted for dating sites which have been excavated. But what about sites which have undergone surface surveys only. How do we date those sites?

A significant use of ceramic studies is in trying to reconstruct site formation processes. Since large proportions of the artefacts found at a site are often pot sherds/pots, ceramic assemblages often become the focal point of archaeological investigations. Aspects ranging from active use to final abandonment and discard are explored in the course of ceramic analysis. The length of human occupation of a site and population estimates are often dependent on the following information:

a) The proportion of the site excavated

b) Contemporaneity, or the number of households at the site that were occupied at any given time

c) The number of whole vessels at the site

d) The number of whole pots per household

e) The rate of replacement of broken pots

f) The number of persons per household (Rice 1987: 302)

The range of information that Rice (1987) has pointed out for calculating the length of occupation or population of a site is entirely dependent on all these questions or some of them being answered by the excavated material. However since this study is grounded in the results an archaeological survey of a site can yield. One needs to relook at these questions and see where they fit in with the answers that are more likely to be found in the results of a survey.

a) The proportion of the site surveyed. How was the and where was the demarcation of a site made?

b) The number of pot sherds found on the surface does not necessarily indicate the population of a site. Quantitative studies used for reconstructing demography are plagued by problems of generalizing from a sample to a population.

c) In order to generate the chronology of a site the survey material is compared with existing studies on other sites in the hopes of locating similar looking/types of pottery (ibid: 302.

While it is certainly true that such an exercise is helpful in locating certain shapes and types of pottery from pre-existing literature. These studies are a result of different individual efforts and one cannot help but be aware of the fact that personal views and biases are present in each of them. Therefore an understanding of what was the methods used for classification, what was the aim of the study, what percentage of material was analysed and what was not before using the information for their own study is imperative before the data is used to build the chronology of a site.

However one cannot deny that sequential changes in ceramic forms can be used to construct chronological sequences. Pots in use differ over time in terms of how they were made, of what they were made, for what they were used, probably where they were made and certainly by whom they were made. Such differences will be reflected in the fabric, form, technology and decoration of the sherds excavated from different contexts (Orton et al 1993:24). The presence of a particular class of pottery in relation to a stratigraphic level within an archaeological site can help in creating ceramic chronologies using the principle of stratigraphy. When such a sequence is repeated in the entire site or a part across a number of sites within a region, it is then possible to create with the help of cross dating a broad regional chronological sequence (Sinopoli 1991: 74).

But what if it is a single phase site or a site which yields not enough archaeological material that can be used for dating or has a disturbed stratigraphy? How will then the business of dating the site be taken care of? In such cases alternate techniques of dating

have been devised such as seriation which focuses on the changes in ceramic forms using vessel forms mostly independent of where they were recovered from. Constructing a seriation essentially records the relative frequency of the different ceramic classes from site/sites and arranges then in an order based on the assumption of a pattern of lenticular change (Sinopoli 1991: 75). However at the same time, the dating of pots should be on basis of variations between assemblages, rather than variations in individual vessels and any such variation needs to be considered carefully and if necessary kept aside when trying to establish chronology (Orton et al. 1993: 196).

Since constructing the chronology of a site one of the aspects that this seeks to address it becomes imperative to briefly point out the fallacies of dividing the past with the use of terms such as 'Prehistory' or 'Protohistory' . Increasingly it is being realised that the use of such terms is passé. It is pejorative term since it implies that literate societies have histories while communities which have strong oral traditions do not have a history since it has not been written down. Instead archaeologists such as Peter R. Schmidt and Stephen A. Mrozowski (2013:2) are suggesting the use of the term of Deep time history to construct histories of the past based on oral and indigenous traditions as well as incorporating archaeological data. Time as a concept is open ended in Deep time history, the beginnings and the ending points "shift as change occurs in the issues and institutions being examined by archaeology and history". This understanding of time and past is yet to gain momentum in our country. Since past is formed by current discourse, it is time that we look beyond the accepted divisions of history in our country and move beyond the use of terms that are remnants of colonial understanding of modernity.

Ceramic Studies in India

Sinopoli (2002, 2003) explored the question of the organisation of ceramic production as well as the issues of variability and standardization at Vijayanagara. She combined archaeological and ethnographic data to examine pattern of ceramic consumption by different occupational and social groups, distribution and so forth.

Variations in vessel orientations and rim forms were looked at from within the Vijayanagara urban core and among settlement sites in the metropolitan region and

degrees of standardization were assessed as well. Further the role of ceramic producers and the scale, technology, and organization of pottery production were looked at as well.

Providing an interesting perspective on the factors underlying variability in artefacts is Daniel Miller's (1985) study of earthenware pottery from the village of Dangwara in Ujjain. The study according to the author is a micro analysis of all that is familiar in an archaeological domain i.e. the details of rim form, body angularity and decorative technique. Miller proposes the theory that artefacts embody the organisational principles of human categorisation processes and believes that a close study of the pottery will reveal the manners in which these organisational principles generate variability in material forms (ibid:1). Miller deliberately chooses to focus on factors such as rim diameter, shoulder height etc. which may be called etic in nature and ignored factors such manufacturing, marketing and use i.e. those which may be termed emic. Miller purposely emphases on those aspects of ceramic analysis that the archaeologists assume according to him are 'relatively unproblematic cultural categories' (ibid: 197). Despite his contextual analysis which takes into account, for instance, the relationship between ceramics and caste hierarchy, he also ends up imposing his ideas of categories on the pottery that the people of the village clearly do not agree with.

The archaeological survey of the site of Kaundinyapura has previously been mentioned in this chapter. Here the focus is on the results of that survey specifically the ceramic analysis undertaken of the survey sample. It is imperative to mention that not all sites yield substantial or the kind of pottery that can magically answer all questions. Thus, the survey of Kaundinyapura for instance did not yield such pottery which could help in determining the size of the vessels for instance. Smith felt that the previous descriptions of ceramic were too general to answer specific questions. Hence the ceramics from the site was approached as if it was undifferentiated. The ceramic collections of the Kaundinyapura survey were sorted out on the basis of both descriptive as well as analytic components. Information regarding vessel form, quality, colour, surface treatment and ware type (form and size) were recorded. They were subsequently grouped into different categories in order to answer the goals of the project. Questions regarding the town site's participation in the trade network, the way in which trade goods were distributed at such

a site were addressed through the ceramic analysis of the sample collected. For example "rims were recorded with the same basic information as body sherds but for this study, subsequent groupings were achieved by emphasizing two particular aspects i.e. rim form and diameter" (Smith 1997: 237-54).

"*Beyond Pots and Pans: A Study on Chalcolithic Balathal*" by Anup Mishra (2008) is a colossal effort at a systematic and scientific study of Chalcolithic pottery from Balathal. Numerous classification devices were used to classify Balathal pottery. In order to classify vessel on the basis of formal attributes, rim forms, orifice types, neck forms, shoulder forms, body forms and base forms were all taken into account. Stylistic attributes of the decorated pots were taken due note of. Further the vessels were classified on the basis of their functional attributes into domestic and ritualistic. In order also examine the questions of local production and imported pottery, thin section study and X-ray diffraction analysis of pottery was undertaken. In the face of the fact that there is a serious paucity of standard books on ceramic analysis, Anup Mishra's (2008) work will definitely prove to be of help to students of archaeology, especially those students interested in working with ceramics.

1.7. Methodology

Systematic survey of sites is the need of the hour when numerous sites documented/non-documented, protected/non-protected are fast disappearing due to both environmental and human intervention. Further excavation is a proven costly affair and sometimes not the best avenue for gathering information from sites which particularly occupied by modern village/urban settlements and so forth.

The archaeological survey was conducted in two stages. The first stage was a reconnaissance survey of the area around Ahar, Udaipur in Rajasthan. The aim of the reconnaissance was to visit the sites reported in *IAR* and other published material around the site of Ahar. In the process additional information about the sites other than the already reported portions, i.e. GPS coordinates, correct actual details as to their location, present state of preservation so forth were also taken note of. The sites visited and

documented are Dholi Magri, Maharaja Ki Kheri, Tarawat, Dharauli, Dharta, Fachar, Iswal.

In the second stage a systematic survey at the sites Dholi Mangri and Maharaja Ki Kheri was conducted in order to understand the surface archaeology and landscape transformations as well as the factors involved. The systematic archaeological survey involved the area being divided into transects, which will be walked by crew members in order to locate, document and collect artefacts and features. In the process, the exact locations of artefacts and features and other archaeological phenomena was precisely mapped and documented using a Global positioning System (GPS) and other field equipment. The survey was aimed at obtaining a representative sample of the surface material with special focus on ceramics collected for analyses.

1.8. Structure of the thesis: Summary of the chapters

The **introductory chapter** as is apparent from the above discussion introduces the aims and objectives of this thesis. The discussion then veers towards the archaeological surveys and ceramic analysis. Discussion on different case studies is initiated with the intention of bringing forth a nuanced understanding of where this study situates itself within the larger narrative.

The **second chapter** titled '**Preliminary Archaeological Survey in the Study Area'** discusses the results of the first phase of a multi-seasonal archaeological surface survey project which was aimed at visiting the previously reported archaeological sites in the areas surrounding the archaeological site of Ahar in Udaipur district of Rajasthan as well as to scout for new archaeological sites in the area. During the course of this archaeological investigation, the archaeological sites of Balathal, Tarawat, Dharauli, Dharta, Fachar, Iswal and Bedla were revisited and two new sites of Maharaja Ki Kheri and Dholi Mangari were also located. The sites visited were thoroughly surveyed and documented. In the process, additional information about the sites other than that which was already reported, that is GPS coordinates, actual details as to their location, present state of preservation and so forth was also collected.

Chapter three titled "**Systematic Surface Survey at Dholi Mangari: Methodology and Results"** focuses on the second phase of a multi-seasonal archaeological survey programme, which was carried-out in the month of November 2014. During this phase of the survey project, a systematic surface survey and collection strategy was adopted to study and understand the archaeological site of Dholi Mangari and its surroundings in a detailed manner. The chapter gives a detailed overview of the site environs, survey methodology and sampling techniques along with the methods adopted for collecting archaeological material during the survey. The second part of the chapter is dedicated to methods used to classify and analyze the ceramics collected during the surface survey at Dholi Mangari in order to gain a comprehensive understanding about various types of ceramics present at the site.

The **fourth chapter** entitled as "**Systematic Surface Survey at Maharaja Ki Kheri:**

Methodology and Results provides a detailed overview of the systematic archaeological survey carried at the site of Maharaja Ki Kheri in the month of May, 2016. The first part of the chapter discusses survey methodology, sampling and collection strategies adopted during the survey. The second part of the chapter discusses the methods used for classifying and analysing the ceramics collected during the survey as well as the results of the ceramics analysis. The chapter also includes the illustrations of and photographs of ceramics recovered during the survey from the site.

The **fifth chapter** is the concluding chapter which discusses the findings of this study.

Chapter Two

Preliminary Archaeological Survey in the Study Area

Introduction:

This chapter discusses the results of the first phase of a multi-seasonal archaeological surface survey project which was aimed at visiting the previously reported archaeological sites in the areas surrounding the archaeological site of Ahar in Udaipur district of Rajasthan as well as to scout for new archaeological sites in the area. During the course of this archaeological investigation, the archaeological sites of Balathal, Tarawat, Dharauli, Dharta, Fachar, Iswal and Bedla were revisited and two new sites of Maharaja Ki Kheri and Dholi Mangari were also located. The sites visited were thoroughly surveyed and documented. In the process, additional information about the sites other than that which was already reported, that is GPS coordinates, actual details as to their location, present state of preservation and so forth was also collected.

2.1. The Study Area and its Archaeological History

The excavations at the archaeological site of Ahar, District Udaipur of Rajasthan by R.C. Agrawal (*IAR 1954-55*: 14-17) brought to light an archaeological culture whose moorings were not known earlier. The site was re-excavated by the Department of Archaeology and Museums, Government of Rajasthan and Deccan College, Pune in 1961-62 (Sankalia et al. 1969). The excavations revealed the existence of an 'indigenous rural, agro-pastoral' culture familiar with the use of copper and using a specific type of pottery known as 'Black and Red Ware' in Eastern Rajasthan. This culture was termed as Ahar culture or Ahar-Banas culture and is the earliest farming based culture in Rajasthan belonging to the chalcolithic period, i.e. c. 3600 BCE- 1800 BCE (Misra and Mohanty 2001). Since then a large number of sites belonging to this culture have been reported during subsequent explorations in the Banas valley of Rajasthan and at present there are around 111 archaeological sites which have been ascribed to the Ahar culture with over 80 percent of the sites located in the three districts of Chittaurgarh, Bhilwara and Udaipur (Shinde and Sarkar 2014: 465-479; Misra 2007: 155). Excavations and explorations at the famous

archaeological sites of Gilund, Balathal and Ojiyana have immensely helped to understand the occupational history of the region by providing important information regarding the varied aspects of the Ahar culture. Subsequently, a large number of archaeological sites with occupational sequence ranging from Mesolithic to Medieval times have been reported by the archaeologists of the Archaeological Survey of India, Rajasthan State Archaeological Department as well as others like V.N. Misra (1967) and Reema Hooja (1988). Much of this work has been reported in various issues of the *IAR* and other journals like *Ancient India, Puratattva,* and *Pragdhara.* However, the information contained in these journals regarding excavated or explored sites is very limited and provides very brief information about chronology, diagnostic artefacts and architecture. Some of the earliest surveys carried-out in the area remain unpublished and those which are reported are presented in a gazetteer format, providing minimal information regarding the site, often with a fleeting mention of ceramics. These survey reports tend to exclude vital information and details such as exact location and coordinates, site size, nature of these sites within a larger area or region, their spatial patterning and distribution and relationship to the landscape and environment. The absence of these details make these reports insufficient as they do not provide the reader with the very basic details and one has to remain content with the small notes that have been published, which in turn limits our knowledge and creates problems in understanding the distribution of sites across the region as well as the information about the material culture present at these sites.[1]

Secondly, the earlier explorations and excavations carried out in the area appear to have been primarily focused on studying the sites belonging to the prehistoric and proto-historic periods and very less effort has been made to explore or study archaeological sites containing the deposits from the later periods and their material culture, which in turn limits our knowledge of understanding the cultural sequence of this part of the region as well as of other areas. The material (ceramics) from the Early Historical and later periods have not been studied or discussed about as it should have been. There are a very

[1] A table has been put in the appendix which indicates the number of sites discovered in Udaipur.

few sites like Ahar, Balathal and Gilund, and Purani Marmi of which the ceramics and other artefacts belonging to later periods have been studied in some detail. There are hardly any references about the ceramics belonging to the Early Medieval and Medieval levels present or recovered at the sites in the already published reports, which makes it very problematic to identify and correlate or cross-date the ceramics from later periods in the region. Apart from that there has been a lack of systematic archaeological surface surveys in the area and no attempt has been made to carry-out systematic intra-site, inter-site or regional surface surveys in the recent past.

2.2. The Geographical Backdrop of the Study Area

In order to draw a larger picture of the landscape within which the archaeological sites came up and flourished over time, it is important to understand the various facets of the surrounding natural environment. This section will include a general description of the physiographic and geological divisions, drainage systems, agricultural setup, soils, climatic conditions, flora and fauna as well as the mineralogical resources found in the area of research. At the end of the section, the relevance of this entire descriptive information will be tied up with how it reflects on the location of archaeological sites in the area.

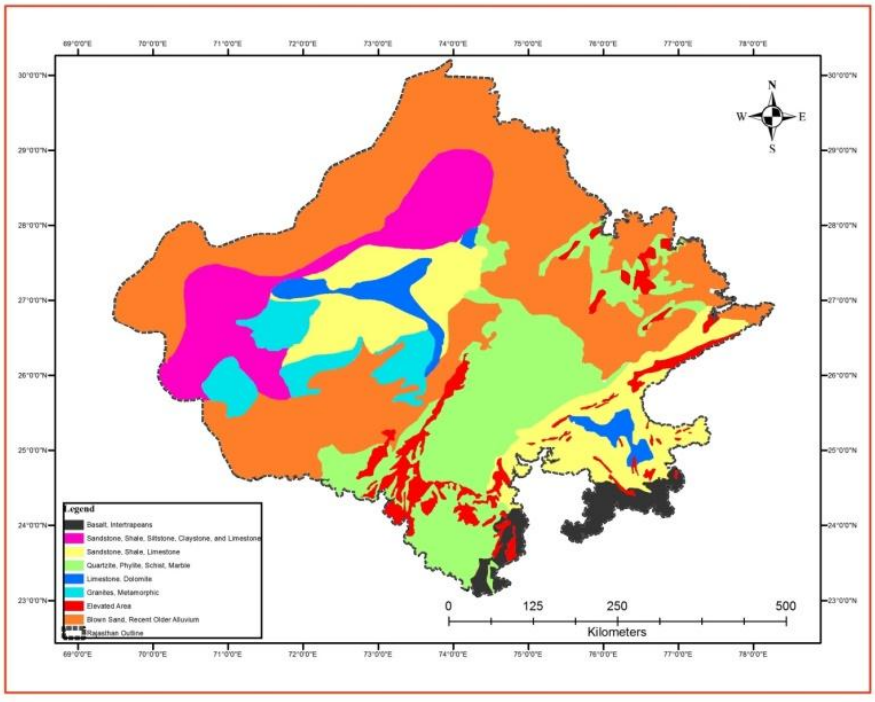

Figure 2. 1: Geological Map of Rajasthan (Courtesy Aadil Zubair)

2.2.1. Geological formations in the area

The geological structure of the study area is very complex, and the rock formations of this region belong to the pre-Cambrian era and are broadly divided into two sets - the pre-Aravalli and the Aravalli formations (Misra 1967: 9). The pre- Aravalli formation is further divided into two types: the Banded Gneissic and the Bundelkhand Gneiss. Because of the greater degree of metamorphic variability, the rocks of Aravalli formation has been classified into three systems, namely, the Aravallis, the Raialos and the Delhis (Mishra 2008:29). These rock formations cover the major part of the study area. The geological formations are briefly discussed in the following sections.

The Banded Gneissic Complex and Bundelkhand Gneiss:

They occupy almost the entire Mewar plain south of Sambhar Lake and up to Banaswara. It has been heavily eroded and forms an almost level albeit often in places undulating plain. The younger Archean sediments, namely the Aravallis and the Raialos rest on the floor formed by these rocks. Bundelkhand Gneiss is revealed in 110 km long stretch between chittor and Bhilwara in the Berach valley. It is covered by the Vindhyas in the south and by the banded Gneissic Complex elsewhere. Gneiss largely is a pink to reddish colour granite however it is transversed by prominent quartz reefs and dolerite dykes. Banded Gneissic complex is visible in the stretch between south Mewar and Ajmer and takes the form of alternating bands of biotite

gneiss and granite (Misra 2007: 1-2; Misra 1967: 11-13).

The Aravalli system:

The Aravallis are considered as the oldest folded mountain series in the world which was formed during the Palaeozoic times. It consists of argillaceous rocks and can be found in various metamorphic forms such as shales, slate, phyllites and mica schists. The basal beds consist of thin, arkos and gritty quartzite. Impure argillaceous and ferruginous limestones can be found in Bundi and around the city of Udaipur. Beyond Udaipur in the north, quartzite dominates the region (Misra 1967: 13-14).

The Raialos:

This 600 m thick white limestone stretch can be found around Raialo, near Nathdwara and west of Neemuch in eastern Rajasthan and at Makrana, Ras and in Godwar in western Rajasthan. It generally rests on the Aravalli, the Banded Gneissic Complex and Bundelkhand Gneiss but sometimes has a thin conglomeratic quartzite or sandstone at their base (Misra 1967: 14-15).

The Delhi system:

It lies over the Gneisses and the Aravalli's. The dominant constituents of the Delhi system include quartzite and impure lime stones. West of Udaipur, the system is well developed in the form of massive quartzite ridges (Misra 1967: 15-16).

2.2.2. Physiographical setting of the area

Physiographically, the area under study is an extension of the Malwa plateau and is bounded by the Aravallis on the western and the eastern sides; The Indo-Gangetic

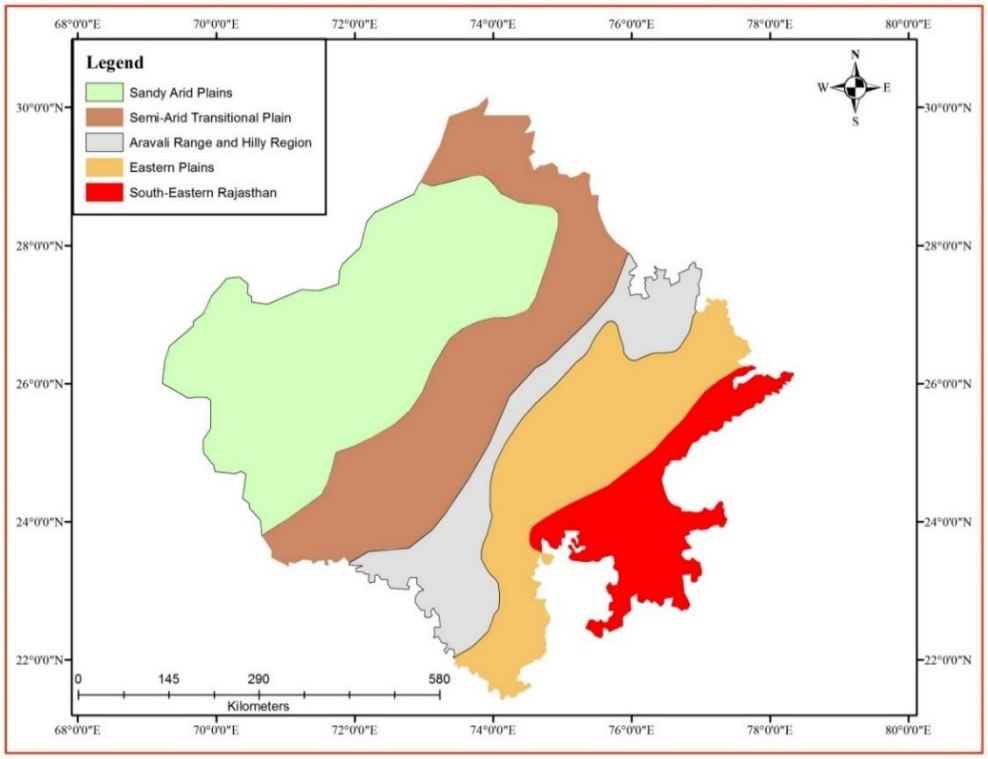

Figure 2. 2: Physiographic Map of Rajasthan (Courtesy Aadil Zubair)

alluvial plain lies on the northern side of the region.

The region has been broadly divided into three physiographic divisions: i). the Aravalli Range, ii). Western Rajasthan and iii). Eastern Rajasthan plains. The following pages will briefly discuss the varied facets of these physiographic divisions.

i) The Aravalli Range:

The Aravalli Range is the most prominent topographic feature in the region and is older than the Himalayas in geological time, and is one of the oldest mountain ranges in the world (Mishra 1967: 9). Running in a northeast to southwest direction, the Aravalli Range divides Rajasthan into two distinct geographical units. The western plains, i.e. Marwar consisting nearly sixty percent of the total area of Rajasthan, is arid or semi-arid land with sandy terrain and low rainfall located to north and west of the range. The eastern part i.e. Mewar is comparatively well-drained, fertile and semi humid located to the east and southeast of the range (Hooja 2006:13; Shah 2001: 40). The Aravallis were formed during the Dharwar period and subsequently uplifted in the Paleozoic, Mesozoic and Tertiary eras. During the late Tertiary and Quaternary periods, these regions constituted by distinct physiographic zones evolved as degradational and aggradational units. The rocks comprise of quartzites, granites and rocks of the Aravalli series. The softer varieties of rocks such as phyllites and limestones have weathered or worn-out and formed low hills and broad valleys. The Aravallis originally extended up to Delhi, but at present, the range terminates at around Jaipur. The highest section of the Aravalli Range lies to the north-west of Udaipur and is locally called as 'Bhorat Plateau' with an average elevation of 1125 m above the mean sea level (Misra 1967: 33).

ii).Western Rajasthan:

The western portion, lying to the north and west of the Aravalli range, consists mainly of the sandy arid plains, forming the traditional Maru region of sand, sand dunes with arid conditions, and the semi-arid transitional plains comprising the north-western *baggar* area of Rajasthan. This latter semi-arid transitional plains tract contains the Luni river basin, and the 'Interior Drainage' area, along with a small area comprising the Ghaggar

plain. This arid and semi-arid region is a vast expanse of land, with numerous sand dunes, often stretching over a great distance. The overall area is believed to be a natural northerly extension of the Gujarat plains, with progressive desiccation culminating here in a true desert. The main river of this part of Rajasthan is the Luni with a number of tributaries, including the Bandi, Jojri and Sukri etc., all but one of which join it from the south. Recent researchers suggest that climatic changes probably played a part in the varying amounts of water that have come down the Luni River over the centuries. The broad beds of the Luni and its tributaries have been considerably filled by aeolian and alluvial sediments. In the extreme north, are the shallow beds of the now mostly dry rivers Ghaggar and its tributary Chautang. It has been postulated that in prehistoric times some of the water-courses of this region would have drained into a more active river system. The area is known for its salt deposits and lakes too, especially at Sambhar, Degana, Kuchaman, Pachbhadra and Didwana (Baid 1968: 292-303; Misra 1967: 23-25).

iii). Eastern Rajasthan

The major geographical unit of Rajasthan lies to the east and southeast of the Aravalli divide. The area is watered by a network of rivers, many of them perennial, belonging to the Chambal-Banas and Mahi system. The major tributaries of the river Banas, which eventually joins the river Chambal, include the Khari, Morel and Berach, while those of the Mahi include the Som and Jakhar. The southern part of this region is known commonly known as Mewar area (Mishra et al 1999: 39-49).

The whole area is a fairly well defined zone in geographical terms, bounded on the west by the Aravallis, on the south and southeast by the northern scarps of the Central Indian Vindhyas, and on the north and northeast by the alluvium of the Indo-Gangetic plain. It is a hilly and uneven area that includes fertile river plains, the highlands and plateau of Bhorat, the southeast Rajasthan 'Pathar' region and the zone's north-eastern hilly tracts. In contrast to the mainly arid and semi-arid part of Rajasthan, in this area, fertile tracts and valleys with alluvium, loam and black soil are common. The higher land was covered with dense forests until recently. The Banas-Berach river system, which forms part of the 'Eastern Plains' may be viewed as comprising two physiographic units namely the Banas

basin and the Chappan plain. The Banas basin covers the eastern part of Udaipur, western Sawai Madhopur and Southern Alwar districts. It forms the southern boundary of the Mewar plains, drained by the Banas and its tributaries Berach, Kothari, Khari, and others (Misra 1967: 35-38).

In the west and southern part of the Banas Basin, the higher hummocks and hills have thin soil cover, and a topography marked by eroded granite and gneissic rocks. To the east, the land slowly falls to an undulating rocky plain, interspersed with fertile cultivable tracts. In contrast to the scantier alluvium deposits of the western sections of the plain, in the eastern and north-eastern sections the thickness of the alluvium deposits increases and the plain assumes a more level aspect. North and east of Ajmer, the alluvium has covered the underlying gneiss completely. Further north-north east, the Banas and the other river basins of the Eastern Plain gradually merge with thick alluvium of the Indo-Gangetic Plain (Hooja 2006 : 14-15).

The Chappan Plain lies to the south of the Banas Basin, and includes south-eastern Udaipur, Dungarpur, Banaswara, and southern Chittaurgarh districts. It is situated south of the great Indian watershed of the Aravallis and is drained by the Mahi and its tributary rivers. These rivers eventually flow out into the Gulf of Cambay. The hills of the Chappan shut off the Banas basin from the Gujarat plains that lie to the southwest, while its valleys serve to act as passes that have traditionally been used for passage and transportation of trade-goods (Misra 1967: 43).

2.2.3. Drainage Pattern of the Area

The geological formations of the area influence its drainage patterns. The Aravallis form a watershed channelling and draining down the waters across the area. The area is drained by River Banas and its tributaries Berach, Kothari and other affluents. The Banas rises in the Aravallis near Kumbhalgarh and enters the Mewar Plain near Nathdwara. It runs east-northeast up to Mandalgarh where it meets and absorbs the Berach, which flows down from the hills north of Udaipur where it is known as the Ahar after the village lying close to the ancient site Ahar. From Ahar, the Berach moves eastwards eventually joins the Banas at Bigod. The Banas meets Kothari near Dewair and flow down the Aravallis

past Bhilwara and finally merges the Chambal, east of Sawai Madhopur. The Chambal flows into southeast Rajasthan near Chittaurgarh and the flows north-east past Kota and after merging with Banas and Kali Sindh flows in an easterly direction until it merges into Yamuna near Etawah in Uttar Pradesh. Some of the northern tributaries of the Banas are the Khari, Dal, Sodra and the Mahi. In Apart from the rivers there are several artificial lakes and tanks found throughout Mewar (Misra 1967: 38-41; Mishra 2008: 29).

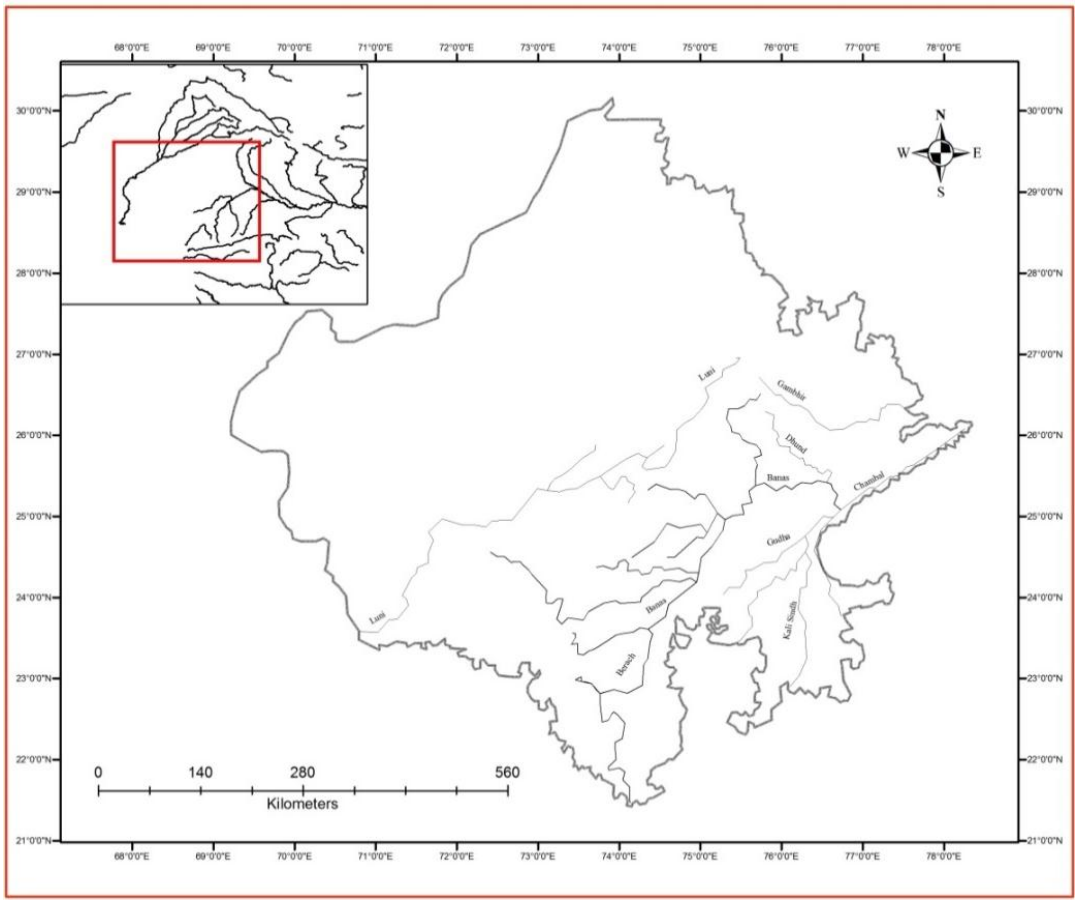

Figure 2.3. Drainage Map of Rajasthan, (Courtesy Aadil Zubair).

2.2.4. Climatic Conditions

The area on the basis of climatic conditions can be categorized as semi- arid and arid zones. The arid zones are marked by sparse and greatly capricious precipitation as well as extreme variations in temperature and high evaporation. In this zone west to east the

mean annual rainfall ranges from 100mm to 450 mm. The main rainy season is from June to September. This zone hardly experiences any precipitation during winter. The hottest months in the year with a mean temperature of 40◌ centigrade are May and June. Dust storms and very high wind speeds are recorded during the summer and monsoon seasons. During winter, the temperature is as low as 4° centigrade and short periods of frost are also experienced (Misra 1967: 42-51; Krishnan 1977 c.f. Shah 2001: 46).

2.2.5. Soils

Soil is considered to be the most important natural resource as the mankind has always depended on soil for food and other resources. Due to different physiographic features and distribution of rainfall the soils of Rajasthan are highly variable. The soil type of Southeast Rajasthan, ranges from thin alluvial covering over sandstone plateau, light loam that is more sandy over the tracts of Bundelkhand gneiss and sandstone, clayey soils over the shales and phyllites, black cotton soil over Deccan Trap and in pockets upon the older formations, alluvium, loam and yellow-brown soils in the Banas and Chappan plains, and deep sand deposits in beds of large rivers with rare occurrences of blown sand. At places, banks of major rivers are composed of sub-recent conglomerate cemented by *kankar*. The limestone areas are generally bare and rocky (Heron 1936 c.f. Shah 2001: 46). In the entire state of Rajasthan, alluvial soils are less extensive, found mainly in parts of the Luni basin and old Ghaggar basin in Ganganagar. Desert soils with low clay content, high sand content and *kankar* are more extensive. The soil cover on the steeper slopes of the Aravallis is thin. (Misra 1967: 59-63; Allchin *et al* 1978 c.f. Shah 2001: 47).

2.2.6. Flora and Fauna:

The vegetation in the study area mainly comprises of dry deciduous forests and a small portion in Banswara falls in the sub-tropical evergreen forests. The flora includes a variety of trees and plants and the most common trees are mango (*Magnifera indica*), *babul (Acacia arabica), bar (Ficus bengalensis), dhak (Butea frondosa), gular (Ficus glomerata), jamun (Eugenia jambolana), khair (Acacia catechu), khajur (Phoenix sylvestris), kherja (Prosopis spicigera), mahua (Bassia latifolia), and pipal (Ficus*

religiosa). Apart from that the smaller shrubs consist of *akra (Calotropis procera), anwal (Cassia auriculata)* and *karanda (Carissa carandas).* During the rainy season, variaety of grasses and hedges grow up in the lowlying areas and on the higher slopes of the Aravallis, species of orchid, *Rosa lyelli* and *Girardinia heterophylla* are found. Apart from that a few species of ferns also occur.

The fauna of the area generally includes tigers, black bears and *sambars (Cervus unicolour)* are found in the Aravallis whereas, wild pigs, dogs, foxes and wolves are found in abundance. In the plains, animals such as black buck, ravine deer, hares, partridge and *nilgai (Boselaphus tragocamelus)* are also found. The rivers and lakes are full of fish (Misra 1967: 51-59; Erskine 1992: 10-11).

2.2.7. Mineral Resources:

The Aravallis contain rich deposits of minerals such as copper, zinc, lead, silver, iron, manganese and beryl. Iron ore is present in abundant quantities in southeast Rajasthan especially in Udaipur, Sawai Madhopur, Bhilwara and Bundi districts. Copper is also present in the Aravalli region (Misra 1967: 101- 129); Mishra 2008: 29).

2.3. Geographic relevance of the location of the sites

The present day administrative districts of Vallabhnagar and Mavli fall within the Banded Gneissic Complex that forms the bedrock geology of the area. The geological formation comprises of the Sandmata Complex and the Hindoli Group. Besides, some intrusive granite such as Untala and Gingla garnitoids are also present within Banded Gneissic Complex. The main mineral constituents of the granites and gneisses are quartz, plagioclase, microline, hornblende, biotite, muscovite, minor garnet and apatite, zircon (Sinha-Roy et al. 1998:66).

The Ahar culture sites are located in south-eastern Rajasthan in the districts of Dungarpur, Banswara, Udaipur, Chittaurgarh, Bhilwara, Bundi, Tonk and Ajmer. The majority of the sites are located on the banks of Banas or near it or its tributaries Berach, Kothari, Khari, Dal, Sodra and Mahi. Most of the sites are located one or more km away from the rivers whereas, the archaeological sites of Balathal, Bansen and Ojiyana for

instance are located quite far from the river. In such a case where a site is located away from a perennial river, usually there is a seasonal stream or one or more natural depressions. The latter will store rain water for the greater part of the year. In the sandy bed of the stream, water will be available a few meters below the surface during the summer months (Misra 2007: 156).

Physiologically, the sites are located in a mixed landscape which is conducive to cultivation as well as animal husbandry. Fertile soil in the vicinity of most of the sites was exploited for raising crops and the undulating rocky grounds were the gazing pasturelands for the livestock. Mewar with its rolling plain and long stretches of flat ground intersecting with higher rocky ground often encloses depressions. Run off from higher grounds during rainy season every year gets deposited in these depressions, thereby adding to the fertility of the soil. Almost all the sites are located near existing villages, which in many cases is right on the top or a portion of the archaeological mound, making explorations as well as excavations a difficult venture. Rarely do we find sites which are free of encroachment like the site of Gilund.

In the view of the above discussion, how does this information facilitate our understanding regarding the sites of Dholi Mangari and Maharaja Ki Kheri? Dholi Mangari is located in the Mavli Tehsil whereas Maharaja Ki Kheri is located in the Vallabhnagar tehsil and both the sites share the same bedrock geology and are part of the Banded Gneissic Complex, as is indicated by the kind of rock formations noticed at both the sites. The cut portion of the mound of Dholi Mangari for instance shows evidence of natural bedrock formations and the forested portion of the mound also shows evidence of pieces of this rock scattered across the surface. Maharaja Ki Kheri on the other hand is part of an agricultural land. However one can find a scatter of rocks across the surface, which appear to have been a part of rock formation earlier. It is also interesting to note that during the preliminary survey in the area, no evidence of lithic tools was found from either of the sites. Both the sites are not located near or next to a river. Maharaja Ki Kheri which is located right next to the road connecting Vallabhnagar to the village of Maharaja Ki Kheri and has one natural depression right at the edge of the field and the other further down the road on the opposite portion of the land. Both are a source of

water for the inhabitants of the nearby villages although they are largely dependent on rain water. In the case of Dholi Mangari, the reconnaissance of the area in and around the site did not indicate the presence of a pond or lake. The Google Earth images also failed to show any river streams or rivulet nearby. The issue of what and where the water source is/are has to be looked into. The vegetation on both the sites is scanty and shrub like, combined with the rocky patches which provide ideal grazing ground for livestock. However it is pertinent to remember that the descriptions of the site in terms of water sources and vegetation cover might have varied from when these sites were occupied in the past.

2.4. Reconnaissance Survey in the Study Area

The first stage of the multi-seasonal archaeological survey project was focused at revisiting all the previously reported archaeological sites in the area and studying them in a more thorough and detailed manner as well as to scout the rest of the area for new sites. The aim was to get a better understanding of the landscape in which the archaeological sites and features are located and to find a site which would be conducive for carrying-out a systematic surface survey at. Before setting out a foot in the field, a list of all the previously documented archaeological sites in and around the city of Udaipur was prepared, the data for which was derived from various issues of journals such as *Indian Archaeology - A Review* (*IAR*), *Puratattva*, *Man and Environment*, *Ancient India* and other published reports. A revised list of 111 Ahar culture sites by V.N.Misra (2007: 363-368) proved to be useful for getting an idea about the location and spread of the sites in the area. Toposheets and satellite imagery from Google Earth were also used for locating the archaeological sites as well as to gain a better understanding of the landscape in which the sites are located. The preparatory work resulted in producing a base map of the area and helped to define the limits of boundaries within which it was feasible to carry-out the survey.

The reconnaissance survey was carried out using the conventional ‘village-to-village’ method of surveying during which an attempt was made to visit as many previously reported sites as possible and also to identify and locate new archaeological sites in the

area. The survey was carried-out by the researcher with the help of Shreyanjana Bhattacherjee[2] and during the course of survey, the archaeological sites of Dharauli, Fachar, Tarawat, Balathal, Bedla, Dharta and Iswal were re-visted and surveyed in a more thorough and detailed manner. The sites were re-examined and documented in order to generate more precise and accurate details, which were found missing from the published reports such as the location, dimensions, landscape setting as well as to gauge the impact of environmental and cultural factors on the sites and so forth. In the process, the geo-spatial locations of the sites were established by using a handheld GPS and their coordinates and were recorded. The data was then transferred onto Satellite Imagery Software Google Earth and Arcgis 10.2 to produce a base map of the area. It is imperative to mention that almost all the earlier reported sites in the area are no longer in the same state of preservation as they were at the time when first identified or reported. Details including the condition of the site, shape, water sources, land use and other necessary information were recorded for all the sites separately. Apart from that photographs of the sites and other archaeological features were also taken. The sites have underwent huge transformations or modification overtime as a result of rapidly increasing urbanization and need for agricultural lands and The state of preservation that the sites are in is lamentable.

During to the course of the survey two new sites of Dholi Mangari and Maharaja Ki Kheri were also located and documented because of the help extended by Mubarak Hussain (Superintendent Archaeologist and curator at Ahar museum Udaipur) and J.S. Kharakwal.

After the initial phase of reconnaissance survey, it was decided that the site of Dholi Mangari will be taken up for a systematic intensive surface survey and collection programme. Dholi Mangari, being an unreported site and without any major encroachments provided an ideal scenario for carrying-out a systematic survey for which the site was visited for the second time during the season in order to assess the archaeological potential and to get a basic understanding of the archaeological material scattered across the surface of the site. Grab samples of pottery scattered at the site were

[2] Student of archaeology at CHS, JNU, New Delhi.

collected and during the recce, it was realized that the pottery scatter at the site is very less for carrying out a full-fledging systematic surface survey. Therefore, it was decided to carry-out systematic surface survey and collection programme at both Dholi Mangari and Maharaja Ki Kheri in order to understand the occupational or chronological sequence at the two sites as well as to understand the relationship between the two sites in general and how the sites relate to larger archaeological landscape surrounding them. This was done by systematically classifying the ceramics from the two sites and by comparing the ceramic assemblages from these sites with that of excavated sites such as Ahar, Balathal and other important archaeological sites in the region.

2.4.1. Sites Visited during the Preliminary Survey

The following few pages will provide a detailed description of the sites visited during the reconnaissance in the area.

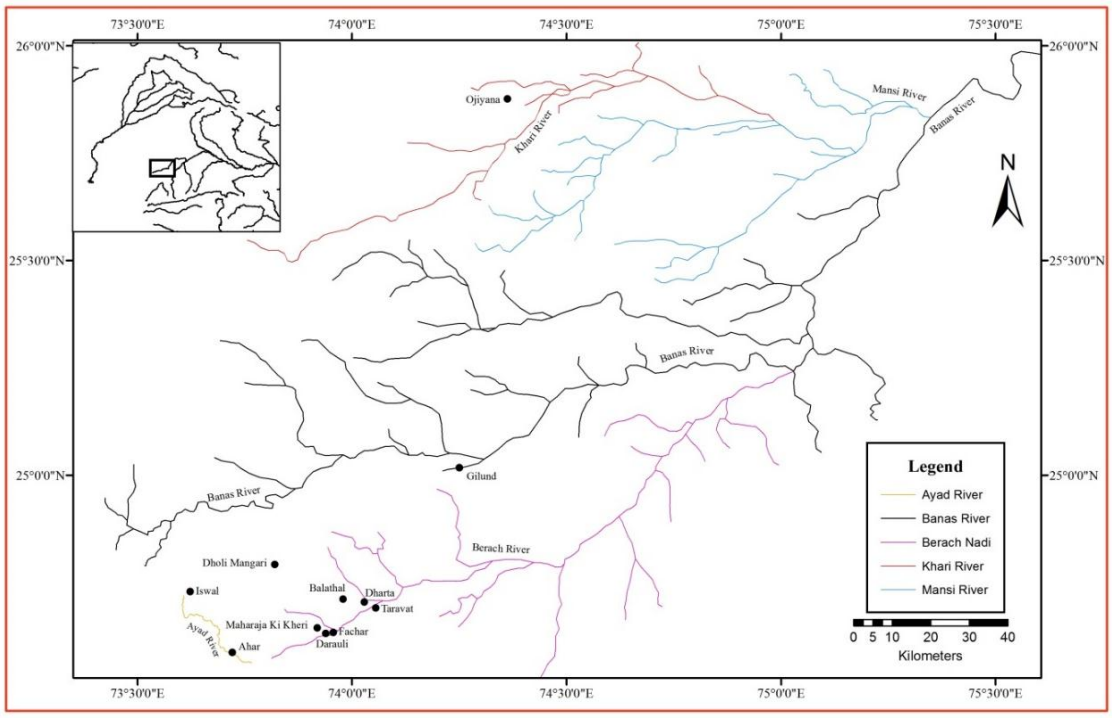

Figure 2.4. Map of the sites visited during the present survey (Courtesy Aadil Zubair).

i). **Tarawat** (24° 41' 25.07"N; 74° 3' 20.58"E)

Figure 2.5. The Archaeological Site of Tarawat (Source: Google Earth)

The site of Tarawat is located 47 km northeast of Ahar and about 10 km southeast of the archaeological site of Balathal. The site is located on the right bank of a tributary of the

Berach River and is at present completely inhabited by the modern day village.

Figure 2.6. The walls of a modern day house and a temple at the site

The site was surveyed as a part of a larger ongoing survey of Rajasthan and Malwa in the 1960's by the Archaeological Survey of India. The site was reported to have yielded evidence of "microliths, Black and Red ware and associated pottery together" (*IAR 1956-57*:8). However, the site has been referred to as an agricultural settlement which could have acted as a satellite for Balathal in the past for the exchange of agricultural and craft products in the past (Dibyopama 2010: 53). When we visited the site however we found that a large portion of the archaeological mound/site was under modern village occupation. One could see ample evidence of the raw material freely lying around which could be fashioned into microliths but the microliths and pottery which was reported years back had long vanished. The mound has been cut significantly into and now houses a temple on the top it. It also has water plant machinery at the top. The raw material that was earlier mentioned now finds place in the walls of the houses which are essentially made of stone.

ii). **Dharta** (24° 43’ 10.44”N, 74° 01’ 42.84”E)

The site is located at a distance of about 36 km to the northeast of Ahar and about 5 km to the east of Balathal. The site is located at the bank of a small tributary of Berach River in Mavli tehsil of Udaipur District.

Figure 2.7. The Archaeological site of Dharta (Source: Google Earth)

It is an unprotected site which was excavated approximately four years ago by the State Archaeology Department of Rajasthan, in order to ascertain its occupational sequence and to establish its relationship with the larger Ahar Banas cultural complex. The modern village of Dharta is perched on the top of the mound, which has been cut in the middle by a road running across the village. A large portion of the mound has been destroyed and converted into agricultural land for cultivation. During the present survey we were able to talk to the sarpanch of the village who informed us that while ploughing the fields during the sowing season a number of pots and potsherds were discovered on the surface by the farmers and the information was passed on to the concerned authorities from the State Department of Archaeology, who, after doing a preliminary survey of the site decided conduct small scale excavations at the site by putting up some trial trenches. However, the excavation report for the site remains unpublished and there has been no mention of the material culture from the site, except for some passing references in *IAR* and other

reports. The portion of the mound which lies untouched is vegetated with small trees and shrubs with a sparse scatter of potsherds across the surface.

Figure 2.8. The archaeological mound of Dharta

iii). **Iswal** (24° 43´45.1´´ N, 073° 37´ 16.4 E)

Figure 2.9. The archaeological site of Iswal (Source: Google Earth)

The archaeological site of Iswal is located about 20 km north-west of Udaipur city on the Udaipur-Jodhpur state highway. The site is located to the southwest of the present day village and is spread over an area of about one square km comprising of two mounds on the eastern side and a sparse habitation in the form of some houses and a medieval Vishnu temple on the western side. During the present survey in the area, it was slightly difficult to locate the site, however, the information obtained from the locals of the village helped the researcher to locate the site and the areas which were excavated. The site was explored and excavated by Lalit Pandey of Institute of Rajasthan Studies-Sahitya Sansthan and his team over several seasons during which a series of trenches were laid in different parts of the site. The excavations at the site revealed various structures and archaeological features, suggesting that the site was an iron smelting center as is attested by the recovery of iron smelting furnaces, artefacts and tuyeres from the trenches. The excavations at the site had also provided the dates for the earliest settlement at the site at around 2973 years BP (Pandey 2009). During the subsequent excavations at the site, an attempt was made to establish the cultural and ceramic sequence at the site which revealed the strata belonging to the Early Historic and Early Medieval periods containing ceramics, coins, bangles, copper ring, and two sealings and other structures. On the basis

Figure 2.10. Exposed structure at the site

Figure 2.11. A heap of iron slag at Iswal

of the material recovered from the site, the Early Historic and Early medieval levels have been tentatively dated from 3rd century to 5th century CE and 7th-8th century CE respectively (Pandey 2009; Pandey et al. 2009: 58-64).

During the present survey, it was found that the site is fairly preserved without any encroachments or other disturbances with pieces of iron slag scattered all over the surface in dense clusters along with sparse concentration of potsherds of Red Ware with coarse fabric and highly abraded surfaces (probably tuyere fragments). It was also observed that the excavation trenches have been left open and the structures exposed, which are usually backfilled after the excavations and it reflects the lack of professional excavation skills on their part.

2.5. Disappearing Archaeological sites in the Area

During the preliminary survey in the study area, an attempt was made to revisit and document all the previously reported sites. However, it appeared that there are various lacunas or errors in the published reports regarding the location of the archaeological sites. The lack of precise locational details created a lot of problems while looking out for the sites within the larger landscape as there are various villages with similar names which makes it very difficult to identify and locate the actual places of interest. As a result, some of the sites were not located during the present survey. Secondly, it is imperative to mention that the landscape in the area has been heavily modified or transformed over the last two to three decades owing to rapidly increasing population and urbanization. A large number of archaeological sites in the area have been destroyed or are in a very poor condition. Many of the sites were found to be completely obliterated or erased and turned into agricultural lands or are layered with modern day habitations. All these factors are contributing to the rapid disappearance of archaeological sites in the area under study and in the larger landscape as well. Most of the previously explored and excavated sites in the area are on the verge of being getting completely destroyed in the near future, except for a few sites which are still somehow better preserved.

The archaeological site of Darauli, which was located by K.N.Puri of the Archaeological Survey of India during the 1950's and has been reported as containing the deposits of

Black and Red Ware (*IAR 1956-57*: 8) and has been often included in the list of the archaeological sites in the area by several people in their works. During the present survey, it was however, not possible to locate the site at all. Several attempts were made to enquire from the local people to find the whereabouts of the site, but they were not able to point us in the right direction. Same was the case with some other sites such as Joeera, Bedla and Gadariawas, which the researcher was unable to locate because of the inaccuracies or flaws in the reportage of these sites. Another factor which contributed to the problem of locating the sites was the attitude of the local people, who at times felt very reluctant to pass on the information to an outsider regarding the presence of archaeological remains in their locality and tended to misguide the surveyor with wrong directions. However, in some cases, the information derived from the local people proved very useful for reaching sites which are located away from the main habitation or have been destroyed or erased in the recent past for which the site of Fachar provides a perfect example. The site had been reported during the 1950's as containing microliths and Black and Red Ware pottery. The locals from the village provided valuable information about the location of the mound and confirmed of it being surveyed by people in the past, however, the mound has been completely erased and leveled over the last two decades and the area has been inhabited by people, removing all the evidences of the past settlement. The famous archaeological site of Balathal is also facing the problems of rapidly increasing urbanization. Although, a protected site, the mound has been destroyed considerably, leaving a small portion of it intact.

The preliminary survey demonstrated that there are several flaws and inaccuracies in the previously published reported regarding the location of the sites in the area as the geo-spatial coordinates are hardly provided. Further, the lack of systematic archaeological surveys and inadequate reportage of the material culture (ceramics) from the sites hinders our understanding of the proper archaeological landscape of the area. The archaeological work, both explorations and excavations carried out in the area over the last six or seven decades had mainly focused on locating and excavating sites containing the deposits from Chalcolithic period and in a few cases with deposits from Early Historic levels. There are hardly any sites in the area belonging to later (Early Medieval and Medieval) periods which have been excavated or explored. Same is the case with the ceramic studies done

by people for different excavated sites in the area. Almost all of the works discussing the pottery from the area mainly discuss the ceramics recovered from the Chalcolithic and Early Historic phases from different excavated sites. Pottery belonging to the later periods had been completely neglected by these researchers, except for a few passing references about the occurrence of pottery belonging to later periods at the sites. This obsession with the chalcolithic archaeology of the region has produced a very biased picture of the regions occupational history, with the later periods being neglected altogether.

2.6. Conclusion

During the survey it was realized that the region needs to be intensively surveyed and efforts are to be made to locate and document the archaeological sites across the landscape in a more systematic and detailed manner, which will help in better understanding the archaeological settlement patterns in the region as well as to salvage as many archaeological sites as possible from being getting destroyed forever in the near future. The preliminary survey in the area was mainly aimed at revisiting the previously reported archaeological sites in the area in order to generate more information and details about the sites which are missing from the published reports as well as to locate a site conducive for conducting a systematic archaeological surface survey and the material culture of which can be studied and analyzed. During the course of the survey, many sites which are reported as containing rich archaeological deposits were visited and some of these were found completely transformed or destroyed mainly because of the cultural factors such as urbanization and demand for agricultural lands. However, two of the sites visited, Dholi Mangari and Maharaja Ki Kheri were chosen for the systematic surface surveys to be carried at owing to their archaeological potential as well as the need to document the sites before they too disappear like many others have in the recent past. The following chapters of the thesis will discuss the results of the systematic surface surveys carried out at the two sites with a detailed description about the methodology employed and the analysis of ceramics collected during the survey.

Chapter Three

Systematic Surface Survey at Dholi Mangari: Methodology and Results

Introduction

The chapter focuses on the second phase of a multi-seasonal systematic archaeological survey programme, which was carried-out in the month of November 2014. During this phase of the survey project, a systematic surface survey and collection strategy was adopted to study and understand the archaeological site of Dholi Mangari and its surroundings in a detailed manner. The chapter gives a detailed overview of the site environs, survey methodology and sampling techniques along with the methods adopted for collecting archaeological material during the survey. The second part of the chapter is dedicated to methods used to classify and analyze the ceramics collected during the surface survey at Dholi Mangari in order to gain a comprehensive understanding about various types of ceramics present at the site.

3.1 Introducing the Site

The archaeological site of Dholi Mangari (24°47.482´N, 73°49.218´E) is located in tehsil Mavli of Udaipur district Rajasthan. It is located at a distance of about 43 km north of Udaipur city and 23 km by road from the tehsil headquarters of Mavli towards the west. The site lies close to the small town of Ghasa Khedi and can be reached via a metaled road. The archaeological mound of at Dholi Mangari is located to the southwest of the present day village and measures c. 230 m (NS) x 270 m (EW) with an elevation of around 5-6 m above the surrounding areas, however, the topography of the mound is not uniform, but undulating. The mound is completely uninhabited except for a temple which is perched at the top of the mound. The surface of the mound is covered by thorny bushes and shrubs in patches as well as by *kikar (Acacia karoo)* trees, which cover certain parts of the mound. The mound is strewn with quartzite fragments, which may have been quarried while digging the foundations for the construction of the temple. The archaeological potential of the site was realized in 2010 when a portion of the mound was removed by a JCB in order to make space for the construction of a temple. The residents

of the village promptly informed the concerned authorities regarding the potsherds and bones which were coming out of the mound during the process of soil removal. A team from the State Department of Archaeology Rajasthan visited the site and prevented further damage to the site by stopping the soil removing process. They also collected pottery samples from the surface of the site, however, the site was never surveyed or reported properly beyond catching the headlines of few local newspapers and still remains unprotected. The following are two Google earth maps of the site which show how the mound looked like before it was cut as well as how much of the mound has transformed after a small chunk of it was bulldozed off in 2010.

Figure 3.1. The mound of Dholi Mangari, tehsil Mavli, Udaipur in 2006, courtesy Google Earth.

The portion of the mound was actually removed in order to build a temple at the site, however, because of the timely intervention by the concerned authorities from the State Archaeology department, the construction work was stopped and the time was shifted to an empty space in front of the mound. Apart from this cutting, a small pathway and a few steps leading to the temple on the top of the mound have been constructed by cutting across mound along its northern edges. Other than that, a small drain or sewer carrying

the sewage from the temple flows down the mound. Rest of the mound is fairly preserved without any kind of damage to it either from natural or cultural factors, despite being located in the midst of agricultural fields.

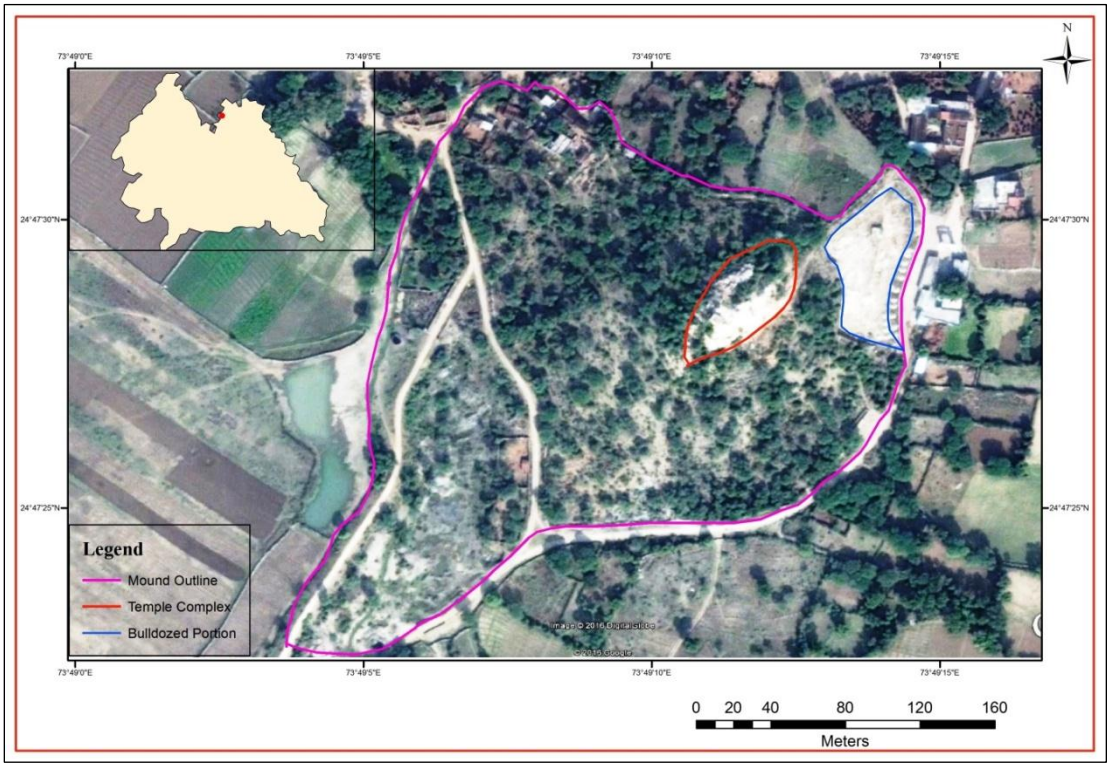

Figure 3.2. The site of Dholi Mangari, tehsil Mavli, Udaipur, 2016, courtesy Aadil Zubair.

The sections of the mound which were exposed in 2010 by the cuttings made into the mound reveal an interesting stratigraphy, which is very helpful to get an idea about the occupational sequence at the site as well as the geological formation of the mound.

Figure 3.3. The portion of the mound removed for the construction of a temple at Dholi Mangari.

One of the exposed sections of the mound facing east is about 6 m high from the surrounding areas of which the first two meters from the bottom consist of solid quartzite rock formations and at approximately 2.5 m above the rock formation, the strata contain archaeological assemblages in the form of potsherds, bones and ashy lenses alongwith fragments of quartzite and small pebbles. During the recce, it was observed that the potsherd scatter across the surface was mainly concentrated towards the exposed or disturbed areas at and around the mound, whereas, rest of the areas had a very sparse or thin scatter of pottery. Since, the rest of the mound is fairly preserved and has never been dug up or tempered with, potsherds and other archaeological material which comes up to the surface as a result of such activities is very scanty in these areas. Further, while interacting with the residents of the village, we were informed that the material

Figure 3.4. Exposed section of the mound at Dholi Mangari

which was removed by cutting off the mound was dumped into agricultural fields and also used to fill up some of the depressions or swampy areas near the mound. As mentioned earlier that the mound is vegetated with thick grasses and bushes, it is also used by the local shepherds as a pasture for the grazing their animals.

3.2. Systematic Archaeological survey at Dholi Mangari

The archaeological site Dholi Mangari as stated earlier is an unreported site and has never witnessed any kind of archaeological investigations prior to the present survey. Taking this fact into consideration, a reconnaissance survey was carried out at the site during which the site and the areas surrounding it were investigated and grab samples of pottery scattered on the surface were collected. The idea was to acquaint or familiarize oneself with the morphology of the site and the material culture spread across its surface. After an analysis of the pottery samples collected during the recce, it was decided to study the archaeological site in a more systematic and detailed manner by means of a systematic surface survey and collection programme. There are several important archaeological sites in the area such as Ahar, Balathal, Gilund, Ojhiyana and some others, which have received larger attention from the archaeologists and researchers and have been excavated several times. However, the area has never witnessed any systematic surface surfaces in the past. The archaeological site of Dholi Mangari provided an ideal scenario for carrying out a systematic surface survey owing to its well preserved archaeological record and also to generate new datasets for accessing the archaeological potential of the site and its placement in the larger archaeological landscape in the region.

3.2.1. Aims and objectives of the survey

The main purpose of any archaeological fieldwork is to generate new information for which the projects are carefully designed to achieve or fulfill specific aims and objectives. Banning (2002: 27) points out that the results of any archaeological survey are directly dependent upon the objectives or goals of the project as well as the survey design. The survey design calls for a thoughtful and careful planning as it justifies or has a direct bearing on the survey methodology and results (Hester et al. 2009: 21). The systematic survey and collection programme at the archaeological site of Dholi Mangari

was designed and executed in order to study and understand the surface archaeology of the site in a comprehensive and detailed manner. The survey programme was aimed at:

a) Establishing and demarcating the spatial extant of the site on the basis of ceramic scatter across its surface and in the surrounding areas.

b) To study and understand the surface archaeology of the site by systematic documentation and analysis of the material scattered across its surface.

c) To systematically collect a substantial sample of the material (ceramics) scattered across the surface of the site for further analysis and to get a tentative idea of the relative chronological sequence of the site.

d) To try and establish between Dholi Mangari and other important archaeological sites in the area on the basis of the archaeological material present at the sites.

3.2.1 Sampling Strategies and Survey Methodology

Sampling is generally done to generate information about a large area or a part of it (Read 1987: 47) and the sampling strategies adopted by any survey project are generally interceded by a number of important factors and the objectives of the project. Sampling techniques are also used to generate a representative or statistically valid characterization of a large site or an area. Archaeologists generally draw inferences about the past on the basis of samples as it is not always possible to recover and study all the materials present at a site or in a region (Hester et al. 2009: 25). However, the sampling strategies should be devised carefully in order to reduce any chances of bias and also should be kept flexible or in accordance with the on-field conditions. There are many factors which can considerably affect the detection and documentation of archaeological material while surveying and in turn can affect the strategies and results of any survey programme. The most important of these factors are visibility, obtrusiveness, resolution, coverage, accessibility, sampling units and so forth (Banning 2002: 39-40; Hester et al. 2009: 46-50). Surveys are usually carried out by walking across the landscape and scouting the surface for archaeological remains and it sometimes becomes very difficult for the

surveyors to detect artefacts with unaided or naked eyes owing to poor visibility or resolution. A careful consideration of all these factors that affect the detection of archaeological material is crucial for successful execution of a survey and its effectiveness. Taking all these factors into consideration, a careful survey strategy was designed or devised in order to maximize or optimize the detectability of the archaeological material scattered across the surface. The entire mound of Dholi Mangari was at first explored to mark-out the areas which were feasible for carrying out the survey and where surface collections can be made. There were certain portions of the mound which were densely vegetated and covered by thick grasses and bushes with limited accessibility, making it very difficult to survey these areas. The vegetative cover turned out to be a major deterrent and obscured the archaeological remains. These portions of the mound were strewn with huge quartzite boulders and were bereft of any potsherd scatter. Hence, it was decided to focus the survey on the eastern part of the mound, which provided better accessibility and covered the areas where pottery scatters were mainly found. The survey area was marked with the help of GPS units taken at various points across it and a base map of the area to be surveyed was accordingly prepared.

There are several important factors which determine the configuration of the sampling units for surveys such as the topographical conditions, land accessibility, time and resources available and is generally conditioned by the objectives of the project. Generally, archaeologists make use of sampling units such as quadrats and transects for carrying out surveys depending upon the nature of observations one wishes to make with limited resources and time limits of the fieldwork (Hester et al. 2009: 34). Taking into consideration the topography of the mound, it was decided to use transects instead of the grid or quadrat method for surveying the site as it was relatively easier for the small survey team to put a series of contiguous transects across the site rather than gridding it . The survey team, apart from myself comprised of 3 research students[1] from Jawaharlal Nehru University, New Delhi, who volunteered for the survey.

[1] The crew members were Laminthang Simte, Prerana Srimaal and Shreyanjana Bahattacherjee.

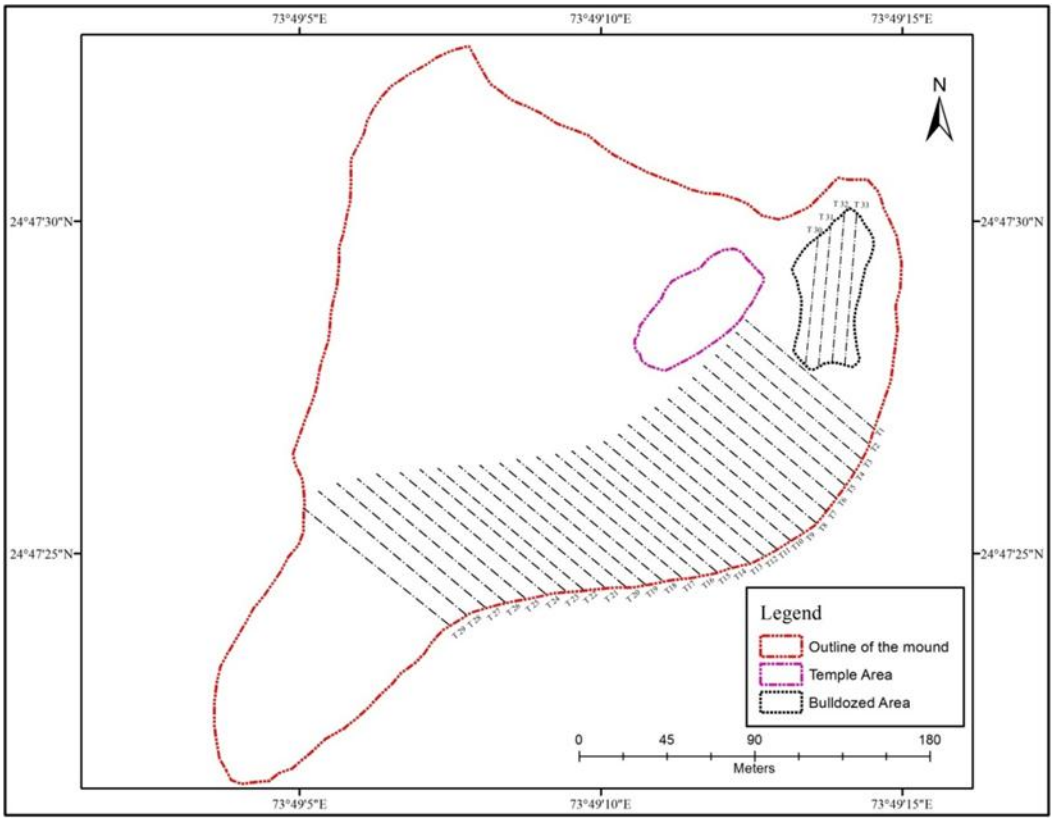

Figure 3.5. Map showing the survey area and the placement of transects across it (Courtesy Aadil Zubair)

The aim was to intensively survey as much of the mound as possible and to collect a ceramic sample large enough to fulfill the aims of the project. In the process, a total of 33 transects were laid out across the survey area and were numbered accordingly. The transects were separated by a distance of 5 m apart from each other and were 70 m long, however, in some cases the length varied. Transects 1 to 29 were placed NE/SW orientation and transects 30-33 were placed in N/S direction as can be seen in Figure 3. 5. The rationale behind the placement of transects in different orientation was that the transects numbering 1-29 covered the mounded portions of the site, whereas, transects30-33 covered the areas which as a result of soil removal were undulated and full of ditches or depressions with huge pieces of rock scattered across the surface and covered by a sparse vegetation.

Figure 3.6. The slope of the mound littered with fragments of rock and potsherds at Dholi Mangari.

The transects placed across the survey area were intensively surveyed by the crew members while maintaining an equal distance between themselves. In the process an attempt was made to collect all the artefacts (ceramics) encountered from each individual transect. Because of a very sparse concentration of ceramics at the site, it was decided to adopt a total collection strategy where all the potsherds found across the survey area were collected and bagged for further analysis. All the artefacts collected during the survey were bagged and labelled for each individual transect separately. Apart from that a detailed documentation of the material scattered along every individual transect was done. It should be mentioned here that the length of the transects was kept flexible owing to the undulated terrain where at times it was not possible to survey a transect to its full length. In some cases, certain portions of the transects were covered by thick and dense vegetation and were completely inaccessible to the surveyors making it very difficult to systematically survey them. A detailed description about the topography, vegetation and other landscape elements encountered during the survey at the site were also recorded.

3.2.2. Exposed sections of the mound: an observation

As has been already mentioned in the chapter that a large chunk of the mound at Dholi Mangari was removed using a bulldozer in the year 2010 for the constructional purposes and in the process a large section of the mound got exposed revealing an interesting stratigraphy. The exposed sections of the mound are not uniformly cut and owing to the undulating topography of the mound bear different elevation profiles.

Figure 3.7. Exposed section of the mound at Dholi Mangari.

During the survey at the site, an attempt was made to clear a section and to draw the profile, however, after repeated attempts it was not possible to do so owing to the fragile and crumbly nature of it. Hence, it was decided that instead of drawing the profiles of the sections, they were photographed and the stratigraphy of each exposed section was recorded in a detailed manner. Three exposed portions of the mound with varying elevations were taken up for the study, which are as following:

1) **Section facing North:** The height of the exposed section is 2.60 meters and the layers containing cultural material start at 1.35 m from the bottom and end at 2.5

m. These layers contained potsherds and with a few fragments of desiccated bone. The bottom most layers in the section contains large fragments of quartzite and the top most layers are very loose soil devoid of any cultural material.

2) **Section facing North-East:** The height of the section is 3.2 meters above the surrounding areas and the layers containing cultural material in the form of pottery and bone fragments start at 2 meters from the below.

3) **Section facing East:** This is the highest of the three sections with an elevation of 4.9 meters above the surrounding areas. The strata containing pottery and other cultural material start appearing at 1.80 meters capped by a thin layers of pebbles/cobblers and ashy lenses at 2.70 meters. A number of vitrified/burnt potsherds and charcoal pieces were found sticking out of the section.

As is apparent from the above description that the layers with potsherds, charcoal, bones or ashy lenses are not continuous and neither are they situated in the same layer or at the same height in the three sections. Here one can begin by pointing out that archaeologists work with the law of superposition when they study stratigraphy of a site based on the premises that under most conditions, the oldest layers are on the bottom and the youngest at the top. "A sequence of events, physical and or cultural, producing the layers is represented by the changes from the bottom to top. The possibility of 'reverse stratigraphy also needs to be taken into account where normal stratigraphic processes might be disrupted by digging of storage pits or graves, animal burrowing and so forth and one has to be very cautious while studying the stratigraphic sequence at a site" (Hester et al. 2009: 238). So if one adheres to the above stated definitions, then one can perhaps speculate that what we see in the exposed sections of the mound of Dholi Mangari might be an indication of reverse or lateral stratigraphy. This will explain why one finds potsherds between layers of quartzite and marble stones. It will perhaps also explain the ashy lens with bones in them as they might have been part of a pit which was closed by constructing a stone floor above it to perhaps cap it. But let me be very clear that this is purely assumption or a hypotheses that one is playing

with and unless the remaining portion of the mound is excavated and supporting evidence is unearthed these thoughts will remain a mere speculation

3.3. The Ceramic sample

In order to undertake a proper ceramic study, which will in turn lead to an understanding of ceramics from any given archaeological site or region, Sinopoli (1993: 1) believes that a ceramic sample representative of the whole archaeological site or region is of uttermost importance and the most basic requirement. She further emphasizes the need for a systematic sampling strategy for the collection a large ceramic sample which then needs to be classified keeping in mind the aims and objectives of the study. As mentioned in the earlier portion of this chapter a systematic surface survey focused on collecting a ceramic sample representative of the site was undertaken. Here it is prudent to mention that the word 'large' cannot be associated with the ceramic sample collected from the site of Dholi Mangari. Because of a very less density of ceramics scattered at the surface, an attempt was made to collection as many sherds as possible across the survey area, but in a systematic manner for further analysis and to extract information regarding the chronological sequence at the site as well as to document the types and sub-types of ceramics present at the site.

3.3.1. Ceramic Classification and Documentation

Artefact classification is a cornerstone or forms an integral part of archaeology as a discipline. It is the initial means to organize and break down the data generated into more manageable units in order to derive maximum information out of it (Sinopoli 1991: 43). In simpler terms, classification brings an order to the data, defines variability and establishes the relationships between the groups (Rice 1987: 274). It is a process of arranging data into groups on the basis of variable attributes or any observable traits that can be defined. Following this maxim, the pottery collected from Dholi Mangari underwent a multi-stage classificatory process in order to breakdown the ceramic corpus into more manageable units and to derive maximum information out of it.

3.3.1.1. Cleaning and preliminary organization of the ceramics

The pottery collected from each individual transect had been bagged and labelled separately in the field itself. This was done in order to facilitate the organization of data in to manageable units. The ceramics were transported to Delhi and then cleaned off the dirt and encrustations by soaking the sherds in water and rubbing the surfaces with a soft brush. The sherds were then kept out in the sunlight so as to dry them. It was noticed that several potsherds despite being soaked for long in water and then gently brushed with soft brushes continued to retain a white layer on the surfaces of the sherds. The reason behind the white encrustation found on several sherds is not clear, though one can make assume that this might be the result of the alkaline property of the soil at the site. The salts from the soil might have leached or reacted with the sherds thus, forming a white layer that cannot be removed by a simple soaking and brushing routine. After cleaning and drying the potsherds, they were they were initially separated into types and were marked by assigning a sequential number to each individual sherd. The potsherds from Dholi Mangari were classified on the basis of both qualitative and quantitative variables. The initial sorting was done intitutively on the basis of what could be observed by an unaided eye. "The most prevalent and in many cases the most successful approach to ceramic typology used in archaeology is intuitive typology. By intuitive typology the reference is to the common practice of laying out sherds on a table and sorting them in piles of more or less similar sherds. Although definite criteria are used in this sorting, they are seldom made explicit during the sorting process. The sorting criteria are sometime defined in retrospect as the analyst tries to characterize every pile" (Sinopoli 1991: 50). Initially the sherds were sorted in to three broad categories i.e. Diagnostic (Rims and Bases), Non-Diagnostic (Body sherds) and decorated sherds. Then to further document attributes such as fabric, surface treatment, firing characteristics and so forth of the sherds were examined individually and the information was put in the ceramic recording forms. Efforts were made to derive the maximum information possible from the analysis by recording as many attributes as possible for every individual potsherd and the observations were duly noted down or documented on printed recording forms. The initial sorting of ceramics into different types helped to organize the data in a systematic

manner and also to identify different types of ceramics present in the assemblage; which in turn proved useful to develop a ceramic typology for the site.

3.3.1.2. Attributes recorded

Ceramic analysis considers a number of attributes that correspond to variations in vessel morphology, manufacturing and decorative techniques and the metric data. Attributes are characterized as any observable trait that can be defined and isolated. It is not always possible to study all the attributes of an object, but certain attributes pertaining to the aims and objectives of a particular research problem are chosen (Rice 1987: 284). The attributes recorded for the ceramics (both diagnostic and non-diagnostic sherds) from Dholi Mangari included identifying the fabric, surface treatment, firing condition, colour, temper (inclusions in clay), surface feel and other attributes such as scraping or trimming marks (manufacturing marks). Surface treatment of both the exterior and interior surface was also recorded such as the presence or absence of slips, wash, feel and texture and so forth. A distinction was made between polished and burnished on the basis of whether the sherds had glossy surface or had high and consistent sheen on them. On the basis of surface treatment and feel, the sherds were divided into abrasive, rough, powdery, and smooth categories. The firing characteristics of the shreds were examined and a note made of whether it is oxidized, reduced or exhibit defects in firing technique. Apart from that every individual sherd was counted, weighed and documented using recording sheets. In case of the diagnostic sherds, certain additional morphometric attributes were also recorded such as orifice and base diameters. The orifice diameters and internal height of the rim sherds and diameters and for the base sherds were determined using a rim diameter chart and a manual calipers respectively. Apart from that the morphological attributes such as vessel form or shape and rim type were also determined and recorded. For the decorated sherds, apart from the above mentioned attributes, designs or decorative elements present on the surface of the sherds were taken note of. The diagnostic sherds were also systematically drawn and digitized, however, the decorated sherds were not drawn, but photographed.

3.3.2. Categorization of ceramics into ware types

The ceramic assemblage from Dholi Mangari was divided into different ware types or categories on the basis of the attributes or variables recorded during the classificatory process, especially the surface treatment and the condition of the core. The ceramics (diagnostic and non-diagnostic) were first grouped into oxidized and reduced categories and were represented by codes 'O' and 'R' respectively on the basis of the condition of the core. Similarly, on the basis of the surface treatment, the sherds were grouped into unslipped, slipped and burnished categories and were coded as 1, 2 and 3 respectively. Apart from that the sherds were classified on the fabric and the percentage of the inclusions in the clay body into fine, medium and coarse varieties and were assigned letters F, M, and C. The coding scheme devised during the process helped to document of ceramics in a better and easy manner and so helped to group the ceramics into various types or ware categories. The devised codes were used for both diagnostic and non-diagnostic sherds. The following table will make it easy to understand the coding scheme used for categorizing the ceramics into different ware types.

Core	Oxidized	O
	Reduced	R
Surface Treatment	Unslipped	1
	Slipped	2
	Burnished	3
Fabric	Fine	F
	Medium	M
	Coarse	C

Table 3.1. Codes used for classifying ceramics

On the basis of the above mentioned attributes, the entire ceramic assemblage from Dholi Mangari was divided into the following ware categories:

1. **Red Ware (Oxidized):** the ceramics belonging to this category were further classified into:

    a) Unslipped Red Ware with medium fabric (O1M)

    b) Slipped Red Ware with medium fabric (O2M)

    c) Burnished Red Ware with medium fabric (O3M)

    d) Unslipped Red Ware with coarse fabric (O1C)

    e) Slipped Red Ware with coarse fabric (O2C)

    f) Slipped Red Ware with fine Fabric (O2F)

2. **Reduced Ware:** Ceramics placed under this category comprises mainly of different varieties of Grey Ware, which on the basis of distinct variables have been categorized into:

    a) Unslipped Grey Ware with medium fabric (R1M)

    b) Slipped Grey Ware with medium fabric (R2M)

    c) Burnished or Polished Grey Ware with medium fabric (R3M)

    d) Unslipped Grey Ware with coarse fabric (R1C)

    e) Slipped Grey Ware with coarse fabric (R2C)

3. **Black and Red Ware (BRW):** The ceramic type is generally characterized by a red slip on the exterior surface and a black slip on the interior surface, which is the result of inverted firing process. The pottery is generally of fine fabric and occurs in both plain and painted varieties with paintings usually in white on the black surface comprising of geometric designs such as straight and wavy lines, dashes and concentric arcs (Sarkar and

Shinde 2011: 64). The pottery is generally wheel made and the major vessel types include bowls and dishes with convex and carinated profiles and knife-edged rims (Shah 2001: 1; Sarkar and Shinde 2011: 64). The ceramic assemblage collected during the survey at Dholi Mangari consists of a few sherds of plain BRW with fine fabric and are placed under O3F/R3F category. These sherds are devoid of any decorations and have highly burnished or polished surfaces.

3.3.2.1. Categorization of diagnostic ceramics into vessel forms

As a part of the classificatory process, the formal or morphometric attributes of the diagnostic sherds were taken into consideration in addition to technological and stylistic attributes. Formal attributes refer to the overall shape of a vessel and its constituent parts. These attributes are commonly used in ceramic studies to describe the shape of a vessel, its measurable dimensions and other components (Mishra 2008: 45) and are used to define types. The diagnostic assemblage was first divided into rims, bases and other appendages after which the metric attributes of the sherds were determined by measuring the rim and base diameters of the sherds, the details of which were documented. However, in archaeological contexts and especially from surface surveys, rarely are complete vessels found to indicate form or shape, but in fragmented form. Majority of the sherds collected during the present survey were highly fragmented with a number of sherds of which the rim diameters were not possible to determine. The profiles of the diagnostic sherds were drawn and digitized in order to get a clear idea of the vessel morphology or form, which in turn helped to devise or create a typology and to distinguish different vessel types as well as to provide some idea of the chronological sequence at the sites. The sherds were characterized into different vessel forms such as jars, pots, bowls, dishes, basins, and so forth and were assigned different codes denoting their form or shape which made the process of classifying and documentation a bit easier. The sherds were also assigned a sherd number. The following table enlists the codes used for denoting various vessel forms during the classification process.

Shape	Code
Jar/Pot	1
Bowl	2
Dish	3
Basin	4
Lid	5
Dish on stand	6
Pot rest	7
Base	8
Knob	9
Indeterminate	10

Table 3.2. Codes used to denote various vessel forms

3.4. Non Diagnostic Ceramic Assemblage from Dholi Mangari

Non-diagnostic sherds usually constitute body sherds which are neither attached to a rim or a base. These sherds can provide a plethora of information if studied and analyzed properly regarding the technological aspects of pottery production such as manufacturing techniques, raw materials used, surface treatment, firing techniques and so forth. However, it entirely depends on the objectives of the classification process whether the body sherds are studied or not.

The non-diagnostic ceramic assemblage from Dholi Mangari can be broadly divided into categories i.e. Red Ware and Grey Ware with medium to coarse fabric. The pottery is generally wheel made, however, a small percentage of handmade sherds also find a place in the assemblage. The pottery (both oxidized and reduced) comprises of slipped,

unslipped and burnished or polished sherds, with medium to coarse fabric. The pottery is usually well-fired with a completely oxidized or reduced core. However, a large quantity of sherds exhibit defects or deficiencies in the firing technique. The site shows high levels of potsherds with burnt core present in the assemblage. The burnt core ranges from being thin band in the core to almost the entire core being black or grey. The majority of the oxidized sherds show visible inclusions such as mica and sand along with chaff that are either naturally present or were deliberately added as tempering agents to clay. Potsherds have high levels of white grit present in them which appears to be small pieces of white material or substance being crushed and mixed with the clay as a tempering agent. Ninety percent of the sherds exhibit varying levels of inclusions in the clay body providing them with high levels of porosity. Inclusions are present in sherds belonging to both oxidized and reduced categories. A large number of sherds are also treated with a micaceous wash which gives them a lustrous appearance. The 33 transects surveyed yielded a total of 206 non diagnostic sherds, which were classified and analyzed and were divided into different types on the basis of certain attributes or traits they possess. The analysis of the non-diagnostic pottery from the site shows that the Oxidized or Red Ware dominates the ceramic sample at the site with 197 (95.63%) sherds followed by sherds belonging to Reduced or Grey Ware category with 12 (5.8%) sherds. The following chart and the corresponding table shows the percentage of different non-diagnostic ware types recovered from the site during the survey.

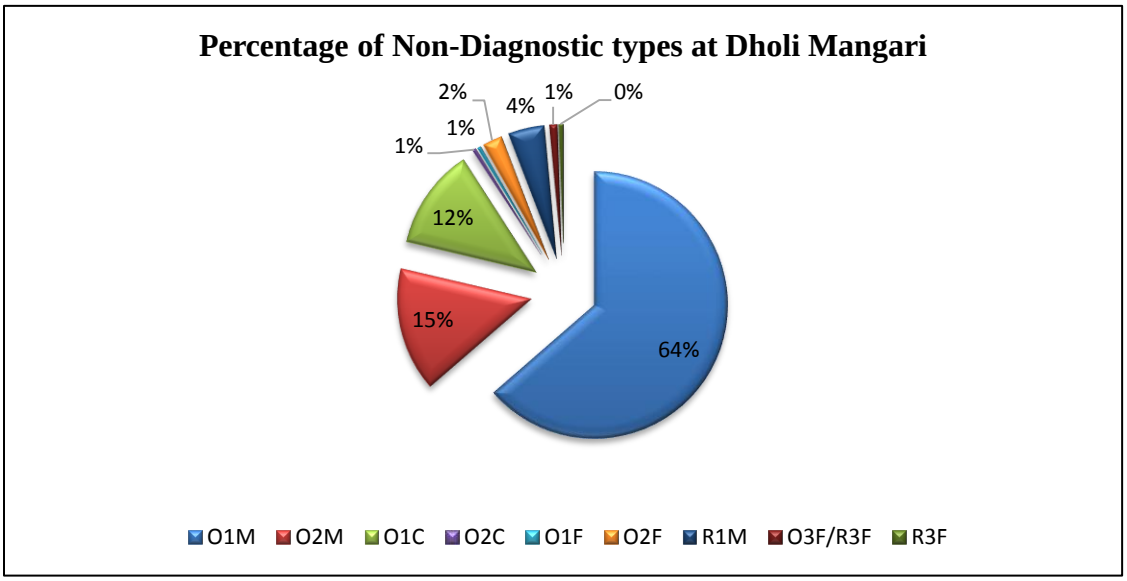

Figure 3.8. Percentage of Non-diagnostic ware types from Dholi Mangari

The Unslipped Red Ware of medium fabric (O1M) dominates the non-diagnostic assemblage with 131 sherds. The data on spatial distribution and density of different ware types in the 33 transects surveyed has been put in the form of a table and is attached at the end as an appendix.

Type	Number of Non Diagnostic sherds	Grand Total	Percentage
O1M	131	206	63.59
O2M	31	206	15.04
O3M	0	206	0
O1C	25	206	12.13
O2C	1	206	0.48

O1F	1	206	0.48
O2F	5	206	2.42
R1C	0	206	0
R3C	0	206	0
R1M	9	206	4.36
R2M	0	206	0
O3F/R3F	2	206	0.97
R3F	1	206	0.48

Table 3.3. Count and percentage of Non-Diagnostic types from the ceramic assemblage

The non-diagnostic ceramic sample collected from the site during the survey is dominated by sherds with medium to coarse fabric, however, a few sherds with fine fabric belonging to Red Ware and Black and Red Ware with smooth or burnished surfaces are also included.

3.5. Decorated pottery from Dholi Mangari

A very small percentage of sherds collected during the survey at Dholi Mangari bearing different designs or decorative elements were also studied and classified. The decorative or stylistic attributes refer to the embellishment of a pottery vessel in a manner unrelated to the manufacture or function of the vessel (Rice 1987: 144). Generally, decorative treatments are mostly done in two ways: by displacing or penetrating the surface of a vessel and by making additions to the surface (ibid: 144). Majority of the sherds bearing design on their surface are from the non-diagnostic corpus along with a few diagnostic sherds as well. The decorated sherds mainly belong to the Red Ware category with a

single sherd of Grey Ware carrying a design. The sherds contain a variety of designs which can be grouped under the following categories:

3.5.1. Incised: Incised designs are made with a sharp pointed instrument or tools such as reeds, metal wires and so forth. The designs are executed when a vessel is in the wet, leather-hard or dry condition and can be done before and after the application of slip to the surface of a vessel (Rice 1987: 146). Most of the decorated sherds from Dholi Mangari carry geo-metrical and non-geometrical incised designs in the form of zig-zag and wavy lines, grooves, oblique notches or cuts, triangular dents, crisscross, chessboard and diamond patterns, crosses, arches, chevron and also occurs in a combination.

3.5.2. Applique and Incised: this design refers to the application of small shaped pieces of clay to the surface of a vessel and adding decorative inlays (ibid: 148). A number of sherds from Dholi Mangari exhibit this decorative element, which involves the addition of extra clay to the vessel surface and is incised with a sharp object or simply pinched.

3.5.3. Punctured: A very small number of sherds carry this type of design which is made by pricking the wet surface of the pot.

3.5.4. Scored or etched design: The decorative elements include geometrical shapes like triangles, rectangles and squares and are executed by scoring out clay from the surface of a vessel when in leather hard or damp stage.

The decorations mentioned above are found on both oxidized and reduced sherds from Dholi Mangari and are largely executed on the external surface of the vessel. Majority of the sherds from the Oxidized or Red Ware (unslipped and slipped) category are decorated with incised designs alongwith a small percentage of sherds belonging to the Reduced or Grey Ware of medium fabric. Majority of the decorated sherds in the assemblage have worn-out or weathered surfaces alongwith a few sherds the surfaces of which are encrusted. During the analysis it was found that there are no sherds bearing painted designs, graffiti's or stamped decorations in the assemblage. Apart from that a large number of sherds belonging to the Red Ware category have their surfaces treated by a micaceous wash or coating and a small number of sherds having corrugated external

surfaces which has been done by applying additional coating of clay or slurry to the surface of the sherd. Following are photographs of the decorated sherds from Dholi Mangari.

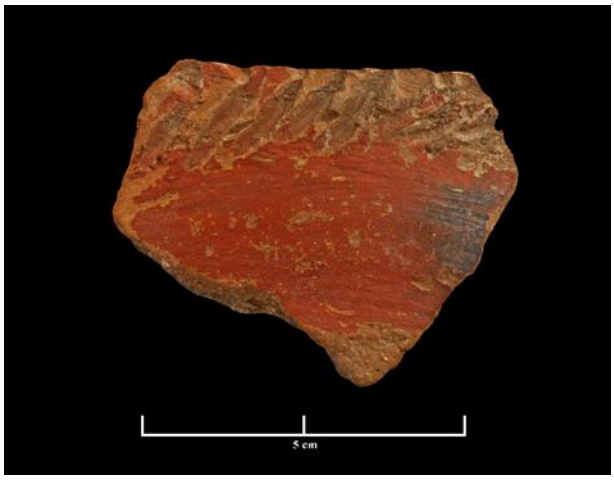

Figure 3.9. DM (a), Applique and Incised design, Dholi Mangari

Figure 3.10. DM (b), Incised Diamond Pattern, Dholi Mangari

Figure 3.11. DM (c), Incised cut design, Dholi Mangari

Figure 3.12. DM (d), Incised design, Dholi Mangari

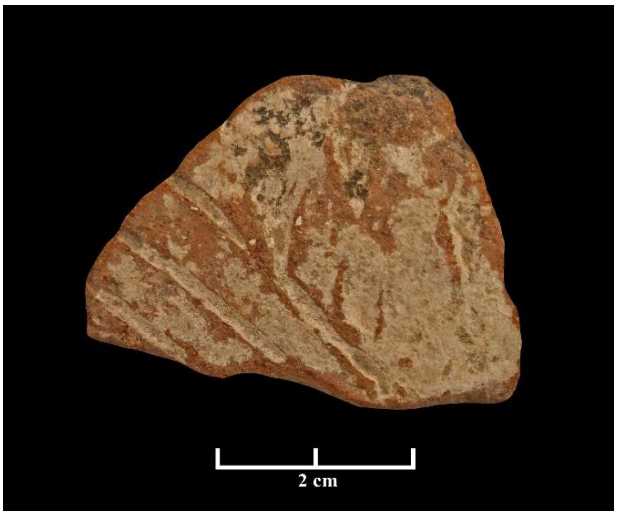

Figure 3.13. DM (e), Incised grooves, Dholi Mangari

Figure 3.14. DM (f), Combination of incised designs, Dholi Mangari

Figure 3.15. DM (g), Applique and cut design, Dholi Mangari

Figure 3.16. DM (h), Applique and Incised design, Dholi Mangari

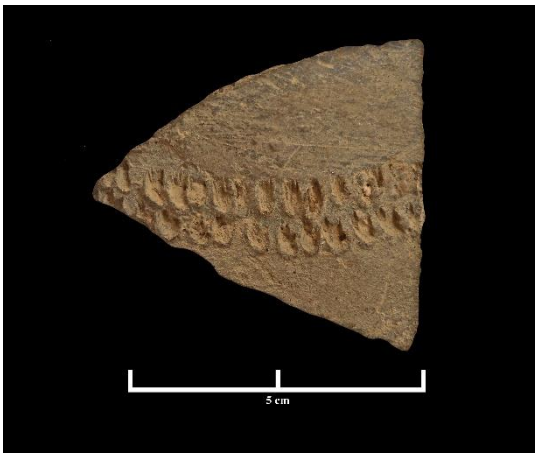

Figure 3.17. DM (I), Scored or Etched design, Dholi Mangari

Figure 3.18. DM (j) Parallel Incised lines, Dholi Mangari

Figure 3.19. DM (k), Combination of Incised designs, Dholi Mangari

Figure 3.20. DM (l), Applique and Impressed design, Dholi Mangari

Figure 3.21. DM (m), Incised wavy design, Dholi Mangari

The following table provides a detailed description of the decorated sherds collected during the survey at Dholi Mangari.

S. No.	Type	Count	Wt. (g)	Description
DM (a)	O2M	1	33	Fragment of Red Ware with slip applied on the exterior, black smudged/fire-cloud on the slipped portion, decorated with a sharp and slanting cut or incised applique band. Similar to D 83 (c) fig. 36 from period I (A) at Ahar (Sankalia et al. 1969 : 77)
DM (b)	O1M	1	10	Fragment of an unslipped Red Ware decorated externally with deep and broadly incised diamond pattern.
DM (c)	O1M	1	13	Fragment of an unslipped Red Ware decorated with small slanting cuts.
DM (d)	O2M	1	16	Fragment of a slipped Red Ware with a sliced design in a square panel capped with deep corrugation. Similar to D 98 (b), fig.41 from period I (A) at Ahar (Sankalia et al. 1969 : 83-84)
DM (e)	O1M	1	13	Fragment of a Red Ware with abraded and encrusted surfaces with an incised design on exterior.
DM (f)	O1M	1	14	Fragment of a coarse unslipped Red ware decorated by a pattern of horizontal zig zag lines.
DM	O1C	1	8	Fragment of an unslipped coarse Red Ware decorated with sharp and slanting cut applique

(g)				band.
DM (h)	O1C	1	6	Fragment of an unslipped coarse Red Ware decorated with a deeply incised diamond with an applique roundel. Similar to D 86 (c) fig. 37 from period I (A) at Ahar (Sankalia et al. 1969 : 78)

Table 3.4. Decorated Pottery from Dholi Mangari

DM(i)	R1M	1	9	Fragment of an unslipped Grey Ware decorated with a design of two rows of scoring marks. Similar to D 141, fig. XCIV from phase C2 at Balathal (Mishra 2008 : 327)
DM (j)	O1M	1	10	Fragment of unslipped Red Ware with incised parallel lines or grooves.
DM (k)	O1M	1	13	Fragment of unslipped Red Ware bearing a combination of incised designs.
DM (l)	O3F	1	16	Fragment of Burnished Red Ware with an applique-impressed design
DM (m)	O1M	1	9	Fragment of unslipped Red Ware with a combination of incised groove and wavy design on exterior.

3.6. Diagnostic ceramic assemblage from Dholi Mangari

The diagnostic sherds which include both rims and bases provide a multitude of information regarding a vessel. The morphological and metric attributes of rim sherds can help in determining the shape and type of a vessel. Orifice diameter, internal height and other formal attributes can help in defining whether the vessel was for the purpose of storage, cooking etc. Further the study of diagnostic pottery is very useful for establishing occupational or chronological sequences of a site or an area by comparing or cross-dating

the ceramics with already established chronological markers or ceramic types from other excavated sites in the area or region and to extrapolate optimum information possible out of the assemblage.

3.6.1. An analysis of the diagnostic pottery from Dholi Mangari

The diagnostic assemblage collected during the survey at Dholi Mangari can be broadly grouped under two categories, i.e. oxidized (Red Ware) and Reduced (Grey Ware).The sherds grouped under these two categories were further divided into various ware types on the basis of the technological and attributes they possess. The diagnostic assemblage from the site is dominated by Red Ware along with a small percentage of Grey Ware and a few sherds of Black and Red Ware. Majority of the diagnostic pottery from both red ware and grey ware are of medium to coarse fabric with both slipped and unslipped varieties, however, a very negligible percentage of sherds are of fine fabric with slipped or burnished surfaces. The pottery is largely wheel made, however, a small percentage of handmade sherds (mainly oxidized) with coarse fabric are also present in the assemblage. Pottery is generally ill-fired or incompletely oxidized with a very small percentage of sherds having a perfectly oxidized or reduced core. A large number of sherds have abraded or worn-out surfaces, probably due to exposure to various natural and cultural factors. During the analysis, it was observed that the commonly used tempering material in the sherds is mica and sand, however, some sherds contained grit or grog and other inclusions such as chaff and husk in their clay body.

The different vessel types or forms in the assemblage can be categorized into jars, pots, bowls, basins, lids, dish-on-stand and so forth and exhibit different attributes and properties, which helps to divide the vessels into distinct types and sub-types. The diagnostic assemblage from the site on the basis of varied attributes can be grouped into different ware categories. The following pages of the chapter will provide a detailed analysis and description of the diagnostic pottery collected during the survey from Dholi Mangari. The pottery has been divided into the following ware types:

a) Unslipped Red Ware (O1M): This ware dominates the ceramic assemblage and consists of sherds with medium and coarse fabric. However, majority of the sherds are of medium fabric with a small percentage of sherds of coarse variety. The vessels belonging to this ceramic group are generally wheel made with a few examples of handmade sherds as well. The sherds are usually devoid of any surface treatment and have abrasive or roughened surfaces. Though in some cases the sherds do have a smooth surfaces and some sherds are treated with a lustrous micaceous wash which gives the sherds a golden hue.

Figure 3.22. Unslipped Red Ware jar with applied micaceous wash

The pottery belonging to this group is generally ill-fired with a few well baked sherds. The tempering material usually consists of mica and sand alongwith chaff, grit and other inclusions. A small percentage of sherds also bear striation marks on their surfaces as well as traces of fire-clouding or burning. The major vessel types belonging to this category include jars, pots, lids, bases and sometimes bowls as well. A large number of unslipped sherds were found bearing various types of geometric and non-geometric designs as well.

b) Slipped Red Ware (O2M): The sherds belonging to this ware type are mainly medium fabric with a very small percentage of sherds with coarse fabric. The vessels belonging to this group are generally treated with a thin slip on the outer surface and rim portion of the inner surface with a small percentage of sherds having burnished or highly polished or smoothened surfaces. The slip is generally found on the external surface of the sherds, however in some cases both the surfaces are treated with a fine slip. The pottery is generally ill-fired with a good percentage of sherds having a perfectly oxidized

Figure 3.23. Slipped Red Ware sherds from Dholi Mangari

core. Some of the sherds also bear traces of scraping or trimming on the surface. The colour of the slip varies in red (Hue 10R 4/6, 5/6, 4/8), orange (Hue 2.5YR 6/6), bright brown (Hue 2.5YR 5/8, 5/6), reddish brown (Hue 2.5YR 4/6), and dull reddish brown (hue 2.5YR 5/4).

Some sherds show varying levels of wear and tear and the surfaces of these sherds have got weathered over time. The inclusions present in the sherds are consists of mica

particles and sand, however in the coarse varieties, inclusions such as chaff, husk, and other granular particles are found. The vessel forms included in this ware type are jars, pots, bowls, basins, dishes, pot-rests, and lids. It is however important to mention that a very few diagnostic shapes belonging to slipped Red Ware category were found to bear any kind of decorations.

c) Grey Ware: A very small percentage of slipped and plain Grey Ware sherds (12) with medium to coarse fabric were also collected from the site and were analyzed. Most of the sherds from the Grey Ware category bear a good quality slip with smooth surfaces. However, a few Slipped and Unslipped Grey Ware sherds with coarse fabric also constitute the ceramic assemblage. The Grey Ware pottery is generally wheel made with a perfectly reduced core with a very minute quantity of sherds which show defects in the firing technique. Some of the sherds contain mica and sand particles in the clay body which are added as a tempering material during the production process. However, the Grey Ware sherds with coarse fabric were found containing inclusions such as chaff, husk and grit and are generally ill-fired or exhibit an incompletely reduced core. The Grey ware assemblage from the site is represented by different vessel forms or shapes such as jars, pots, dishes, basins and bowls.

d) Black and Red Ware (BRW):

During the survey at Dholi Mangari, only 2 sherds belonging to this ware type were collected and has been categorized as O3F/R3F for the documentation purpose. Generally, vessels belonging to this category have a black inner surface up to the neck on exterior and the rest of the surface is red. The vessels are of fine fabric with slipped or burnished surfaces (Sarkar and Shinde 2011: 64). However, in case of Dholi Mangari, the black colour is confined to the inner surface and does not extended up to the neck on exterior. The two specimen of this ware from Dholi Mangari are highly burnished. The colour on the external surface ranges from Red (Hue 2.5 YR 4/8, 5/8) to Brown (7.5 YR 5/3). Internal surface colour remains a constant shade of black (Hue Gley 1 2.5/N). The two sherds collected during the survey represent convex sided bowls.

Figure 3.24. Black and Red Ware sherd from Dholi Mangari

3.6.2. Ceramics from Dholi Mangari: some observations

The first stage of ceramic production involves preparing the raw material, which is clay. At this stage naturally occurring clays tend to have impurities in the form of organic matter, and mottles. They are manually sorted or by drying the damp clay and then pounding them and passing them through a coarse screen. Alternately the clay combined with water form a suspension, with the coarse particles eventually sinking to the bottom and the fine clay remaining at the top (Sinopoli 1991:16), the aim is to remove extraneous unwanted materials in order to achieve the plasticity of the clay required for forming vessels (Orton and Hughes 2013: 125). In the light of this discussion it is pertinent to ask the question whether the ceramics from the site of Dholi Mangari show signs of excellent clay preparation or not. Potsherds from the site were closely examined for inclusions, whether they were intermittent or regular. It was found that the potsherds have high levels of white grit present in them. By white grit here I mean small white granular substance which have been found in the clay body of a large number of sherds. These non-plastic inclusions are added by the potter deliberately as a tempering material or

occur naturally in the clay. About ninety percent of the sherds show varying levels of inclusions in the clay body and have highly porous surfaces. The porosity of a vessel, refers to the size and number of pores in a fired vessel and is contrariwise related to ceramic strength: the more and larger the pores, the weaker the vessel, though pores may help delay vessel breakage by acting to inhibit the spread of incipient cracks (Sinopoli 1991:13). "The number and size of pores or voids are also important to thermal stress resistance. Cracks that form in response to thermal stress are stopped from spreading when they reach large pores. Pores can be increased in size and number by adding organic materials such as straw or seeds to clay" (ibid: 14). In Dholi Mangari's case potsherds do show evidence of chaff marks. The questions however unanswered are why there is such a high occurrence of white grit in the clay. What is the nature and function of the white granular inclusions? Is it to increase porosity which means longevity of the vessel?

The firing condition of the potsherds is another thing which was closely looked at by examining the core. A grey band in the middle of the sherd would indicate that the vessel was baked in uncontrolled open firing or by bonfire method which would result in dissipation of heat faster than the time required for baking. Vessels baked in kiln do not in most cases show evidence of a burnt core (Mishra 2008:46). The occurrence of burnt core also in some cases indicate inclusion of organic material in the clay which when it comes in contact with fire releases carbon and hence the black colour. Another theory postulated by the archaeologists is that the clay has carbonaceous properties which then react with heat and turn the core of the pot black. The reason behind discussing these various theories is to understand what processes the ceramic assemblage from the site of Dholi Mangari underwent. The site shows high level of potsherds with burnt core ranging from being a thin band at the core to almost the entire core being black or grey. It is difficult however to comment on the grey colour potsherds which have been included in the study. Further a small percentage of sherds from the site also bear traces of burning, soot-marks, and fire clouding on their surfaces. Some of the diagnostic sherds bear decoration on the external surface as well. However, such examples are limited from the site, as most of the sherds bearing designs or decorations belong to the non-diagnostic varieties.

The 33 transects surveyed yielded a total of 104 diagnostic sherds, which were classified and analyzed. They were divided into different types on the basis of certain attributes or traits. The analysis showed that Oxidized or Red Ware dominates the ceramic sample at the site with 67 (64.4%) sherds followed by grey ware with 12 (11.5) sherds. The O1M

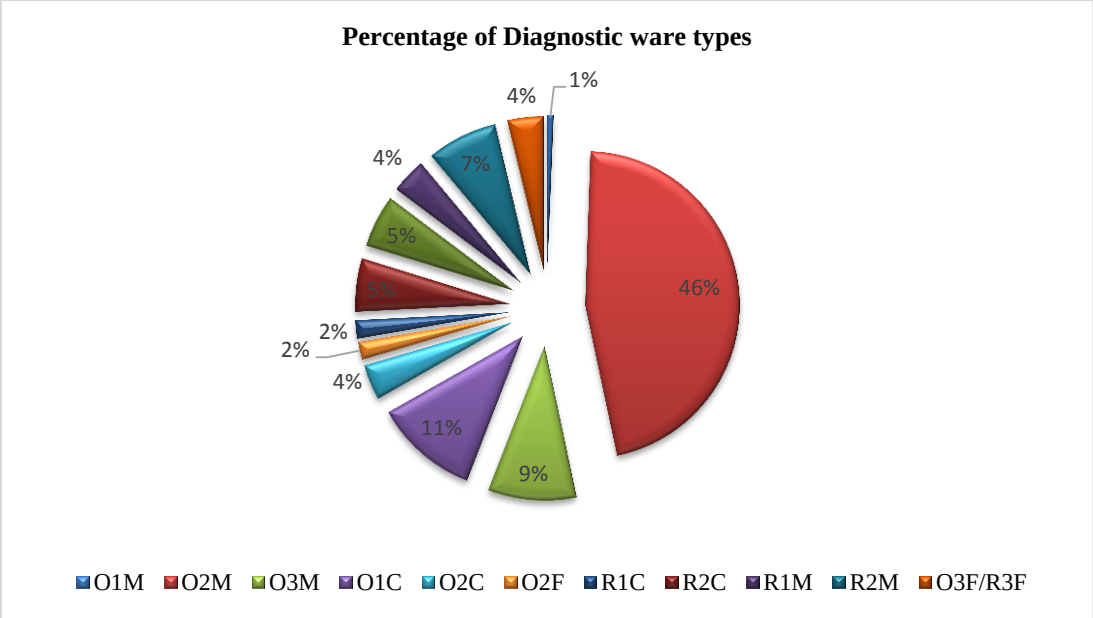

Figure 3.25. Percentage of diagnostic ware types from Dholi Mangari

category dominates the diagnostic assemblage with 30 sherds. The following pie chart and corresponding table reflect the total number of potsherds of the diagnostic types have been found belonging different ware types.

Type	Number of Diagnostic sherds	Grand Total	Percentage
O1M	30	104	28.84
O2M	25	104	24.03
O3M	5	104	4.80
O1C	6	104	5.7

O2C	2	104	1.92
O1F	0	104	0
O2F	1	104	0.96
R1C	1	104	0.96
R2C	6	104	5.76
R1M	2	104	1.92
R2M	4	104	3.84
O3F/R3F	2	104	1.92
R3F	0	0	0

Table 3.5. Count and percentage of diagnostic ware types from Dholi Mangari

The data on spatial density and distribution of different ware types in the 33 transects surveyed has been put into the form of a table attached at the end of the thesis as appendix.

3.7. Spatial distribution of diagnostic pottery from Dholi Mangari

The systematic archaeological surface survey carried out at the site of Dholi Mangari yielded a very less quantity of diagnostic sherds. Owing to the less density of ceramic scatter at the site, an attempt was made to cover the survey area intensively and to collect all the ceramics scattered across it as has been stated earlier in the chapter. In order to do so, transects spaced at a close interval of 5 m apart were laid across the area and the surface was intensively surveyed by the crew members and collections were made in a systematic manner. A total of 104 diagnostic sherds belonging to different ware types and representing various vessel forms were collected during the survey and were later on

systematically classified and analyzed. The illustrations of the diagnostic pottery were made on paper and were intended to get an idea or reconstruct as much as possible the complete form of the vessel out of the fragmented rim or base sherds.

The following sections of the chapter gives a detailed account of the diagnostic pottery shapes or forms collected during the survey along with drawings and illustrations as well as the descriptions of the transects wherefrom the collections were made.

Transect 1: This transect was located at the edge of the exposed portion and was laid in NW-SE orientation. The transect had loose soil and had a lot of small thorny shrubs including a tree of Bougainvillea. A few potsherds was collected from the transect. Most of the potsherds collected were non-diagnostics and only two diagnostic potsherds belonging to the red ware category of medium fabric were found. While one of the sherds was too tiny to draw, the other sherd belongs to a Jar/pot.

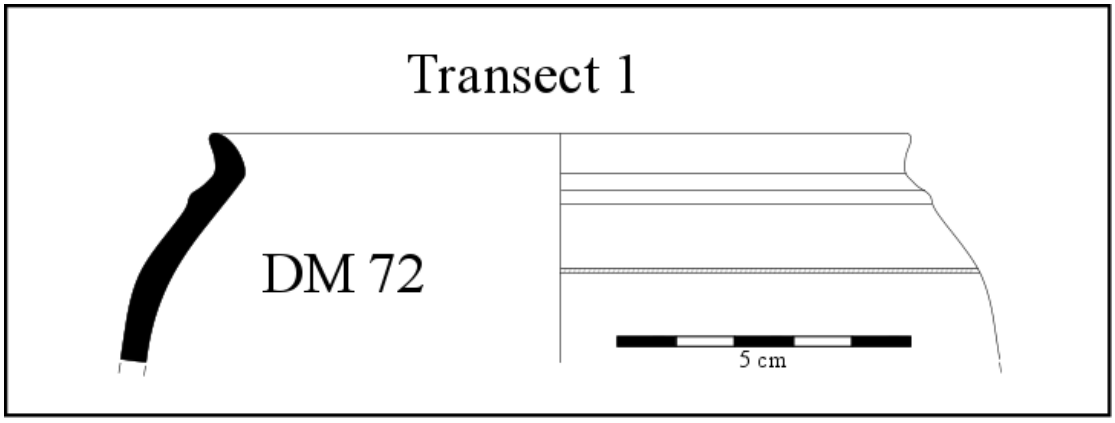

Figure 3.26. Diagnostic pottery from transect 1

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 72	2	O3M	1	17	12	Out-turned rim with a mild rib on shoulder followed by an incised design on exterior. Burnished external surface up to the neck on interior.

						Smooth inner surface, well-fired
DM	-	O2M	1	2	-	Traces of slip found on the sherd. White grit in the profile section, the fragment is too tiny to draw a profile.

Table 3.6. Diagnostic pottery from transect 1

Transect 2: This transect was laid 5 meters apart from the first transect. The intention was to survey 2.5 meters of the ground on either side of the crew member. The sample unit yielded sherds belonging to the red ware category. All the sherds are of medium fabric, one unslipped and rest slipped along with a small sherd with burnished surfaces belonging to the Jar/Pot, bowl and dish categories.

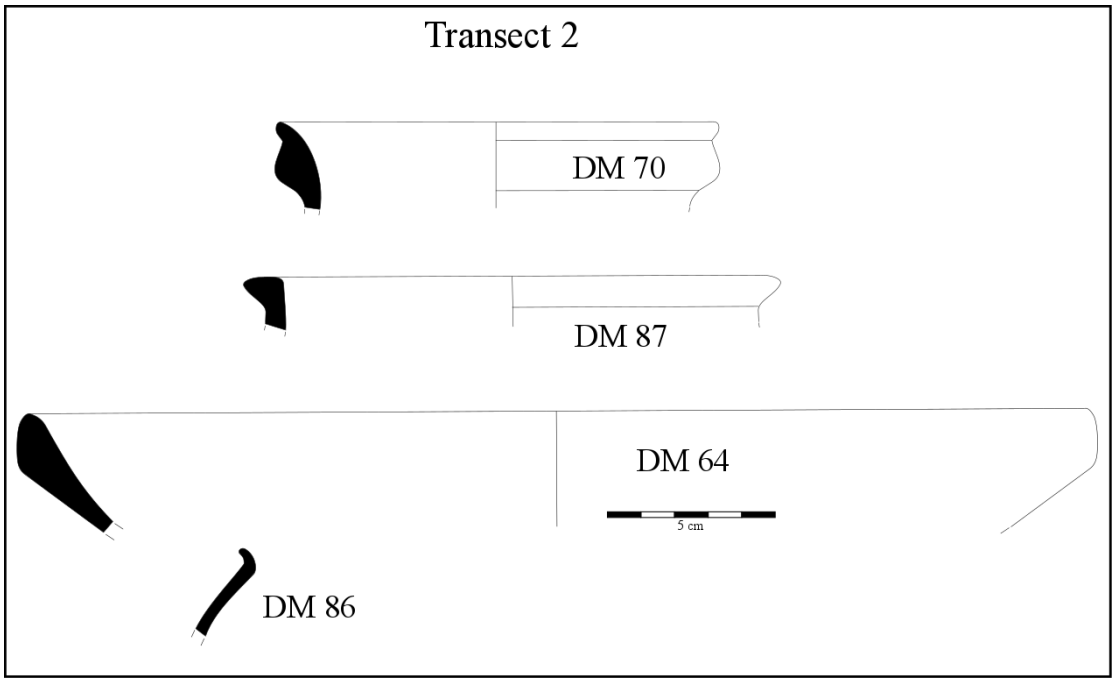

Figure 3.27. Diagnostic pottery from transect 2

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 70	1	O1M	1	14	14	Externally projected/ thickened rim with a mild concavity on exterior. Abraded surfaces, incompletely oxidized. A large percentage of white grit present all over the sherd.
DM 87	1	O2M	1	8	16	Externally projected, beaked rim with a flat top. Slip in traces, encrusted surfaces, incompletely oxidized. A large percentage of white grit present all over the sherd.
DM 64	3	O2M	1	36	32	Externally projected thickened rim with tapering sides. Inner surface slipped (smooth), abraded exterior, ill-fired.
DM 86	2	O3M	1	5	-	Out-turned short featureless rim with oblique shoulders. Burnished interior and exterior surface. Well fired.

Table 3.7. Diagnostic pottery from transect 2

Transect 3: The foliage from this transect onwards increased considerably which obscured the surface and made it difficult to locate the archaeological material scattered across it. Along with trees of neem, babul and tamarind; big clusters of aloe vera were also formed the part of vegetation in the transect. The sherds collected belong to the red ware category. All the sherds were of medium fabric with one sherd bearing a good quality slip and the rest of the sherds are unslipped. Two of the sherds were very small

with worn-out surfaces and broken rims, hence could not be measured or drawn. The rest belonged to the two rims belong to Jar/ Pot category.

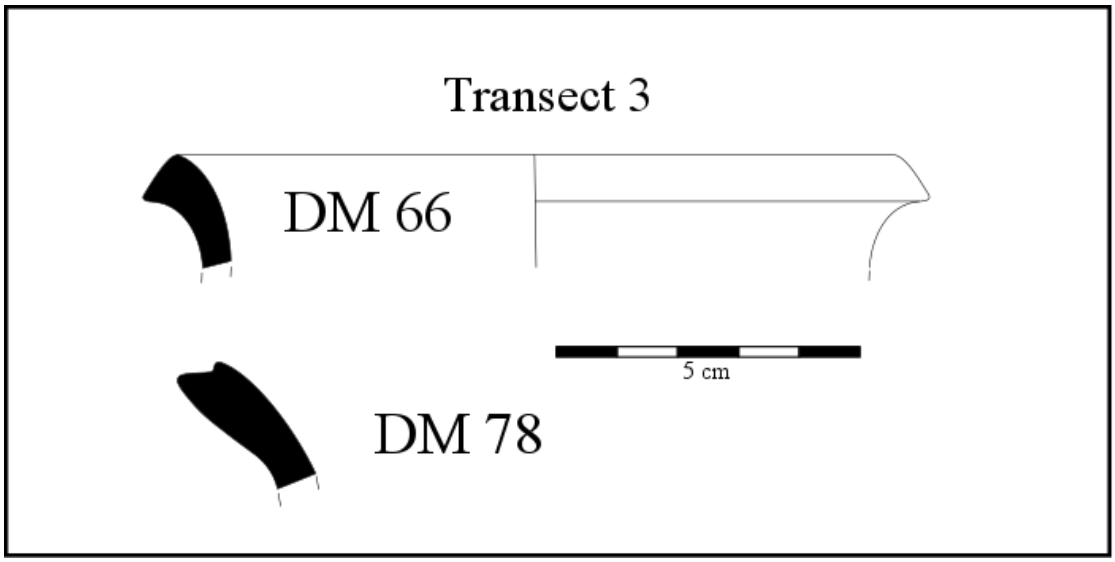

Figure 3.28. Diagnostic pottery from transect 3

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 66	1	O2M	1	10	12	Externally projected beaked rim with concave neck. Both sides same slip, smooth surface, fire cloud on the exterior surface, ill fired.
DM 78	1	O1M	1	16	-	Externally projected rim with a groove on top. Abrasive surfaces with white grit and mica particles in clay, well fired.
DM 26	10	O1M	1	8	-	Light mica dusting on the exterior surface, rolled and ill fired.
DM 29	10	O1M	1	7	-	Ill fired, rolled.

Table 3.8. Diagnostic Pottery from transect 3

Transect 4: While walking the transect quite often we also came across human as well as animal faeces. The mound though houses a temple at the top is also used for open defecation by the people of the village as well for grazing their animals which mostly include cows. Tile fragments were found but not collected. Two diagnostic sherds representing jars/pot were collected with one belonging to unslipped red ware with medium fabric and the other to the burnished grey ware category.

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 71	1	O1M	1	9	14	Externally projected beaked rim with a prominent flange on exterior and a deep groove on rim interior. Encrusted with white matter, well fired.
DM 39	1	R3M	1	40	14	Out-turned featureless rim with a short concave neck with a mild rib and a groove on shoulder externally. Burnished external surface up to the neck on interior, smooth inner surface, well-fired

Table 3.9. Diagnostic pottery from transect 4

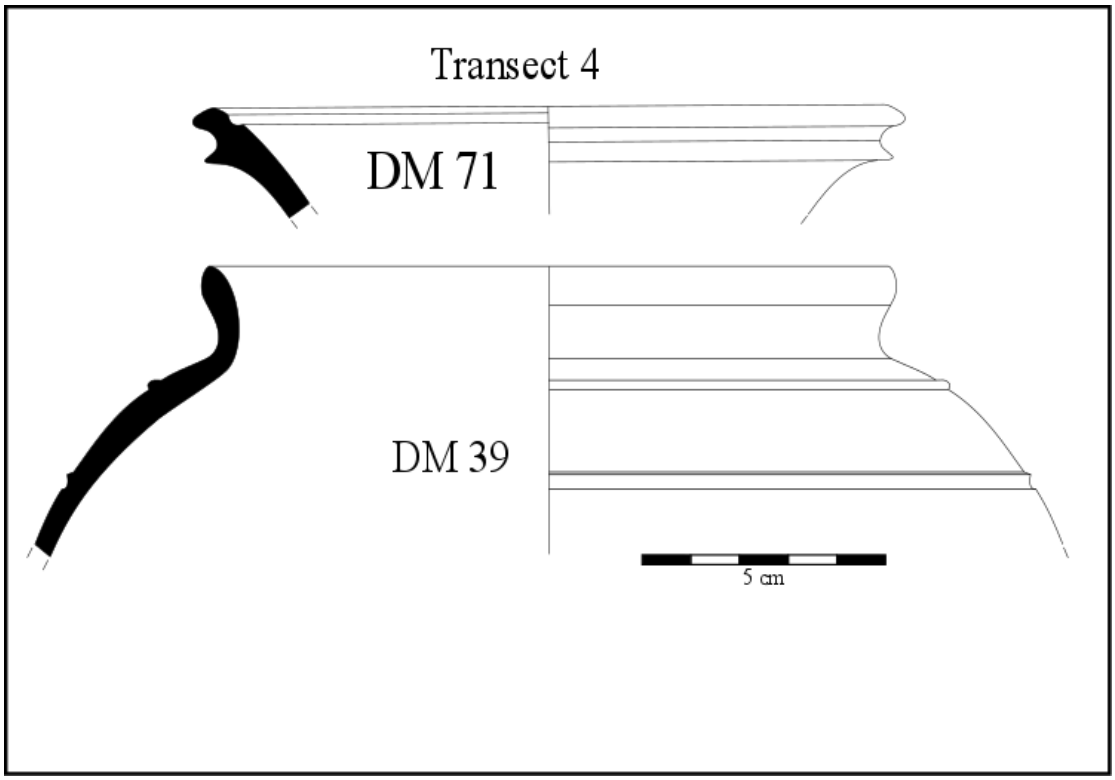

Figure 3.29. Diagnostic pottery from transect 4

Transect 5: The soil in this transect was moist to touch and most of the pot sherds that were collected were heavily encrusted with soil. A single diagnostic sherd with a thick rim possibly a bowl/basin belonging to the coarse red ware category was collected.

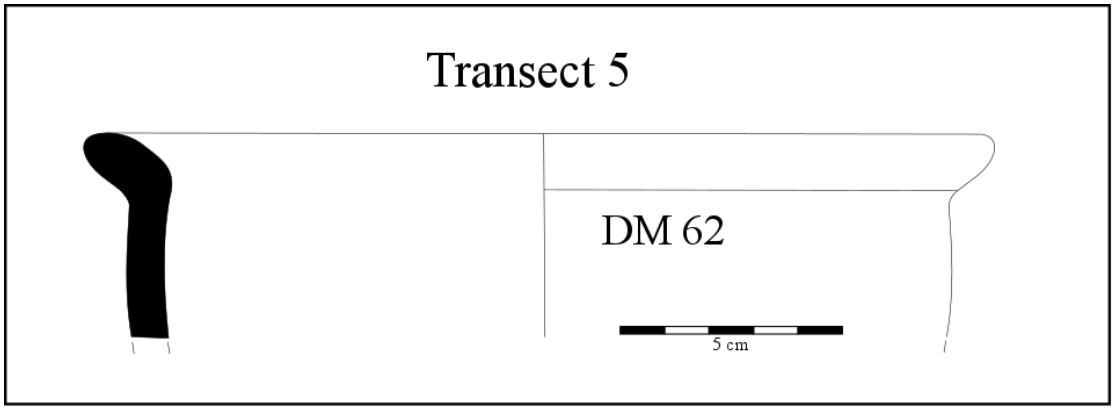

Figure 3.30. Diagnostic pottery from transect 5

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 62	2/4	O2C	1	76	22	Out-turned thickened rim with convex sides. Slip in traces, smudged interior, slightly abraded and gritty surfaces, ill fired.

Table 3.10. Diagnostic pottery from transect 5

Transect 6: The vegetation in the transect had increasingly become dense, trying to detect potsherds or any other archaeological material was a difficult task and it required a very through scanning of the surface to collect potsherds in this transect. All the sherds except one belongs to the red ware category. The sherds are of medium fabric and are unslipped. The sherds belong to the Jar/Pot, Pot/Bowl, Basin/Lid categories along with a fragment of dish-on stand.

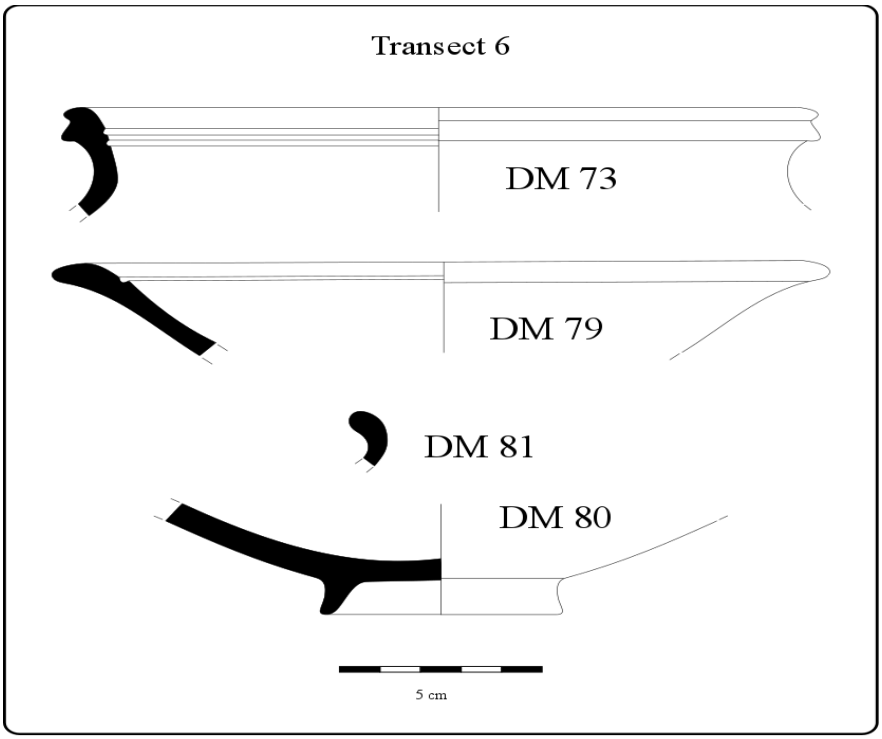

Figure 3.31a. Diagnostic pottery from transect 6

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 73	1/2	R1M	1	42	18	Externally projected and beaked rim with a concavity on the exterior and two shallow grooves on rim interior. Short concave neck. Burnt core.
DM 79	3/5	O1M	1	38	18	Splayed out rim with a mild ledge on the interior, abrasive Ill fired
DM 81	1	O1M	1	6	-	Out turned featureless rim with a short concave neck, well fired.
DM 80	8	O1M	1	20	6.5	Encrusted, burnt interior surface, well fired.

Table 3.11a. Diagnostic pottery from transect 6

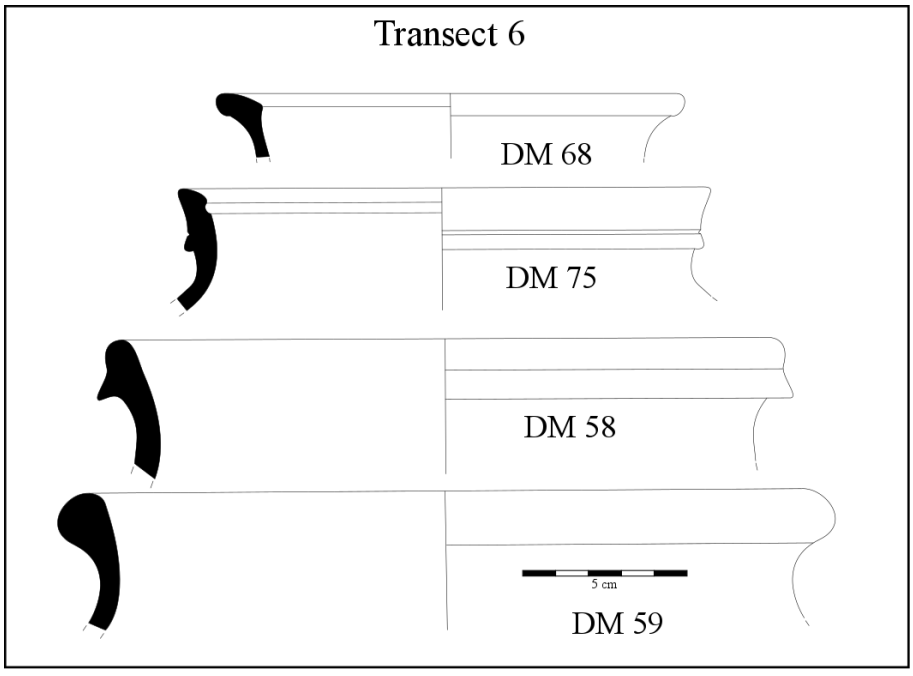

Figure 3.31b. Diagnostic pottery from transect 6

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 68	1	O2M	1	13	14	Horizontally slayed out rim with slanting sides, Traces of slip on the interior surface, ill fired

DM 75	1/2	O1M	1	20	16	Externally collared rim with a shallow groove, slightly bevelled on the interior with a shallow groove, short concave neck. Abraded surface, well fired.
DM 58	1/2	O1M	1	38	20	Externally projected, collared rim with a slight concavity on the exterior. Abraded surface and well fired.
DM 59	1/2	O1M	1	42	22	Externally projected thickened/beaded rim with a short concave neck, ill-fired.

Table 3.11b. Diagnostic pottery from transect 6

Transect 7: This transect also yielded quite a number of potsherds, with most of them belonging to the non- diagnostic category. While walking the transect, it was noticed that most of the bigger hauls of potsherds were being found in clusters. The diagnostic sherds of both slipped and unslipped red ware belonging to jar/pot types were collected.

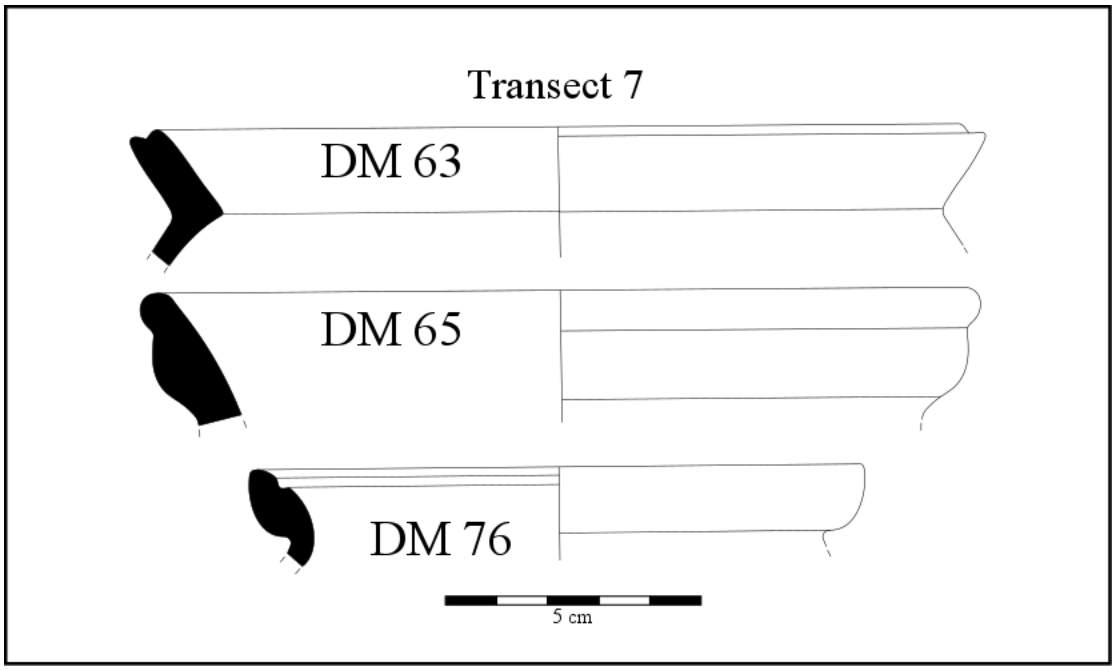

Figure 3.32. Diagnostic pottery from transect 7

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 63	1	O1M	1		16	Splayed out rim with a shallow groove, internally carinated neck. Traces of slip, well fired.
DM 65	1	O1M	1	15	16	Externally thickened rim with a groove on exterior. Abraded surfaces, well fired.
DM 76	1	O2M	1	14	12	Externally projected thickened rim with a groove on interior, short concave neck. Slip in traces, micaceous surfaces, well-fired

Table 3.13. Diagnostic pottery from transect 7

Transect 8: The sampling unit was covered by thick foliage and thorny shrubs, which made it difficult for the crew members to survey the ground properly and to make collection from it. The sample unit yielded three diagnostic sherds with two of them belonging to the red ware category and one sherd of coarse slipped grey ware with an incised design on exterior surface. The sherds belong to the categories of jar/pot and Bowl/Dish.

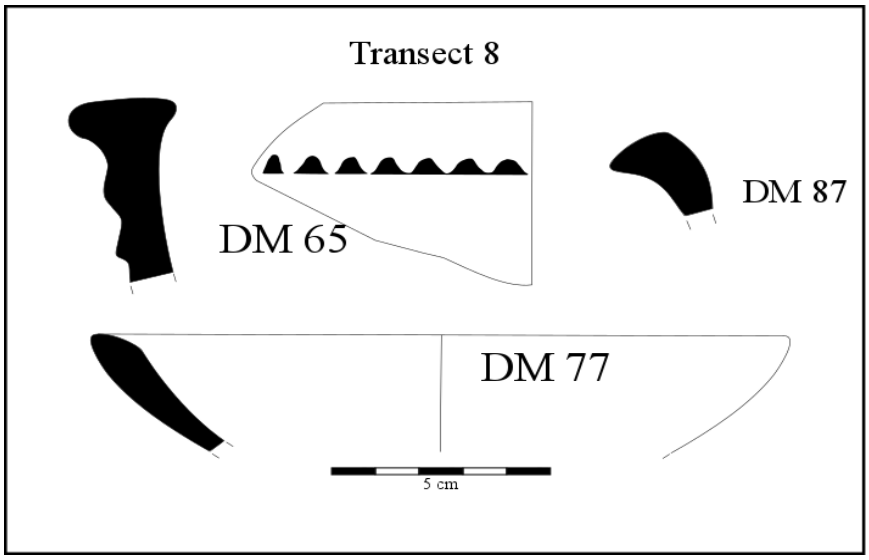

Figure 3.33. Diagnostic pottery from transect 8

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 65	10	R2C	1	57	-	Bilaterally projecting (nail headed) rim with a flat top and slightly convex sides. Two mild ribs on exterior with one bearing an incised design (notches/cuts). Both surfaces slipped, chaff and other inclusions in clay with burnt core.
DM 87	1	O1C	1	12	-	Externally projecting beaked rim. Abraded surfaces with inclusions in clay, ill fired.
DM 77	2/3	O2M	1	18	16	Externally projecting and internally bevelled rim with tapering sides. Slip on the inner surface (smooth), slightly abraded exterior, burnt core.

Table 3.14. Diagnostic pottery from transect 8

Transect 9: The sampling unit covered an area which was littered with rock fragments and thin foliage. The unit yielded a good number of potsherds which were mostly body sherds. The diagnostic sherds collected belong to the Red Ware of medium fabric with one sherd being treated with a micaceous wash giving it a lustrous golden hue. All of the sherds belong to the jar/pot category of which the rim diameter of only one sherd could be determined.

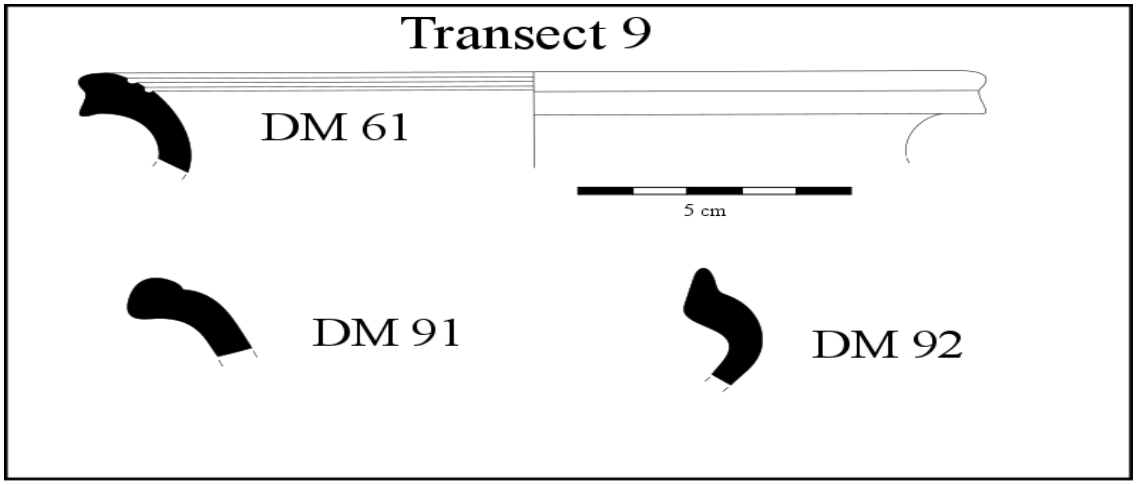

Figure 3.34. Diagnostic pottery from transect 9

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 61	1	O2M	1	13	16	Externally projected beaked rim with two shallow grooves on interior. The sherd has a micaceous wash on exterior giving it a golden hue, well-fired.
DM 91	**1**	O1M	1	7	-	Externally projected beaded rim. Eroded sherd with encrustations on exterior, mica particles in clay, well-fired.
DM 92	1	O1M	1	8	-	Externally projected oblique-cut rim with a pointed top and a depression on interior, short concave neck. Abrasive surfaces, full of white grit. Well-fired

Table 3.15. Diagnostic pottery from transect 9

Transect 10: The sampling unit shared the contextual information with the previous transect and the surface was littered with fragments of rock and dense foliage. The transect yielded a few sherds belonging to the red ware category. The collected sherds included sherds of both medium and coarse fabric type. Two sherds belong to the Jar/Pot category while the other might be a bowl/basin type. A base fragment was collected as well.

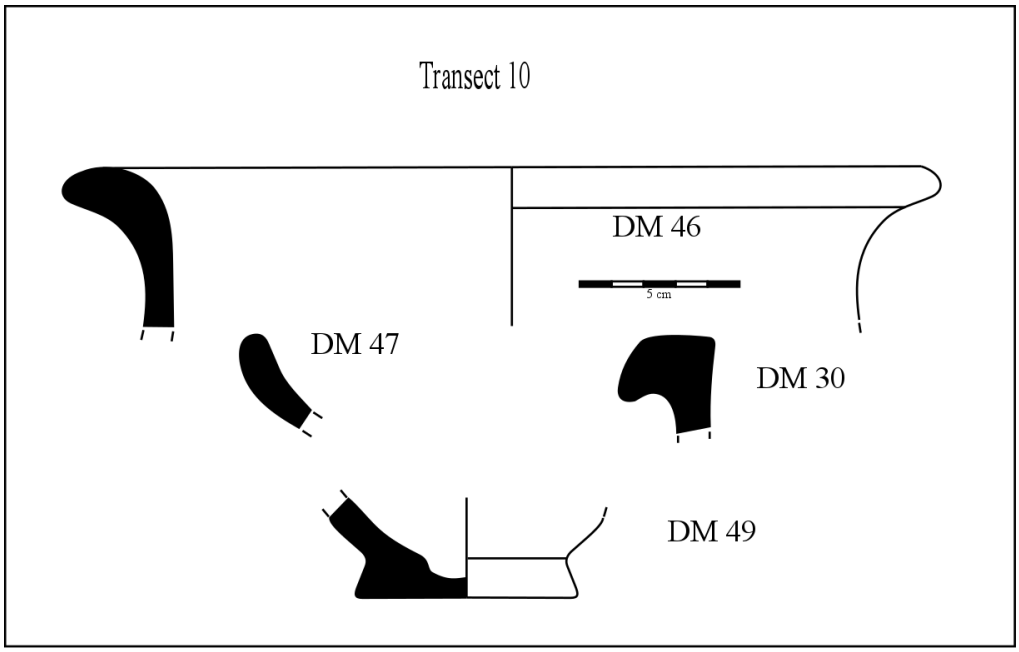

Figure 3.35. Diagnostic pottery from transect 10

S.No.	Form	Type	Count	Wt.(g)	Dia. (cm)	Notes
DM 46	1	O2C	1	80	26	Thick slip on the exterior with traces of slip on interior, inclusions in clay, ill fired.
DM 47	2/ 3	O1M	1	15	-	Externally projected, featureless rim. Abraded/ eroded surfaces, ill-fired.
DM 30	1	O1C	1	98	-	Externally projected beaked or hooked rim with a flat top. Eroded surfaces, Inclusions in clay (White grit), soot marks on the internal surface. well-fired
DM 49	8	O1M	1	34	6	String cut, flat base with tapering sides and a prominent depression at the center. Slightly abrasive surfaces, ill fired.

Table 3.16. Diagnostic pottery from transect 10

Transect 11: This transect covered the unexposed slope of the mound covered with thorny bushes, shrubs and other types of vegetation. The pottery scatter in this area was very sparse and the sherds collection were mainly non-diagnostics. The sample unit also yielded few diagnostic sherds belonging to the red ware category. The collected sherds included sherds of both medium and coarse fabric type. All of the sherds belong to the Jar/Pot category with one however remaining indeterminate.

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 60	1	O1M	1	67	14	Externally projected beaked and grooved rim with a concave neck. Abraded /eroded surfaces, well fired.
DM 89	10	O1C	1	98	-	Thick sturdy sherd (broken), abrasive surfaces, white grit burnt internal surface, incompletely oxidized.
DM 90	1	O1C	1	72	-	Externally projected beaked rim with two shallow grooves on rim exterior. Thick sherd, well fired.

Table 3.17. Diagnostic pottery from transect 11

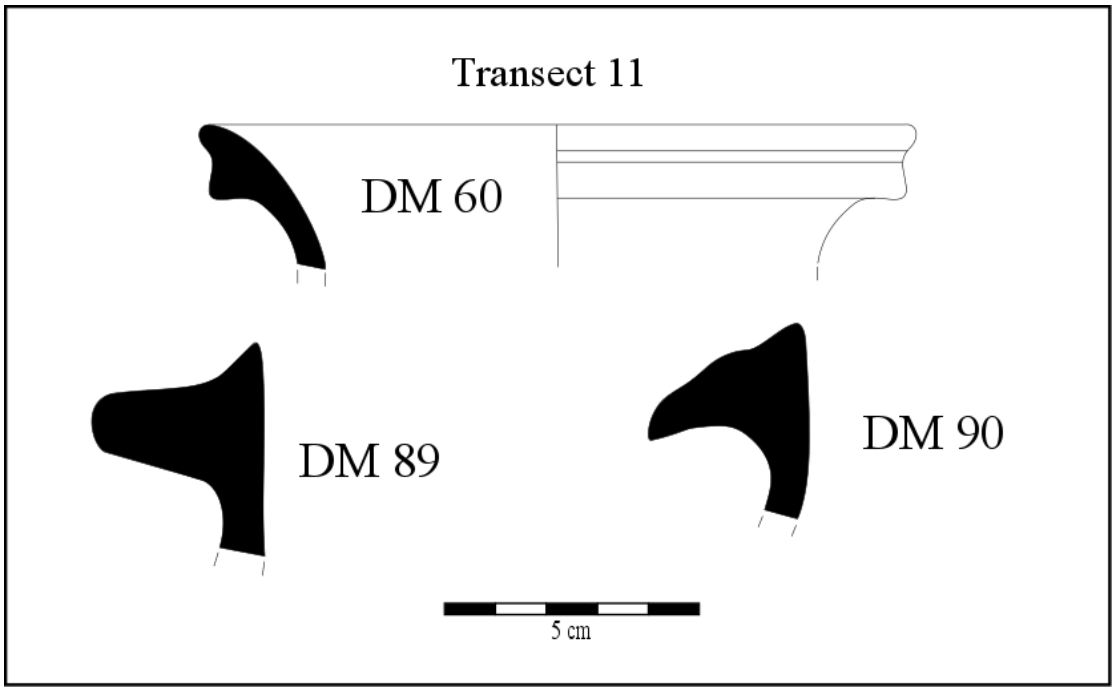

Figure 3.36. Diagnostic pottery from transect 11

Transects 12 to 19: These transects covered the undulating slope of the mound and were covered with a thick scatter of rock fragments, boulders, and sparse concentration of potsherds. Dense thorny bushes and foliage covered the ground alongwith with human excreta which made it very difficult the crew members to survey these area with equal intensity and to make collections from the sampling units. However, attempts were made to survey as much area as possible which yielded 48 non-diagnostic belonging to the Red ware category and 3 sherds of Grey ware as well. Apart from that two very tiny rim sherds of red ware with worn out surfaces were also collected, but it was not possible to determine the diameter of these sherds and were not taken up for further analysis.

Transect 20: The sampling unit covered the part of the mound with a slightly less foliage and vegetation which provided better accessibility and resolution for surveying the area more intensively. However, the area had a dense scatter of rock fragments alongwith a sparse cluster of potsherds. The transect yielded a total of 23 sherds of which only two were diagnostic sherds of red ware with medium fabric and belong to jar/pot-rest and bowl/dish types.

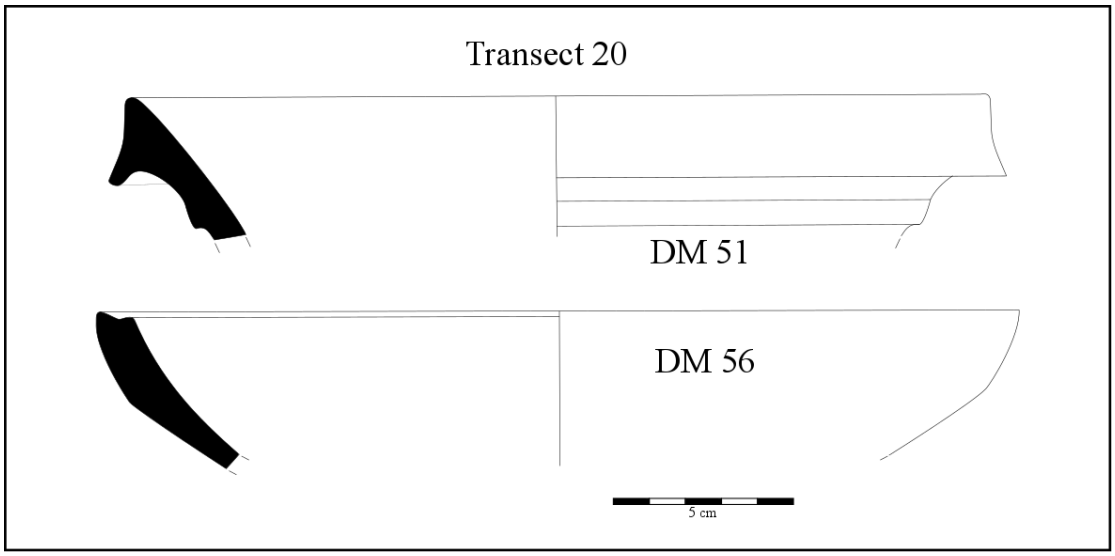

Figure 3.37. Diagnostic pottery from transect 20

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 51	1/7	O1M	1	42	24	Externally projected collared rim with a ledge on neck exterior. Thick sherd, well fired, the inner surface is encrusted with white material.
DM 56	2/3	O2M	1	43	26	Externally projected rim with a groove on the top, tapering sides. Slightly abrasive and burnt exterior, inner surface slipped (smooth), ill fired.

Table 3.18. Diagnostic pottery from transect 20

Transect 21: The sampling unit shares the contextual information with the previous transect and yielded a good number of non-diagnostic sherds of both red ware and grey ware with medium to coarse fabric. From the transect, only three diagnostic rim sherds

were collected with two sherds of Grey ware and one sherd of Red ware. All the three sherds represent jar/pot types.

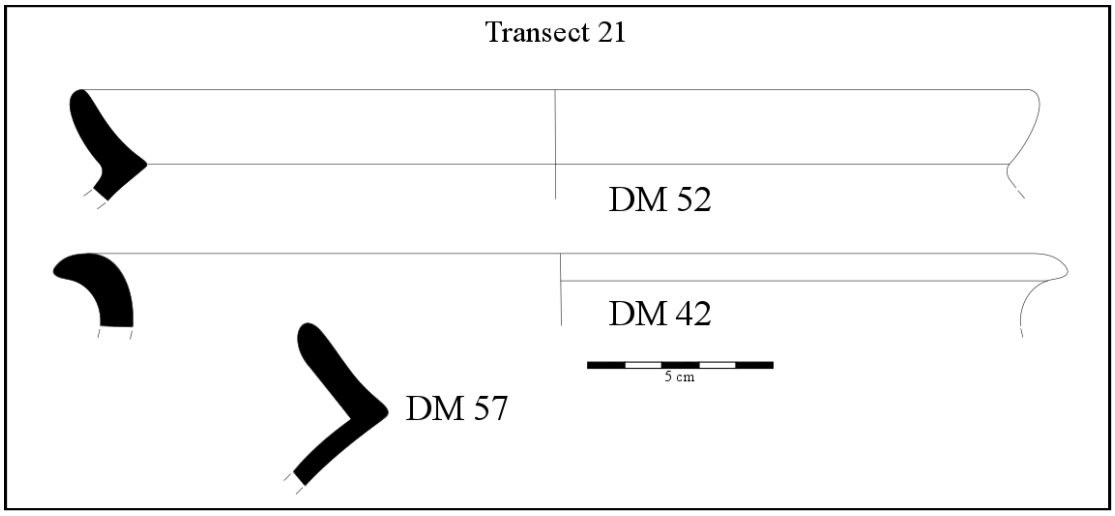

Figure 3.38. Diagnostic pottery from transect 21

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 52	1	R3M	1	25	26	Thick featureless rim with a slight depression on the interior surface, internally carinated neck. Burnished surfaces with smudged external surface and encrusted inner surface.
DM 42	1	O2M	1	18	26	Externally projected beaked rim. Both surfaces slipped, well-fired
DM57	1	R2C	1	30	-	Flared rim (featureless) with a slight depression on the interior. Internally carinated neck with expanding shoulders. Thick grey ware with a smooth slip. Broken rim.

Figure 3.19. Diagnostic pottery from transect 21

Transects 22 to 27: The area covered by the transects formed part of the mound which was under heavy vegetation. Thorny bushes alongwith other thick grasses and plants made it almost impossible to walk the transects in a systematic manner. However, every attempt was made to cover the areas which provided some access along these transects and the surface was surveyed for artefacts. Due to heavily foliage which had obscured the actual surface of the mound, it was not possible to make any collections from these transects. The areas covered by these transects were marked out and documented.

Transect 28: The transect covered an open area of the mound on the south-western side of the mound and with a relatively lesser vegetative cover, which provided accessibility and better resolution to survey the areas and make collections from it. The sampling unit yielded an ample number of potsherds, mostly non-diagnostic alongwith a few sherds of diagnostic Red Ware of medium fabric. The diagnostic sherds are represented by jar/pot type alongwith two sherds of which the rim diameters could be determined.

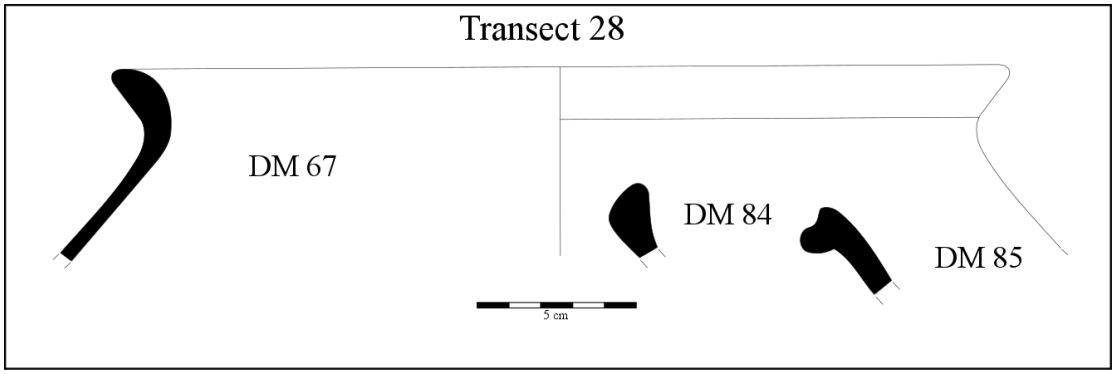

Figure 3.39. Diagnostic pottery from transect 28

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 67	1	O2M	1	13	28	Out turned/flaring rim, slightly thickened on the interior, short concave neck with slanting shoulders. Traces of slip can be seen on the

						exterior surface, ill fired.
DM 84	10	O2M	1	9	-	Slip in traces, ill-fired
DM 85	1	O1M	1	10	-	Externally projected beaked rim with a concavity on top. Abraded surfaces, well fired.

Table 3.20. Diagnostic pottery from transect 28

Transect 29: The sampling unit was located along the south western periphery of the mound and was littered with large chunks of quartzite and a thin scatter of pottery. The portion of the mound is used by the locals for open defecation and for dumping household garbage. The vegetation in this part of the mound was sparse which provided better resolution and greater accessibility to survey the area. However, the pottery collected from the transect belonged to non-diagnostic category. As the area is used for dumping purposes, a lot of modern pottery (*kulhars*) and *diyas* were found in this area, which most probably were dumped by people visiting the temples nearby. This kind of pottery was easily identified as modern and was not collected.

Transect 30: The remaining of the transects (30 to 33) were laid in N/S orientation and covered the exposed portion of the mound, which has been removed off in 2010 and has formed a depression on this side of the mound. The surface covered by transect 30 was strewn with pieces of rock alongwith a dense scatter of potsherds. The pottery collected from the transect comprised mostly of diagnostic sherds alongwith a few body sherds as well. The pottery belongs to both Red Ware and grey ware of medium fabric with unslipped, slipped and burnished surfaces. A single sherd of Black and Red Ware was also collected from this area. The diagnostic shapes belong to jar/pot, bowl, dish/lid and basin types.

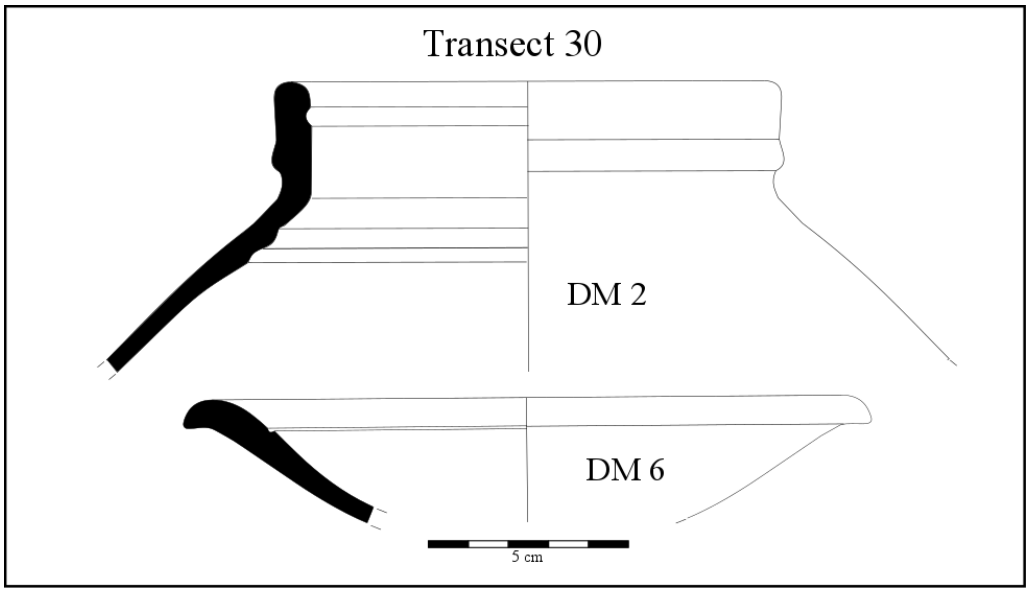

Figure 3.40a. Diagnostic pottery from transect 30

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 2	1	O1M	1	73	12	Straight rim with rounded top and internally constricted neck. A mild ledge on exterior and a deep groove on rim interior followed by two wide groves on interior below the neck. Smooth surfaces, well-fired.
DM6	3/ 5	O1M	1	28	16	Flaring, beaked rim with slightly incurved sides with a ledge on interior. Striation marks on both surfaces, light mica dusting on the exterior.

Table 3.21a. Diagnostic pottery from transect 30

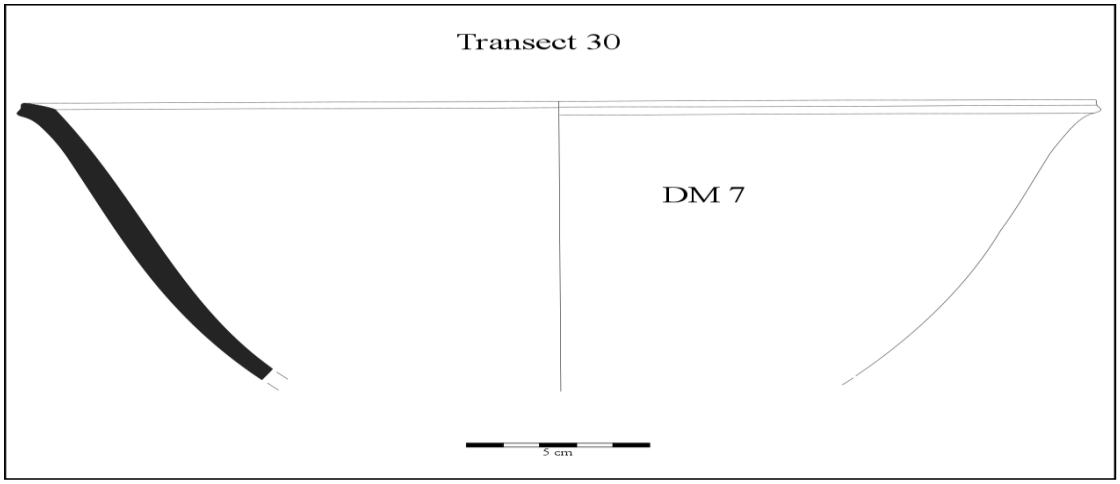

Figure 3.40b. Diagnostic pottery from transect 30

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 7	2/4	O1M	1	211	30	Out-turned and grooved rim with convex sides. Micaceous surfaces (encrusted) with inclusions in clay, ill-fired.

Table 3.21b. Diagnostic pottery from transect 30

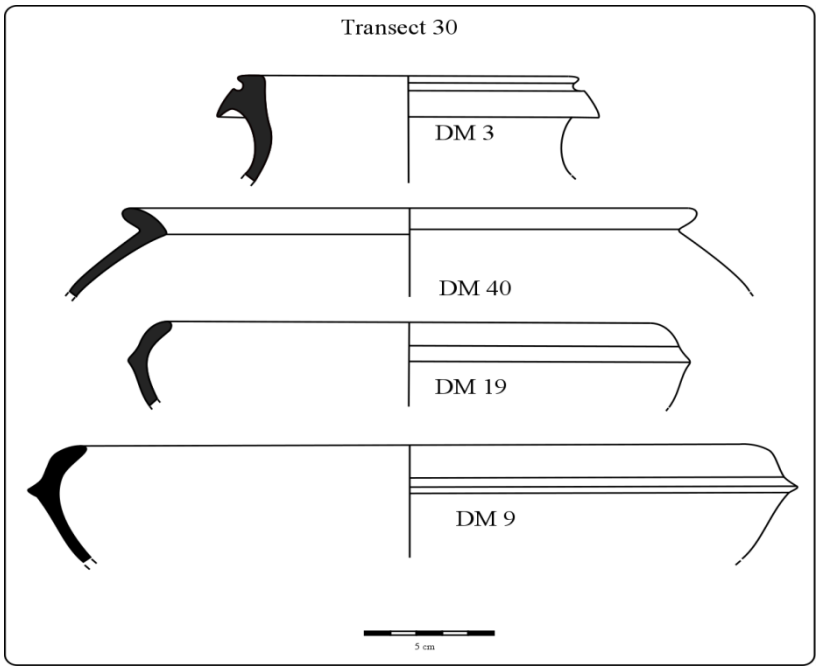

Figure 3.40c. Diagnostic pottery from transect 30

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 3	1	O2M	1	76	14	Externally projected collared and undercut rim with an almost flat top and a groove on exterior, concave neck with a shallow depression on rim interior. External surface slipped up to the neck on interior, well-fired.
DM 40	1	O2M	1	47	22	Flared rim with a short concave and internally carinated rim, sloping shoulders. External surface slipped up to the neck on interior, well-fired.
DM 19	2/3	O2M	1	69	22	Incurved rim with carination/ridge on exterior, convex/ incurved sides.
DM 9	2/3	O2M	1	65	26	Variant of DM 19 with a more pronounced carination/ridge on exterior. The sherd has a micaceous wash on the exterior surface giving it a golden hue. The inner surface is encrusted with white material. Ill-fired.

Table 3.21c. Diagnostic pottery from transect 30

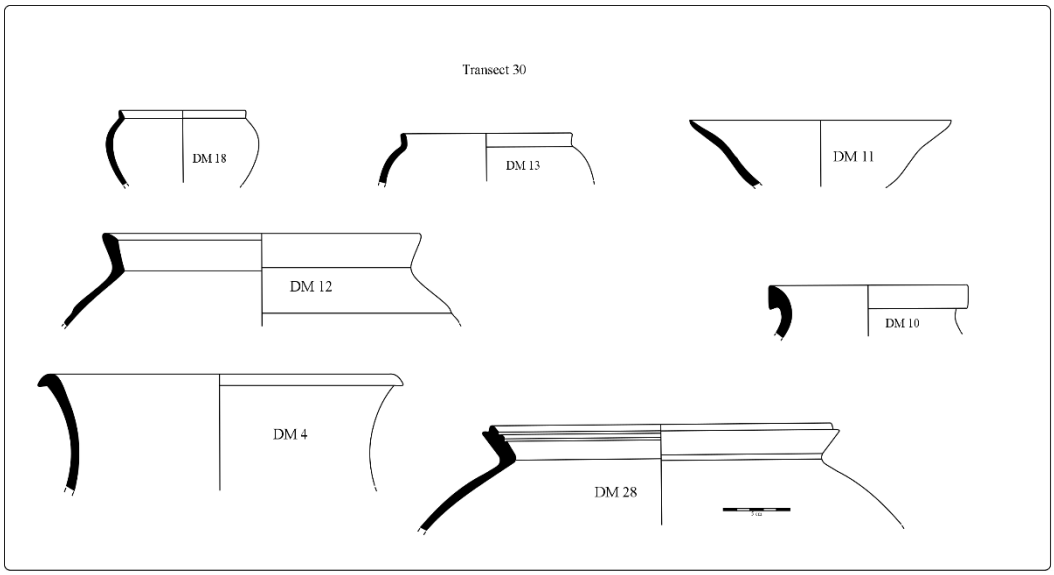

Figure 3.40d. Diagnostic Pottery from transect 30.

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 4	1	O2M	1	108	26	Out-turned beaked rim with a long concave neck. Thin slip on the exterior. White encrustations on both surfaces, inclusions (white grit) in clay, ill-fired
DM 18	2	O3M	1	13	9	Short out-turned rim with internally carinated neck and convex sides. Burnished external surface with smooth interior, burnt core. (BRW).
DM 13	2	O3M	1	10	12	Externally projected featureless rim with convex sides. Burnished exterior surface extending up to the rim on interior. Well fired.
DM 11	2	O1M	1	44	20	Flaring internally sharpened rim with tapering sides.
DM 12	1	O2M	1	86	24	Externally projected, internally bevelled rim with internally carinated neck; oblique shoulders with a mild rib on exterior. External surface slipped up to the neck on interior (smooth), ill-fired.
DM 10	1	O1M	1	45	14	Externally projected thickened / collared rim with short concave neck. Smooth surfaces, well-fired
DM 28	1	O1M	1	182	26	Splayed-out rim with a groove on top and two grooves on interior; Internally constricted neck with oblique shoulders. Encrustations (white) on both surfaces, well-fired.

Table 3.21d. Diagnostic pottery from transect 30

Transect 31: The sampling unit was placed across the disturbed portion of the mound with loose and dry soil and very little vegetation or foliage. However, there was a dense scatter of rock fragments along with and a sparse concentration of potsherds along the transect. The sampling unit yielded sherds belonging to both oxidized and reduced categories with medium to coarse fabric with unslipped, slipped and burnished surfaces.

The diagnostic shapes collected belong to jar/pot, bowl, and basin types.

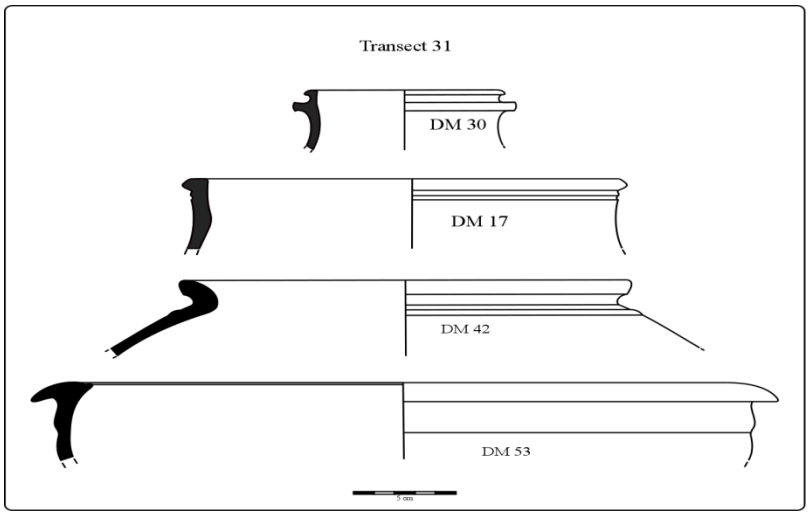

Figure 3.41a. Diagnostic pottery from transect 31

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 30	**1**	R2C	1	18	10	Externally collared rim with a lug/flange on exterior below the rim, elongated concave neck. Abraded surfaces, chaff and other inclusions in clay, ill fired.
DM 17	**1**	O1M	1	36	20	Externally projected, slightly beaked rim with a flat top. Straight and internally constricted neck. Smooth surfaces, well-fired.
DM 42	**1**	R2C	1	80	22	Out turned, slightly oblique cut rim on the exterior with a short concave contour neck. Thick Grey Ware vessel with slip on the external surface extending up to the neck on interior. Chaff and other inclusions in clay, burnt core.
DM 53	4	R1C	1	64	32	Incurved, externally collared rim; convex sides with a groove on exterior. Thick grey ware. Chaff in clay, ill fired.

Table 3.22a. Diagnostic pottery from transect 31

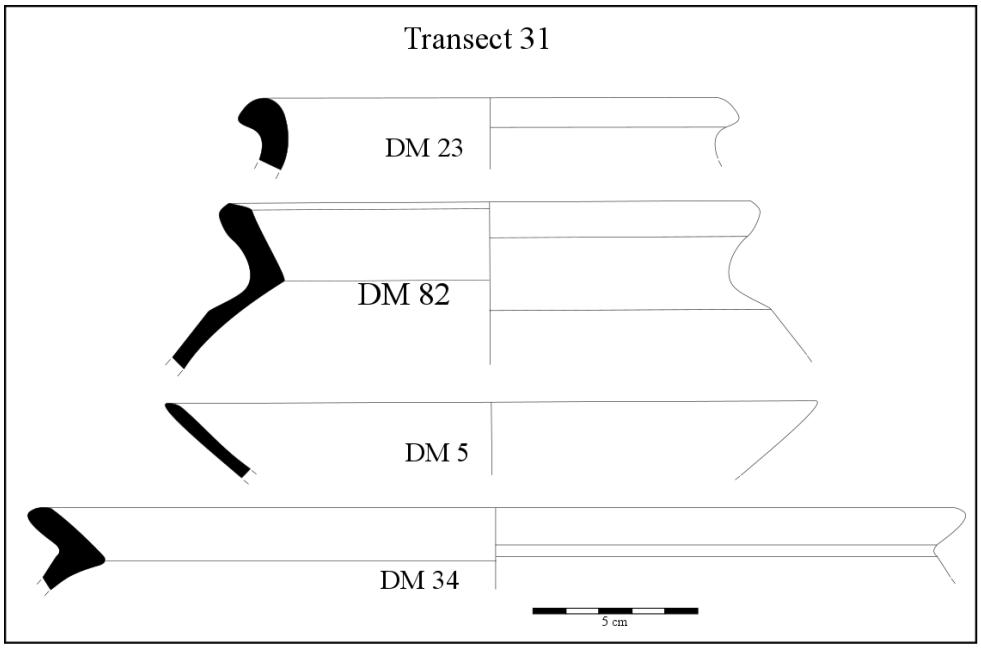

Figure 3.41b. Diagnostic pottery from transect 31

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 23	1	O1C	1	15	14	Out-turned, beaked rim with a short concave neck. Abrasive micaceous surfaces, chaff in clay, burnt core.
DM 82	1	R3F	1	10	16	Splayed out, externally thickened rim with a concave and internally carinated neck with a ridge on shoulder externally.
DM 5	2	O1M	1	14	20	Everted, sharpened rim with tapering sides. Slightly abrasive surfaces, Ill fired
DM 34	1	O2M	1	35	26	Splayed out rim with an internal carinated neck. External surface slipped up to the neck on interior, incompletely oxidized.

Table 3.22b. Diagnostic pottery from transect 31

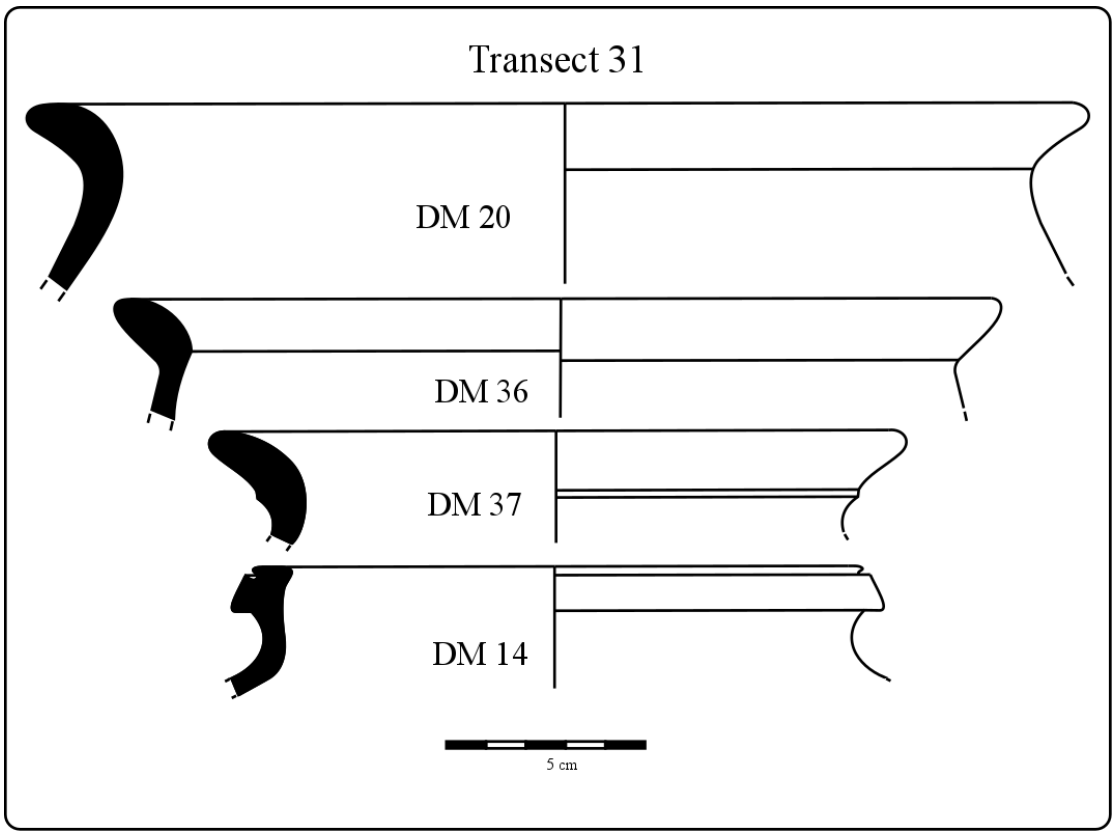

Figure 3.41c. Diagnostic pottery from transect 31

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 2O	**1**	O2M	1	14	26	Flared-out rim with a short concave neck and oblique shoulders. Slip on the exterior surface extending up to the neck on interior, well fired
DM 36	**1**	O2M	1	31	22	Splayed-out thickened rim with slightly carinated neck and oblique shoulders. Slip in traces on exterior, encrusted (white) inner surface, ill-fired.
DM 37	**1**	O2M	1	19	17	Flaring, internally thickened rim with a mild ledge on exterior, short concave neck. Slip on both sides. Ill fired.
DM 14	**1**	O2M	1	49	15	Externally collared rim with a flat top having a depression on interior; concave neck with expanding shoulders. External surface slipped. Incompletely oxidized.

Table 3.22c. Diagnostic pottery from transect 31

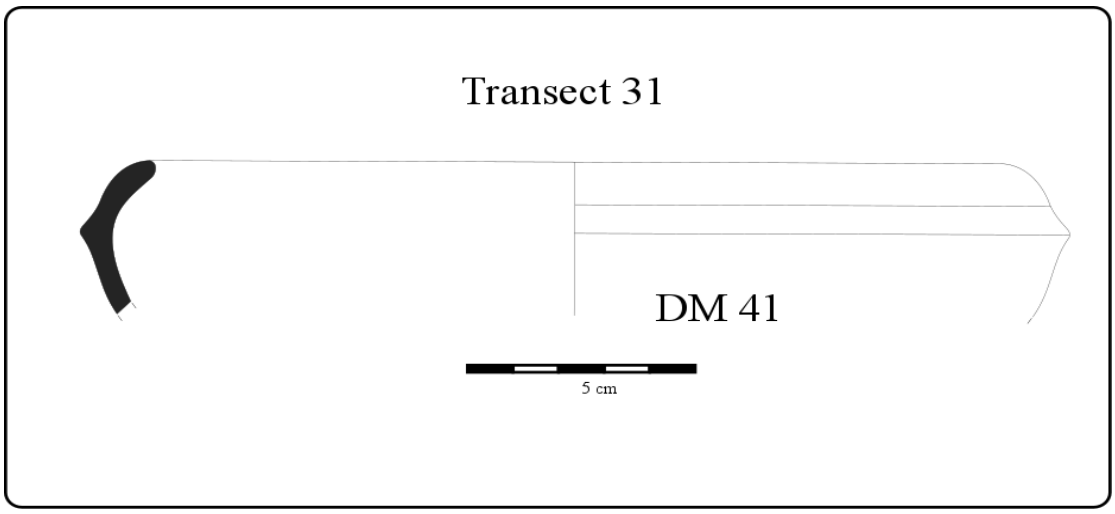

Figure 3.41d. Diagnostic pottery from transect 31

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 41	2/3	R2M	1	55	23	Incurved rim with a carination on exterior, incurved sides. Both surfaces slipped with faint striations, ill-fired

Table 3.23c. Diagnostic pottery from transect 31

Transect 32: The transect shares the contextual information with transect 31 and the diagnostic pottery collected from the unit is mainly unslipped, slipped and burnished Red

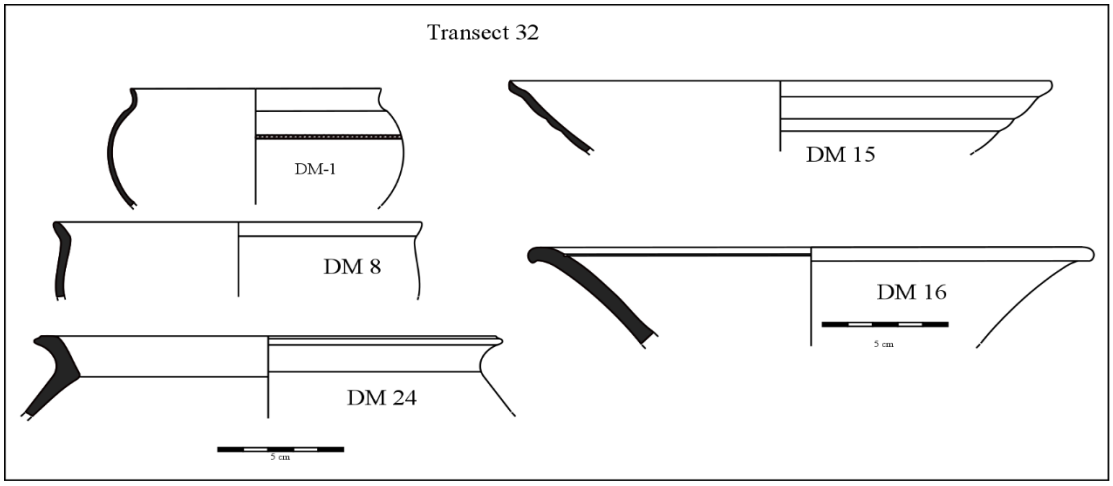

Figure 3.42a. Diagnostic pottery from transect 32

Ware of medium to coarse fabric along with a single sherd of slipped grey ware of medium fabric. Apart from that a sherd of Red Ware of fine fabric with burnished surfaces with an applique and incised design on exterior. The pottery shapes belong to jar/pot, bowl and basin types.

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 1	**2**	O3F	1	22	12	Black and red ware with burnished exterior, incised rib design on the exterior surface. Ill fired.
DM 8	**2**	O3M	1	32	15	Short out-turned, internally bevelled rim with slightly convex sides. Slip on the exterior surface with burnish/polish.
DM 24	**1**	O2M	1	24	20	Ill fired, slip found in patches on the exterior surface.
DM 15	**2**	O2M	1	30	22	Smooth exterior surface, fire cloud on the interior surface, ill fired.
DM 16	**2/3**	O1M	1	72	23	Slightly abrasive surfaces, with fire clouding on the interior surface, white grit in the profile, ill fired.

Table 3.24a. Diagnostic pottery from transect 32

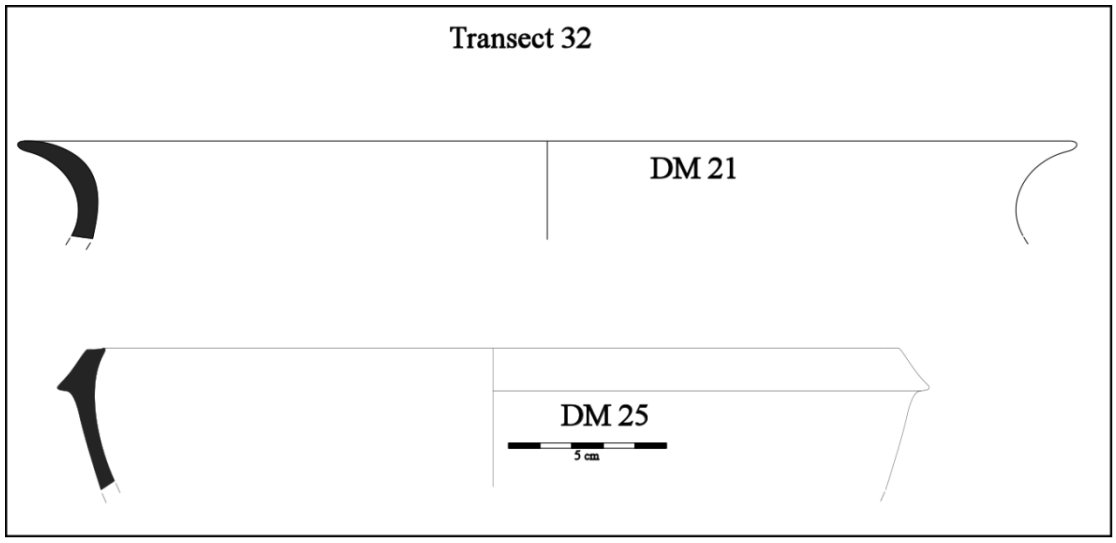

Figure 3.42b. Diagnostic pottery from transect 32

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 21	**1**	O1C	1	89	34	Out-turned rim with a tapering tip, short and a short concave neck. Abrasive surfaces, inclusions in clay, ill fired.
DM 25	**2/ 4**	O2M	1	57	28	Slip on the external surface, both internal and external surface encrusted with white material, ill fired.

Table 3.24b. Diagnostic pottery from transect 32

Transect 33: The final transect covered during the survey was located near the road leading to the village. The area was littered with modern day trash and garbage piled all along the roadside, which obscured a large portion of the surface making it difficult for the surveyors to collect materials in these areas. The sampling unit yielded only two diagnostic sherds belonging to unslipped grey ware and slipped Red Ware with medium fabric. The shapes represent jar/pot and bowl types.

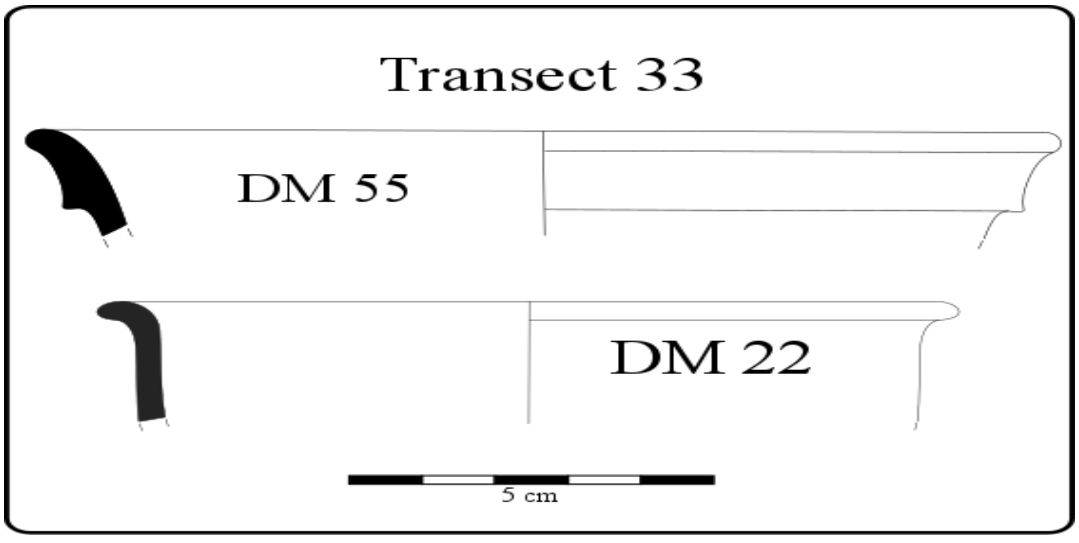

Figure 3.43. Diagnostic pottery from transect 33

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Description
DM 55	1	R1M	1	9	14	Externally projected rim with a ridge on exterior. Abraded surface, ill fired, light dusting of mica on the external surface.
DM 22	**2**	O2M	1	43	12	Out-turned beaked rim with slightly convex sides. Smooth exterior surface, thin slip on the exterior surface, ill fired.

Figure 3.25. Diagnostic Pottery from transect 32

Conclusion

The chapter revolves around the systematic surface survey carried out at the archaeological site of Dholi Mangari as well as the ceramic analysis of the sample collected from the site. The first half of the chapter discusses about the environmental or geographical settings of the site, the survey methodology and sampling techniques as well as the collection strategies adopted as well as points to various factors which created problems or limitations during the survey. The second part of the chapter deals with the classification and analysis of the ceramics collected from the site during the survey. The discussion throws light on the methods or techniques employed for classifying and analyzing the ceramics as well as the parameters on the basis of which the ceramics were grouped into different types. The discussion on the ceramics is accompanied by drawings or illustrations, pie charts, tables and transect details which provides a qualitative as well as quantitative dimension to the same.

Chapter Four

Systematic Surface Survey at Maharaja Ki Kheri:

Methodology and Results

Introduction

This chapter provides a detailed overview of the systematic archaeological survey carried at the site of Maharaja Ki Kheri in the month of May, 2016. The first part of the chapter discusses survey methodology, sampling and collection strategies adopted during the survey. The second part of the chapter discusses the methods used for classifying and analysing the ceramics collected during the survey as well as the results of the ceramics analysis. The chapter also includes the illustrations of and photographs of ceramics recovered during the survey from the site.

4.1. Maharaja Ki Kheri and its environs:

The archaeological site of Maharaja Ki Kheri (24°38.646´N, 73°55.097´E) lies outside the village known by the same name. The site is located at a distance of about 26 km east

Figure 4.1. The site of Maharaja Ki Kheri (Source: Google Earth)

of Udaipur in the Vallabhnagar district of Rajasthan and 10 km southwest of the archaeological site of Balathal. The site measures 160 m (NS) x 350 m (EW) and is in the form of a very shallow mound, a large portion of which has been converted into agricultural land which remains covered by standing crop for most of the time. A small rivulet flows nearby the site towards the south and a large water body lies to the north of the site. The major portion of the site has been flattened and converted into agricultural field with a very small chunk of the mound left intact. The mound exhibits an almost monotonous terrain with a gentle slope towards the west and is covered by a very thin or sparse vegetative cover in the form of thorny bushes and other grasses. The surface of the mound is strewn with fragments of stone and a thin scatter of pottery.

Figure 4.2. The site of Maharaja Ki Kheri

The site was first reported by V.N.Misra in the year 1963 (*IAR 1963-64*: 19) during the course of his explorations in the area after which the site left without any further archaeological investigations till 2013, when small scale excavations were carried out at the site by Vasant Swarnkar of the Delhi circle of ASI and his team. The excavations at the site were carried out with a primary focus on determining the chronological sequence for the site and its relationships with other chalcolithic sites in the area. During the excavations, a total of eight trenches were laid at two different locations across the site

and several structures or archaeological features made of stone along with evidences of a small drain along with pottery were discovered. On the basis of the evidence recovered during the excavations, two cultural periods have been identified with Period I as Chalcolithic and Period II as Medieval (*IAR 2012-13*: 116 -20). Except for this brief information, no mention has been made regarding the material (pottery) recovered from the excavations and the report for the same is still awaited.

4.2. Systematic Archaeological survey: The Rationale

It was during the preliminary phase of my survey in the area that the site was located and it was decided that though a portion of the site had been excavated, it will be good to study the surface archaeology of the site and the material culture scattered across it in a more systematic manner. During the recce, it was observed that there is a good ceramic scatter at the site which if analyzed in a systematic manner would help to understand the chronological sequence of the site and its relationship to the other archaeological sites in the area. During the survey at the site of Dholi Mangari, it was increasingly realized that though the site had a sparse potsherd scatter, not big enough to augment an understanding of Ahar culture in a standalone narrative. Thereafter, Maharaja Ki Kheri was surveyed and the initial grab samples of pottery indicated that the study of archaeological material present at the site would further generate information and boost the study. Topographically, the two sites are very different from each other; however, the pottery from the two sites when compared showed enough similarities as well as variations. Hence, it was decided to carry out systematic surface survey at the site of Maharaja Ki Kheri with the following aims and objectives:

a) To mark out or delimit the spatial extant of the site on the basis of ceramic scatter across the surface.

b) To determine or establish the chronological/occupational sequence of the settlement at Maharaja Ki Kheri as well as understand the relationship between Maharaja Ki Kheri and Dholi Mangari and also the relationship of these two sites with other major archaeological sites in the region such as Ahar and Balathal.

c) To determine the impact of current land use upon the site and the problems posed by it for studying the surface archaeology at the site.

4.2.1. Sampling Strategies and Survey Methodology

It was during the month of May 2016 that a decision was made to carry-out a systematic surface survey at the site. However, this time I did not find any trained crew members for help during the survey as was in the case of survey at Dholi Mangari earlier. Help was sought from a local person named Prakash Vaishnav to carry out the survey, who was initially not acquainted with the methods of surveying, but proved to be fast learner and helped in carrying out the survey programme successfully. At first, it was decided to use grid method to systematically survey the site, however, with limited crew members and resources available it did not seem possible. Therefore, it was decided to use transects instead of gridding the site, which was relatively an easier method to carry out the survey.

Before delimiting the survey area, the surrounding areas around the site were explored thoroughly for any kind archaeological material scattered across the surface and it was found that the surrounding fields were devoid of any such material. After the initial recce, the boundaries or limits of the survey area were marked out with the help of a GPS unit and a base map was prepared for the survey area and the

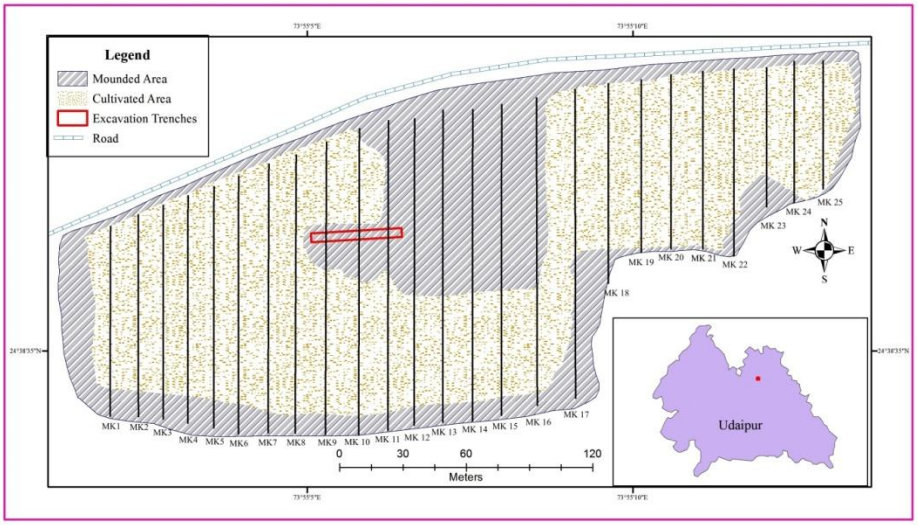

Figure 4.3. Placement of transects across the survey area at Maharaja Ki Kheri (Courtesy Aadil Zubair)

placement of transects across it was figured out. A total of 25 transects north-south oriented transects were laid out across the site. The length of the transects varied between

50 to 100 meters due to varying contour of the site and were spaced at a distance of 5 meters apart from each other. Transects were laid with the help of 50 m measuring tapes and the orientation was maintained by using a compass and pigs flags. Owing to an almost monotonous topography and sparse vegetative cover, it was relatively easier to layout transects at the site in comparison to that of Dholi Mangari where the undulating nature of the mound and several other factors especially thick vegetation posed several problems during the survey.

4.2.2. Field Walking and Collection Strategy

Once the transects were laid out, each individual transect was intensively surveyed by walking along the transect at a time and scanning the ground for ceramics and other artefacts scattered on the surface. The transects were closely spaced from each other which helped to survey the surface at a greater intensity and more thoroughly. The details for every individual transect surveyed were systematically documented in a field notebook including the density and distribution of ceramics and other material scattered along the sampling unit as well as information about the location, topography and present land use and so forth. GPS readings were taken for each sampling unit at the starting and end points which later on helped to place the location of transects on the map accurately.

In order to reduce the post-fieldwork analysis and processing, the collection strategy for Maharaja Ki Kheri was slightly modified compared to that of Dholi Mangari. It was decided that only diagnostic and decorated body sherds from the site will be taken back to Delhi as it was very difficult for me to carry so much pottery back to Delhi from the site alone, however, the non-diagnostic pottery from the transects was systematically documented, The diagnostic sherds collected from each transect were bagged separately and were labelled according to their respective transect numbers and were later on transported to Delhi for further analysis. A large number of potsherds scattered across the surface of the site were unearthed as a result of the agricultural activities at the site as well as due to the fact that the excavators discarded and dumped excavated material i.e. potsherds at the site from the recent excavations. Two large heaps of potsherds were found at the site, which according to the owner of the land were collected by him from the cultivated portions of the mound and piled up at one place since its presence reduced

the fertility of the soil and also hampers agricultural activities such as tilling or ploughing of the land. A few samples of the pottery were also collected from these areas as well and whenever we encountered such piles while walking the transects, they were duly made note of. It should be mentioned here that no artefacts were found at the site during the survey.

It is imperative to mention here that it was relatively much easier to carry-out the survey at the site compared to that at the site of Dholi Mangari. The site offered an ideal scenario for testing the sampling strategies as was devoid of any thick vegetation and provided a better resolution for making collections from the sampling units in a systematic manner. Whereas, at Dholi Mangari, owing to dense vegetative cover and foliage, a portion of the mound within the survey area could not be surveyed as it was very difficult to access those areas and make collections from. However, owing to the fact that the survey was at Maharaja Ki Kheri was done with the help of a person who was not acquainted with the know-how of the methodology, many a times mistakes were made, which, however were rectified immediately soon after.

4.3. Classification and Analysis of Ceramics from Maharaja Ki Kheri

The ceramic corpus collected during the survey at Maharaja Ki Kheri as stated in the previous section of this chapter consists of Diagnostic and Decorated body sherds. However, the non-diagnostic assemblage found across the transects was properly documented in the field itself, but not collected. During the survey, a total of 672 sherds were found scattered across the transects out of which only 80 sherds were diagnostics and the rest comprised of non-diagnostics or body sherds and also a few sherds bearing decorations. The diagnostic sherds from the site were carried back to Delhi for further analysis.

4.3.1. Non-diagnostic Pottery from Maharaja Ki Kheri

The non-diagnostic sherds as mentioned above were documented and classified in the field itself. The sherds were categorized into types on the basis of varying attributes such

as surface treatment, fabric, colour, condition of the core and so forth. The sherds were also counted and details of every individual sherd were recorded.

The non-diagnostic ceramic assemblage from Maharaja Ki Kheri can be broadly divided into categories i.e. Red Ware and Grey Ware with medium to coarse fabric. The pottery is generally wheel made, however, a small percentage of handmade sherds also find a place in the assemblage. The pottery (both oxidized and reduced) comprises of slipped, unslipped and burnished or polished sherds, with medium to coarse fabric. A large quantity of sherds exhibit defects or deficiencies in the firing technique. The site shows high levels of potsherds with burnt core. The burnt core ranges from being thin band in the core to almost the entire core being black or grey. In the Reduced category, sherds generally exhibit a good firing state, however a large number of sherds show defects in firing techniques. The tempering material used is generally mica along with chaff/husk and other larger inclusions. Majority of the oxidized sherds show visible inclusions such as mica and sand along with chaff that are either naturally present or were deliberately added as tempering agents to clay. Potsherds have high levels of white grit present in them. Ninety percent of the sherds exhibit varying levels of intrusions in the clay body high porosity. Inclusions are present in sherds belonging to both oxidized and reduced categories. A large number of oxidized sherds were found treated with a micaceous wash which gives a sherd a golden lustre or hue. A number of sherds were found in among the non-diagnostics with traces of scrapping and trimming on their surfaces along with a number of sherds with fire-clouds or smudged surfaces. There were also sherds with completely weathered or worn-out surfaces and encrusted surfaces. The 25 transects surveyed yielded a total of 583 non diagnostic sherds, which were classified and analysed. They were divided into different types on the basis of certain attributes or traits. Out of the total non-diagnostic assemblage, 421 sherds belonged to oxidized or red ware category the reduced assemblage consisted of 192 sherds. The non-diagnostic assemblage is dominated by Red ware with a good percentage of sherds belonging to Grey Ware categories. In the Reduced category, sherds generally exhibit a good firing state, however a large number of sherds show defects in firing techniques. The tempering material used is generally mica along with chaff/husk and other larger inclusions. A large number of oxidized sherds were found treated with a micaceous wash which gives a sherd a golden

lustre or hue. A number of sherds were found in among the non-diagnostics with traces of scrapping and trimming on their surfaces along with a number of sherds with fire-clouds or smudged surfaces. There were also sherds with completely weathered or worn-out surfaces and encrusted surfaces.

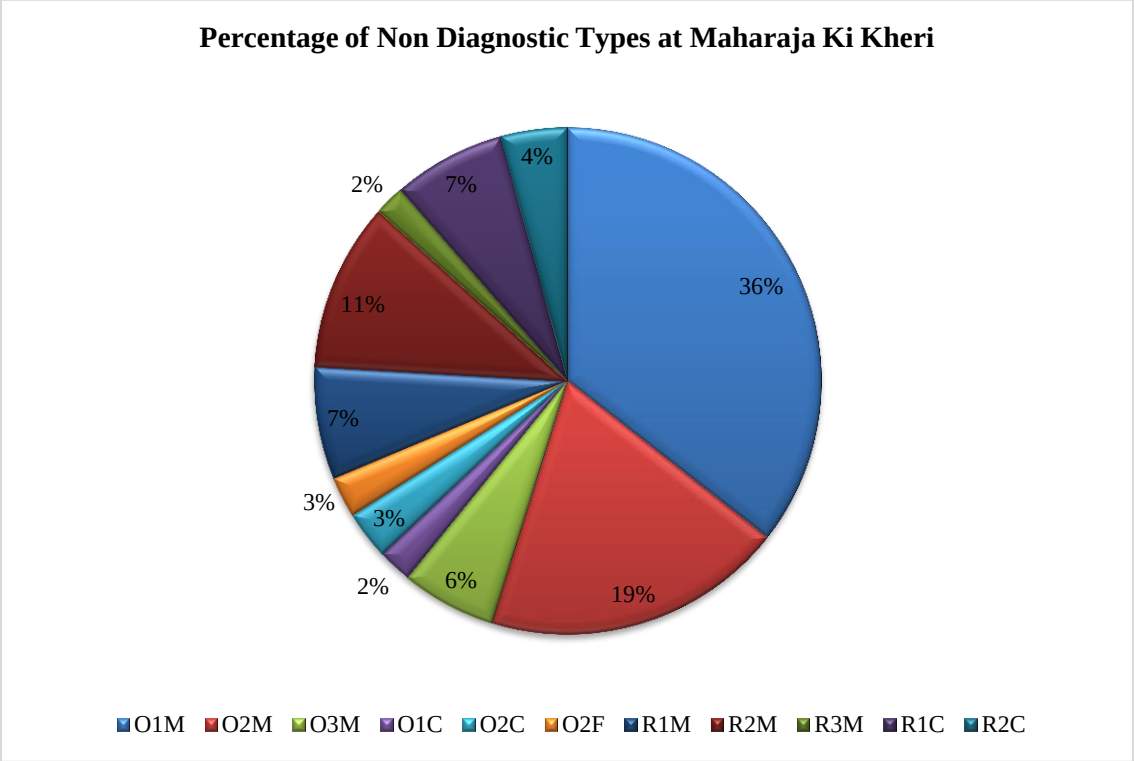

Figure 4.4. Percentage of Non-diagnostic ware types from Maharaja Ki Kheri.

Type	Number of Non Diagnostic sherds	Grand Total	Percentage
O1M	218	613	35.56%
O2M	118	613	19.2%
O3M	37	613	6.03%
O1C	13	613	2.17%
O2C	19	613	3.09%
O2F	16	613	2.6%
R1M	44	613	7.17%
R2M	66	613	10.7%
R3M	12	613	1.95%
R1C	44	613	7.17%
R2C	26	613	4.24%

Table 4.1. Count and percentage of Non-diagnostic ware types from Maharaja

4.3.2. Decorated Pottery from Maharaja Ki Kheri

A very small percentage of sherds bearing designs were collected from the site during the survey. The sherds containing decorations on their surfaces belong to both oxidized and reduced ware types with majority of the shreds belonging to the red ware category along with a few specimens of Grey Ware as well. The designs were generally found on the external surface of the vessels and consist mainly of incised, punctured, Applique and incised, chevron, grooves, diamond patterns, combinations of zigzag and wavy incised lines and so forth. The sherds were classified and analyzed by recording various attributes in a detailed way like fabric, surface treatment, condition of the core, as well as the stylistic attributes. The following few pages will discuss various types of decorated sherds along with photographs and other important details collected from the site during the present survey.

Figure 4.5. MK (a), Grooved incised design, Maharaja Ki Kheri

Figure 4.6. MK (b), Incised notches, Maharaja Ki Kheri

Figure 4.7. MK (c), Oblique notches/ cuts, Maharaja Ki Kheri

Figure 4.8. MK (d) Slanting notches or cuts, Maharaja Ki Kheri

Figure 4.9. MK (e), Combination of incised designs, Maharaja Ki Kheri

Figure 4.10. MK (f), Diamond pattern, Maharaja Ki Kheri

Figure 4.11. MK (g), Applique and incised design, Maharaja Ki Kheri

Figure 4.12. MK (h), Chevron design, Maharaja Ki Kheri

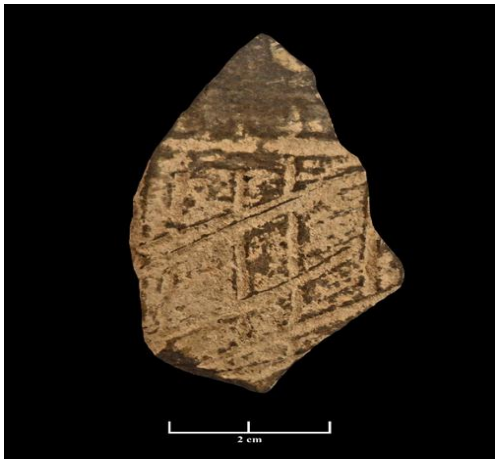

Figure 4.13. MK (i), Diamond Pattern, Maharaja Ki Kheri

S. No.	Type	Count	Wt. (g)	Description
MK (a)	O1M	1	9	Fragment of an unslipped medium red ware decorated with shallow parallel grooves followed by a punctured design on the exterior surface.
MK (b)	O1M	1	20	Fragment of an unslipped red ware decorated with incised design of small slanting cuts or notches. A micaceous wash on the exterior surface has applied giving a golden hue to the sherd.
MK (c)	O1M	1	18	Fragment of an unslipped red ware decorated with incised design of small slanting cuts or notches. A micaceous wash on the exterior surface has applied giving a golden hue to the sherd.
MK (d)	O1M	1	27	Fragment of an unslipped red ware decorated with incised design of small slanting cuts or notches. A micaceous wash on the exterior surface has applied giving a golden hue to the sherd.
MK (e)	O2M	1	6	Fragment of a slipped medium red ware decorated with an incised design of a combination of parallel lines and waves.
MK (f)	O2M	1	8	Fragment of medium red ware. A portion of the sherd has slipped applied on it. A shallow channel divides the slipped part from the decorated portion. An incised design of diamond pattern has been used to decorate a portion of the vessel.
MK (g)	R1M	1	56	Fragment of a grey unslipped medium ware decorated with applique and incised design on the shoulder.
MK (h)	R1M	1	32	Fragment of a grey unslipped medium ware decorated with an incised chevron design
MK (i)	R1M	1	16	Fragment of a grey unslipped medium ware decorated with incised design of diamonds.

Table 4.2. Decorated pottery from Maharaja Ki Kheri

4.3.3. Diagnostic Ceramic Assemblage from Maharaja Ki Kheri

During the surface survey at Maharaja ki Kheri, a total of 81 diagnostic sherds were recovered and collected for further analysis. The sherds were transported back to Delhi and were taken up for a systematic analysis in order to identify and understand various types and sub-types of ceramics from the site and their chronological affiliations. The

sherds were first cleaned off their dirt by washing the sherds in water and rubbing the surfaces with a soft brush and were dried in the sunlight. After cleaning the sherds, they were sorted into Diagnostic (Rims and Bases) and Decorated categories and were assigned sequential numbers in order to facilitate the documentation process. After the initial sorting was done, the sherds were taken up for a systematic analysis and were categorized into different types and sub-types on the basis of various attributes they possess. The sherds were documented in a detailed manner and all the information derived from them was recorded put in pre-printed recording sheets.

4.3.3.1. Attributes recorded

The ceramic sample collected during the survey of the site went through the same rigours process of classification as did the ones from Dholi Mangari. The information recorded for Diagnostic sherds included identifying the fabric, surface treatment, firing condition, colour, temper (inclusions in clay), surface colour and body colour and other attributes such as scraping or trimming marks. Similarly surface treatment of both the exterior and interior surface was also recorded. Again a distinction was made between Polished and Burnished on the basis of whether the sherds had glossy surface or had high and consistent sheen on them. The firing condition of the shreds was examined and a note made of whether it is oxidized, reduced and so forth. In order to arrive at an understanding of the vessel forms, Diagnostic rim sherds were measured for their diameter, internal height as well as attributes like carination, grooves and so forth were also noted. Apart from that the decorative elements or design types on the surface of the sherds were also recorded. The sherds were also counted and weighed. The sherds were assigned codes to represent their rim type and form. It must be pointed out that every attempt was made to draw the profile of each and every diagnostic sherd. However some of the sherds were so eroded or thick hand made that it was not possible to draw. Sometimes the tiny dimensions of the sherd also prevented the same.

In order to augment an understanding of whether these vessels were restricted or unrestricted in form further, their profile section was drawn to scale. On the basis of all this information ware categories and morphological categories were arrived upon.

4.3.3.2: Different Ware Types: An Analysis

The samples have been divided into Oxidized ware and Reduced ware. The division is based on the aspects already discussed in the previous chapter. Codes mentioned in the previous chapter for classifying the ceramics have been put to use here as well. Different ware categories that were defined during the classification process are as follows:

Red Ware (Oxidized)

a. Unslipped Red Ware with medium fabric (O1M)

b. Slipped Red Ware with medium fabric (O2M)

c. Unslipped Red Ware with coarse fabric (O1C)

d. Slipped Red Ware with coarse fabric (O2C)

Grey Ware (Reduced)

a. Unslipped Grey Ware with medium fabric (R1M)

b. Slipped Grey Ware with medium fabric (R2M)

d. Unslipped Grey Ware with coarse fabric (R1C)

It is pertinent to mention here that the ceramic assemblage from Maharaja Ki Kheri is dominated by pottery of medium and coarse fabric. We do not find any examples of fine ware here. It is interesting to further note that excavators in the *IAR* mention the fact that the top soil containing the medieval period pottery has almost been totally removed and that one can easily see scatter of potsherds belonging to the chalcolithic period. However despite this fact we did not find a single sherd belonging to the Black and Red ware variety which is ubiquitously found at sites such as Ahar. As already mentioned in the previous section the ceramic assemblage was divided into diagnostic and decorated categories. These two categories of ceramics will be taken up for a detailed discussion and analysis in the following sections of the chapter.

The diagnostic assemblage collected during the survey at Maharaja Ki Kheri can be broadly grouped under two categories, i.e. oxidized (Red Ware) and Reduced (Grey Ware).The sherds grouped under these two categories were further divided into various types on the basis of the attributes they possess. The diagnostic assemblage from the site is dominated by Red Ware along with a small percentage of Grey Ware of medium fabric. Majority of the sherds both red ware and grey ware are of medium fabric with examples of both slipped and unslipped varieties present.

Unslipped Red Ware: A large number of diagnostic sherds from the site belong this this ware type. This ware dominates the ceramic assemblage and consists of sherds with medium and coarse fabric. However, majority of the sherds are of medium fabric with a small percentage of sherds of coarse variety. The vessels belonging to this ceramic group are generally wheel made with a few examples of handmade sherds as well. The sherds are usually devoid of any surface treatment and have abrasive and micaceous surfaces and in some cases the sherds are treated with a lustrous micaceous wash which gives the sherds a golden hue. The pottery belonging to this group is generally ill-fired with a few well baked sherds. The tempering material usually consists of mica and sand alongwith chaff, grit and other inclusions. A small percentage of sherds also bear striation marks on their surfaces as well as traces of fire-clouding or burning. The major vessel types belonging to this category include jars, pots, lids, bases and sometimes bowls as well. A large number of unslipped sherds were found bearing various types of designs as well.

Slipped Red Ware – This ware type dominates the diagnostic assemblage from Maharaja Ki Kheri. The sherds belonging to this ware type are mainly medium fabric with a very small percentage of sherds with coarse fabric. The vessels belonging to this group are generally treated with a thin slip on the outer surface and rim portion of the inner surface with a small percentage of sherds having burnished or highly polished or smoothened surfaces. The slip is generally found on the external surface of the sherds, however in some cases both the surfaces are treated with a fine slip. The pottery is generally ill-fired with a good percentage of sherds having a perfectly oxidized core.

Some of the sherds also bear traces of scraping or trimming on the

Figure 4.14. Unslipped Red Ware pottery treated with micaceous wash

surface. The colour of the slip varies in red (Hue 10R 4/6, 5/6, 4/8), orange (Hue2.5YR 6/6), bright brown (Hue 2.5YR 5/8, 5/6), reddish brown (Hue 2.5YR 4/6), and dull reddish brown (hue 2.5YR 5/4). The inclusions present in the sherds are consists of mica particles and sand, however in the coarse varieties, inclusions such as chaff, husk, and other granular particles are found. The vessel forms included in this ware type are jars, pots, bowls, basins, dishes, pot-rests, and lids. It is however important to mention that a very few diagnostic shapes It is however important to mention that a very few diagnostic shapes belonging to slipped Red Ware category were found to bear any kind of decorations.

Grey Ware- A total of 16 grey ware sherds have been documented from the site of Maharaja Ki Kheri. Most of these sherds contain a good quality slip with smooth surfaces. However, a few sherds belong to the coarse variety. The pottery is generally wheel made with a perfectly reduced core with a small number of sherds showing defects in firing. Some of the sherds contained mica particles in the clay body without any large inclusions. The Grey Ware sherds with coarse fabric were found containing inclusions

such as chaff and grit in the clay body and are generally ill-fired. The grey ware assemblage at the site is represented by jars/pots, dishes, basins and bowls.

Figure 4.15. Red Ware sherds with abrasive and encrusted surfaces

The 25 transects have yielded a total of 80 diagnostic sherds which were classified and analysed. They were divided into different types on the basis of certain attributes or traits. The analysis showed that Oxidized or Red Ware dominates the ceramic sample at the site with 67 (67.25) sherds followed by grey ware with 16 (20) sherds. The O2M category dominates the diagnostic assemblage with 32 sherds. Interestingly the transects did not yield a single Black and Red ware.

The following pie chart and corresponding table reflect the total number of potsherds of the diagnostic types have been found belonging different ware types. The data on spatial density and distribution of different ware types in the 25 transects surveyed has been put into the form of a table attached at the end of the thesis as Appendix.

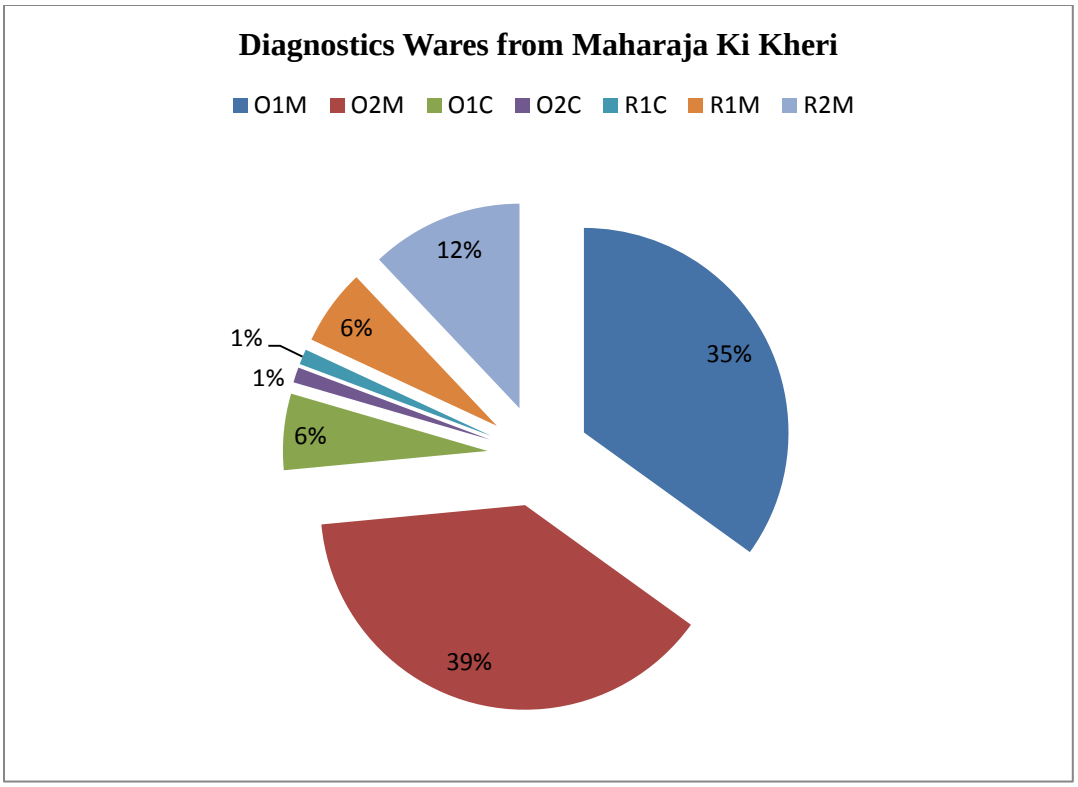

Figure 4.16. Chart showing percentage of diagnostic ware types from Maharaja Ki Kheri

Type	Number of Diagnostic sherds	Grand Total	Percentage
O1M	29	80	36.25
O2M	32	80	40
O1C	5	80	6.25
O2C	1	80	1.25
R1C	1	80	1.25
R1M	5	80	6.25
R2M	10	80	12.5

Table. 4.3. Count and Percentage of Diagnostic ware types from Maharaja Ki Kheri

4.4. Diagnostic forms and their spatial distribution at Maharaja Ki Kheri

As mentioned in the previous chapter in order to create a typology, the diagnostic sherds were categorized into different vessel forms on the basis of their formal or morphometric attributes. The process of categorizing pottery into different vessel forms required the same methodology as was applied in case of Dholi Mangari. The categorization was done on the basis morphology of the rim, the orifice diameter, internal height as well as other technological attributes and formal attributes. The diagnostic pottery was divided into different types and were assigned certain codes in order to make the recording process a bit easier. Following are the shapes and their corresponding codes found at the site of Maharaja Ki Kheri.

Shape	Code
Jar/Pot	**1**
Bowl	**2**
Dish	**3**
Basin	**4**
Lid	**5**
Dish on stand	**6**
Pot rest	**7**
Base	**8**
Knob	**9**
Indeterminate	**10**

Table 4.4. Codes assigned to vessel forms from Maharaja Ki Kheri

The following section gives a detailed account of transects accompanied by drawings of the profile of the sherds and the details of the every single sherd.

Transect 4:

The first three transects 1-3 did not yield any diagnostic pottery, however a large number of non-diagnostic sherds were collected from these three transects. From transect 4, which was placed across the cultivated portion of the mound, diagnostic sherds of slipped and unslipped red ware with medium to coarse fabric were collected. The sherds belong to jar/pot, basin, knob and a base fragment.

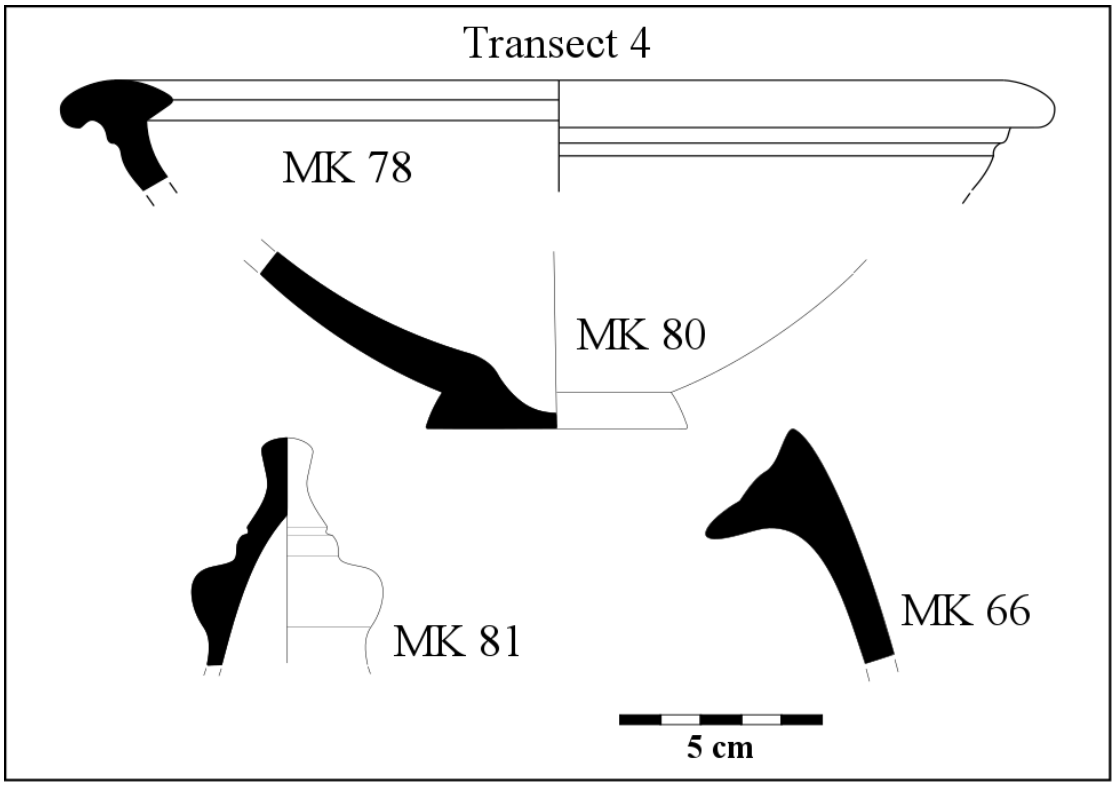

Figure 4.17. Diagnostic pottery from Transect 4

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 78	4	O2M	1	46	22	Bilaterally projected nail-headed rim with deep groove on exterior below the rim, incurved sides. Inner surface slipped (smooth), slightly abrasive external surface with a deep groove below the rim, incompletely oxidized.
MK 80	8	O1M	1	23	6	String-cut base with a depression at the center, slightly
MK 81	9	O2M	1	37	-	External surface slipped (smooth), ill-fired.
MK 66	1	O1C	1	42	-	Externally projected beaked rim with a pointed top and two shallow groove on rim exterior, tapering sides. Thick sherd (probably handmade) with abraded surface and chaff in clay, incompletely oxidized.

Table 4.5. Diagnostic pottery from Transect 4

Transect 7:

Transect 5 and 6 did not produce any diagnostic sherds, but a few decorated sherds alongwith a large number of non-diagnostic sherds were collected from these two transects. Transect 7 yielded a good number of non-diagnostic sherds alongwith two diagnostic sherds of slipped red ware of medium fabric. The sherds collected represent jar/pot types.

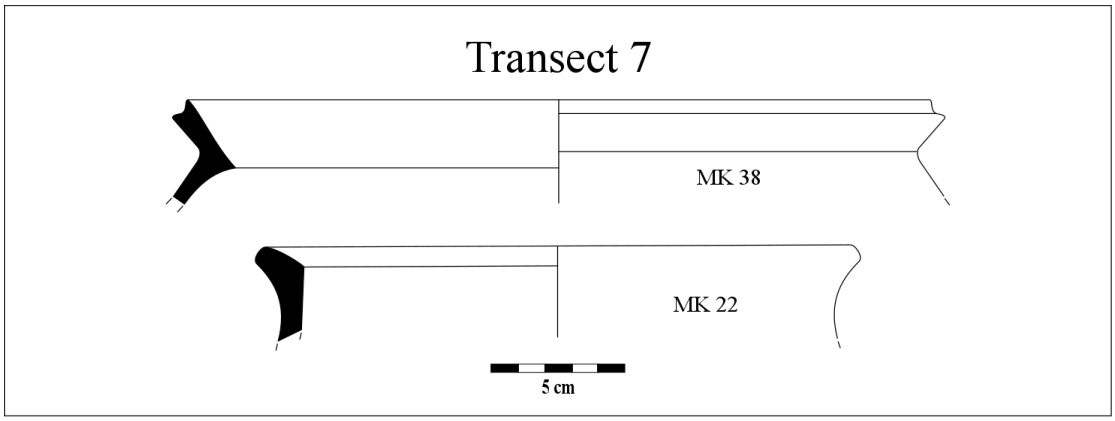

Figure 4.18. Diagnostic pottery from Transect 7

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 38	1	O2M	1	17	28	Splayed-out beaked rim with a concavity on exterior and a pointed top, short concave internally carinated neck. External surface slipped up to the rim on interior, fire-clouded or smudged surface on exterior, incompletely oxidized.
MK 22	1	O2M	1	16	22	Flared-out rim and neck. Both surface slipped (smooth) with mica particles in clay, well-fired

Table 4.6. Diagnostic pottery from Transect 7

Transect 8:

The sampling unit was located close to the excavated areas of the mound and yielded a large number of non-diagnostic sherds of both oxidized and reduced ware types with varying attributes. Apart from that some diagnostic sherds were also collected from the transect which comprises of sherds slipped red ware with medium fabric and a single

sherd of slipped grey ware. The diagnostic sherds belong to jar/pot and basin types. Two sherds of the red ware category bear incised designs and a single sherd of slipped grey ware also carries incised grooves on rim interior and the shoulder exterior. A jar belonging to red ware of medium fabric has a micaceous surface which gives it a golden hue and carries an incised design on neck exterior.

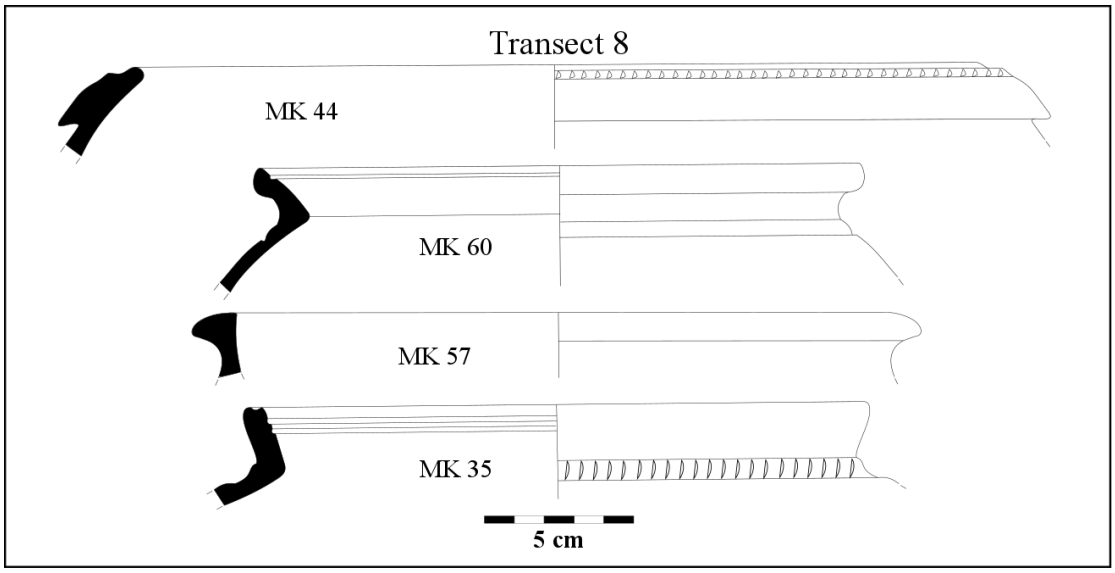

Figure 4.19. Diagnostic pottery from Transect 8

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 44	4	O2M	1	23	28	Incurved externally collared rim with a ridge on exterior; incised design (notches) on rim exterior. Traces of slip on both surfaces, mica particles in clay, ill-fired
MK 60	1	R2M	1	32	20	Splayed-out externally thickened rim with a groove on interior and a mild ledge or rib followed by a deep groove on shoulder, short concave internally constricted neck. Grey ware sherd of

						medium fabric with slip on external surface up to the rim on interior, well fired
MK 57	1	O2M	1	16	22	Bilaterally projected rim with a slightly concave neck. Both surfaces same slip (traces), mica particles in clay, ill-fired
MK 35	1	O2M	1	18	22	Flared or splayed-out rim with a concavity on top followed by a mild rib on neck exterior bearing an incised design, two shallow grooves on rim interior. Smooth surfaces with a micaceous wash on exterior giving a golden hue, well-fired.

Table 4.7. Diagnostic pottery from Transect 8

Transect 9:

The transect covered portions of the excavated area and resulted in a collection of a large number of non-diagnostic and diagnostic sherds belonging to both red ware and grey ware types. The diagnostic sherds collected from the unit are mostly of unslipped red ware with medium fabric alongwith a few sherds of slipped red ware as well as two sherds of slipped grey ware and one sherd of unslipped variety. Majority of the sherds collected from the unit are of jar/pot type alongwith sherds representing bowl, basin, and a base.

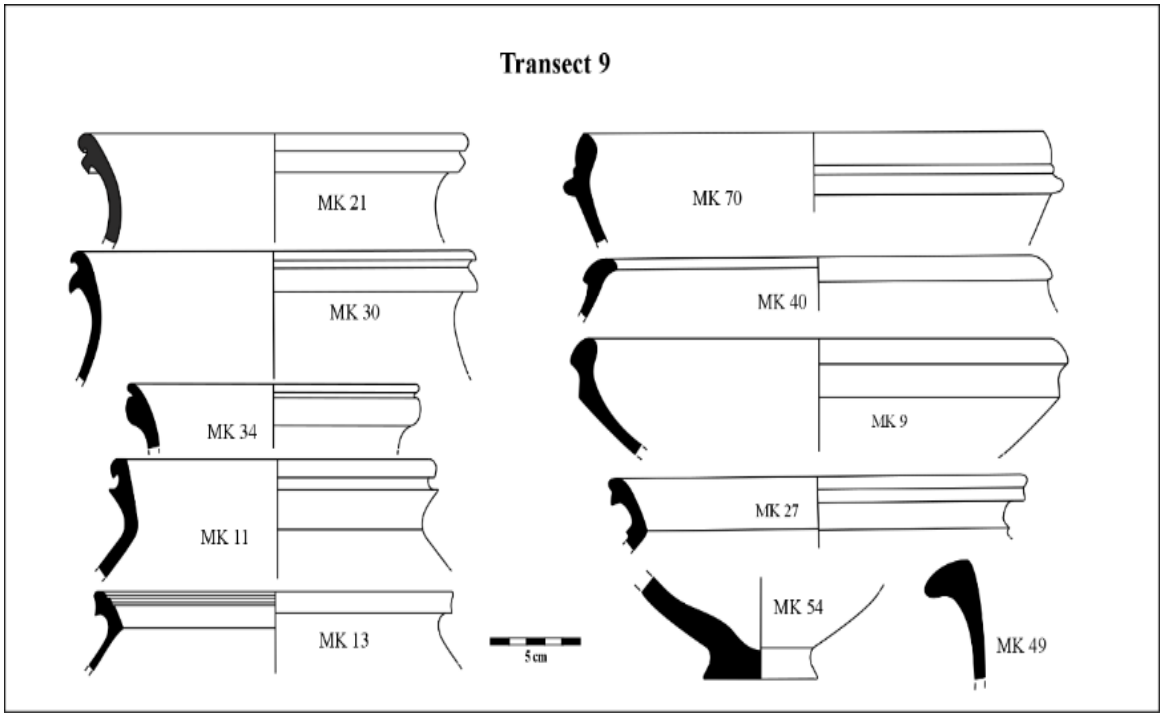

Figure 4.20. Diagnostic pottery from Transect 9

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 21	1	O1M	1	24	22	Externally projected clubbed or collared rim with a concave neck. Smooth surfaces with particles of mica in clay, well-fired
MK 30	1	R1M	1	32	22	Externally projected collared rim with a groove/concavity on exterior, concave neck. Slightly abrasive surfaces with encrustations on exterior, well-fired
MK 34	1	O1M	1	13	16	Externally projected thickened rim with a groove on exterior. Slightly abraded surfaces with mica in clay, well-fired
MK 11	1	O1M	1	26	20	Externally projected collared rom with a flat top and a sharp flange on exterior, short concave internally carinated neck with oblique shoulders. Smooth surfaces with mica particles in clay, ill-fired

MK 13	1	O1M	1	23	20	Externally projected collared rim with a mild concavity on exterior and two shallow grooves on interior; short concave internally carinated neck. Slightly abrasive surfaces (encrusted), ill-fired
MK 70	2/4	R2M	1	46	24	Traces of thin slip on both surfaces, burnt core
MK 40	¼	O1M	1	22	24	Bilaterally projected oval collared rim with a concavity on interior, short concave neck and oblique shoulder. Smooth surfaces with mica particles in clay, well-fired
MK 9	3/4	O2M	1	37	26	Externally beaded rim with a sharp carination on exterior, incurved sides. Both surfaces same slip, encrusted inner surface, incompletely oxidized
MK 27	1	R2M	1	26	24	Externally projected beaked rim with a groove on exterior. External surface slipped up to the rim on interior (smooth), well-fired
MK 54	8	O1M	1	38	6	String-cut base with a mild depression at the center, smooth surfaces, mica in clay, ill-fired
MK 49	10	O2M	1	56	-	Externally projected beaked rim. Thin slip/ wash applied on both surfaces, thick sherd with abraded surfaces, mica in clay, ill-fired.

Table 4.8. Diagnostic pottery from Transect 9

Transect 10:

The transect unit covered portions of the excavated area and a large number of stone fragments and boulders were found scattered all over the place alongwith a thick scatter of potsherds, mainly non-diagnostics. The diagnostic pottery collected from the transect is mainly red ware of medium to medium fabric with slipped and unslipped varieties alongwith a few sherds of slipped and plain grey ware of medium fabric. The sherds belonging to the red ware category are of jar/pot and bowl/ dish category and the grey ware sherds representing jar/pot types.

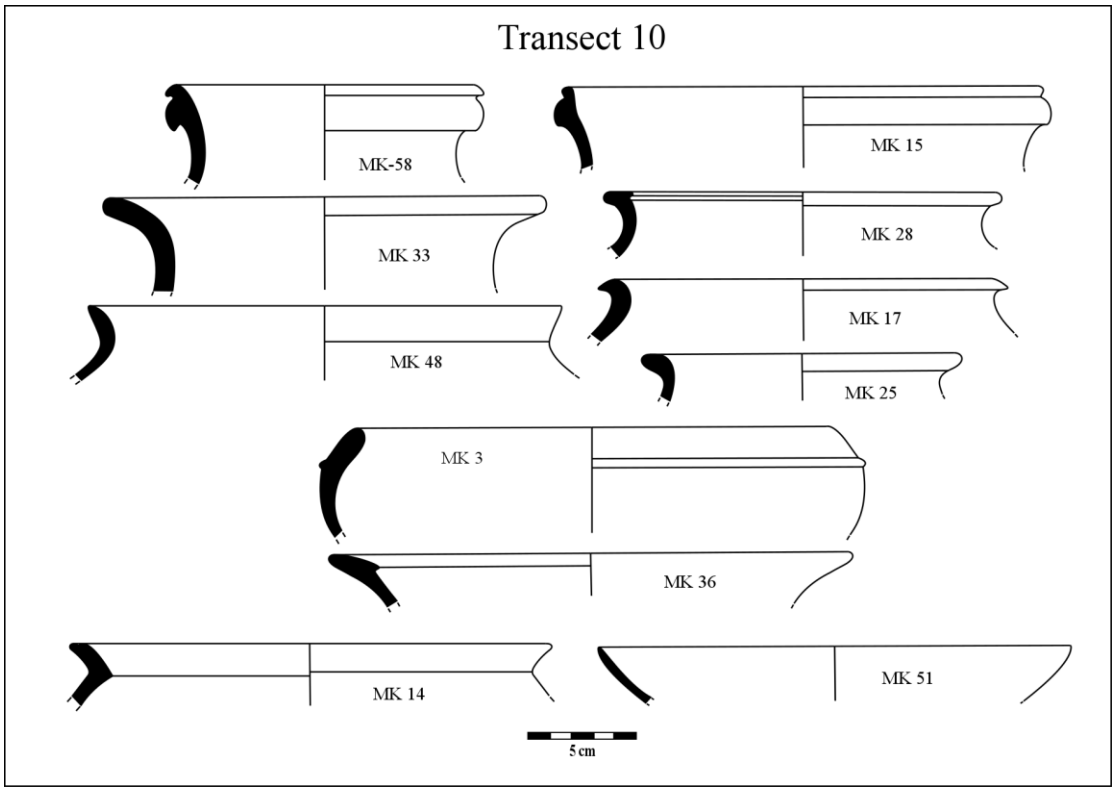

Figure 4.21. Diagnostic pottery from Transect 10

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 58	1	O1M	1	24	14	Externally projected collared rim with a concavity on exterior, concave neck. Encrusted external surface, smooth inner surface with mica particles in clay, well-fired.
MK 33	1	O2M	1	52	20	Out-going rounded rim with a concave neck. Thick sturdy sherd with traces of slip on both surfaces, encrusted external surface, mica particles in clay, ill-fired.
MK 48	1	O2M	1	17	22	Flared-out rim with a pointed top and a concave neck. Thin slip on both surfaces, abraded external, smudged inner surface, ill-fired.
MK 15	1	O1M	1	21	22	Externally projected thickened rim with a groove on exterior and a concave neck. Smooth surfaces with mica particles in clay, burnt inner surface, well-fired.
MK 28	1	R1M	1	14	18	Bilaterally projected rim with a flat top and a groove on interior, concave neck. Smooth surfaces, well-fired.
MK 17	1	O2M	1	23	18	Out-turned beaked rim with an oblique-cut top and a short concave neck. External surface slipped with a veneer coating of clay (rusticated), mica particles in clay, ill-fired.
MK 25	1	R2M	1	13	16	Flaring externally projected rim with a short concave neck. Both surfaces slipped (smooth), mica particles in clay, well-fired.
MK 3	2/3	O1M	1	32	22	Incurved featureless rim; convex sides with a mild rib on exterior. Slightly abraded (gritty) surfaces with mica particles in clay, incompletely oxidized.
MK 36	3/ 5	O2M	1	12	24	Externally projected, internally splayed-out rim with a ledge on interior, tapering sides. Thin slip on inner surface, smooth surfaces with mica particles in clay, well-fired.
MK 14	1	O2M	1	17	22	Splayed-out rim with a groove on top; short concave and internally carinated neck. External surface slipped up to

						the rim on interior, smooth micaceous surfaces, well-fired
MK 51	2/3	O1M	1	6	22	Everted, sharpened rim with convex sides. Slightly abrasive surfaces with mica particles in clay, well-fired.

Table 4.9. Diagnostic pottery from Transect 10

Transect 11:

The sampling unit shares the contextual information with the previous transect and covered a portion of the excavated area at the site. Apart from the non-diagnostic sherds, the transect yielded a number of diagnostic sherds of both oxidized and reduced types. Majority of the red ware sherds are of medium to coarse fabric with slipped and unslipped surfaces and represent jar/pot, bowl and basin forms. The grey ware sherds are of medium fabric with slipped and unslipped surfaces and represent jar/pot categories.

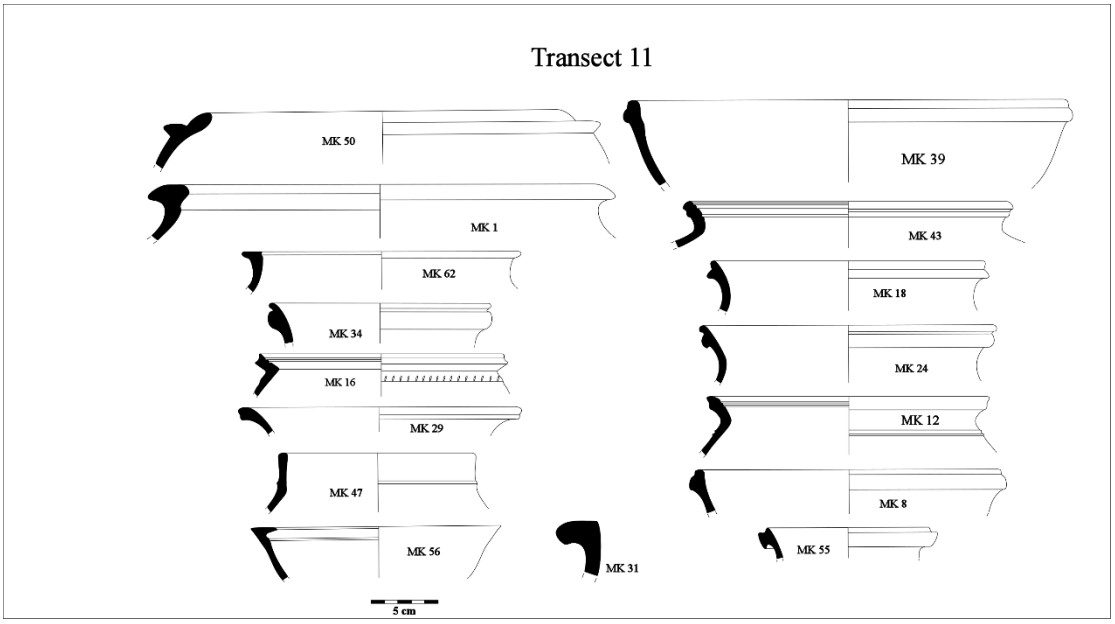

Figure 4.22. Diagnostic pottery from Transect 11

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 50	1/ 4	O2M	1	36	26	Incurved thickened rim with a flange on exterior, convex sides. Traces of slip on external surface, slightly abraded surfaces with mica particles in clay, ill-fired
MK 1	1	O1C	1	48	26	Bilaterally projected nail-headed rim with a depression on interior; short concave neck. Thick sherd, encrusted surfaces with burnt exterior, chaff and other inclusions in clay, ill-fired.
MK 62	1	R1M	1	16	18	Bilaterally projected rim with a flat top and a shallow groove on interior; concave neck. Smooth surfaces, well-fired
MK 34	1	O1M	1	9	16	Externally projected thickened rim with a groove on exterior. Smooth surfaces with mica particles in clay, well-fired
MK 16	1	O1M	1	19	18	Splayed-out rim with a concavity on exterior and two shallow grooves on interior; short concave and internally carinated neck. Smooth surfaces, well-fired
MK 29	1	R2M	1	10	20	Flaring thickened rim with a groove on exterior; slanting sides. Slightly abraded surfaces with traces of slip on both sides, well-fired
MK 47	1	O1M	1	26	15	Straight rim with a rounded top, internally carinated neck with a mild rib on exterior. Encrusted surfaces, well-fired
MK 56	2	O1M	1	14	18	Out-going, internally projected rim with a flat top with a groove on interior below the rim, tapering sides. Smooth surfaces with fire-clouding on exterior, ill-fired
MK 39	4	O2M	1	48	32	Externally projected, thickened rim with a rounded top and a mild rib/ledge on interior below the rim; convex sides. Thin slip or wash applied on both surfaces, encrusted inner surface, ill-fired
MK 43	1	O2M	1	23	24	Flaring rom with a mild rib on exterior and two shallow grooves on

						interior; short concave neck and expanding shoulders. Slightly abraded surfaces with traces of slip on both sides, ill-fired.
MK 18	1	O1M	1	18	20	Externally projected beaked rim with a concave neck. Slightly abrasive surfaces, ill-fired
MK 24	1	O1M	1	27	22	Externally projected collared rim with a groove on exterior; concave neck. Slightly abrasive surfaces with mica particles in clay, well-fired
MK 12	1	O1M	1	26	22	Externally projected thickened rim with a concavity on exterior; short concave internally constricted neck short concave neck; ribbed shoulder with two shallow grooves on rim interior. Smooth, smudged surfaces, ill-fired
MK 8	1/4	O1M	1	16	22	Externally projected thickened rim with a groove on top; tapering sides. Smooth surfaces with mica particles in clay, ill-fired
MK 55	1	O2M	1	9	12	Externally projected collared rim with a concavity on top and a short concave neck. Thin slip or wash on exterior, smooth surfaces, well-fired
MK 31	1	O1C	1	36	-	Externally thickened rim with almost a flat top. Thick sherd, slightly abraded surfaces, full of chaff, incompletely oxidized

Table 4.10. Diagnostic pottery from Transect 11

Transect 12:

The transect resulted in the collection of a number of non-diagnostic sherds and also a few diagnostic sherds belonging to slipped and unslipped varieties of red ware and grey ware of medium fabric. The sherds belong to jar/pot, bowl/dish, basin and lid categories.

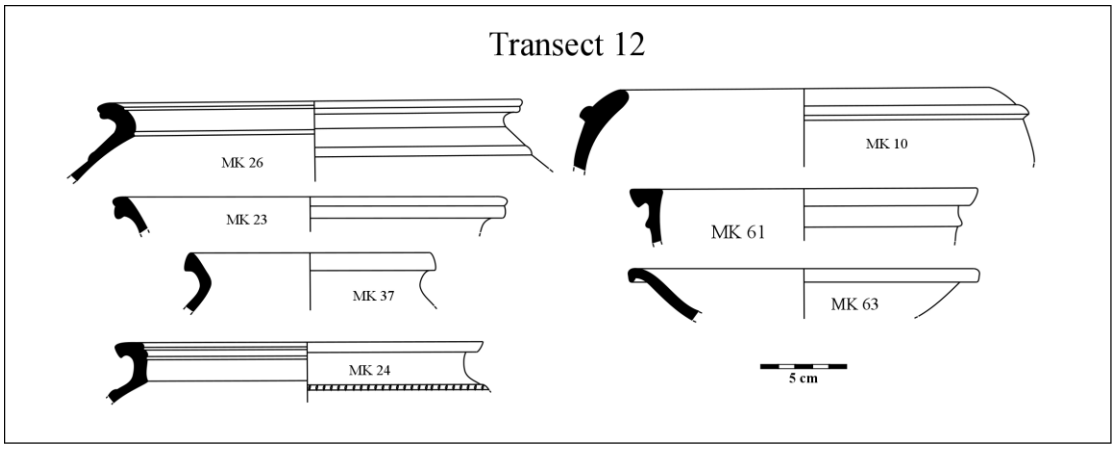

Figure 4.23. Diagnostic pottery from Transect 12

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 26	1	R2M	1	28	26	Flaring rim with a groove on exterior and two shallow grooves on interior; short concave neck with a mild rib on shoulder. Slightly abraded surfaces with traces of slip on both surfaces, well-fired
MK 23	1	O2M	1	17	22	Out-turned beaked rim with a groove on exterior and a concave neck. Both surfaces slipped, encrustations on exterior, incompletely oxidized
MK 37	1	O1M	1	11	14	Out-turned collared rim with a short concave and internally constricted neck. Smooth surfaces, ill-fired
MK 24	1	R2M	1	32	22	Horizontally splayed-out collared rim with a short concave internally carinated neck; two shallow grooves on rim interior and a mild rib bearing an incised design on shoulder externally. External surface slipped up to neck on interior (smooth), well-fired
MK 10	4	O2M	1	42	20	Incurved featureless rim with a flange on exterior; convex-sided vessel. Slightly abraded surfaces with traces of slip on both sides, incompletely oxidized
MK 61	1/4	R2M	1	36	20	Externally collared rim with a flat top; incurved sides with a ledge/rib on

						exterior. Both surfaces slipped (smooth), well-fired
MK 63	5/3	O1M	1	26	20	Flaring, externally collared rim with tapering sides. Slightly abraded and encrusted surfaces, well-fired.

Table 4.11. Diagnostic pottery from Transect 12

Transect 13:

The sampling unit yielded a mix of red and grey ware of medium and coarse fabric. Most of the sherds belong to Jar/pot category with one of them possibly either being a basin or a lid with one sherd bearing an incised design on exterior. Both slipped and unslipped ware are present in the ceramic sample collected from the transect. The crew member walking the transect made a note of the fact that potsherds possibly discarded after the excavation were kept in a pile in the middle of the transect by the farmer of the agricultural land.

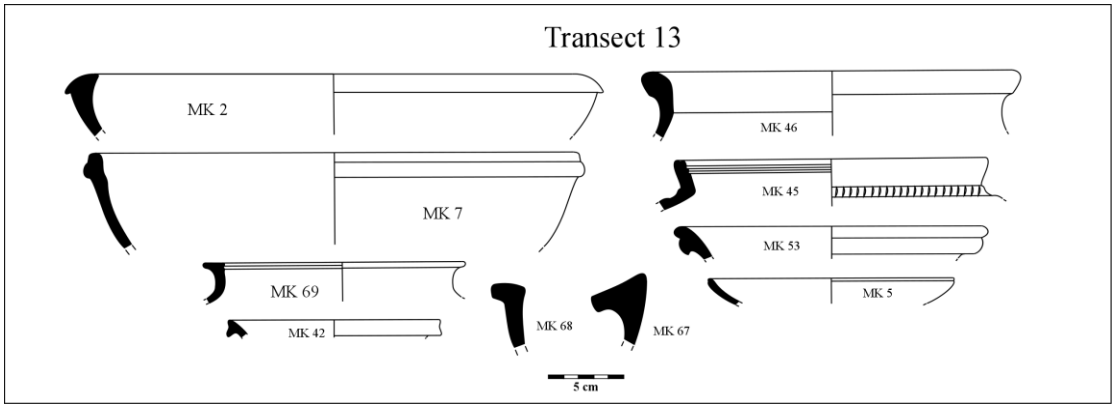

Figure 4.24. Diagnostic pottery from Transect 13

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 2	4	O2M	1	28	32	Beaked or collared rim with incurved sides. Both surfaces slipped (smooth), well-fired
MK 7	4	O2M	1	36	32	Externally projected, thickened rim with a rounded top and a mild rib/ledge on interior below the rim;

						convex sides. Thin slip or wash applied on both surfaces, encrusted inner surface, ill-fired
MK 69	1	R2M	1	19	16	Bilaterally projected rim with a flat top and a groove on interior; short concave neck. Slightly abraded surfaces with traces of slip on external surfaces and rim interior. Striations on neck interior, well-fired
MK 42	1	O2M	1	6	14	Externally projected beaked rim with a concavity on exterior. Traces of a thin slip on both surfaces, well-fired
MK 45	1	O2M	1	17	22	Flared or splayed-out rim with a concavity on top followed by a mild rib on neck exterior bearing an incised design, two shallow grooves on rim interior. Smooth surfaces with a micaceous wash on exterior giving a golden hue, well-fired.
MK 53	1	O1M	1	13	20	Externally projected, beaked rim with a concavity or groove on exterior. Encrusted surfaces, well-fired
MK 5	2/3	O1M	1	4	18	Everted featureless rim with a groove on exterior, tapering sides. Smooth surfaces, ill-fired
MK 68	3/4	O1C	1	34	-	Splayed-out rim with incurved sides. Thick handmade sherd, full of chaff, well-fired
MK 67		O1C	1	42	-	Beaked rim with an oblique-cut top. Thick handmade sherd, full of chaff, ill-fired
MK 46	1	O1M	1	28	24	Externally projected, thickened or beaded rim with a short concave neck. Slightly abraded surfaces, well-fired

Table 4.12. Diagnostic pottery from Transect 13

Transect 14:

A large number of diagnostic sherds were collected from the sampling unit along with a few diagnostic sherds of unslipped red ware and grey ware with medium fabric. The vessel forms include jar/pot shapes.

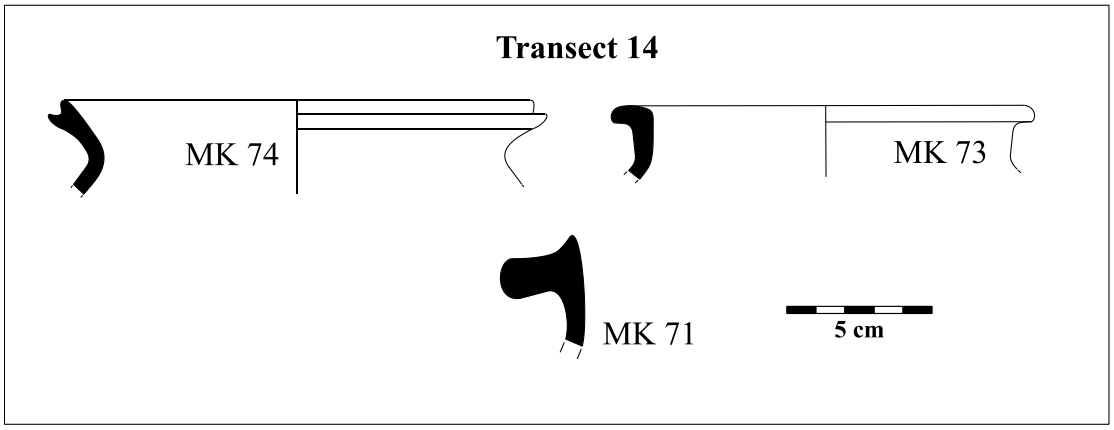

Figure 4.25. Diagnostic pottery from Transect 14

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 74	1	R1M	1	13	16	Externally projected beaked rim with a concavity on exterior, short concave neck. Slightly abraded surfaces with mica particles in clay, well-fired
MK 73	1	R1M	1	18	14	Horizontally splayed-out rim with a straight neck. Smooth surfaces, well-fired
MK 71	1	O1M	1	42	-	Rim with a pointed top and a collared lug or flange on exteriors. Abraded surfaces, incompletely oxidized

Table 4.13. Diagnostic pottery from Transect 14

Transect 15:

The transect covered a portion of a freshly ploughed field and yielded a large number of non-diagnostic sherds as well as a few sherds of diagnostic slipped red ware with medium fabric. All the sherds belong to jar/pot category.

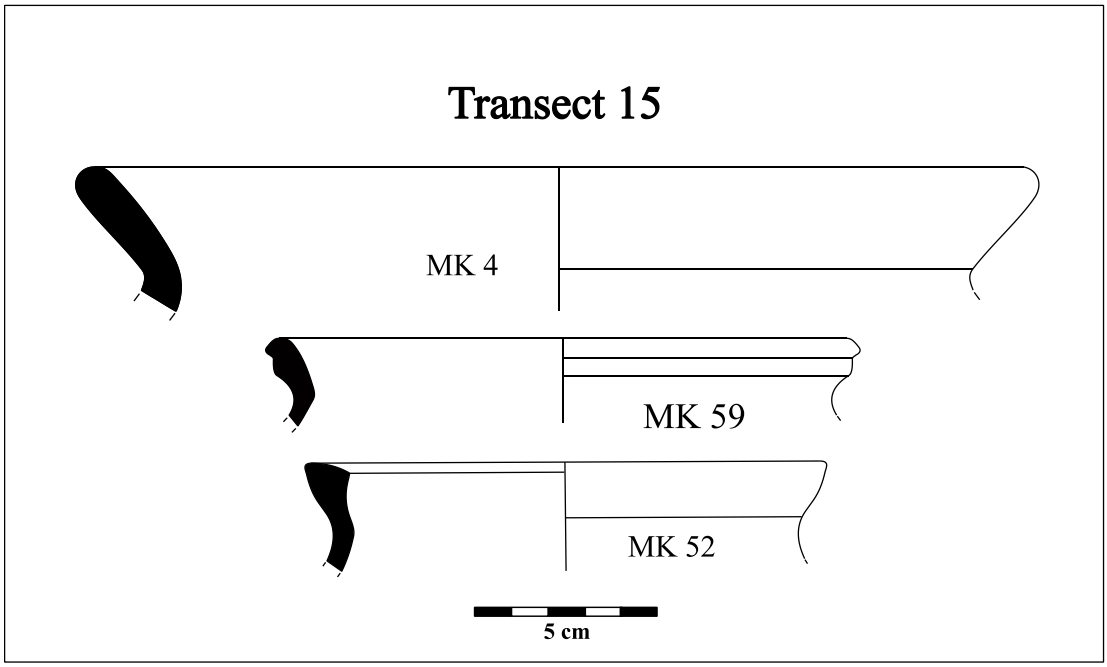

Figure 4.26. Diagnostic pottery from Transect 15

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 4	1	O2M	1	24	26	Splayed-out featureless rim with a short concave neck. Both surfaces slipped with white encrustation on exterior, ill-fired
MK 59	1	O2M	1	12	18	Externally projected thickened rim with a slightly concavity on exterior; short concave internally carinated neck. Both surfaces slipped (smooth), well-fired
MK 52	1	O2M	1	10	14	Bilaterally projected rim with a slightly beveled top and a depression on interior; short concave neck. Thin slip or wash applied on external surface up to the neck on interior, burnt core

Table 4.14. Diagnostic Pottery from Transect 15

Transect 16:

The sample unit yielded sherds of unslipped red ware with medium fabric belonging to the Jar/Pot category. The crew member walking the transect noted down the steady decrease in the number of potsherds that were collected during the survey as we moved towards the eastern part of the site.

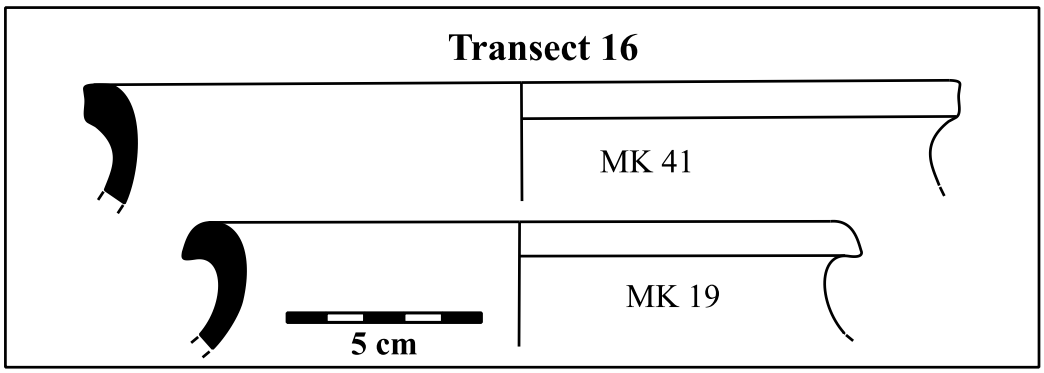

Figure 4.27. Diagnostic pottery from Transect 16.

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 41	1	O1M	1	13	22	Externally projected, thickened rim with a mild concavity on exterior, short concave neck. Smooth surfaces with mica in clay, well-fired
MK 19	1	O1M	1	22	16	Out-turned, drooping rim with a short concave neck. Slightly abrasive surfaces, ill-fired

Table 4.15. Diagnostic pottery from Transect 16

Transect 17:

The sample unit yielded one sherd belonging to the red ware category and the other to the grey ware category. Both were of medium fabric and belong to the Jar/Pot categories. The density of potsherds in the transect was very low and yielded only a few sherds of non-diagnostic sherds as well.

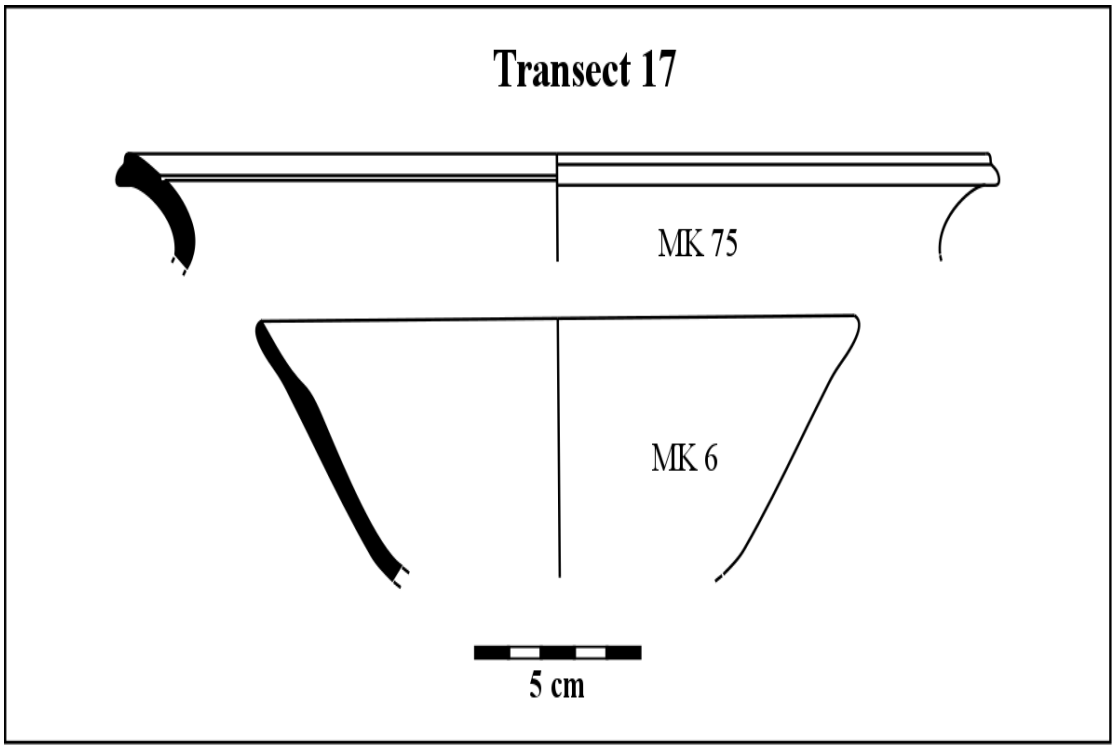

Figure 4.28. Diagnostic pottery from Transect 17

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 75	1	R2M	1	16	26	Externally projected, beaked rim with a concavity on exterior, short concave neck. Both surfaces slipped (smooth), well-fired
MK 6	2	O1M	1	22	18	Everted internally sharpened rim with slightly incurved sides. Smooth surfaces with mica particles in clay, ill-fired

Table 4.16. Pottery from Transect 17

Transect 18:

The sample unit yielded one sherd belonging to the red ware category and the other to the grey ware category. One sherd belong to the medium fabric category the other one had a coarse fabric. They both however belong to the Jar/Pot category.

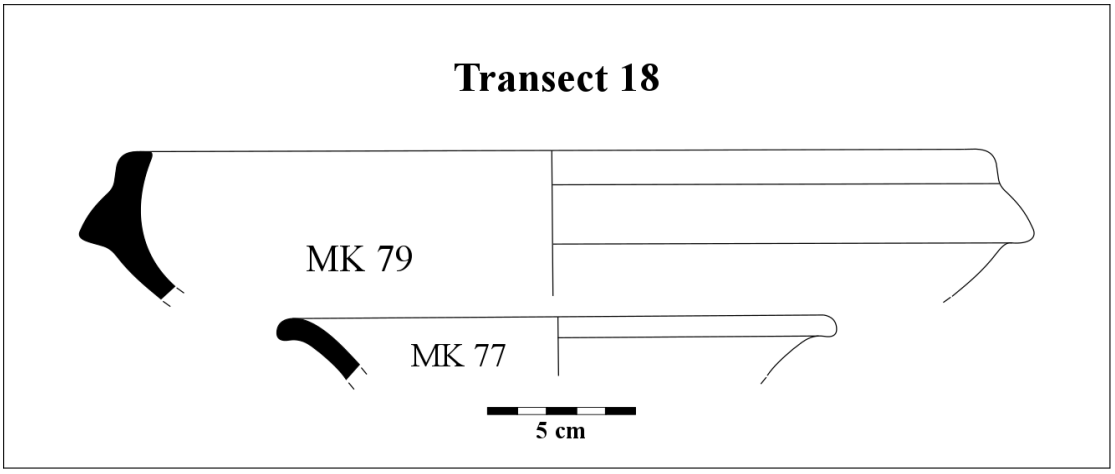

Figure 4.29. Diagnostic pottery from Transect 18

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 79	2/3	R1C	1	42	28	Incurved, collared rim with an almost flat top, convex sides. Abrasive surfaces, chaff and other inclusions in clay, ill-fired
MK 77	?	O1M	1	12	18	Flaring, externally beaded rim. Smooth surfaces with mica particles in clay, ill-fired

Table 4.17. Diagnostic pottery from Transect 18

Transect 21:

The sample unit yielded three sherds of slipped red ware with medium to coarse fabric and a slipped grey ware sherd with medium fabric. The sherds belong to jar/pot, jar/basin categories. The sampling unit yielded a few non-diagnostic sherds as well.

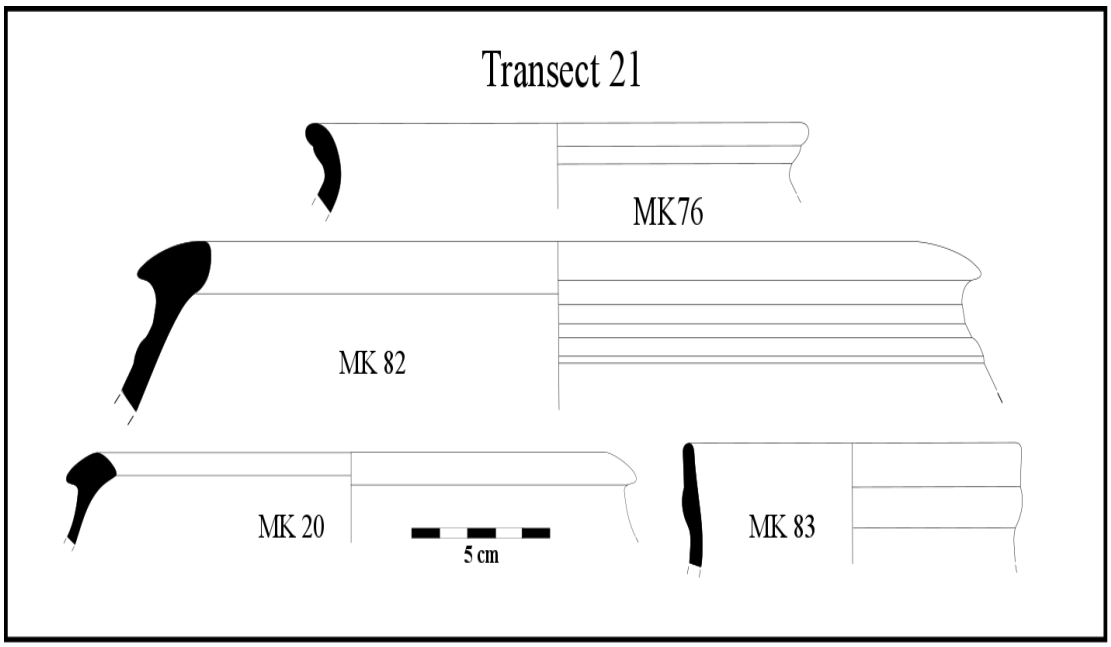

Figure 4.30. Diagnostic pottery from Transect 21

S. No.	Form	Type	Count	Wt. (g)	Dia. (cm)	Notes
MK 76	1	R2M	1	9	18	Flaring, externally thickened and grooved rim with a short concave neck. Both surfaces slipped (smooth), well-fired
MK 82	1/4	O2C	1	44	26	Bilaterally projected, beaked rim with a grooved neck followed by a mild rib on shoulder. Traces of slip on exterior, encrusted and burnt surfaces, chaff and other inclusions in clay, ill-fired
MK 20	1/4	O2M	1	22	20	Bilaterally projected, beaked rim with oblique shoulders. Smooth surfaces with mica particles in clay, ill-fired
MK 83	1	O2M	1	16	12	Straight featureless rim with a mild rib on exterior, slightly concave neck. External surface slipped up to rim interior, encrusted external surface, ill-fired

Table 4.18. Diagnostic pottery from Transect 21

Transects 22 to 25 did not yield any diagnostic sherds, however a very less number of non-diagnostic sherds were collected form the area covered by these transects. It was observed that towards the eastern corner or the site there was a very low density of potsherds.

Conclusion

Survey of the archaeological site of Maharaja Ki Kheri and the ceramic analysis of the sample collected during survey are the two major aspects discussed in this chapter. Beginning with a discussion of the location of the site, the description of the survey etc,

the chapter then focuses on the categorising the potsherds on the basis of colour, fabric, surface treatment, orifice diameter, internal height. Now that the ceramic analysis of both the sites has been completed, the comparative study of the sites as well as a discussion on the chronology of the sites can easily be undertaken. This forms the first part of fifth chapter, where ware types and vessel forms from Dholi Mangari and Maharaja Ki Kheri will be compared to each other as well with those from Ahar, Balathal, Gilund and other sites.

Chapter Five

Discussion and Conclusion

Introduction:

This chapter focuses on the comparative study and analysis of the pottery collected from the archaeological sites of Dholi Mangari and Maharaja Ki Kheri by means of a systematic surface survey and collection programme. An attempt has been made to compare the ceramics from the two sites with each other and also with pottery from the already excavated sites in the area such as Ahar and Balathal in order to draw similarities between the ceramic types and sub-types and to build a tentative chronological sequence for the two sites. The second section of the chapter will summarise each and every chapter as well as discuss the way forward.

5.1. Comparative Ceramic Studies in Archaeology

Ceramics are one of many artefact classes that have played a significant role in how archaeologists interpret similarity across cultural divides. Studies of ceramic chronology based on pottery classification have provided time scales for vessels in many regions across the world and these individual time scales allow archaeologists to compare aspects of ceramics between sites and regions. Ceramic studies have been fundamental in archaeological research as a primary chronological tool due to the sensitivity of pottery to reflect changes over time. Seriation being one of the most commonly employed methods for establishing chronologies is based on the premise that material culture changes predictably through time, and that it is possible to perceive changes in material culture over time by means of the comparative analysis of like units. Seriations are established by the analysis of presence or absence of diagnostic types or by comparison of the relative frequency of diagnostic types among assemblages. The chronological placement of ceramic types is done by cross-dating or comparing the pottery with already established collections from the neighboring sites or regions and based on the identification of similar looking ceramic types are assigned a relative temporal placement. In order to generate information about the chronology of a site, ceramics are

compared with pottery from the excavated sites in the area/ region with well-established chronological sequences in order to find or identify close parallels between the assemblages and to place the ceramics in a relative chronological time period.

Based on this premise the ceramics collected from the two sites were compared first to each other and later on with pottery from the excavated sites of Ahar, Balathal and other nearby sites in order to generate an idea about the chronological sequence of the two sites and to draw parallels between various ceramic types and sub-types present at the sites across the region. The following sections of the chapter will give an overview of the comparative analysis of the ceramic assemblage collected from the two sites in relation to each other and also with pottery from other excavated sites in the area, especially, Ahar and Balathal.

5.2. Ceramic Assemblage from Dholi Mangari and Maharaja Ki Kheri: A Comparison

Pottery collected from the two sites during the survey was classified and analyzed using by taking into account various attributes in order to derive maximum information from the assemblage. The purpose of classifying the ceramics was to draw parallels between the ceramic types from the two sites and to generate a tentative chronology for the two sites by comparing the pottery with already excavated sites in the region.

5.2.1. Ceramic Assemblage from Dholi Mangari

The ceramic assemblage collected during the survey at Dholi Mangari can be broadly grouped under two categories, i.e. oxidized (Red Ware) and Reduced (Grey Ware).The sherds grouped under these two categories were further divided into various ware types on the basis of the attributes they possess. The diagnostic assemblage from the site is dominated by Red Ware along with a small percentage of Grey Ware and a few sherds of Black and Red Ware. Majority of the diagnostic pottery from both red ware and grey ware are of medium to coarse fabric with both slipped and unslipped varieties, however, a very neglible percentage of sherds are of fine fabric with slipped or burnished surfaces. The pottery is largely wheel made, however, a small percentage of handmade sherds

(mainly oxidized) with coarse fabric are also present in the assemblage. Pottery is generally ill-fired or incompletely oxidized with a very small percentage of sherds having a perfectly oxidized or reduced core. A large number of sherds have abraded or worn-out surfaces, probably due to exposure to various natural and cultural factors. During the analysis, it was observed that the commonly used tempering material in the sherds is mica and sand, however, some sherds contained grit or grog in their clay body.

The different vessel types or forms in the assemblage can be categorized into jars, pots, bowls, basins, lids, dish-on-stand and so forth and exhibit different attributes and properties, which helps to divide the vessels into distinct types and sub-types. Apart from that a small number of decorated sherds bearing incised, applique, punctured or etched design. During the analysis it was found that there are no sherds with painted designs, graffiti's or stamped decorations in the assemblage.

The ceramic assemblage is dominated by unslipped red ware with medium to coarse fabric followed by slipped red ware variety with medium to coarse fabric. A small percentage of slipped and plain Grey ware sherds (12) with medium to coarse fabric were also collected from the site and were analyzed. Most of these sherds contain a good quality slip with smooth surfaces. However, a few sherds belong to the coarse variety. The pottery is generally wheel made with a perfectly reduced core. Some of the sherds contained mica particles in the clay body without any large inclusions. The Grey Ware sherds with coarse fabric were found containing inclusions such as chaff and grit in the clay body and are generally ill-fired. The grey ware assemblage at the site is represented by jars/pots, dishes, basins and bowls. From Dholi Mangari two sherds belonging to the Black and Red Ware category were also collected.

5.2.2. Ceramic Assemblage from Maharaja Ki Kheri

Just like Dholi Mangari, the ceramic assemblage from Maharaja Ki Kheri is dominated by Red ware with a good percentage of sherds belonging to Grey Ware categories. The pottery is largely wheel with a small percentage of sherds which are handmade. Sherds belonging to both oxidized category are generally ill-fired or incompletely oxidized with a good number of sherds having a perfectly oxidized core. In the Reduced category, sherds generally exhibit a good firing state, however a large number of sherds show

defects in firing techniques. The tempering material used is generally mica alongwith chaff/husk and other larger inclusions. A large number of oxidized sherds were found treated with a micaceous wash which gives a sherd a golden lusture or hue. A number of sherds were found in among the non-diagnostics with traces of scrapping and trimming on their surfaces alongwith a number of sherds with fire-clouds or smudged surfaces. There were also sherds with completely weathered or worn-out surfaces and encrusted surfaces. A very small percentage of sherds bearing designs were collected from the site during the survey. The sherds containing decorations on their surfaces belong to both oxidized and reduced ware types with majority of the shreds belonging to the red ware category alongwith a few specimens of Grey Ware as well. The designs were generally found on the external surface of the vessels and consist mainly of incised, punctured, Applique and incised, chevron, grooves, diamond patterns, combinations of zigzag and wavy incised lines and so forth. The diagnostic shapes comprise of jars, pots, basins, lids, bowls, and dishes of both red ware and grey ware.

The pottery assemblage from the two sites looks very similar to in terms of fabric and surface treatment, however there are several differences between the ceramic corpuses. At Dholi Mangari, the pottery is generally very porous and contains inclusions in the form of white grit, which is absent from Maharaja Ki Kheri. Similarly, the Black and Red Ware is completely absent from the assemblage at Maharaja Ki Kheri. An interesting thing to mention is that not a single diagnostic sherd with fine fabric was found at Maharaja Ki Kheri. The Diagnostic sherds from the two sites when compared to each other show a lot of dissimilarities in terms of vessel morphology. There is a lot of difference between some of the vessel forms present at the two site, however a few shapes are quite similar to each other with minor variations. The decorated sherds from the two sites also show a lot of variability as the designs present of the sherds exhibit differences.

5.2.3. Comparison of Pottery from the two sites with Excavated sites in the area.

As mentioned above, one of the most important aspects of the ceramics analysis was to get an idea or clarity about the occupational or chronological sequence at Dholi Mangari and Maharaja Ki Kheri. In order to do so an attempt was made to compare the ceramics

from the two sites with pottery from several important excavated sites in the region such as Ahar, Balathal, Gilund, Ojhiyana, Purani Marmi as well as with other sites such like Hastinapura, Sonkh, Nagda, and so forth. However, it was not possible to find parallels for all the sherds collected from the two sites. A comparative study of both diagnostic and decorated sherds from the two sites to a large extent helped to put these sherds in some chronological time frame.

A number of sherds from the two sites show close similarities with pottery from sites like Ahar and Balathal, however, majority of the sherds did not find any close parallels. The sherds which showed close affinities with the potteries from the above mentioned sites are as follows:

Sherds from Dholi Mangari

1. DM 1 is similar to T.57 and its variants of Period Ia from Ahar (Sankalia 1969: 62) and also to T 376 of Phase C2 from Balathal (Mishra 2008: 310).

2. DM 10 bears close resemblance with T 308 of Phase C1 from Balathal (Mishra 2008: 310).

3. DM 12 is similar to No. 23/24 (Fig. 20) from Balathal (Dandekar 2012: 315).

4. DM 18 is similar to T 57 d from Period 1a from Ahar (Sankalia1969: 62) and also to T 391b of Phase C2 from Balathal (Mishra 2008: 310).

5. DM 20 shows close similarities with T.22 (A1), T 66 and T 88 from Phase A2 at Balathal (Mishra 2008).

6. DM 21 shows close resemblance to T 68 of Phase A2 from Balathal (Mishra 2008: 268).

7. DM 22 resembles T 190 from Period Ib from Ahar (Sankalia 1969: 116) and also finds close similarities with T 323 of Phase C1 at Balathal (Mishra 2008: 300).

8. DM 23 is closer to T 462 and T491 of Phase C2 from Balathal (Mishra 2008)

9. DM 24 is similar to T 286 of Period IIc from Ahar (Sankalia 1969: 162).

10. DM 28 is closer to No. 23/24 (Fig. 20) from Balathal (Dandekar 2012: 315).

11. DM 34 resembles T 106 of Phase B from Balathal (Mishra 2008).

12. DM 36 resembles T 136 of Phase B from Balathal (Mishra 2008)

13. DM 39 finds a close variant in T 32a of Period Ia from Ahar (Sankalia 1969).

14. DM 4 is similar to T 79 of period Ia from Ahar (Sankalia) and also bears close resemblance with T 482 of Phase C2 from Balathal (Mishra 2008).

15. DM 40 is close to T 255a of Period IIa from Ahar (Sankalia 1969).

16. DM 41 is similar to T94 of Phase A2 from Balathal (Mishra 2008)

17. DM 42 looks similar to T 175 of Period Ib and T 20b/e/f of Period Ia from Ahar (Sankalia 1969).

18. DM 52 is close to T 518 of Phase C2 from Balathal (Mishra 2008).

19. DM 57 is similar to T 518 of Phase C2 from Balathal with minor variations (Mishra 2008).

20. DM 60 resembles T 287 of Period IIc and T 233 of Period IIa from Ahar (Sankalia 1969).

21. DM 61 is a variant of T 287 of Period IIc from Ahar (Sankalia 1969).

22. DM 62 resembles T 282 of Period IIb from Ahar (Sankalia 1969) and T 164 of Phase B from Balathal (Mishra 2008).

23. DM 64 resembles T 283 of period IIb from Ahar (Sankalia 1969) and T 41 of phase A1 from Balathal (Mishra 2008).

24. DM 66 is close to T111b of period Ib from Ahar (Sankalia 1969).

25. DM 67 is similar to T 20b of period Ia from Ahar ((Sankalia 1969).

26. DM 72 is similar to T 57 of period Ia from Ahar (Sankalia 1969) and also bears close resemblance with T233 a of Phase C1 from Balathal (Mishra 2008).

27. DM 77 is similar to T 127 of Phase B from Balathal (Mishra 2008).

28. DM 8 resembles T 102 of Period Ib from Ahar (Sankalia 1969) and T 259 of Phase C1 from Balathal (Mishra 2008).

29. DM 80 is close to T 52 of Period Ia from Ahar ((Sankalia 1969).

30. DM 86 bears close resemblance to T 232 of Phase C1 from Balathal (Mishra 2008).

31. DM 87 is close to T 78f of Period Ia from Ahar (Sankalia 1969).

32. DM 89 finds a close parallel in T532 of C2 from Balathal (Mishra 2008).

The following table lists the comparatives of pottery from Dholi Mangari:

Sherd No.	**Ahar Sankalia (1969)**	**Balathal Mishra (2008)**	**Others**
DM 1	T. 57 and variants(Fig. 25/ Ia)	T 376 (LXX/ C2)	
DM 10		T 308 (LV/ C1)	
DM 12			Dandekar 2012 (Fig. 20/ No. 23, 24: 315)
DM 13	T 57b (Fig. 25/ Ia)	T 240 (XLII/ C1)	
DM 14			Dibyopama 2015 (352, Fig. 5[2]:)
DM 18	T 57 d (Fig. 25/Ia)	T 391b (LXXI/ C2); T248 (XLIII/ C1)	
DM 20		T 22 (VII/ A1); T 66 (XVI/ A2); T 88 (XXII/ A2)	
DM 21		T 68 (XVII/ A2)	
DM 22	T 190 (Fig, 63/ Ib)	T 323 (LIX/ C1)	

DM 23		T 462 (LXXXI/ C2); T 491 (LXXXVI/ C2)	
DM 24	T 286 (Fig. 97/ IIC)		
DM 28			Dandekar 2012 (Fig. 20/ No. 23, 24: 315)
DM 34		T 106 (XXV/ B)	
DM 36		T 136 (XXXIV/ B)	
DM 39	T 32a (Fig. 14/ Ia)		
DM 4	T 79 (Fig. 31/ Ia)	T 482 (LXXXV/ C2)	
DM 40	T 255a (Fig. 91/ IIa)		
DM 41		T 94 (XXIII/ Ia)	
DM 42	T 175 (Fig. 59/ Ib); T 20b/e/f (Fig. 10/ Ia)		
DM 52		T 518 (XCI/ C2)	
DM 57		T 518 (XCI/ C2)	
DM 60	T 287 (Fig. 97/ IIc); T 233 ((Fig. 85/ IIa)		
DM 61	Variant of T 287 (Fig. 97/ IIc)		
DM 62	T 282 (Fig. 96/ IIb)	T 164 (XXXIV/ B)	
DM 64	T 283(Fig. 97/ IIc)	T 41 (X/ A1)	
DM 66	T 111b (Fig. 47/ Ib); T 198 (Fig. 75/ Ic); T 211a (Fig. 77/ Ic)		
DM 67	T 20 b (Fig. 10/ Ia)	T 22 (VII/ A1); T 40a (IX/ A1)	
DM 72	T. 57 (Fig. 25/ Ia)	T 233a (XLII/ C1)	
DM 77		T 127 (XXVIII/ B)	
DM 8	T 102 (Fig. 46/ Ib)	T 259 (XLV/ C1)	
DM 80	T 52 (Fig. 23/ Ia)	T 431 (LXXVI/ C2)	
DM 86		T 232 (XLII/ C1)	
DM 87	T 78f (Fig. 31/ Ia)		
DM 89		T 532 (XCIII/ C2)	
DM 43		T 518 (XCI/ C2)	

Table 5.1. Comparatives of diagnostic pottery from Dholi Mangari

Sherds from Maharaja Ki Kheri

A very less number of sherds from Maharaja Ki Kheri could find parallels in the pottery from excavated sites in the region.

1.MK 48 is similar to T 84 of period Ia from Ahar (Sankalia 1969) and T40 a of phase A1 from Balathal (Mishra 2008).

2.MK is close to T47 of period Ia from Ahar (Sankalia 1969) and T 450, 451 of phase C2 from Balathal (Mishra 2008).

3. MK 22 is close to T68b of phase A2 from Balathal (Mishra 2008).

4. MK 24 resembles No. 63/64 (Fig. 31) from Balathal (Dandekar 2012: 320).

5. MK 45 is close to No. 23/24 (Fig. 20) from Balathal (Dandekar: 315).

6. MK 53 is similar to Type XXXV of Period V from Hastinapura (Lal 1954-55: 81).

7. MK 37 is a variant of T53 of period IIa from Ahar (Sankalia 1969).

8. MK 17 finds a parallel in T462 of Phase C2 from Balathal (Mishra 2008).

9. MK 2 resembles Type XI of Period V from Hastinapura (Lal 1954-55: 77).

10. Mk 48 finds a parallel in Type V.48 of Period V from Sonkh (Hartel 1993).

Apart from the diagnostic sherds a number of decorated sherds bear close resemblance with the decorated sherds from Ahar and Balathal. If we look at the chronological dates of Balathal and Ahar, Period I at Ahar dates to 1940 – 1270 BCE and Period II is dated to 3rd Century BCE to late Medieval. Similarly at Balathal Pd. I belongs to chalcolithic and Pd. II has been dated as Early Historic.

Sherd No.	**Ahar (Sankalia 1969)**	**Balathal (Mishra 2008)**	**Others**
MK 48	T 84 (Fig. 33/ Ia)	T 40a (IX/ A1)	
MK 9	T 47 (Fig. 18/ Ia)	T 450, 451 (LXXIX/ C2)	
MK 52			
MK 22		T 68b (XVII/ A2)	
MK 24			Dandekar 2012 : 320 (No. 63, 64; Fig. 31)

MK 45			Dandekar 2012 (No. 23, 24; Fig. 20)
MK 53			Type XXXV (Hastinapura, Fig. 28/ V)
MK 57			
MK 46			
MK 4	T 226b (Fig. 81/ Ic)	T 63a (XV/ A2)	
MK 33	T 80 (Fig. 32/ Ia)	T 321a (LIX/ C1)	
MK 19		T 462 (LXXXI/ C2) T 482 (LXXXV/ C2)	
MK 54	T 225a (Fig. 91/ IIa)	T 556 (XCV)/ C2	Dandekar 2012 (No. 23; Fig. 20)
MK 37	Variant of T 253 (Fig. 90/I Ia)		
MK 14			Variant of No 24 (Dandekar; Fig. 20)
MK 16			Variant of No. 23 (Dandekar 2012 Fig. 20)
MK 17		T 462 (LXXXI/ C2)	
MK 2			Type XI (Hastinapura, Fig. 26/ V)
MK 48			Type V.48 (Sonkh/ V)

Table 5.2. Comparatives of Diagnostic sherds from Maharaja Ki Kheri

Majority of the sherds from both Dholi Mangari and Maharaja Ki Kheri find close parallels with the ceramics from chalcolithic levels at Ahar and Balathal with minor variations, however, it is important to mention that the typical Ahar culture pottery is missing from the two sites, such as Black and Red Ware. Grey Ware with applique and incised or fingertip design belonging to the Early Historic levels period at Balathal is present in the ceramic assemblage of both the sites. Similarly lustrous redware with golden hue is also present at both the sites. However, reserved slip ware, Painted BRW, rusticated ware is absent from both the sites.

On the basis of this comparative analysis, a tentative occupational sequence for the two sites can be established as having some affinities with the chalcolithic and Early Historic settlements in the region as well as habitations from the later periods as well. However,

one has to keep in mind that the data sets used in the present study present various obstacles for drawing comprehensive archaeological interpretations and for establishing the occupational sequences at the sites. The reason being that the ceramic assemblages for both the sites were recovered through surface survey and lack the provenience or contextual information normally obtained from excavations. The lack of stratigraphic information can result in materials representing thousands of years of occupation being mixed together on the surface making it very difficult to sort out distinct archaeological assemblages. The materials collected from both the sites represent a palimpsest of occupations and it is highly problematic to discern a discrete occupational sequence for the sites. For unstratified contexts it is sometimes very difficult to figure out whether different ware types found at one site represent co-occupation and interaction or separate periods of occupation.

5.3. Summary of the Chapters

The introductory chapter begins by stating the aims and objectives of the current study. It then goes on to explore the types of archaeological surveys that were undertaken in India and then moving on to focus specifically on those conducted in Rajasthan. Since this thesis is centred on a comparative ceramic study, a brief but not exhaustive discussion on ceramic studies has also been included in the chapter.

Chapter two is based on the preliminary survey conducted in and around the city of Udaipur. In this village to village reconnaissance, we tried locating as many documented sites of Ahar culture as possible. However, with limited time and resources, we managed to locate six sites as well with some help located two archaeological sites which were not on the list of sites enumerated by several archaeologists such as V.N.Misra and Anup Mishra. The archaeological sites, Dharauli, Fachar, Tarawat, Iswal, Balathal, Bedla and Dharta share something in common. All of them are victims of rapid development and are fast losing their entity as archaeological sites. No proper signage or as in the case of Balathal a rusted old board indicate the lack of initiative on the part of the concerned authorities to protect or promote these sites.

Chapter three, deals with the systematic survey of the archaeological site of Dholi Mangari and its results. The chapter has been divided into two parts. The first part gives a detailed account of the site, the survey and sampling method adopted. Due to the undulating topography and vegetation growing at the mound of Dholi Mangari transects were laid in order to cover as much area under survey as possible. Care was also taken while pacing the transects so, that the space between the survey crew members was not too huge or small in order to cover achieve maximum coverage and make collections from the sampling units. The second part deals with the analysis of the pottery collected during the survey along with the drawings of the ceramics analyzed. Inclusions, temper, firing, shape of the vessel of each potsherd was documented.

Chapter four deals with the systematic survey of the archaeological site Maharaja Ki Kheri and its results. The chapter follows the same rationale of the previous chapter i.e. chapter three. The chapter has been divided into two parts. The first part gives a detailed account of the site, the survey and sampling method adopted. The second part deals with the ceramic analysis of the potsherds collected during the survey. On the basis of colour, surface treatment fabric, rim orifice diameter, profile drawing an understanding of the ceramic assemblage from the site is brought forth in the chapter.

Time and resources restricted this study to small area. As was discussed in chapter two, due to rapid population growth and construction activity a number of archaeological sites are simply disappearing. Surface surveys which do not require a lot of manpower or resources can surely document these sites. Furthermore such surveys can provide us with a plethora of information about sites which are not as large as Ahar or Balathal or do not have huge cultural deposits. In terms of the ceramic study, one can further look in to the technological and production aspects of the ceramic samples found from both the sides. An ethno archaeological study of the modern day potters plying their trade in the Mavli district can provide a small window in to the technological or manufacturing aspects of adding temper, firing conditions etc. as well as perhaps the cultural aspects of the designs and application of wash or slip on pots.

Appendix I. Ahar culture sites in Udaipur district

Site Name and Co-ordinates	District/River	Cultural Assemblage	References
Ahar 24° 35' N: 74°44 E'	Udaipur/ Ahar	Microliths (Blades, Fluted cores), White painted Black and Red ware	*IAR 1954-55:14-15, IAR 55-56:11, IAR 61-62:45-50*
Darauli	Udaipur/ Berach	Chalcolithic and Black and Red Ware,	***IAR 1956-57:8***
Fachar 24° 38N 73° 58'E	Udaipur/ Berach	Black and Red ware , Microliths	***IAR 1956-57 :8***
Joera 24° 44' ; 74° 07	Udaipur/ Ahar	Black and Red Ware and Microliths,	***IAR 1956-57:8***
Sialpura 24° 40 N 73° 41'E	Udaipur /Ahar	Black and Red Ware and Microliths,	***IAR 1956-57:8***
Tarawat 24° 42' N; 74° 06'E	Udaipur/Berach	BRW, micros,	***IAR 1956-57:8***
Balathal 24° 43'N. 74° 01'E	Udaipur/ Berach	Ahar culture and Iron Age	***IAR 1993-94:93-97, IAR 1995-96:64-70,IAR 1996-97:90-100,IAR 1997-98: 145-153, Misra et al. 1995, 1997.***
Goga Thala 25° 04'N; 74° 03'E	Udaipur/Banas	Black and Red Ware and Microliths,	***IAR 1957-58: 44-45.***
Kotharia 24° 57' N; 73°03'E	Udaipur/Banas	Black and Red Ware	***IAR 1957-58:44-45***
Mangas 25° 04'N; 74° 13'E	Udaipur/Banas	Black and Red Ware	***IAR 1957-58:44-45***
Bespur 24° 12'N; 73° 13'E	Udaipur/Gomti	Black and Red Ware	***IAR 1979-80: 65***
Jhadol	Udaipur/Gomati/Tidi	Black and Red Ware,	***IAR 1979-80:65, Agrawala 1981:62***
Toraniya	Udaipur/Gomti	Black and Red Ware	***IAR 1979-80: 65***
Utpuriya	Udaipur/Gomti	Black and Red Ware	***IAR 1979-80: 65***
Kheri 24°'38 N;73° 56'E	Udaipur/Katara Nadi	Painted Black and Red Ware	***IAR 1962-63:19***
Rupawali 24°41' N;74° 13´ E	Udaipur/Berach		***IAR 1962-63:18***
Deopore /Depura	Udaipur/Som	Black and Red Ware	***IAR 1979-80:65***

Appendix I. Ahar culture sites in Udaipur district

Bedla	Udaipur/Ahar		***IAR 1997-98:54***
Devki Doonak 24° 51'N; 73° 54' E	Udaipur		**Misra 2007:367**
Juni Kochhli 24° 57' N; 73° 57′ E	Udaipur/Banas		**Hooja 1988**
Kalyanpur 24° 00′N, 73°45' E	Udaipur/Gomti		**Hooja 1988**
Karanpur 24° 39'N; 73°57'E	Udaipur/Katara Nadi		**Hooja 1988**
Menar 24° 37' N; 74° 07' E	Udaipur/Berach		**Hooja 1988**
Thepsthal	Udaipur/Sabarmati		**Hooja 1988**
Bamanhera 24° 59′ N; 73° 53'E	Udaipur/Banas		**Hooja 1988**

Appendix II. Distribution chart of Diagnostic sherds, Dholi Mangari

Transect	O1M	O2M	O3M	O1C	O2C	O2F	R1M	R2M	R3M	R1C	R2C	O3F/R3F	Total
1		1	1										2
2	1	2	1			1							4
3	3	1											4
4	1								1				2
5					1								1
6	6	1					1						8
7	2	1											3
8		1		1							1		3
9	2	1											3
10	2			1	1								4
11	1			2									3
12													
13													
14													
15													
16													
17													
18													
19													
20	2												2
21		1							1		1		3
22													
23													
24													
25													
26													
27													
28	1	2											3
29													
30	7	4	2									1	14
31	2	5		1				4		1	1		14
32	1	3	1	1								1	7
33		1					1						2
Total	30	24	5	6	2	1	2	4	2	1	3	2	104

Appendix III. Distribution chart of Non Diagnostic sherds, Dholi Mangari

Transect	O1M	O2M	O1C	O2C	O1F	O2F	R1M	O3F/R3F	R3F	Total
1	11	2				2	1	1		17
2	9	5					1		1	16
3	10		1				4			15
4	15									15
5	5	1								6
6	18	3	3							24
7	10	3	3							16
8										
9	11		1			1				13
10	4	1								5
11	4	1	4							9
12	2									2
13										
14										
15	2		1							3
16										
17										
18										
19		2					1			3
20	10	4	3				2			19
21	8	4	7							19
22										
23										
24										
25										
26										
27										
28	8	2	2	1				1		14
29										
30	4	3								7
31					1	2				3
32										
33										
Total	131	31	25	1	1	5	9	2	1	206

Appendix IV. Distribution chart of Diagnostic sherds, Maharaja Ki Kheri

Transect	O1M	O2M	O1C	O2C	R1M	R2M	R1C	Total
1								
2								
3								
4	1	2	1					4
5								
6								
7		2						2
8		3				1		4
9	6	3			1	1		11
10	4	5			1	1		11
11	8	4	2		1	1		16
12	2	2				3		7
13	3	4	2			1		10
14	1				2			3
15		2						2
16	2							2
17	1					1		2
18	1						1	2
19								
20								
21		2		1		1		4
22								
23								
24								
25								
Total	29	32	5	1	5	10	1	80

Appendix V. Distribution chart of Non Diagnostic sherds, Maharaja Ki Kheri

Transect	O1M	O2M	O3M	O1C	O2C	O2F	R1M	R2M	R3M	R1C	R2C	Total
1												
2	2											
3	8	10		2								
4	3	4								4		
5	4	13					2	3	1			
6	7	2	2	1	4					1	4	
7	1	6					7	12	1	1		
8	7	8	10		6	1	1			2	2	
9	15							3	2	3		
10	23	25	8	2		2	8	14		4	7	
11	16	4				3	2	16	3	10		
12	26	8	7		1					3		
13	26	9					1	8		4	9	
14	24	13	4	4	5	3	12	4	2	6		
15	30		6			1	2	1	1		1	
16	15			1		3	3	2	1	2		
17	3				3	2	4	3	1	1		
18	6	12		1		2	2			1	2	
19	1	1		1		1				1	1	
20	1			1						1		
21												
22												
23												
24												
25	218	118	37	13	19	16	44	66	12	44	26	

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